

# LONG LIFE FOR THE ALLISON AUTOMATIC TRANSMISSION

PROPER CARE AND FEEDING OF THE MOST POPULAR AUTOMATIC TRANSMISSION COUPLED WITH DIESEL-POWERED MOTORHOMES SHOULD LEAD TO MANY TROUBLE-FREE MILES

If you've ever had an automatic automatic transmission fail in your motorhome, then you are familiar with the meaning of the word "expensive." Rebuilding an automatic transmission is costly, with repairs starting around \$1,500 and ranging upward of \$3,000 or higher if a complete rebuild or replacement is necessary. Furthermore, since Murphy's Law is ever-present in our universe (it is in mine, at least), odds are if your transmission fails, it will do so while you are on the road, adding to the overall cost with towing charges and motels, plus ruining your trip. In addition, the area where you break down may not have an authorised Allison transmission shop nearby, which can mean additional time and expense to ship the tranny to a factory-trained repair specialist. But it doesn't have to be that way; the automatic transmission in your motorhome is designed to last the life of the vehicle, and it will – if you take care of it.

Taking proper care of the Allison (or any other automatic) transmission is relatively straightforward, which makes it difficult to understand why it is so often neglected. Simply checking the transmission fluid level on a regular basis (daily while travelling), topping up as needed, and getting regular fluid and filter changes will, in most cases, keep the transmission trouble-free.

"The lifeblood of an automatic is the fluid," said Keith Duner, F314025, Allison Transmission Service Technology Support Group manager. "It not only lubricates the internal workings, but it helps keep internal operating temperatures low by carrying away

heat, which is exchanged at the transmission cooler. Additionally, the transmission fluid passes power through to the convertor, carries dirt and contaminants away through the filter, and it affects clamp load on clutch plates, allowing different power flows through the planetary gear set. Regular fluid checks are absolutely vital for maintaining a healthy transmission."

According to Mr. Duner, Allison transmission fluid can be checked manually or electronically (some models). If you check the fluid manually, he noted that it is important to refer to the owners manual to determine which dipstick marks are appropriate for your transmission. The transmission dipstick may be supplied by Allison or by the motor-home manufacturer. These can be used in a variety of transmissions, so knowing which marks are correct for the unit in your coach is extremely important.

On 3000 and 4000 series Allisons, an optional feature allows one to check transmission fluid levels by using the arrows on the shift selector. Turn the key to the ignition position and push the up/down arrows once to activate the oil level sensor. The up/down arrows also can be used to check the general condition of the transmission. Simply push the arrows twice to enter the diagnostic mode, and the unit will display up to five troubleshooting codes that pinpoint problems in the hydraulic, electronic, or mechanical systems. This is an exceptionally valuable feature for roadside breakdowns, since you can tell the service technician the trouble code over the phone, which may allow the technician to get you rolling again without the necessity of a tow.

## CHECK IT MANUALLY

Although an electronic check of fluid levels greatly enhances convenience, making daily on-the-road checks a breeze, it is not a substitute for getting your hands dirty. Make it a practice to manually check the level at least once every couple of weeks, so you can monitor the fluid condition. Look for discoloration in the fluid and check for odors. Brown fluid and a burnt smell indicate overheating problems that need immediate attention, as does finding grit and/or metal shavings. Also keep an eye out for coolant or other moisture mixed in with the transmission fluid. It sounds weird, but coolant can sometimes get into the transmission as the mechanical systems age (usually through a faulty transmission cooler pipe). It turns into steam in the transmission and can have a disastrous effect on the clutch pads. If you find coolant traces on the dipstick, a fluid analysis kit (part number 29537805) that can help to determine the severity of the problem is available at any authorised Allison repair facility. Unlike engine oil levels, which are checked while the engine is cold, automatic transmission fluid levels are best checked when the transmission has reached operating temperature. Drive your motorhome around for about 15 minutes to bring the transmission up to temperature. Then park the vehicle on as level a surface as possible, set the brake, and put the transmission selector into "park." Leave the engine running. Now pull the dipstick, wipe it clean, and reinsert it. The level should be between the "ADD" and "FULL" marks (check the owners manual for appropriate marks). If the fluid level is low, top up with the recommended fluid. Mr. Duner said that Allison-approved fluid types include

**ALLISON DOES NOT RECOMMEND THE USE OF SUPPLEMENTAL ADDITIVES IN THE TRANSMISSION FLUID**

Dexron, C-4, and TES-295 (synthetic), as well as Allison's own TranSynd (formulated by Castrol). He recommended checking with your dealer or the Allison Web site ([www.allisontransmission.com](http://www.allisontransmission.com)) for more information.

Some brands of automatic transmission fluid may be labelled "Meets the Allison C-4 specification" or "Meets the GM Dexron III specification." Be aware that any fluid that meets these specifications will have either an Allison C-4 specification number or a GM Dexron III specification number listed after the statement. If there is no specification number, the fluid is not recommended by Allison even though it may be the same type and weight as the OEM-specified fluid. For long-term transmission reliability, always check that the fluid you top up with has the specification number listed on the label.

It is also important to note that Allison does not recommend the use of supplemental additives in the transmission fluid. Supplemental additives are marketed with the purpose of altering frictional, antiwear, and oxidation properties of the OEM-recommended transmission fluid. Use them in your 1972 Torino, but never put them in your Allison transmission, as they will do exactly as advertised and affect the frictional, antiwear, and oxidation properties of the OEM-specified fluid, to the detriment of the transmission.

**HEAT IS THE ENEMY**

Most transmission experts agree that one of the primary causes of automatic transmission failure is overheated fluid. Typical operating temperatures for Allison transmissions are in the 160-degree to 200-degree Fahrenheit range. Anything other than light-duty use can push up temperatures well beyond this. Under heavy use/load conditions, such as when going up a mountain fully laden or when towing heavy loads, fluid temperatures can dramatically increase, reaching 300 degrees Fahrenheit or higher. Some transmission fluid begins to break down at temperatures in excess of 200

degrees Fahrenheit, and in the case of extended vehicle operation with the sump temperature at or above the maximum of 300 degrees Fahrenheit, transmission damage can occur. Every 20-degree-Fahrenheit rise in fluid temperature above the 175-degree Fahrenheit mark means a 50 percent decrease in the fluid life, and it doesn't take long to cook a tranny ó just ask anyone who has tried driving an overloaded RV up the Grapevine in California during summer.

Short (emphasise short) burst temperature spikes of even 300 degrees Fahrenheit or a little higher aren't a problem as long as you have a good transmission cooler and the duration of operation at these spikes is very brief. However, prolonged operation at high temperature will damage seals and internal parts. If you notice transmission fluid temperatures rising and staying high, pull over to the side of the road. Set the brake, put the selector in "park," and let the engine idle until the transmission cools down.

Keeping transmission temperatures down is vital to maintaining transmission health. It is important, therefore, that in addition to keeping the transmission cooler in good condition, an accurate transmission temperature gauge is installed. Almost all newer motorhomes come with one as part of the original equipment, but older units may not be so equipped. If your motorhome is without a transmission temperature gauge, have one installed immediately and keep an eye on it while travelling ó especially when heavily laden, towing, or operating the coach under high-temperature weather conditions (such as when crossing Death Valley in the summer). The installation of a larger or a secondary transmission cooler is probably a wise idea if you generally operate under these conditions.

If you notice continual high operating temperatures during all driving conditions, odds are the problem is in the transmission and cooling system and is probably caused by one of the following:

**MOST TRANSMISSION EXPERTS AGREE THAT ONE OF THE PRIMARY CAUSES OF AUTOMATIC TRANSMISSION FAILURE IS OVERHEATED FLUID**

aerated transmission fluid, constricted/ damaged cooler line, damaged/broken converter, or an internal leak.

Before taking the RV into the shop, however, check the fluid level. Improper fluid levels can cause aeration; you may have a leak caused by a defective seal at the intake tube. The other problems will require a trip to the service bay, but don't despair just yet. You may only need to have the cooling lines cleaned or replaced. Internal problems will cost you, but have them checked out right away. Even a moderately expensive repair is better and less costly than a complete rebuild or replacement.

**SERVICE**

Allison transmissions are generally known for their trouble-free reliability and long life. Bulletproof operation, however, doesn't come without regular service, and if you ignore the factory recommended service intervals, you do so at your own peril and to the detriment of your bank account.

Fluid and filter change intervals for your specific transmission are outlined in the operator's manual or other transmission-specific information supplied by the motorhome manufacturer. (They are also listed on the Allison Web site and are available from the dealer.) Of all the intervals listed in this information, the first service is the most important, ridding the transmission of minute manufacturing debris and impurities that might otherwise damage the unit.

As a general rule, the main filter should be changed at break-in (5,000 miles) and every 25,000 miles or 12 months thereafter, whichever comes first, with Dexron III fluid and filters in the 3000/4000 series. In the 1000/2000 series, changes should occur at 50,000 miles or 24 months for fluid and filter with Dexron III. In the 1000/2000 series, if you're using TES 295-approved fluid, change the filter at 50,000 miles or 24 months; fluid at 100,000 miles or 48 months. In the 3000/4000 series (with the 4-inch control module), if you're using TES 295-approved fluid, change the filter at 75,000 miles or 36 months; fluid at 150,000 miles or 48 months. On the 4000 series with TES 295-approved fluid and the 2-inch control module or transmission retarder, change filters and fluid at 50,000 miles or 24 months.

If the vehicle is used infrequently, shortened maintenance schedules may apply, as condensation and other impurities that can damage the transmission may collect over time in

the fluid, building up to unhealthy levels. Regular operation of the vehicle gets the operating temperatures up so that moisture in the fluid "boils off" and remains at nominal levels. It is a good idea, therefore, that vehicles in long-term storage get a day run once in awhile to keep the engine, transmission, and drive-train properly lubricated. Likewise, if the vehicle spends a lot of time on dirt roads or in dusty environments, more frequent service of the transmission is important. The Allison Web site has a handy fluid and filter change interval calculator to help owners through these interval questions.

The only time you'll have to flush the cooler is at transmission failure, and then it should only be done at an Allison distributor.

### TROUBLE SPOTS

I've already discussed the importance of performing regular fluid checks, topping up with the correct fluid, and getting scheduled fluid/filter changes. There are, however, other things to keep an eye on to assure reliable operation. A vital area is a regular leak inspection. Unlike the transmission in the family car, which can operate quite nicely with even a sizable leak as long as the transmission is regularly topped up, the Allison transmission is designed never to leak. Any leakage of fluid from the transmission must be considered serious, and a slow leak is worse than a catastrophic one. If the transmission has a slow leak, aeration and overheating can occur, which lead to damaged internal parts and a costly rebuild. During a catastrophic fluid failure, however, all the fluid quickly exits the transmission and the unit will not function; thus, the cost of a complete rebuild is averted.

Check for fluid leaks by looking for telltale signs of transmission fluid on the casing and on the drivetrain and chassis behind the unit. You also can place a large piece of news or butcher paper under the transmission while the vehicle is parked to catch drips. Another thing to look for is a defective seal at the intake tube (discussed earlier). Regular fluid checks are a great way to monitor fluid usage. If you find that the unit continually needs topping up, you've got a leak somewhere; all you have to do is find it.

Other things that can affect transmission reliability include out-of-adjust-ment shift linkage (especially on older units), worn or abraded wiring, and cracked or broken connectors. Don't forget the modern Allison automatic is an

**THE ALLISON TRANSMISSION IS DESIGNED NEVER TO LEAK. ANY LEAKAGE OF FLUID FROM THE TRANSMISSION MUST BE CONSIDERED SERIOUS, AND A SLOW LEAK IS WORSE THAN A CATASTROPHIC ONE**

electronically controlled unit and any kind of short or poor connection can affect the computer's ability to keep the transmission functioning properly.

When towing or pushing an Allison-equipped vehicle, the transmission's outputs must be disconnected regardless of the distance or speed travelled. Because of this, it is imperative to realign the U-joints before driving, or vibrations can occur that will make your ride uncomfortable while it also damages your transmission.

### DRIVING TIPS

Most people don't think about it much, but the way you drive your coach can have a real effect on the life of the transmission. One common practice that really shortens transmission life is shifting from "drive" to "reverse" or "park" while the vehicle is still rolling. Even the slightest creeping movement is too much. Always make sure the vehicle has come to a complete stop before shifting from "drive" to "reverse" or "park." In fact, after you come to a complete stop, keep your foot on the brake, then feed the selector into "neutral" for a second to unload the transmission before putting it into "reverse" or "park." Most newer electronically controlled Allison transmissions have integrated shift inhibitors that prevent high-speed neutral to range engagement

Another common practice is to park the vehicle without using the parking brake. This is especially bad when the vehicle is parked on even the slightest slope; it puts all the motorhome's weight on a small catch in the transmission, adding damaging stress to the unit. Even when parking on level ground, always make it a practice to set the parking brake. Set the parking brake while your foot is still on the brake pedal and before you shift from "drive" into "park." This keeps the vehicle from weight

loading the transmission.

Improper use of cruise control can also lead to transmission problems. Cruise control is essentially designed to keep a vehicle at a fixed speed while it is travelling over generally level roads. It is not intended to be used while driving up or down steep hills, though it can be useful when climbing long, gentle . grades. Upgrades can be taxing on a vehicle; it's important to control your shifting so your vehicle does not overheat. Trying to keep a preset highway speed up a steep grade through use of cruise control can lead to overheating of the engine and transmission. Turn off the cruise on steep grades and make sure your vehicle is in the proper gear for optimum power and internal cooling. Modern computer-controlled automatics are designed to keep the vehicle in the right gear for conditions at all times. Older, noncomputerized units aren't quite as efficient and manual adjustment of gears may be necessary in order to maintain the best power range.

The transmission in your motorhome is designed to perform efficiently within the maximums set forth by the vehicle's gross vehicle weight rating (GVWR) and gross combination weight rating (GCWR). Don't overload your motorhome with too much gear or by towing too heavy a trailer or vehicle. Doing so puts an enormous strain on the engine, transmission, drivetrain, chassis, suspension, tires, and brakes. It can lead to unsafe operating conditions as well as expensive repairs.

### SUMMARY

If properly used and maintained, the Allison transmission in your motorhome will provide you with many thousands and thousands of trouble-free miles. These units operate efficiently, smoothly, and silently. Hard and rough gear shifts, sliding shifts, noisy operation, vibrations, and other user-noticeable operational oddities mean that servicing is needed by a certified Allison transmission specialist.

This article has hit only the obvious points of user service and operation. It is not intended to be a training or repair manual. However, if you follow the information laid out here, odds are you'll never have any transmission trouble. More detailed information is available from Allison's Web site (. com) and from your Allison transmission specialist. I encourage you to learn as much as possible about the Allison unit in your motorhome.