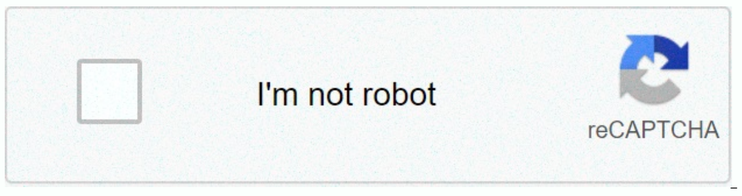

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Nissan xterra manual transmission problems

If you drive a stick-shifting car, then you may have several issues floating in your head. How the funny pattern H that I move this shift button through have a relationship with the gears inside the transmission? What moves inside the transmission when I move the shifter? Advertising When I spoil and hear this horrible grinding noise, what is actually grinding? What would happen if I accidentally reversed while speeding down the highway? Would the whole transmission explode? In this article, we will answer all these questions and even more as we explore the inside of a manual transmission. Cars need transmissions because of the physics of the gasoline engine. First of all, any engine has a red line — a maximum rev value above which the engine cannot go without exploding. Second, if you've read How Horsepower Works, then you know that the engines have narrow ranges of speed where power and torque are at their maximum. For example, an engine can produce its maximum power at 5,500 rpm. The transmission allows the gear ratio between the engine and the drive wheels to change as the car accelerates and slows down. You move the speeds so that the engine can stay below the red line and close to the rev strip of its best performance. Ideally, the transmission would be so flexible in its gears that the engine could still operate at its unique rev value and best performance. This is the idea behind continuous variation transmission (CVT). Then we'll talk about it. Content A continuously variable transmission (CVT) has an almost infinite range of speed ratios. In the past, MCTs could not compete with four-speed and five-speed transmissions in terms of cost, size and reliability, so you wouldn't see them in production cars. Today, design improvements have made MCTs more common. The transmission is connected to the engine by the clutch. The transmission input shaft therefore rotates at the same speed as the engine, which improves both output power and fuel economy. TMCs have become commonplace in hybrid cars because they are much more efficient than manual and traditional automatic transmissions, and their popularity has skyrocketed from there, with automakers competing for the best possible fuel economy ratings. At the end of 2016, one in four cars sold in the United States was equipped with a CVT. The CVT has its drawbacks; in particular, it can be slow to drive, It is designed for efficiency rather than pleasure. However, as many drivers choose to move away from manual transmission, resulting in fewer manuals available, the CVT continues to increase its presence. The CVT also works best in small cars with small engines, which is why most trucks and large SUVs continue to use traditional automatics. You can read How CTV Works for even more information on how continuously variable transmissions work Now let's look at a simple transmission. To understand the basic idea behind a standard transmission, the diagram on the left shows a very simple two-speed transmission in neutral. Let's look at each part of this diagram to understand how they fit together: the green shaft comes from the engine through the clutch. The green tree and the green gear are connected in one unit. (The clutch is a device that allows you to connect and disconnect the engine and transmission.) When you push into the clutch pedal, the engine and transmission are disconnected so that the engine can work even if the car is stationary. When you release the clutch pedal, the engine and green shaft are directly connected to each other. The green shaft and train run at the same speed as the engine. The red tree and gears are called the shape shaft. These are also connected as a single piece, so that all gears on the laying shaft and the layshaft turn itself as a single unit. The green and red trees are directly connected by their felted gears so that if the green tree turns, the same goes for the red tree. In this way, the shape shaft receives its power directly from the engine each time the clutch is engaged. The yellow tree is a spun tree that connects directly to the drive shaft through the car's drive differential. If the wheels turn, the yellow shaft rotates. The blue gears roll over the bearings, so that they rotate on the yellow shaft. If the engine is off, but the car is at the coast, the yellow shaft can rotate inside the blue gears while the blue gears and the laying shaft are stationary. The purpose of the collar is to connect one of the two blue gears to the yellow drive shaft. The collar is connected, by the splines, directly to the yellow tree and rotates with the yellow tree. However, the collar may slide left or right along the yellow shaft to engage either of the blue gears. The teeth on the collar, called dog teeth, fit into holes on the sides of the blue gears to engage them. Let's see what happens when you move to the first gear. Advertising The image on the left shows how, when moved at first speed, the purple collar engages the blue gear to its right. As the graph shows, the green shaft of the engine rotates the layshaft shaft, which turns the blue gear to its right. This machine transmits its energy through the pass to drive the yellow drive shaft. Meanwhile, the blue gear on the left rotates, but it is freewheeling on its bearing so it has no effect on the yellow shaft. When the collar is between the two (as shown in the figure on the previous page), the transmission is neutral. The two blue gears freewheel on the yellow shaft at different speeds controlled by their ratios with the lay tree. Advertising From this discussion, you can answer several questions: when you make a mistake by changing and hearing Horrible grinding noise, you don't hear the sound of speed teeth badly meshing. As you can see in these diagrams, all gear teeth are all fully enseboded at all times. Crushing is the sound of dog teeth trying unsuccessfully to engage holes in the side of a blue contraption. The transmission shown here has no synchros (discussed later in the article), so if you used this transmission, you would have dual-clutch. Double clutch was common in older cars and is still common in some modern racing cars. In a dual clutch, you first push the clutch pedal once to disengage the transmission engine. This removes the pressure from the dog teeth so that you can move the collar to neutral. Then you release the clutch pedal and return the engine to the right speed. The right speed is the speed value at which the engine must operate in the next gear. The idea is to get the blue equipment from the next equipment and the collar rotating at the same speed so that the dog teeth can engage. Then you push the clutch pedal again and lock the collar into the new gear. With each gear change, you must press and release the clutch twice, hence the name double clutch. You can also see how a small linear motion in the gear change button allows you to change gears. The gear change button moves a rod connected to the fork. The fork slides the collar over the yellow shaft to engage one of the two gears. In the next section, let's take a look at a real transmission. Four-speed manual transmissions are far outpaced, with five- and six-speed transmissions taking their place as the most common options. Some performance cars can offer even more gears. However, they all work more or less the same way, regardless of the number of gears. Internally, it looks like this: There are three forks controlled by three rods that are engaged by the gear lever. Looking at the shift rods from the top, they look like this upside down, first and second gear: Advertisement Keep in mind that the shift lever has a rotation point in the middle. When you push the button forward to engage the first gear, you are actually pulling the rod and fork for the first train back. You can see that when you move the shifter left and right, you engage different forks (and therefore different collars). Moving the button forward and backwards moves the collar to engage one of the gears. The reverse speed is manipulated by a inactive (violet) contraption. At all times, the blue reverse speed in this diagram above rotates in an opposite direction to all other blue gears. Therefore, it would be impossible to throw the transmission in reverse while the car is moving; dog teeth would never engage. However, they will make a lot of noise. Manual transmissions synchronisors in modern passenger cars use synchronizers, or synchros, to eliminate the need for dual clutch. The aim of a synchro is to the collar and gear to make frictional contact before the dog's teeth come into contact. This allows the collar and gear to synchronize their speed before the teeth need to engage, like this: the blue gear cone fits into the cone-shaped area in the neck, and friction between the cone and the collar synchronizes the collar and gear. The outer part of the collar then slides so that the dog teeth can engage the machine. Each manufacturer implements transmissions and synchros in different ways, but that's the general idea. Automated manual transmission is perhaps better known and described more accurately as the dual-clutch automatic, and it is an increasingly popular option. Although dual-clutch automatic transmission has become popular on high-end performance cars, such as Porsches and Audis, it is increasingly available on larger models. The dual-clutch automatic works via two clutches, which are controlled by the car's computer network and require no input from the driver. As we discussed, when the clutch of a manual transmission is engaged, it disconnects the engine from the transmission to allow movement. The dual-clutch automatic works two different speeds at a time, which completes the change while bypassing the power disconnection step. This allows a dual-clutch transmission to complete the shifts much faster, as there is no pause as the engine and transmission attempt to match the back. Advertising The car is faster because there is no power interruption, the ride is more fluid because it is almost impossible to identify the time of the gear change, and the fuel economy is better because there is no power lost due to inefficient changes. You can read more about dual-clutch transmissions. It should be noted that some cars with dual-clutch automatics offer manual mode of movement, usually via steering wheel-mounted gear levers, but the experience is not the same. Some performance enthusiasts may bemoan the loss of the row-it-yourself experience, since manual travel is a pleasant and perfect skill, but if speed is the ultimate goal, it's hard to argue with the results of an automated manual transmission. At the end of 2016, only 5% of new vehicles were sold with manual transmissions, according to U.S. World Report news. That is down from a peak of about 25 per cent in 1987. Even if you are one of the few car buyers who driving a manual, you'll have a hard time finding one the next time you go to a dealership. Some manufacturers keep the manual around as an excuse to charge more for an automatic or CVT, but the flip side is that it's hard to get a well-equipped car with a manual transmission. If you want options such as engine upgrades or all-wheel drive, these features are often only available on models or trim levels that do not offer manual transmissions. Sports cars, which to be foolproof ways to get manual transmissions, also turn to faster and more efficient automatic options. Advertising Automakers say that automatic transmissions are simply better in every way, especially the CVT and the dual-clutch options we've covered on previous pages. The real interest in owning a car with a manual transmission is on the decline, as well, especially as American drivers spend more time sitting in heavy traffic, where constantly feathers of a clutch pedal can become tiring. As reported by U.S. News, As drivers encounter more of these excellent modern automatics, less are interested in learning how to drive a manual. Originally published: April 1, 2000, 2000

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