

Analysis of Hyundai's Intelligent Manual Transmission

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Abstract - It's difficult to say if the new Intelligent Manual Transmission in the Hyundai Venue SUV is an automatic or a manual transmission from the standpoint of the user. Technically, iMT is a manual gearbox; it has gears and a mechanical mechanism that looks precisely like any other manual shifter. However, the driving experience is more akin to that of an automatic automobile. The iMT does not have a clutch, only a brake and a throttle. Again, it's not totally automated, because the driver must manually shift gears. You know, technology may be perplexing at times. iMT is the next significant gearbox technology in Indian automobiles after the AMT (automated manual transmission) that Maruti Suzuki popularised. It is now available in the Venue and will soon be available in the Kia Sonet as well.

KEY WORDS: TRANSMISSION, ANALYSIS, AMT, IMT.

1. INTRODUCTION:

When it comes to vehicle technology innovation, one area that has experienced substantial advancement throughout the years is transmission. The gearbox is an essential part of a vehicle. It is directly attached to the engine and transfers the combustion force produced by the engine into momentum, which in turn drives the wheels. How efficient a drive will be depends majorly on the gearbox. As we engage higher (smaller in size) gears in our vehicle, it is observed that the RPM of the engine (rotations per minute) drops for the same speed. It is done by engaging a gear that is smaller in size and reducing the load on the engine. It prevents the engine from being overworked and lowers the fuel consumption at the same time. The primary goal is to make the engine as efficient as possible by lowering fuel consumption while obtaining maximum amount of power. In other words, the gearbox works by transferring engine power to the wheels via the drive shaft and axle, allowing you to move the vehicle. All of this is accomplished through the use of gears and gear ratios set either automatically or manually by the driver. A number of automatic gearboxes have arisen, each with its own set of features that seek to improve your driving experience. The latest innovation in the market is the Hyundai's intelligent Manual Transmission which is available on Hyundai's Venue, I20 and Kia's Sonet in India. Intelligent Manual Transmission is a crucial advance in transmission development in India, and it is one of the most sophisticated but efficient transmission systems now available. Therefore, in this paper, we will do an analysis of the of the Intelligent Manual Transmission.

2. DESCRIPTION

For those wondering what the intelligent Manual Transmission actually is, it's within the simplest of words a clutchless manual transmission. Yes, you heard it right. It indeed may be a clutchless manual transmission because it continues to supply a 2 peddle system consisting of the brake and accelerator, together with a traditional manual gearbox. Now, this may appear confusing, but this is often where the 'Intelligence' comes in. The iMT sits somewhere between the AMT gearbox and therefore the classic manual transmission. With the iMT gearbox, gears are changed seamlessly without the necessity of pressing the clutch paddles, through intelligent software and actuators that virtually press the clutch paddle, while you manually shift the gear. To summarize, Hyundai's latest iMT is indeed the simplest of both worlds!

So, the iMT eliminates the requirement of a foot pedal. to place it simply, imagine you're driving a car with a manual gearbox. Usually once you change gears, you press the foot pedal, take your foot off the accelerator and shift the gear with the assistance of the gear knob. in an exceedingly car with iMT technology, there's no foot pedal. So, your left foot is essentially resting while driving. once you do feel the requirement to vary gears, just slot the gear knob into the specified position and shift up or down such as you normally would. The gear knob will have the standard H-pattern which is seen on the majority manual cars. Plus, there'll be just two pedals within the footwell, the accelerator and also the pedal. While it should feel disconcerting initially, it'll be a welcome change after you are driving a car on traffic laden roads, in an exceedingly bumper to bumper traffic situation. it's just a matter of getting accustomed.

3. WORKING:

This system, like a manual transmission, includes a typical H-pattern manual gear lever. It does not, however, feature a clutch pedal, only the brake and accelerator pedals. The clutch pedal is completely eliminated with this method. The

clutch-less manual gearbox monitors the engine speed as well as the location of the gear lever and engages the clutch as necessary. The technology is "Clutch-less," which implies it does not have a clutch pedal, according to Kia Motors. However, it is not always possible to do so without the clutch mechanism itself. The only thing missing from the driver's footwell is the clutch pedal. Internally, the drivetrain still has a mechanical clutch. However, it is controlled electronically rather than manually. To understand how the iMT works, we must first grasp its essential components. The 'transmission gear shift lever,' or TGS, is joined by an intelligent intention sensor, hydraulic actuator, and a (electronic) transmission control unit (TCU). All of these components function in tandem with a standard manual gearbox connected to the engine. To operate a car equipped with iMT, the 'intention sensor' on the gear lever detects when you are going to transfer gears. When the gears are changed, these intention sensors transmit a signal to the transmission control unit, or TCU. Depending on whether the gear is changed up or down, the TCU sends a signal to the hydraulic clutch actuator to engage or release the clutch plate. The actuator's job here is to generate hydraulic pressure and transfer it via a concentric slave cylinder (CCS), which then engages or disengages the clutch plate. While both an AMT and an iMT are standard manual gearboxes, an AMT uses software to regulate when and how shifts occur, whilst an iMT puts the control in your hands.

4. MERITS AND DEMERITS

I.MERITS:

i.better of both worlds

To start off, well you have got the simplest of both worlds, the control from a manual gearbox and a few conveniences of a gear. you're completely relieved of the clutch operation as there's not any lever within the slightest degree. Your left leg is comfy all times and this helps quite an lot especially within the bumper-to-bumper traffic of town. Also what you continue to have, is additionally a full control of shifting gears manually at your will. Pedals/Foot Controls Then, fuel efficiency are often an enormous concern for several buyers. Thankfully, there's not much of a difference between the ARAI-claimed figures of this trim and also the manual Turbo version. Do note that the Hyundai Venue iMT is obtainable only with the 1.0-litre turbo petrol engine producing 118bhp of power and 172Nm of torque. Now that's not within the smallest amount a limitless disparity if you ask. which we would believe Hyundai's claim that this one doesn't compromise on fuel efficiency and performance. After all, it still uses a standard manual gearbox underneath.

ii. No jerks

Right Rear Three Quarter Interestingly, the gearbox is smooth and there is no head nod movement with the shifting of gears. Be it any transmission, you recognize the strategy of shifting gears involves a little delay. during this version, however, it's well contained and even matches the revs automatically. After all, it is a gem of an engine when it involves excellent drivability. you'll observe progress post the two,000rpm mark when there is a pleasant strong push because the turbo spools up. Even once you floor the gun, it's extremely linear in its power delivery and never feels abrupt with its throttle response. This engine freely revs up to its redline at 6,500rpm, letting you appear each gear. However, it's got an honest low- and mid-range, so you would be ideally doing low speeds during the following gear easily without the requirement for constant changing of gears. That said, the intelligent gearbox suggests you're doing that whenever there is a necessity. Left Front Three Quarter

iii. Creep function

Your right leg is on the pedal, you've started the car, and now want to maneuver ahead. you only put the gearshift in first and begin releasing the brake. The car will automatically start moving slowly without you having to produce a throttle input. this might be pretty helpful and adds to the convenience when in stop-and-go traffic. All you've should be compelled to undertake and to is modulate the brake at low speeds, and if there is a necessity, provides it slightly gas. This creep function together with hill-hold function works even better on up slopes without letting the car move backwards. We didn't should use the emergency which usually gets imperative with a manual gearbox. Right Front Three Quarter Then the car easily picks up from a standstill even within the gear. This means, in bumper-to-bumper traffic, it can overcome your hassle of not just engaging the clutch, but also constant shifting from first to second. And since the pliability band is sort of wide, you may be able to literally speed up and abate during this gear itself. Almost the convenience of an automatic.

iv. Impossible to stall it:

Left Rear Three-Quarter People learning to drive a car always face the matter of stalling it. you usually must be within the right gear and modulate the clutch and throttle accordingly. whether or not you're within the inaccurate gear at wrong

speeds, it'll try its best to amble along. Worst case, it'll beep with a heavy warning sign on the instrument cluster to shift down. We tried different situations like stopping when driving within the sixth gear and not shifting down. just in case of a manual version, if you didn't engage the clutch, the car would have given jerks and stopped. Not during this case. It keeps suggesting you to shift down unless you're within the correct gear. it's the identical after you go up the gears. as an example, now i'm geared, accelerating and since the revs build i do know when to shift up. Well, anyone who knows to drive will get to understand. Unless you're new driving or, could even be deaf not hear the engine whirring so loud! Yeah, so whatever be the case, the instrument cluster suggests which gear you would like to shift up to or to be in. Right Front Three Quarter

5. Price point Now this one is incredibly affordable than the proper automatic version of the Venue. If you compare it with the costs of the turbo manual, the DCT is certainly a lakh rupee more, but the iMT is simply about Rs 15,000-25,000 over the manual counterpart, depending on the corresponding variant.

II. DEMERITS:

1. Not yet a convincing choice to buy I spoke to some people to clarify to them this new technology. Automatic car buyers liked the clutch-less shifts, but weren't really convinced that they're going to still need to change gears by themselves. Then, the manual car drivers loved the very fact they'll not need to use the clutch but were worried they'll need to unlearn the method of not using the left leg in the least and yet shift. the nice thing is it doesn't take time to urge went to it. Rear Badge Then, there's the concern about this system's complexity and reliability. Now whether or not things look simple on the go, there's an intelligent, little system to back it up. The absence of a foot lever has brought in an exceedingly 'transmission gear shift lever' or TGS paired with an 'intention sensor'. When one is on the brink of change gears, this sensor tells an electronic transmission control unit (TCU), which successively signals the hydraulic actuators. These engage and disengage the same old clutch and pressure plates together with the functioning of the concentric slave cylinder and clutch tube. Well, this could sound pretty intense to some buyers. And this complexity might raise questions about its reliability within the future. Nevertheless, nothing aside from the actuators and sensors has changed. So, it doesn't seem to be its visiting be an enormous problem within the future.

2. Not available with a diesel Tail Light/Tail Lamp. But sadly it's limited only to the current turbo petrol option. it'd are great to own it on its diesel model still. After all, the oil-burner of this Venue SUV could be a silent, refined, and a really frugal powertrain. The provision of this iMT would have also helped Hyundai to usher in more buyers.

5. CONCLUSIONS

This is a first-of-its-kind technology that may take some getting accustomed to. Some may become accustomed to it, while others may just avoid it. The only way to know is to wait and see. For the time being, this entire bundle appears to be an intriguing option to examine. Especially when you have the ease of clutch-less shifts and manual control.

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