Seamless acceleration

Stepless shifting of gear ratios eliminates “shift shock” for a smooth driving experience.

Improved response and efficiency

Wider ratio spread and more precise control for outstanding acceleration and fuel economy.

1. Wider gear ratio range

In the XTRONIC CVT, the gear ratio range* from low to high gear is expanded, attaining a top-of-class final gear reduction ratio of about 6, thanks to pulley and steel belt improvements and the use of high performance ATF (Automatic Transmission Fluid). This ratio spread is among the world’s widest for a CVT designed for use with 1.5-liter to 2.0-liter class engines. We extended the low end of the range to improve acceleration, and the high end to improve fuel economy. In addition, the Nissan CVT is easily and flexibly tunable to match engine characteristics, thereby enabling optimization of the balance between combustion efficiency and acceleration.

*Gear ratio range: The ratio spread from low to high gear. The low gear ratio divided by the high gear ratio.

The CVT is an automatic transmission that uses two pulleys with a steel belt running between them. To continuously vary its gear ratios, the CVT simultaneously adjusts the diameter of the “drive pulley” that transmits torque from the engine and the “driven pulley” that transfers torque to the wheels. Because it is continuously variable, the CVT not only avoids the shift-shock and peaks and dips in torque transmission associated with a conventional AT, but also maintains optimum torque for any given power demand. This makes the CVT an exceptional transmission solution that delivers smooth and powerful driving performance together with excellent fuel economy.

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**CVT Structure**

The CVT-belt construction

**Wider gear ratio range**

- Smaller drive pulley radius raises acceleration performance.
- Smaller driven pulley radius enhances fuel economy.

**CVT-belt construction**

**Element**

400 highly rigid elements

**Ring**

Multi-layer high-tensile strength steel

**Graph: Expanded gear ratio range**

**Table: Gear ratio**

<table>
<thead>
<tr>
<th>Engine class</th>
<th>Low gear</th>
<th>High gear</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.5L</td>
<td>2.371</td>
<td>0.439</td>
</tr>
<tr>
<td>2.0L</td>
<td>2.349</td>
<td>0.394</td>
</tr>
<tr>
<td>1.5L – 1.8L</td>
<td>2.361</td>
<td>0.427</td>
</tr>
</tbody>
</table>
2. Wide lockup range

Lockup* of an automatic transmission’s torque converter enables manual-transmission-like direct transfer of engine power and improved fuel economy. Whereas a conventional AT locks up in the mid-to-high speed range, the benefit of a torque converter in a CVT is only during startup. Therefore, the new XTRONIC CVT applies precise control of ratio changes to extend the lockup operating area even further into the low-speed range and thereby boost fuel economy.

*Lockup: The condition in which torque from the engine is transferred directly to the pulley, without being affected by the torque converter.

3. Comprehensive efficiency improvements

Downsized, more efficient oil pump

The oil pump, which is the source of hydraulic power for shifting and assuring torque transmission, has been substantially downsized and made more efficient. This helps maintain control capability that closely follows accelerator pedal action, while boosting fuel economy. For Nissan’s 2-liter class CVT, we adopted a compact chain drive, which contributes to downsizing of the transmission system as a whole.

Reduced hydraulic pressure for pulley control

We improved the precision of the control system used to shift the diameters of the two pulleys, so that sufficient lateral pressure on the belt can be maintained with lower hydraulic pressure. This achieves reliable torque transfer together with high efficiency, thereby contributing to improved fuel economy.

Improved dynamic performance and powerful acceleration feel

Responsive to the driver’s intention with a natural feeling of acceleration.

Quicker CVT shift response

We improved the electronic control system and the hydraulic system components under its control. In addition, adoption of a new high-performance ATF (Automatic Transmission Fluid) enhances response and stability. As a result, the CVT shifts ratios about 30% faster than the previous version. Furthermore, the new XTRONIC CVT controls shifting so that, up to a point, engine rpm will rise along with vehicle speed. As a result, Nissan’s CVT technology provides a more pleasurable driving experience, with nearly instantaneous response and a feeling of naturally powerful acceleration, as well as dependable engine braking.