

2020 TITAN Overview



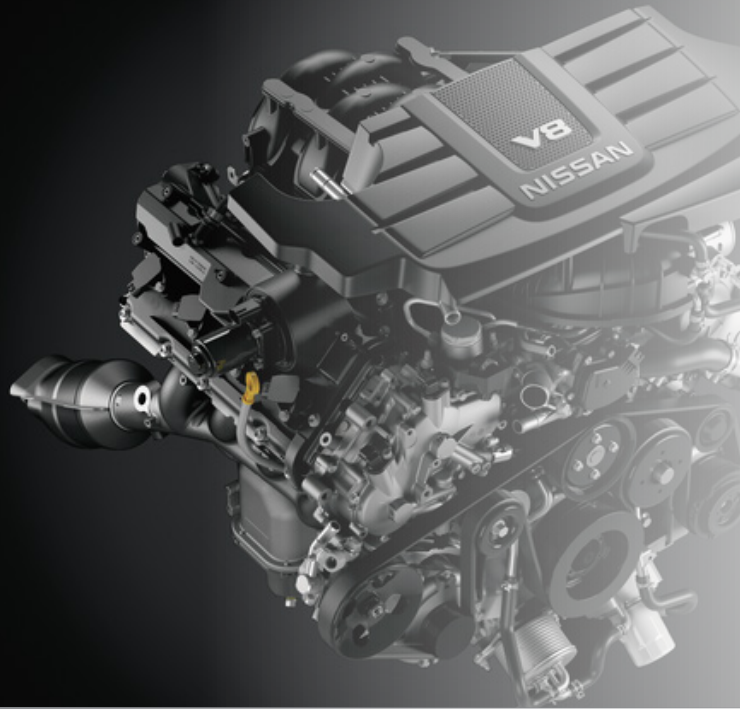
The new 2020 TITAN has been equipped with a retuned direct-injected 5.6-liter Endurance® V8 that can produce 400 horsepower @ 5,800 rpm and 413 lb.-ft. of torque @ 4,000 rpm.



Changes to the engine control software tuning have increased horsepower and torque ratings over previous models, when premium fuel is used.

Premium fuel is not required, but using 92+ octane fuel will increase horsepower by 10HP and engine torque by 19 lb.-ft. If regular fuel is used the engine software automatically adjusts.

NOTE: Horsepower and torque figures based on premium fuel use.



The 5.6-liter DOHC 32-valve V8 features lightweight engine construction and friction reducing components.

The engine utilizes Nissan's VVEL (Variable Valve Event & Lift) technology, which combines hydraulic-controlled variable valve timing and electronically controlled variable valve lift on the intake side.

It works in conjunction with the continuously variable valve timing (CVTCS).

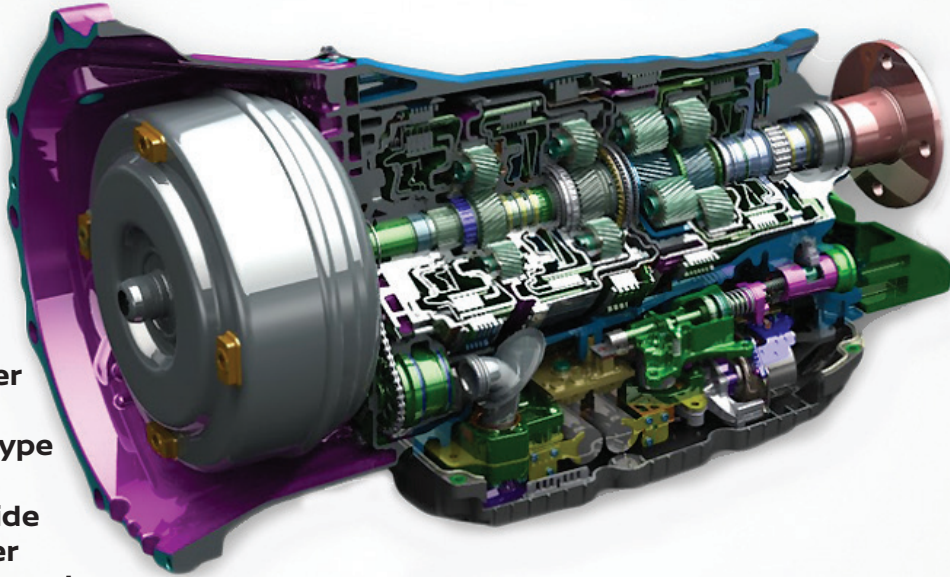
The Endurance® V8 also features Direct Injection Gas (DIG™) technology, which provides better wide-open throttle performance and improved fuel economy and emissions performance (versus a non-direct-injection system).

GE9R01A Transmission

Matched with the 5.6-liter V8 is a new 9-speed automatic transmission with a 3.692:1 final gear ratio – providing more torque to the rear wheels in a given gear and for smoother, improved acceleration.

Gears and shafts within the A/T transfer power from the engine with an expanded torque converter lockup range to the drive wheels. The torque converter in the GE9R01A transmission is a centrifugal pendulum absorber-type torque converter.

This design helps isolate NVH inside the torque converter for smoother operation. It provides close ratios and wider total gear coverage of approximately 9.1 compared to 6.3 for the previous RE7R01B transmission.



GE9R01A 9-Speed Transmission

Torque converter lock-up is also accomplished faster, resulting in less slip. The 9-speed can be locked as early as first gear, depending on throttle application and speed. Higher numeric ratios help improve standing start acceleration while close ratio spacing keeps the engine in its optimal power band.

The expanded lock-up range can contribute to increased fuel economy.

		GE9R01A	RE7R01B
Gear steps		9AT	7AT
Torque capacity		700 Nm	550 Nm
Gear ratio	1st	5.425	4.887
	2nd	3.263	3.170
	3rd	2.250	2.027
	4th	1.649	1.412
	5th	1.221	1.000
	6th	1.000	0.864
	7th	0.862	0.775
	8th	0.713	-
	9th	0.597	-
	Reverse	4.799	4.041
Ratio coverage		9.09	6.31

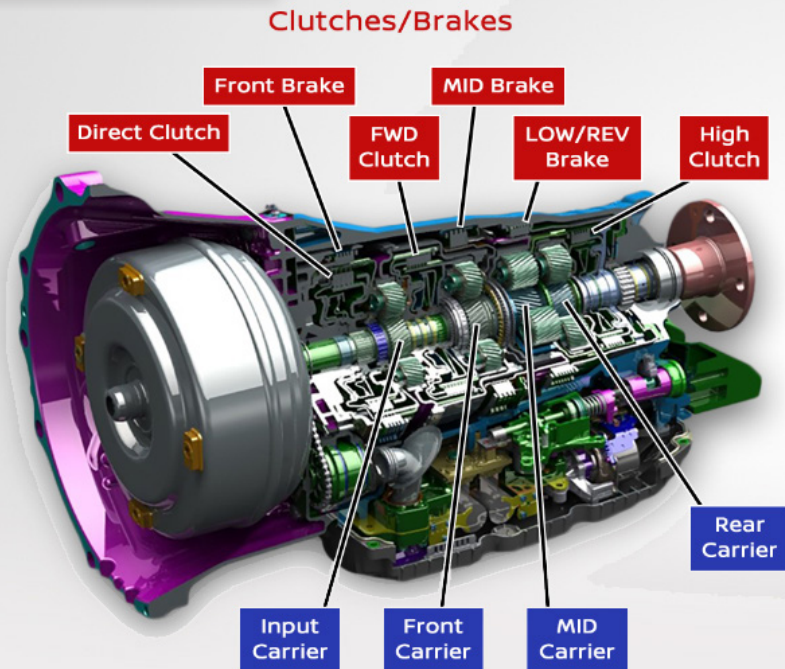
NOTE: The new GE9R01A 9-speed automatic transmission has optimized gear ratios to enable better acceleration while towing.

GE9R01A 9-Speed Transmission

The 9-speed transmission obtains different gear ratios by holding or driving different elements of the planetary gear set to produce the gear ratios needed for all driving conditions.

With the use of 4 sets of planetary gears, the new A/T enables 9 forward and 1 reverse gear, depending on the combination of 3 sets of multiple-disc clutches, and 3 sets of multiple-disc brakes.

The input planetary gear, front planetary gear, and mid-planetary gear handle the forward speeds and a rear planetary gear handles reverse.



NOTE: One-way clutches are not used in the gearbox.

GE9R01A 9-Speed Transmission

Low gear ratios for 1st, 2nd, 3rd, 4th, and 5th gear help enhance acceleration. Overdrive ratios for 7th-9th gear helps lower engine RPM at highway speeds. The smooth gearbox gives the powertrain a linear feel when shifting through the gears.

Hydraulic multi-disc clutches and brakes in the automatic transmission apply gradually to help make application smooth, improving both shift stability and shift timing. Upshifts are more precise, while downshift delay time is reduced. Shift control and all functions of the transmission are controlled by the TCM on the valve body assembly inside the fluid pan.

A magnetic rotation sensor located on the valve body assembly detects revolution from a magnetic rotor on the rear planet. The TCM controls transmission functions and fluid flow control using solenoids mounted to the valve body assembly.

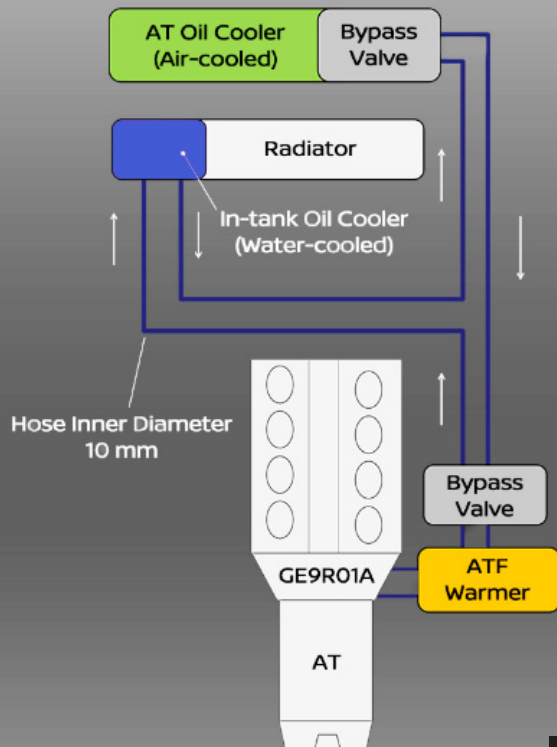


Magnetic Rotation Sensor

GE9R01A 9-Speed Transmission - Fluid Cooling

The design of the GE9R01A requires a lower ATF operating temperature (max 125°C), compared to the RE7R01B ATF operating temperature.

For improved cooling, an additional water-cooled in-tank cooler with larger diameter cooler lines was added.

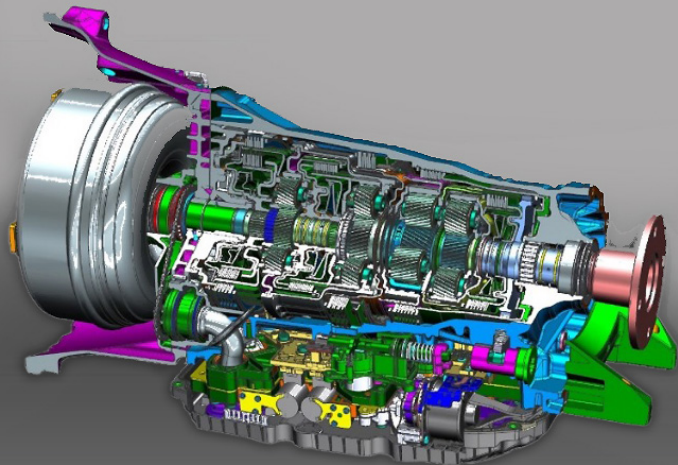


GE9R01A 9-Speed Transmission - Friction

The new transmission has reduced friction compared to the RE7R01B. Friction reduction is accomplished by:

- The GE9R01A uses Matic-P fluid that has a lower viscosity than Matic-S.
- Roller bearings on all rotational components along the input shaft, and ball bearings on the output shaft eliminates all bushings.
- The GE9R01A utilizes two fluid pumps: one mechanical and one electric.

The mechanical pump is a small-vane type oil pump that is driven by a sprocket with a silent chain. It is the primary pump for transmission hydraulic pressure.



NOTE:

The GE9R01A requires an overflow position change wrench (J-52972-2), and an A/T fluid injector (J-52972-1) to perform drain and fill procedures. Refer to the ESM for more information.

GE9R01A 9-Speed Transmission - Friction



Sub Electric Oil Pump Inverter

■ The sub electric oil pump is located on the valve body assembly.

This pump operates under conditions when the mechanical pump cannot supply sufficient oil pressure for proper operation.

Sub Electric Oil Pump

GE9R01A 9-Speed Transmission - Lighter Construction

The GE9R01A case utilizes lighter construction.

The bell housing, the rear mounting bracket on 2WD, and the transfer case are aluminum. The main case is magnesium.

- Many fasteners are aluminum instead of steel.
- The oil pan is a composite construction instead of steel.

NOTICE

Because the oil pan is composite construction, a special transmission jack adapter (J-52940) must be placed in precise locations to avoid damaging the oil pan.

- Many of the aluminum fasteners are one-time-use (they must be replaced whenever removed).
- All one-time use oil pan fasteners and valve body fasteners are installed using the torque plus angle tightening method.

Refer to the ESM for more information.

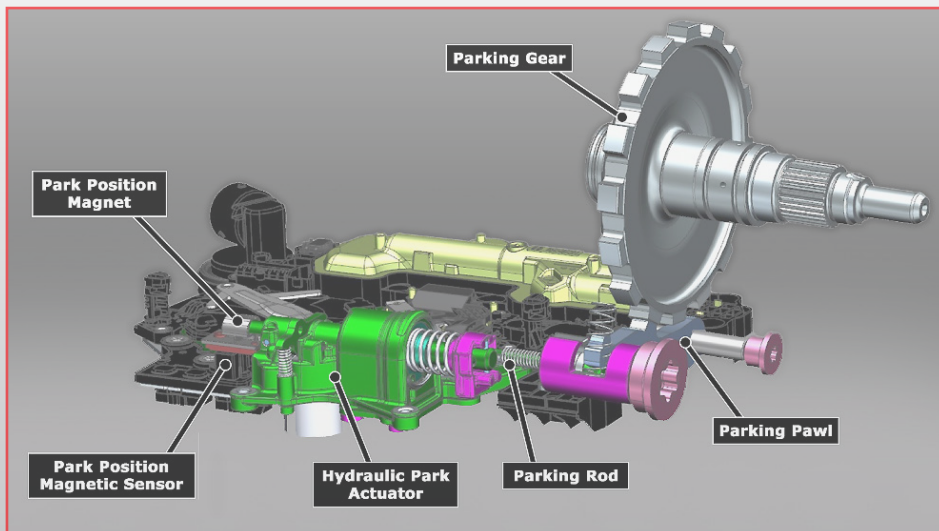
Shift by Wire (standard)

All TITANs are still equipped with a column shift lever, but on the new 2020 models, the shift cable has been eliminated. Shift selection is now accomplished electronically using a CAN communication signal from the shift control unit to the TCM.

The park system is actuated by an electrical signal and hydraulic pressure generated by the sub-electric fluid pump in the valve body.

This pump operates the hydraulic park actuator when the engine is stopped.

Park position is reported to the TCM using a magnetic sensor at the end of the parking rod.



Precautions for Shift by Wire

When the ignition is turned OFF, the GE9R01A automatically places the transmission into Park. The automatic park function of this transmission requires battery voltage to disengage the parking pawl.

Some service procedures require a battery disconnect to complete diagnosis or repair. In these situations, the vehicle's transmission must be placed into the Neutral position using CONSULT Work Support to cancel the automatic park function prior to disconnecting the battery for maintenance.

- The battery has to have power (enough) to perform the procedure with CONSULT. If the battery is low or dead, the automatic park function must be cancelled using a special procedure for disengaging the parking pawl without CONSULT.
- Refer to the ESM for complete information.
- After cancelling the automatic park function and performing the necessary maintenance, the transmission shift lever must be moved to the Park position.

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