



Fig. 1- The new Formula Renault 3.5 racing car with a 530 hp V8 motor © Zytek

## maxon DC motors in Formula Renault 3.5

maxon DC motors are tasked with the responsibility to adjust an electronic throttle system in the formula Renault vehicles.

The Formula Renault race series is one of the most significant feeder series for up and coming F1 drivers. Recently many talented race drivers have made the transition from formula Renault 3.5 to the F1, Jean Eric Vergne, Daniel Ricciardo and world champion Sebastian Vettel to name a few.

Given that F3.5 is such an important feeder series for F1 the cars contain many similar features. For example; a semi-automatic gearshift, left foot brake, V8 engine and dynamically adjustable rear wing. The newest world series cars are fitted with Zytek engines. Zytek produces control mechanisms for the automotive industry, drive technology, engines and hybrid technology. Every vehicle in the series is driven by new Zytek engines. They have been developed specifically for the Formula Renault series. The 3.4l V8 powerplant has 395kW @ 9250 rpm. This is an increase of over 37kW on the previous engine. The engine has been fitted with a fly-by-wire throttle system. This system electronically transmits the pedal movements to the engine controller. i.e, it controls how far the throttle valves are opened at which pedal position.

This gives the driver the ability to obtain a specific torque from the engine at a certain gas pedal position and the respective engine speed. In the case of the Formula racing car, there are three different levels or “pedal maps” for different conditions.

### DC motors control vibrations.

A maxon DC motor and planetary gearbox control the throttle system. The maxon DC motors are from the RE (Rare Earth) DC motor family and the gearbox is from the GP (Planetary Gear) family. They have been highly customised for high vibration levels and the high temperature environment of the application. maxon motor engineers worked closely with Zytek to validate that the motors can function

without any issues under the changing loads. “We began testing maxon’s products in July 2011 and have been extremely impressed with their technical backup and service. The motors need to work in a very hostile environment and maxon really understood the product and the problem and even made suggestions on how to improve the product to help us,” said John Manchester, Operations Director at Zytek. Paul Williams, Sales Engineer at maxon motor, commented: “We are delighted to work in partnership with Zytek. 80% of our business comes from modifying our products for our customers and we thrive on challenging projects.”

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Application report: 421 words



*Figure 2: The 3.4 liter V8 engine, with its 530hp at 9250 rpm, has 50hp more than the previous engine used in the Renault Formula 3.5. ©Zytek*

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