

Electric Actuators In Autonomous Race Car: A partnership With The University La Sapienza In Italy

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News and Articles



Autonomous cars might be here before you know it!

Imagine the possibilities in a world where vehicles are autonomously driven. Imagine that your car drives you, and you don't need to care about it while it drives better than you could ever drive yourself.

Autonomous vehicle development is becoming increasingly important in the automotive sector, especially racing cars.

The students of the University "La Sapienza" Rome in Italy contacted us for a large-scale project, developing an electric and autonomous car prototype with a heat engine, close to a Formula 1 race car.

Throughout their studies, engineering students of "La Sapienza" di Roma, University in Italy, develop their skills and knowledge while putting them into practice.

The students' project consists of designing a driverless race car model and preparing their vehicle for an engineering competition called The Formula Student.

The Formula Student is an international student event organized by the SAE (previously known as the Society of Automotive Engineers), involving the best universities and engineering schools from around the world to evaluate the design and production of a single-seater car.

Each country has its own Formula Student federation. For example, in Italy, there is “Formula ATA,” also known as “Formula SAE Italy.” Each federation organizes its own event in its country during the summer.

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The teams' idea to create a prototype of an autonomous vehicle was born two years ago by a team composed of nearly 30 students from different degree programs. Due to COVID-19, the project was postponed.

The regulations require teams to demo a new car every year. However, to encourage students to participate, it was decided to allow all vehicles converted to driverless to compete for two years instead of just one year.

In 2018, the teams presented only the autonomous vehicle project called “Gajarda AWD Driverless.” In 2019, the “Gajarda AWD Driverless” car competed for the first time. In Hungary, the team placed third in the acceleration and autocross discipline. They also obtained first place in Italy for the Skidpad tests.

In 2020, the team was scheduled to compete for the second year with “Gajarda AWD Driverless,” but it was postponed to 2021.

Electric actuators for autonomous race cars

During the conception process, the team decided to use electric actuators, especially TiMOTION's [TA2P actuator](#). The actuator is used to brake the autonomous vehicle when necessary by connecting the brake pedal to the linear actuator through a rocker assembly. The actuator is located under the brake pedal, inside a carbon fiber box, and is controlled by a microcontroller connected to the onboard computer.

The team chose TiMOTION's actuator to improve the car's braking system performance by simulating brake pedal pressure by a driver.



Some words from the team:

“We expected to move the pedal as fast as possible thanks to a compact linear actuator. We chose TiMOTION's TA2P because it is an excellent compromise between compactness and power.”

“We were looking for a small, powerful, precise device. This actuator meets these characteristics perfectly. Thank you, TiMOTION Europe.”

This year, the students also want to present a new project, the “Gajarda AWD Kompressor” vehicle, in collaboration with TiMOTION Europe, and compete in the 2022 race. There are many mechanical differences compared to the “Gajarda AWD Driverless” project. The main differences are:

- new supercharged engine;


- new engine control unit;
- new monocoque;
- new aerodynamics, particularly four fans to create a ground effect;
- new autonomous software;
- new dynamic model.

We will follow the students and the evolution of this project throughout the year. We look forward to seeing the car on the racetrack.

"Anyone who can create fascinating solutions from limited resources has the potential to do great things." (R. Neumayer, H. Siggemann). It is the Sapienza Corse's slogan.

Any student seeking an exciting project is welcome to apply for the opportunity to co-operate with TiMOTION Europe. We develop ambitious projects. Contact our [local sales department](#).


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