

Ride control innovation, acceleratedSM

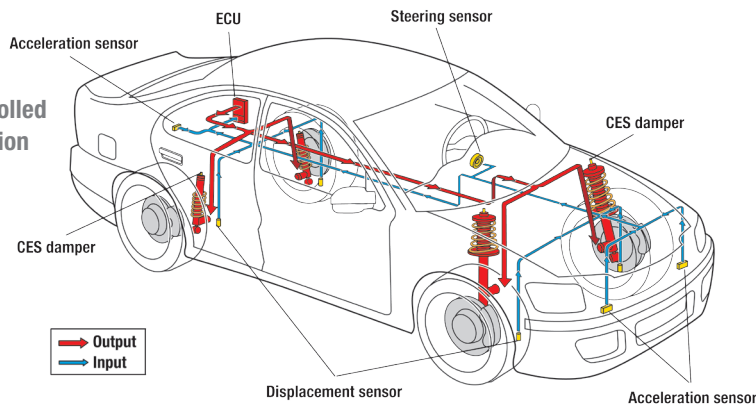


Forward thinking. Forward moving.

Where transportation goes for innovation

One thing that helps distinguish a vehicle from its competitors is its ride. Regardless of the application, Tenneco's electronic damper technologies help vehicles achieve a differentiated signature ride, tuned with the highest attention to detail.

Continuously Controlled Electronic Suspension system (CES)



Tenneco's electronic damper technologies target the entire spectrum of light vehicles – from high-end luxury vehicles to smaller city vehicles – helping OEMs achieve the correct balance of comfort and control for each application.

Tenneco offers three different electronic damper technologies each designed for a specific market application – Continuously Controlled Electronic Suspension system (CES), Digital Ride Control Valve Technology (DRiV™) and Dual Mode Damper Technology.

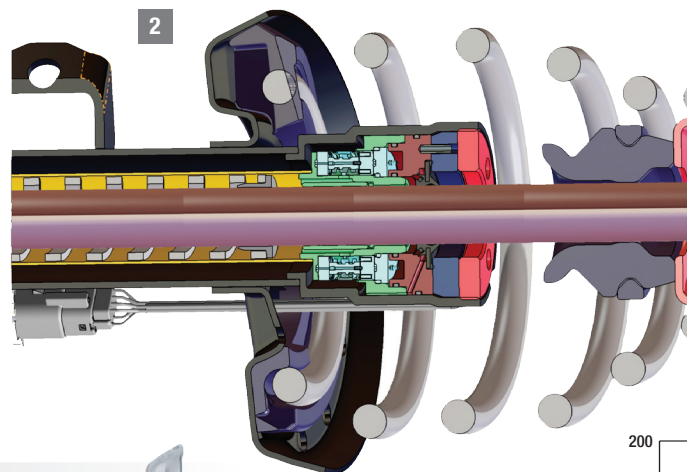
Developed by Tenneco in conjunction with Öhlins Racing, CES is a semi-active suspension system that continuously adjusts damping levels according to road conditions and

vehicle dynamics, such as speed, turning and cornering, delivering comfort without sacrificing the safety of sure handling.

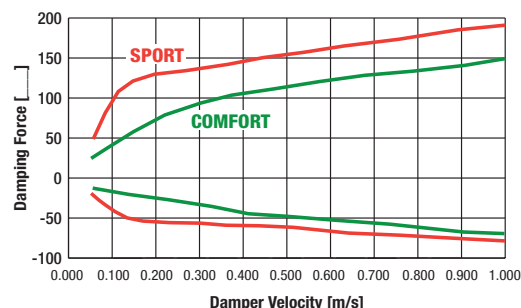
The CES system is triggered by a powerful Electronic Control Unit (ECU). Found at the heart of the CES unit, the ECU is designed to exploit the full potential of the electro-hydraulic valving system by processing input data sent by a group of sensors placed at key locations on the vehicle. Further input signals are provided from the in-car network (CAN).

The CES utilizes control software that processes the sensor information regarding steering wheel angle, vehicle speed, brake pressure and other chassis control information and sends signals that independently adjust the damping level of each shock absorber valve. CES dampers allow a large separation between maximum and minimum damping levels and adjust instantaneously to ensure the optimum in ride comfort and firm, safe vehicle control.

DRiV™ technology is derived from the CES model and features an affordable adjustable damper technology for the B/C vehicle segment. However, unlike CES, no dedicated ECU is required, helping reduce the system cost. The system packaging features an internal valve, with the electronics integrated in the damper, providing minimal deadlength.



- 1 CES Shock
- 2 DRiV™ technology
- 3 Dual Mode Damper technology



Dual Mode Damper technology provides an enhanced ride experience at a minimal system cost for the small and midsize vehicle segment. A button on the dashboard allows the driver to select between two damper settings – comfort or sport – letting the driver choose the type of ride they wish to experience.

Typically one characteristic is a higher level of comfort than a passive damper. On the other hand, when the driver wishes to get the most out of his vehicle, he can select the sport characteristic. The dampers are then set to a firmer damping level to deliver the needed road holding. This is achieved via two valve setting options:

- NC (Normally Closed) offers firm damping without energizing the valve (OA), soft damping is achieved at approximately 0.5A holding current.
- NO (Normally Open) offers soft damping without energizing the valve (OA), firm damping is achieved at approximately 0.5A holding current.



FEATURES & BENEFITS

- Improved primary ride motions through independent control of the vehicle body movements – heave, pitch and roll.
- Improved safety and security due to better road handling capabilities on rough, uneven road surfaces as tire force variation is reduced.
- Enhanced handling through control of load transfer characteristics of the suspension during transient movements.
- Improved secondary ride characteristics such as rolling plushness, impact harshness and shake reduction when driving conditions allow very soft damping levels.
- Improved comfort due to demand-specific damping and variable low-velocity bleed slope.
- Opportunity for vehicle manufacturers to further improve vehicle stability control systems through integration with the damping system.



Partnership Built on Performance

At Tenneco, we don't simply provide a product. We provide a partnership—taking into account customers' entire systems, their unique needs and applications, technology requirements, market challenges and goals. With our electronic damper technologies and our complete line of ride control solutions, we offer the partnership that drives the innovation that maximizes performance and enables true ride control.

PIONEERS IN RIDE CONTROL

At Tenneco, innovation is a hallmark of everything we do. In our advanced ride control technologies and solutions. In our unique, total-system integration expertise and approach. In our commitment to partnership and collaboration. We're always looking beyond the technology horizon to foresee and develop the next-generation ride control solutions that accelerate our customers' success and keep them moving toward the future.

From development through delivery and beyond – we help our partners drive transportation innovation, full speed ahead.

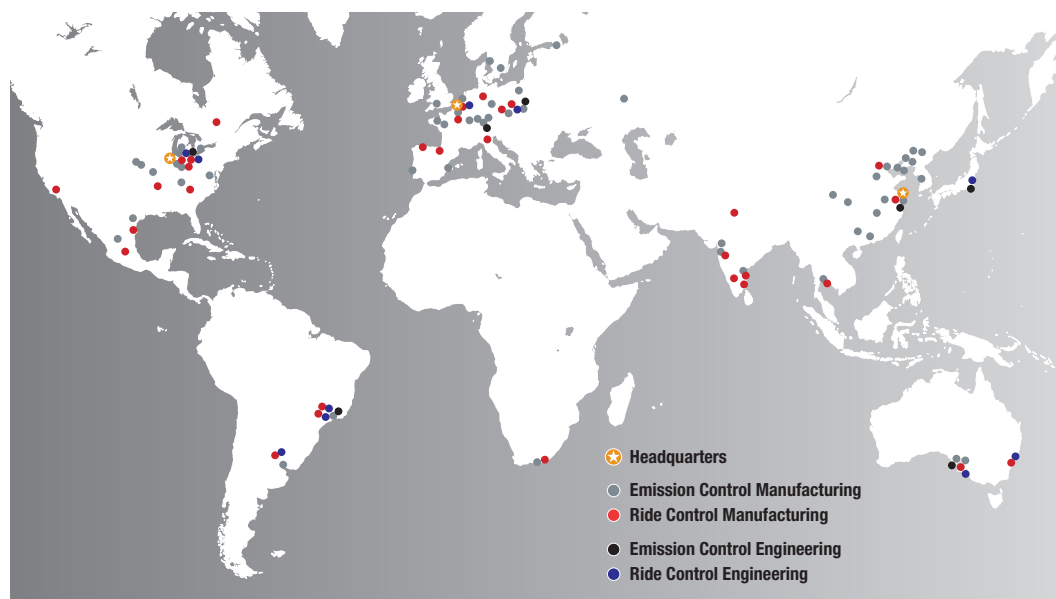
TENNECO IS EVERYWHERE OUR CUSTOMERS NEED US

Our reach is global, but our focus is local, helping customers in each region adapt our global capabilities and technologies for local applications.

- 22,000 people
- More than 80 manufacturing facilities
- 14 state-of-the-art research and development centers
- 3 dedicated research and development centers for ride control engineering

Markets served:

- Light vehicle
- Motorcycle
- Bus and truck
 - Axle suspension
 - Cabin suspension
 - Seat suspension



PLEASE CONTACT OUR RIDE CONTROL TEAMS AROUND THE WORLD ...

North America
1 International Drive
Monroe, Michigan 48161
USA
+1 734-243-8000

Europe
I.Z.A. Schurhovenveld
1420
3800 Sint-Truiden
Belgium
+32-11-703-111

China
C-D, 17F
No. 686 Jiu Jiang Road
Huang Pu District
Shanghai 200001
P.R. China
+86 21-6957-3026

Japan
20-20 Hiradai, Tsuzuki-ku
Yokohama-shi
Kanagawa, 224-0064
Japan
+81-45-942-5231

South America
Praça Vereador Marcos
Portioli Nr. 26
Santa Luzia
Cep.: 13807-900
Mogi Mirim - São Paulo
+55 19 3805-7000



www.tenneco.com