

Clean Air innovation, acceleratedSM

Forward thinking. Forward moving.

Robust valve performance for efficient EGR NOx reduction

Adapting to different systems and environments is critical to effective emission control. Vehicles using low-pressure exhaust gas recirculation (EGR) systems that include Tenneco's Electrical Valve are able to continuously adjust backpressure to driving conditions to power efficient NOx reduction.



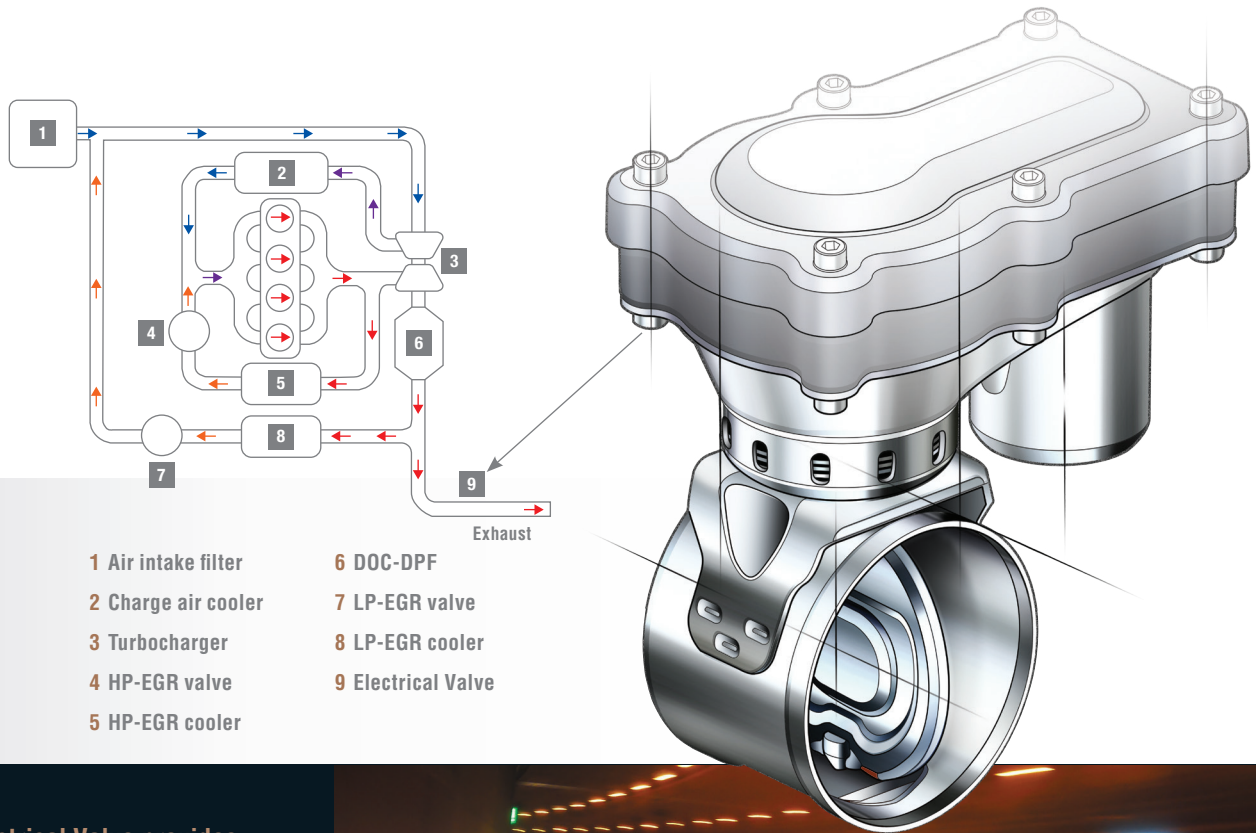
Low-pressure EGR loops require varying pressure levels to recirculate exhaust gas back to the engine intake for effective NOx reduction. Controlled by an electric actuator, Tenneco's Electrical Valve expertly and continuously fine-tunes the position of the exhaust flap to achieve optimal backpressure and emission control.

Robust yet compact at 20% lighter than industry standard, the Electrical Valve actively reduces NOx emissions by up to 50% with light vehicles—and more for light- and medium-duty trucks—with little impact on exhaust system weight or performance. It features a special bearing design that minimizes external

leakage and eliminates rattling and switching noises. And it's durable, even in harsh environments—resistant to water projection and salt pollution, and requires little or no maintenance over the life of the vehicle.

The Electrical Valve is also highly adaptable to different cross sections and installation spaces of exhaust systems, with an actuator-independent, modular design—all at a competitive cost—making it a key component in low-pressure EGR system solutions for customers around the globe.

For more than 15 years, Tenneco has driven the innovation of passive and active exhaust system valves and applications designed to minimize emissions and maximize performance. With the Electrical Valve, we continue to advance the next-generation components that keep our customers moving forward.



- | | |
|---------------------|--------------------|
| 1 Air intake filter | 6 DOC-DPF |
| 2 Charge air cooler | 7 LP-EGR valve |
| 3 Turbocharger | 8 LP-EGR cooler |
| 4 HP-EGR valve | 9 Electrical Valve |
| 5 HP-EGR cooler | |

Tenneco's Electrical Valve provides low-pressure EGR systems with an adaptable and robust solution that helps meet NOx emissions regulations without compromising performance.



ELECTRICAL VALVE FEATURES & BENEFITS

- **Robust performance in a compact size** that meets and often exceeds customer weight requirements, in some cases by up to 20% lighter than industry standard
- **Efficient operation in different environments**, continuously adjusting backpressure requirements depending on driving conditions
- **Durable, special bearing design** minimizes external leakage, provides resistance to water projection and salt pollution, eliminates rattling and switching noises, and requires little or no maintenance over the life of the vehicle
- **Actuator-independent, modular design** makes it easily adaptable to different electrical actuators and tube diameters, and allows it to be purchased and implemented separately from the exhaust system
- **Fail-safe operation**, with a design that automatically returns it to the open position in case of failure and allows only a slight increase in backpressure when open

Experience the active exhaust system valve technology that drives efficiency and performance.

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 the Electrical Valve and our full suite of advanced solutions, we offer a partnership that drives the innovation that maximizes performance and enables true emission control.

THE ENGINE OF INNOVATION IN CLEAN AIR

At Tenneco, innovation is a hallmark of everything we do. In our advanced clean air 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 clean air 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.

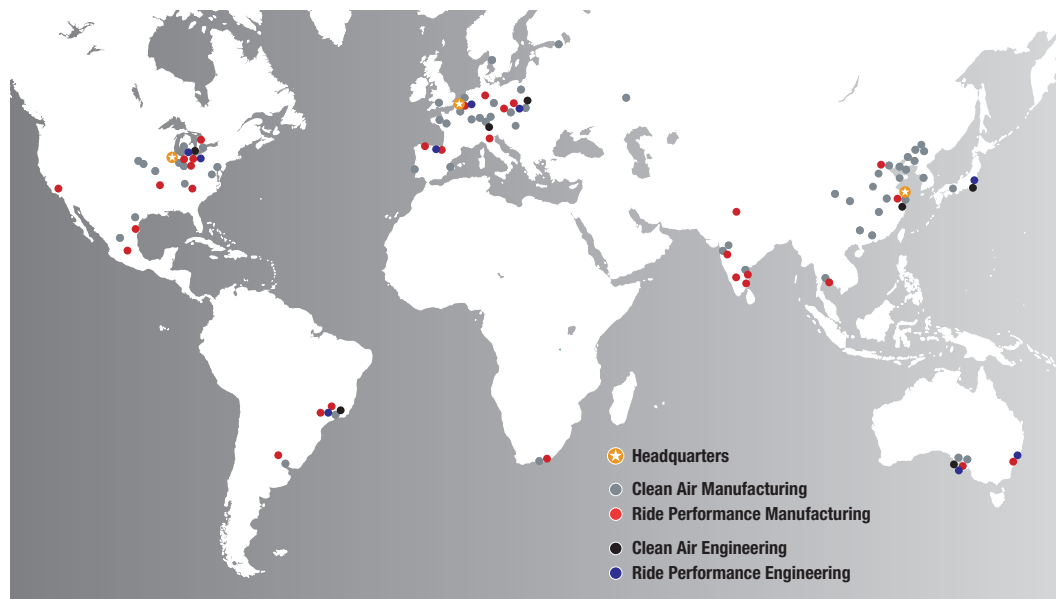
TENNECO IS EVERYWHERE OUR CUSTOMERS NEED US

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

- Nearly 25,000 employees worldwide
- 89 manufacturing facilities
- 14 state-of-the-art research and development centers
- 4 dedicated research and development centers for clean air engineering

Markets served:

- Light vehicle
- Commercial vehicle
 - On-road
 - Off-road
- Locomotive
- Marine
- Stationary
- Large engine
- Retrofit



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