

**Gardner
Denver**

TRANSPORT SOLUTIONS



Compressed Air for E-Mobility

Pneumatic solutions for commercial electric
and alternative fuel vehicles

IR Ingersoll Rand®
Transport Solutions

www.gardnerdenver.com/emobility

Quiet, compact & reliable by design

Design and support from pneumatic experts

Gardner Denver's knowledge of pneumatic systems has been developed over many years. The business has collaborated with some of world's biggest vehicle manufacturers to design and implement commercial packages of the highest quality.

Delivering peak pneumatic performance

We understand that commercial truck and bus operators have high expectations of their fleets, relying on them to safely transport tonnes of cargo and millions of passengers each day. Yet changing regulation and evolving customer needs are placing new pressures on manufacturers, especially the need to reduce energy consumption and harmful emissions while still meeting increasing demand.



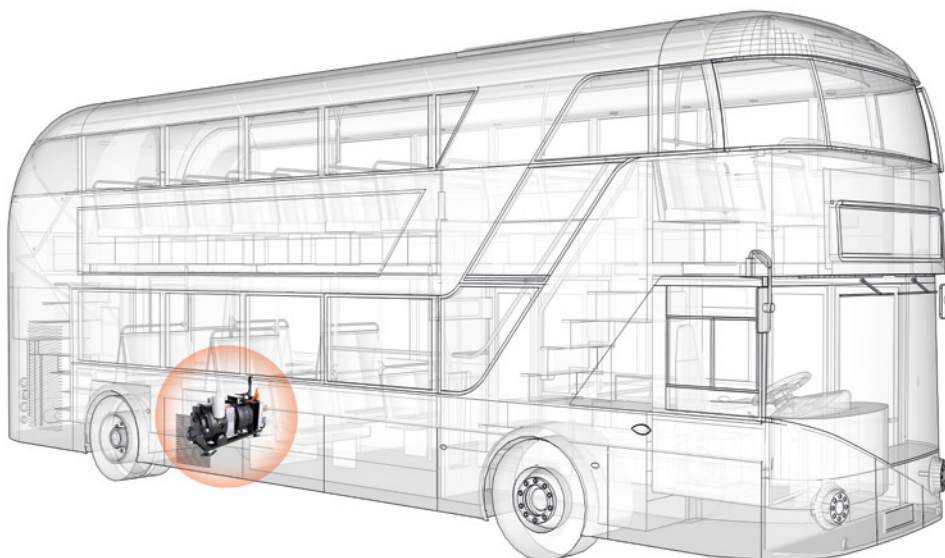


Meeting next-generation demands

Compressed air is key to the safe and reliable operation of critical applications on most commercial vehicles. However, hybrid-electric and fully electric trucks and buses now demand far more of their ancillary systems when compared to traditional diesel drivetrains. There is also a new generation of vehicles utilising alternative fuels, such as hydrogen cells, that are completely reshaping the market. To support this, Gardner Denver has reimagined compressor design, helping customers on their journey to zero emissions.

Upgrading your pneumatic technology

Technology once regarded as industry standard now lags behind the needs of today's market. It's either too large, heavy or noisy for electric vehicles and those using alternative fuels. There is also a need to supply more applications while consuming less energy. Quiet hybrid and fully electric engines, for example, no longer mask the sound of compressors, so quieter models are now necessary to improve passenger and driver experience. These vehicles also require a smaller footprint to meet space and weight limitations.



Rotary Vane Technology from Gardner Denver

Compressors for e-mobility and alternative fuels

Next-generation compressors

Gardner Denver's new line of compressors are perfectly suited to applications found within modern truck and buses. They are quiet, compact and reliable, making them ideal for hybrid and fully electric vehicles. These models are also capable of meeting the needs of emerging technology like hydrogen-powered vehicles.

Reliable by design

Easily installed and maintained

Gardner Denver's products are designed to ensure ease of installation and simple routine maintenance in the field. Modular design allows us to configure a package that meets your vehicle design requirements and deliver an optimised solution for every application.

High-quality air

With a final oil content of 3 PPM, Gardner Denver compressors are recognised as leading solutions for the bus and truck market. Our pulsation-free technology requires minimal maintenance and provides cleaner air that improves the lifespan of downstream equipment. It also removes the need for excessive protection.



TX02 Compressor Package

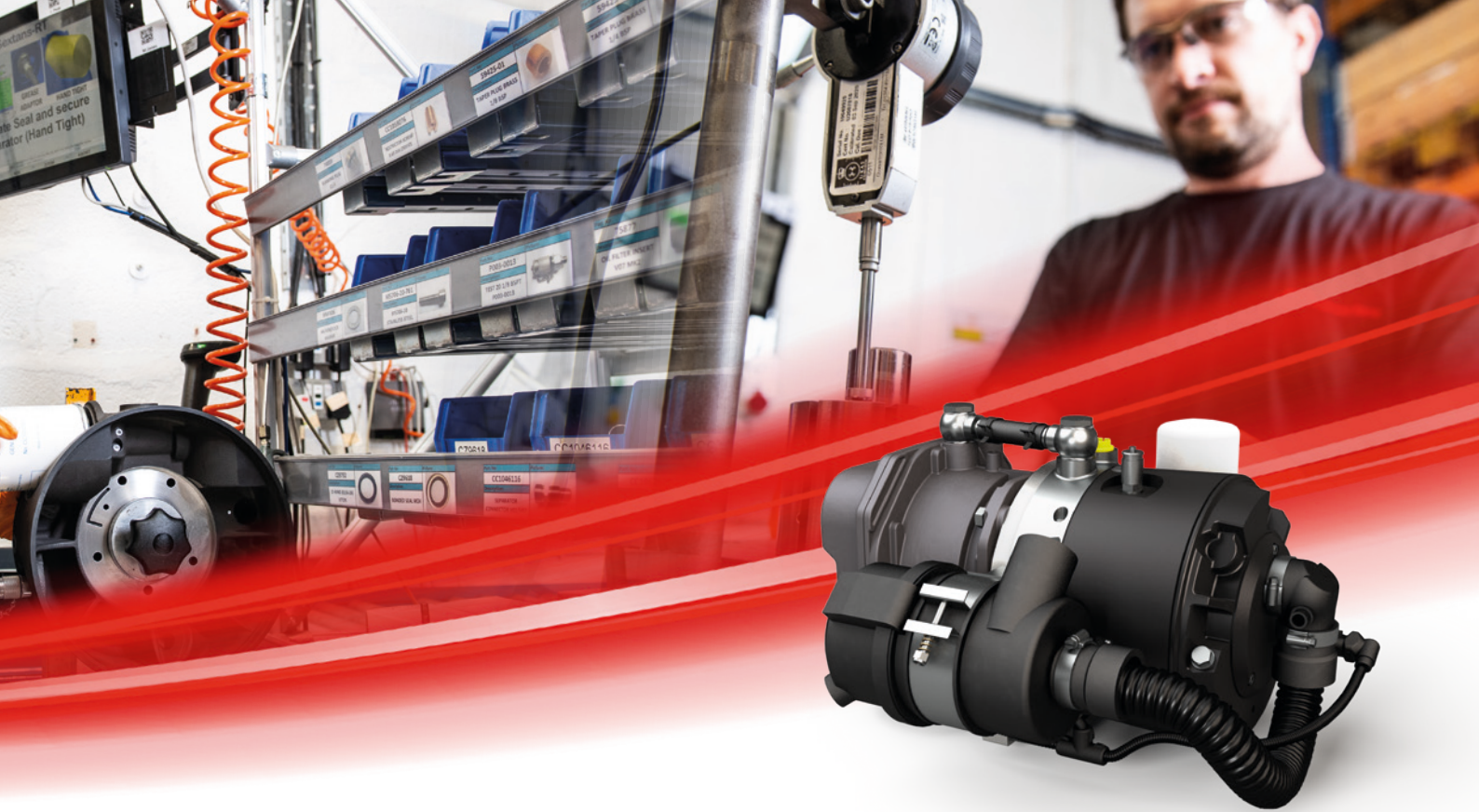
Quiet efficiency

Energy savings

Gardner Denver compressors are designed to keep energy consumption to a minimum. Variable flow offers optimised motor performance and greater efficiency while still being able to meet a range of demands. Package variability also allows Gardner Denver to better interface with the vehicle.

Quiet as standard

With real-world noise levels at 69dB(A) and below, Gardner Denver compressors can be installed next to the passenger cabin with no loss of comfort. They also minimise noise for pedestrians when traffic is stationary and during loading/ unloading.



TX01 Compressor Package

Matched for electric drives

Gardner Denver compressors are designed to be effective for use in electrified drive systems. Efficiency therefore depends on the interface between on-board technology and the vehicle's electronics. We offer a range of different drive configurations to support this interface and achieve the best possible performance. Gardner Denver's intelligent control strategies can also work seamlessly with the vehicle CAN network or operate independently.

Case Study

Electra Commercial Vehicles

Gardner Denver's ability to deliver bespoke solutions for customers is best shown in its work with Electra Commercial Vehicles. In 2018, the company asked Gardner Denver to help develop its fleet of electrified trucks.

Most commercial vehicles running on diesel will incorporate a compressor within the engine build but electric vehicles demand much more of a subsystem and cannot be equipped in the same way. To overcome this challenge, Gardner Denver proposed a modified version of the TX02 package, which allowed full functionality to be maintained without compromising any benefits.

This customised package allowed Electra to overcome the control challenges left when replacing a diesel engine compressor. This solution not only saved the business money, but sped up assembly time and served as a blueprint for all future builds.

To read more, visit: www.gardnerdenver.com/e-mobility

Case Study
© Priority Applications

Gardner Denver
TRANSPORT SOLUTIONS

Electra Commercial Vehicles
Building greener fleets with bespoke solutions

When Electra vehicles needed a space-saving compressor solution, the company turned to Gardner Denver for an innovative solution. Established in 2018, Electra Commercial Vehicles is a US-based company that designs and builds low impact commercial vehicles for use in inner city centres. It now boasts a 20-strong fleet and has plans to increase their electric offer. The company has benefited from rapid interest in electric vehicles which are now dominating the new car sales. Not even last year when the prospect of bringing a fully electric lorry to market seemed unrealistic. In 2020, most major manufacturers were still stuck in development and had yet to introduce a functioning electric lorry to public roads. Recognising a gap in the

Key performance data

- Flow up to 450 l/min
- Air end weight of just 18kg
- An end flange cooling configuration available
- Noise level approx. 69 dBA*
- * Depending on package and application

An compressor technology that played an essential role in powering critical systems on buses, trains and tractors. Gardner Denver's latest generation truck and bus air compressor, the TX02, is perfectly suited to building green commercial vehicles. The TX02 is perfectly designed to meet both Electra's requirements and other future hybrid and electric vehicles ensuring low noise, reliability and easy integration.

IP Ingersoll Rand
Transport Solutions

www.gardnerdenver.com/transport

Transport

Rotary Vane Technology

Transport

Redefining compressors for commercial vehicles

Trusted technology partner

Gardner Denver uses innovative design and the best materials to deliver peak pneumatic performance in a compact package. Our compressors not only save space but are also lighter, quieter and more energy efficient than conventional models.

Gardner Denver is recognised as a leading technology partner in the commercial vehicle sector. Our experts work closely with customers to develop pneumatic solutions suited to their individual needs.

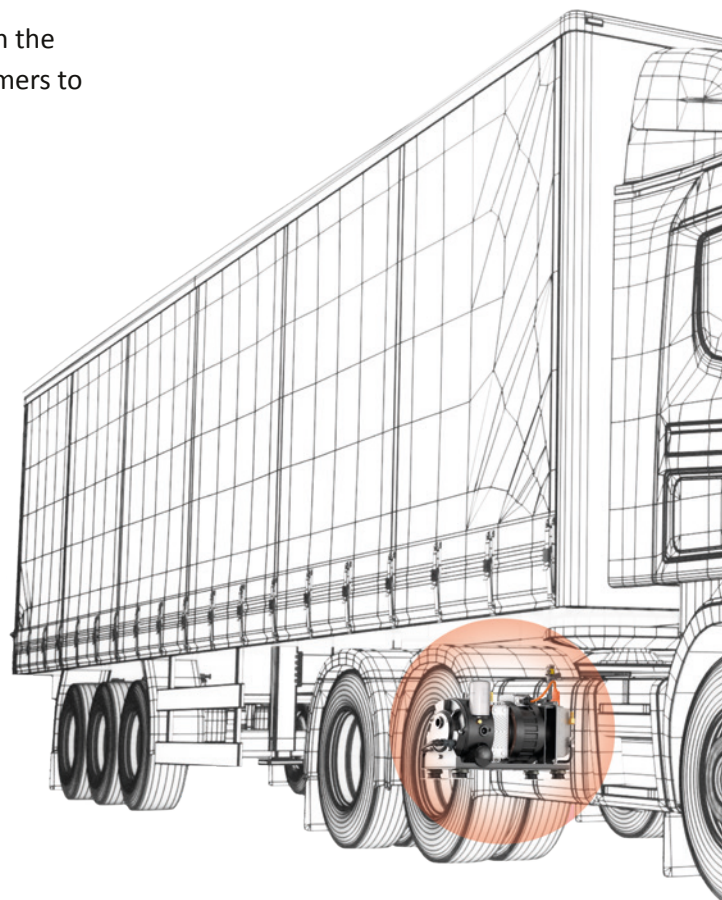
 | **69**



Proven reliability with over
75 million
electric kilometres driven



Market Leading
Final Oil Content
of **<3 PPM**



24v- 800v
packages available



TX Series
air ends offer
20%
size
reduction

Bespoke solutions

Effective packages for every fleet

Gardner Denver can meet a range of different flow demands with a single compressor package. We also work closely with customers to deliver bespoke solutions that are fit for purpose, efficient and require minimal integration.

Design integration, not interruption

A small package footprint allows for straightforward integration where space is at a premium. Full packages include an air end, control module and motor in one compact unit.

Real-world
operation at
dB(A) at 1 metre



Packages can weigh
as little as **35 kg**



Pressure ranges between
7 to 13.5 bar g

Transport

Rotary Vane Technology



Service Capabilities

Products in the TX series require only one service every year, allowing a fleet to spend more time on the road. Rotary vane compressors have very few moving parts and are easily maintained, meaning there is a much lower chance of mechanical failure when compared to competing designs.

Gardner Denver customers are supported by a network of service centres and engineers who are on hand to get your vehicles back up and running. We also keep spare parts nearby to minimise interruptions to service. 'We keep you moving' is not just a strapline but our promise to you. To find out more about Gardner Denver Transport's aftermarket portfolio, including our service kits, recommended maintenance intervals and localised support network, visit our website: www.gardnerdenver.com/emobility.

Our Mission

Reduce our environmental impact



Compressors have a role to play in reducing impact on the environment. We offer highly efficient, ultra-quiet solutions as standard, supporting the industry's drive towards a greener future.

Deliver total compressed air performance



Gardner Denver's compressors are designed for reliable performance, mile after mile. Rigorous testing and design guarantee powerful compressed air performance.

Improve passenger comfort



Quiet, vibration-free design prioritises passenger comfort without sacrificing performance. We strive to keep ambient noise from compressors to an absolute minimum.