

## Line and connection systems for vehicle construction



## Viral passion.

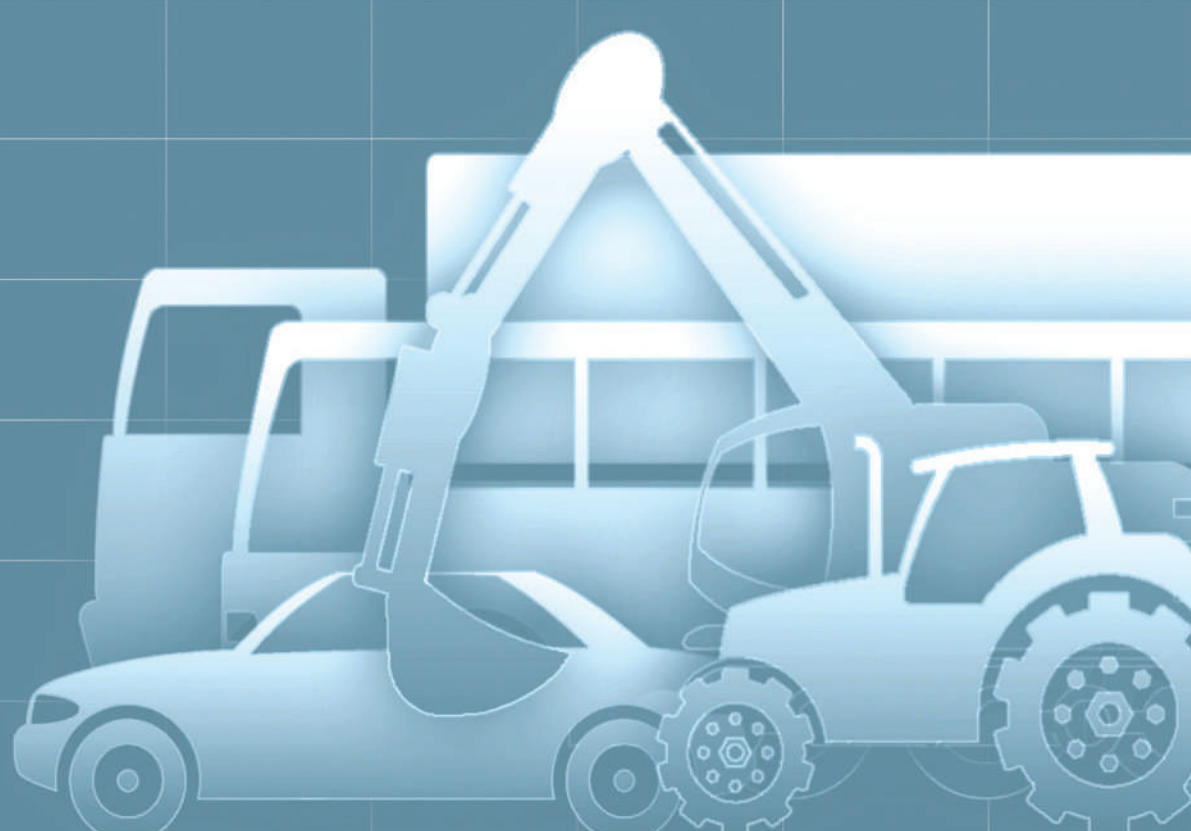
Our customers do not want to talk about the future, they want to experience it here and now in their vehicles. It's possible. Assuming you are using the right technology. Sometimes the decisive edge is hidden in detail. But in order to improve this decisive detail, you need to understand the big picture first.

That is why VOSS Automotive always pays a little more attention to the needs, plans and objectives of its customers. The result: In the line and connection technology field for SCR, pneumatics, thermal management and further applications, VOSS has become known as a specialist that does not take „No“ for an answer. Because the work of the customer deserves custom-tailored ideas, not routine solutions. At VOSS Automotive, we call this: Viral Passion.



## Lifelines for the automotive world.

VOSS Automotive Systems Expertise	System design	Preassembled modules	Line technology	Connection technology	Sensor technology	Valve technology
Pneumatics						
SCR emission reduction						
Thermal management						
Fuel						
Hydraulics						
Fuel cell						



## To live the system means to be passionate about the detail.

Future-oriented solutions in automobile construction must primarily do one thing: bring benefit during daily use. Only those who think beyond the individual components can deliver the decisive time savings for their production. Or devise a low-maintenance fluid layout. To ensure that daily profitability measurements remain sustainable for you, we always think and act with you in mind. We're there for you wherever you are, and on request will be that close that we can hear the grass grow on your factory grounds. This is our understanding of being passionate about progressive thinking.

### Measured by inner values, designed to customer expectations.

Our interests naturally focus on the inner values of your vehicle. As a manufacturer of line and connection systems, we are equally enthusiastic about commercial and off-road vehicles, cars and engine assembly. With an eye for precision and details, we will develop the ideal fluid handling solutions in close cooperation with you. Equipped with eagle eyes and leading-edge technology, we shed light on the unique interior space geometry and properties of your vehicle, making use of our leading know-how during the review phase. Our objective is to adjust even the tiniest screw directly to your liking, without delay. In order to rigorously design the layout of your customized system, increase your reliability and to provide you with real savings in installation time and weight. Down to the specifics.

After more than 85 years of success, we can safely promise you: Our love for details continues to thrive. Alongside that is our passion for the big picture.



# VOSS







1931

The founding of VOSS – production of domestic plumbing fittings

1953

Introduction of tube connections for mechanical engineering and vehicle construction (initial components for compressed-air brakes in commercial vehicles)

1972-76

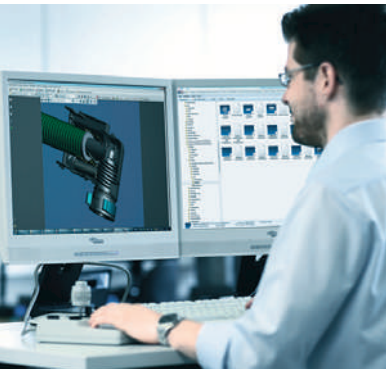
VOSS expands into France, Italy, Spain and Great Britain

1975

Market introduction of the quick connect system 240 for compressed-air brakes in commercial vehicles



## Avoiding “No” leaves more space for “Yes“.



You have the right to perfection. How does VOSS Automotive produce it? Systematically. By turning the customer’s requirements into our challenges, right from the get-go. Whatever the task you may confront us with, you will never hear us say, “that can’t be done.” We call this process-oriented project management – utilizing our full potential from vehicle analysis to series production. This process begins at our in-house test and prototype workshop and still hasn’t stopped by the quality control stage. Processes that are standardized worldwide across all our factories guarantee short development periods and result in the desired level of perfection. In short: Not only are we there to hear your grass grow, VOSS Automotive can also help make it just that little bit greener for you, our customers.

1996

Founding of the sales subsidiary in the United States; start of production in Brazil (specializing in the extrusion of nylon tubes)

2001

Installation of an in-house test and prototype workshop



2004

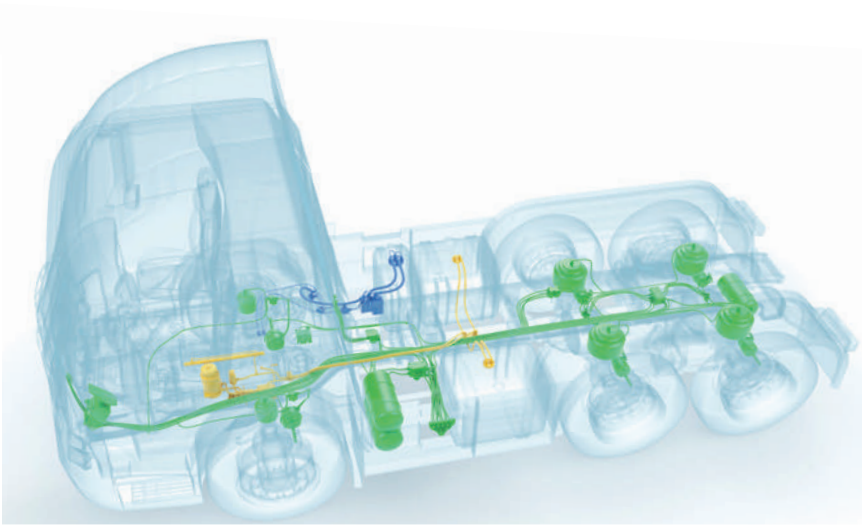
Start of production at the VOSS Automotive Polska facility for the production of line assemblies / Start of the development of SCR lines to reduce nitrogen oxides in exhaust gases

2006-08

Start of production in China (VOSS subsidiary) and India (joint venture) for the production of compressed-air brake components; founding of a sales office in Japan

1993

Initial use of VOSS components in cars:  
quick connect system 203



## Quality and long service life are not products of chance.

Bringing even more value to your work – this is our attitude when we open our factory gates each morning. Making our customers' benefit our goal, VOSS automotive leaves nothing to chance and our passion can be depended on. This is why we at VOSS Automotive prefer being measured against our performance:

- **Development of customized solutions with the help of leading-edge tools and technologies**
- **Close cooperation between customers and our professionally and experienced VOSS Automotive teams**
- **Time and cost savings with high-end comprehensive solutions from a single source**

2010-11

Research and development to gain the market for fuel cell and hydrogen drive systems

Founding of the subsidiary VOSS Automotive Mexico and start of production there

2013

PTC Polymer Technology Center for extrusion and plastic injection molding



2016

Takeover of the existing joint venture VOSS Exotech Automotive Pvt. Ltd.'s minority interests in India, acquisition of an Indian automotive supplier that henceforth operates under VOSS Automotive India Pvt. Ltd.

2025

Profitable growth with our clients, new products and new markets

## SCR – Good for you and the environment.

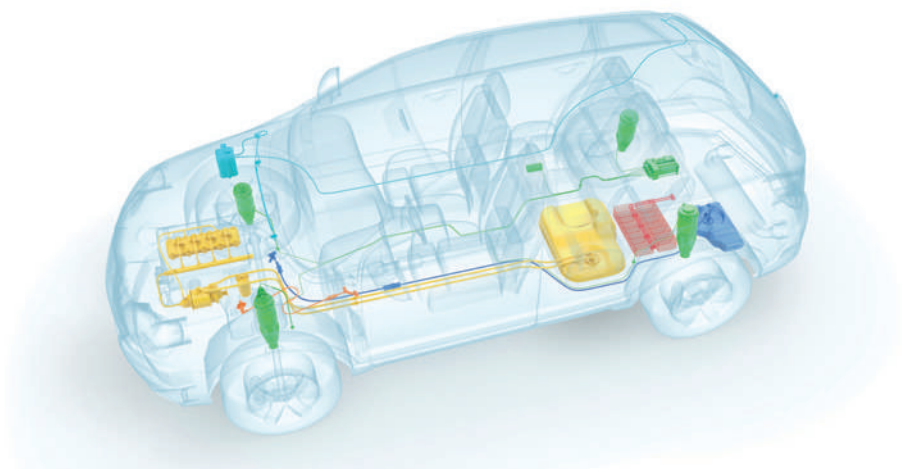
Without SCR technology, it will be difficult to adhere to the extremely low threshold values for nitrogen oxides in the exhaust gases of diesel engines in the present and future. As the threshold values are applicable to different vehicle types worldwide, SCR systems must be integrated into all different kinds of vehicle concepts. The efficiency of the NOx reduction must be assured and optimized under all conditions.

With future-oriented solutions for thawing performance and space integration of SCR systems, VOSS Automotive has been the partner of choice for the international on-road and off-road vehicle industry since introduction of the technology.

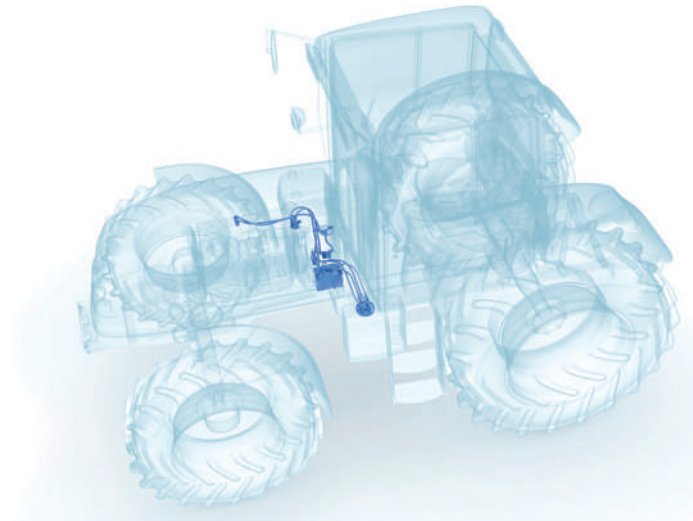
VOSS generates efficiency for the customer product and added value for the climate with custom-tailored complete solutions for unheated, electrically heated, cooling water heated or hybrid SCR systems.

As market leader for SCR line and connection systems, VOSS Automotive provides individually designed, reliable solutions in development, project management, prototype construction, manufacture and logistics, including:

- Thawing performance and energy efficiency
- Space integration
- Frost and heat resistance
- Weight and time savings
- Support in development, installation and validation







## Pneumatics – Experts in your safety.

We started making the first brake components for the company Graubremse as early as 1953. It only took five years for VOSS to successfully increase its sales twenty-fold with the matching tube fittings. Since then, we have made ongoing adjustments to meet the changing requirements; each line and every seemingly insignificant detail has been checked, re-checked, and checked yet again to fill it with new life.

1975 marked a key advancement for our customers, with the introduction of the first quick connect systems for compressed-air brakes in commercial vehicles. A step forward for our customers, as well as for VOSS Automotive. This advancement also secures VOSS Automotive's role as European market leaders within the compressed-air brakes for commercial vehicles and within the air suspension for passenger cars.

VOSS is systematically expanding these successful solutions, in order to be able to meet customer demands today and in the future.

- **VOSS Automotive uses the most appropriate materials, according to the demand (plastic, brass, steel, aluminum)**
- **VOSS Automotive uses the most appropriate procedures, according to the demand (cast, pressed or forging blanks, extrusion profiles, extrusion, injection molding, friction welding, laser welding...)**
- **VOSS systematically fights for every millimeter of space, e.g. in the line installation, the plug connections and in the integration of sensors**

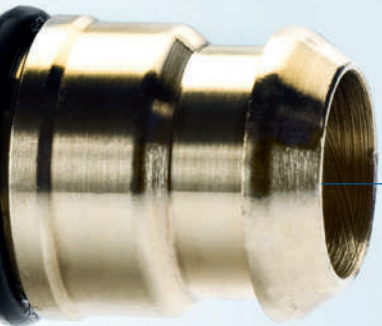




Preassembled line for air suspension systems in passenger cars



Unrestrained passion creating a clearly defined braking distance for you.





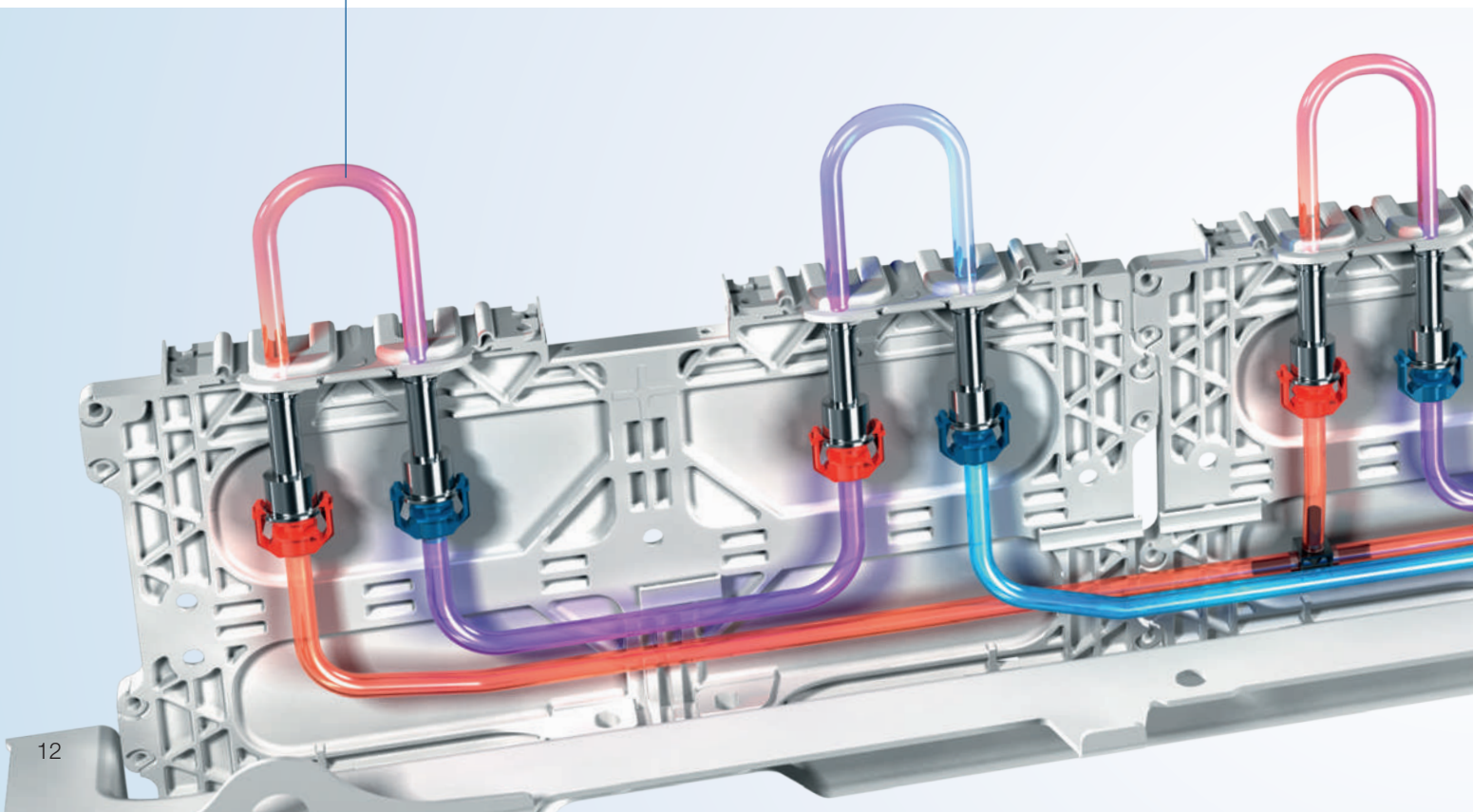
## Thermal management – You'll go longer further.

VOSS makes no compromises when it comes to the thermal management of electric vehicles. Cooling and heating the battery? Ideal usage of space and no pressure loss? Achieve greatest possible ranges and use energy efficiently? VOSS offers the right ready-to-install solution for all needs.

A comprehensive portfolio of connecting systems, tube types and hoses, integrated sensors and manifolds provides all opportunities to optimize the line and connection technology individually for each system. VOSS sees special developments at the specific request of the customer as a welcome challenge.

Be on the safe side with VOSS system solutions for temperature control in electric vehicles.

- **Modular manifold solutions with ideal space usage**
- **Minimized pressure losses**
- **Pre-finished lines for serial/sequential coolant flow**
- **Space-optimized temperature sensor integration**
- **Optional with self-extinguishing material**

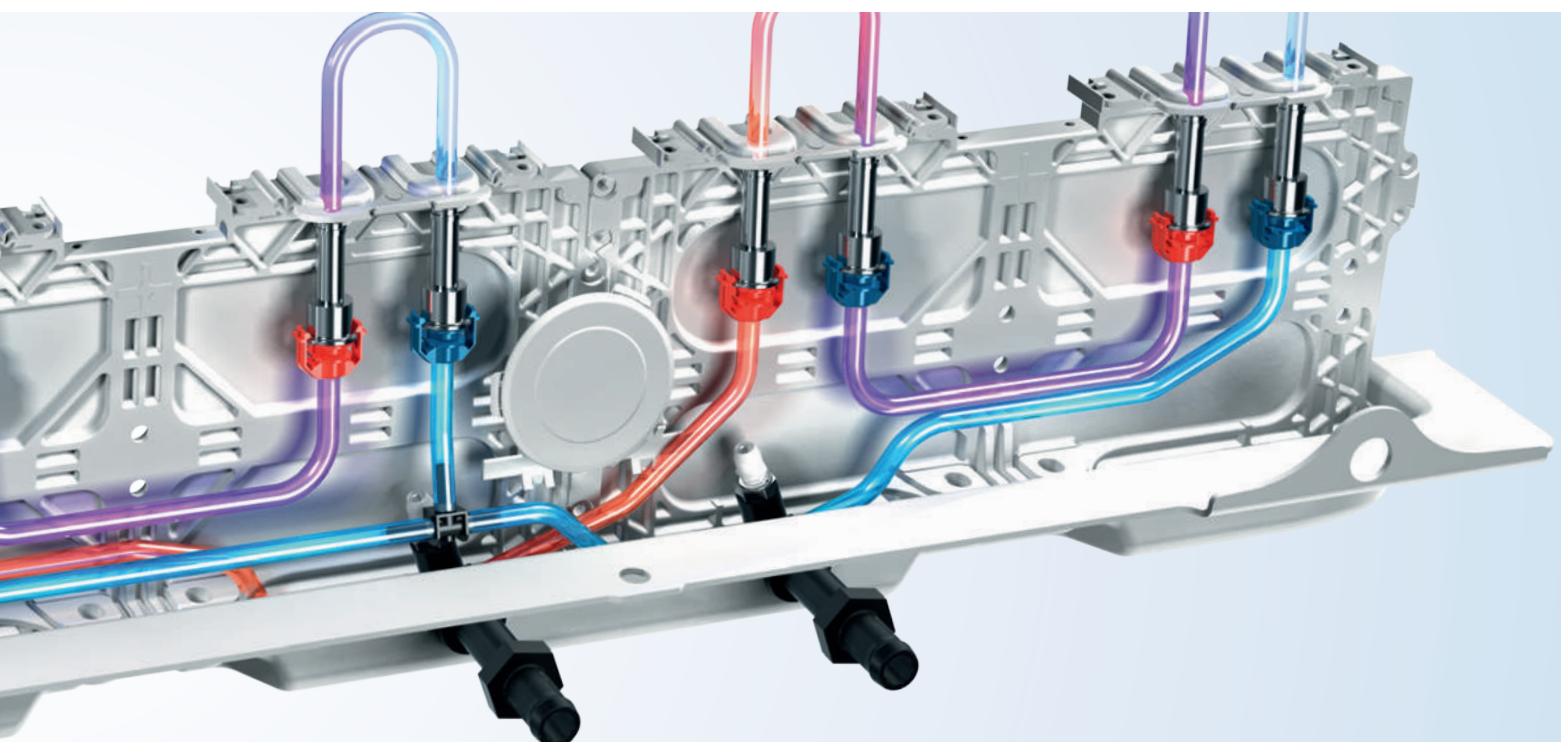




Line assembly with integrated temperature sensor



Customer-specific solutions for battery temperature control





# Only honest sustainability during implementation leaves behind genuine footprints for the future.

The best quality and environmental management is only as good as its diligent execution in all areas. High-end and environmentally friendly technology is only part of the solution. It is supported worldwide by motivated VOSS employees with demonstrated expertise and a well developed sense of responsibility – towards you, our customers, as well as the environment.

For us, worldwide proximity to our customers and development collaboration, sustainable service and comprehensive support are more than just empty words. Instead, it represents our claim that we passionately deliver every day to be completely committed to your needs. While acknowledging an eventful past, we look forward to an even more eventful future. VOSS Automotive is committed to our customers, since even the smallest valve can play an important role. As a market leader, we wish to remain down-to-earth and spend every day earning the trust that you can rightfully expect from a rock-solid partner like us. VOSS Automotive provides you, the customer, with all the benefits that can only come from an independent company.

more than **1/2 billion**

Fir-tree connectors for the compressed-air brake sold since the introduction of quick connect system 230

Supply of approx. **300** customer factories

**17,600** training hours were successfully completed by VOSS employees in 2017 altogether

Nearly **6,000** employees in the VOSS Group

more than **25 mil.** SCR lines sold



## North America

VOSS has been operating its subsidiary in Fort Wayne (IN) since 1996, with focus on development and technical support. Further US offices are located in Detroit and Seattle. In Saltillo, Mexico, VOSS produces line assemblies for the North American market since 2011.

## Europe

The central location for production and development for VOSS is Germany. The headquarters in Wipperfürth is the central point from which we manage the company's business affairs – expanded by a number of subsidiaries and sales offices since the 70s. With more than 1,400 employees, our plant in Poland has a significant importance in our production network. Manufacturing processes for line assemblies serve as a model for our plants in Mexico, China and Bulgaria, where VOSS will open a new factory for the production of line assemblies for car applications in 2019.

## South America

The competence center for the extrusion of nylon tubes is situated in São Paulo. Two factories produce line assemblies and quick connect systems for pneumatic, fuel and SCR applications.

## Asia

In 2007, VOSS opened a factory and development center in Jinan, as well as a sales center in Shanghai. These cover the entire product spectrum. Going forward, SCR technology will be a primary focus. VOSS is represented in Japan by way of a sales center with technical support for the entire product range. In India, VOSS products for compressed-air brakes are the market standard. Since September 2016, the Indian market is managed by VOSS Exotech Automotive Pvt. Ltd. and VOSS Automotive India Pvt. Ltd., both with headquarters in Pune.

# VOSS



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