



Individual thermal management systems
for electric and hybrid vehicles.



THAT'S WHO WE ARE.

FLUID MANAGEMENT FOR VEHICLE AND MACHINE CONSTRUCTION

As a larger medium-sized group of companies, VOSS develops and produces line and connection systems for the automotive industry and mechanical engineering. The success of the VOSS Group is based on great customer proximity, committed employees, innovative products and the demand for permanent top quality for customers with the highest requirements.

With strategic corporate development, a responsible awareness of people, the environment and the region, VOSS has evolved over the past 90 years to an internationally successful group of companies.

VOSS in figures

54

sales partners in
56 countries

6.500

employees

>50.000

marketable
articles

16

international subsidiaries



VOSS

COMPETENCES FOR COOLING SYSTEMS.

OUR SYSTEM COMPETENCE. YOUR ADDED VALUE.

Our expertise is in the development and production of customer-specific system solutions for the thermal management of mobile and stationary applications. For maximum battery performance in electric or hybrid vehicles, optimal temperature control is essential. For this purpose, VOSS designs solutions for connecting and distributing that are tailor-made to meet individual customer requirements.

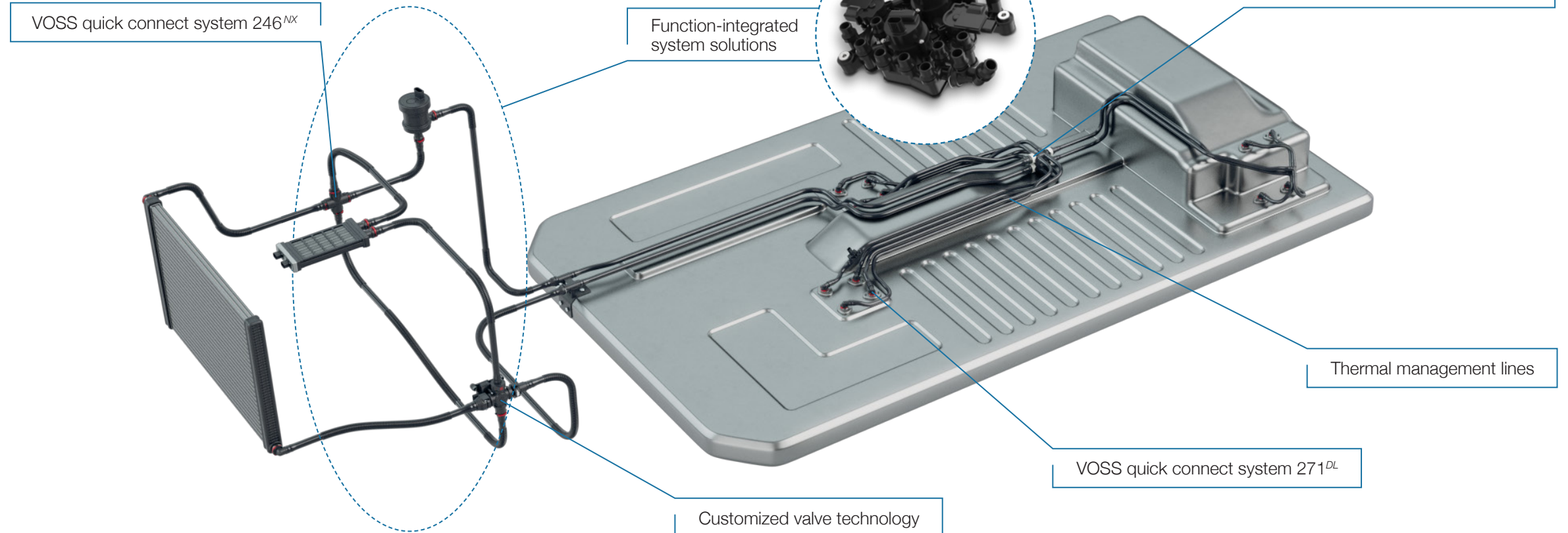
This includes the development of precisely fitting line routings for the smallest and most complex installation spaces as well as the integration of supplementary system components such as quick connect systems, valves, sensors or customer-specific components. Depending on the level of optimization, we work with our customers to develop compact, ready-to-install and functionally integrated modules for minimum assembly effort. In this way, customers and users benefit from the system competence of the entire VOSS Group. This includes not only our innovative product solutions but also our comprehensive services:

- Vehicle analysis and benchmarking
- Innovative product and system development
- Continuous accompanying simulations and FE analysis
- Own test vehicle fleet for field tests under real conditions
- Rapid prototyping and pre-series production
- Validations and tests during the entire product development process
- Worldwide standardized production and assembly processes
- Intelligent logistics concepts
- First installation advice & service also after series production
- Extensive theoretical and practical training
- Worldwide availability of our products & services
- Comprehensive certifications and compliance with the highest quality standards

APPLICATIONS



VOSS SOLUTIONS



COMPONENTS FOR THERMAL MANAGEMENT SYSTEMS

Thermal management lines

Individual solutions for coolant based on line routing and function integration

- Integration of different connection systems, e.g., VOSS QC systems 270, 271 and 246^{MX}, or special solutions according to VDA standard
- Realization of minimum installation space
- Component and installation space optimization through function integration in customer-specific manifolds and connectors
- Integration of temperature sensors possible



- Leak-tight and maintenance-free media-bearing systems along the entire service life of the vehicle
- Minimized pressure losses
- Hydraulic balancing through defined cross-section changes
- Various combinations of hose and tube, plain and corrugated tube, or straight and preformed lines possible
- Customized flexibility by different corrugated tube wave shapes

VOSS

VOSS quick connect system 270^{DL}

Robust plastic couplings for the fir-tree connection of plastic tubes

- Particularly suitable for connections to filigree cooling plates and similar components
- Quick and safe assembly
- Double Lock (DL) for additional safety and active confirmation of the correctly connected QC system



- Very low system height
- Release mechanism can be supplied in two different positions for easy access
- Nominal sizes S6, S10, S14
- Temperature range -40 °C to +85 °C
- Operating pressure max. 2 bar

COMPONENTS FOR THERMAL MANAGEMENT SYSTEMS

VOSS quick connect system 271 ^{DL}

Robust plastic plugs for the fir-tree connection of plastic tubes

- Suitable for components with recessed ports, or with material for profiled bores
- Quick and safe assembly
- Double Lock (DL) for additional safety and active confirmation of the correctly connected QC system



- Very low system height
- Release mechanism can be supplied in two different positions for easy access
- Nominal sizes S6, S10, S14, S18
- Temperature range -40 °C to +85 °C
- Operating pressure max. 2 bar



VOSS

VOSS quick connect system 246 ^{NX}

Plastic QC system for convenient connecting, positioning and releasing

- System-specific 246 connection contour for low height of aggregate connections and adapters
- Quick, safe assembly and disassembly
- High positive engagement of release clip to connecting profile allows higher pressures



- Release mechanism can be rotated into eight different positions for easy access
- Nominal sizes 8 and 12 for different tube sizes
- Temperature range -40 °C to +120 °C
- Operating pressure max. 10 bar



COMPONENTS FOR THERMAL MANAGEMENT SYSTEMS

Customized valve technology

Future-oriented valve solutions for thermal management applications

- Broad spectrum of expertise: mechanically, pressure, thermally and electrically actuated valves
- In-house developed actuators with tailor-made communication protocols
- Integration of VOSS quick connect systems possible



- Modular design concept for individual requirements
- Combination with customer-specific manifolds and connectors
- Minimal internal leakage flows
- Easy integration into function-integrated system solutions (modules)



Function-integrated system solutions

Customized thermal management modules for the optimization of cooling water circuits

- Integration of valves, lines, connection systems, sensors or manifolds into ready-to-install assemblies
- Reduction of single components and circuit complexity
- Minimized line length and optimal utilization of installation space by combining different line sections
- Significant weight savings on the aggregate side and in the water set
- Optimization of system pressure losses and thus the effectiveness of the system through individually designed flow channel cross-sections

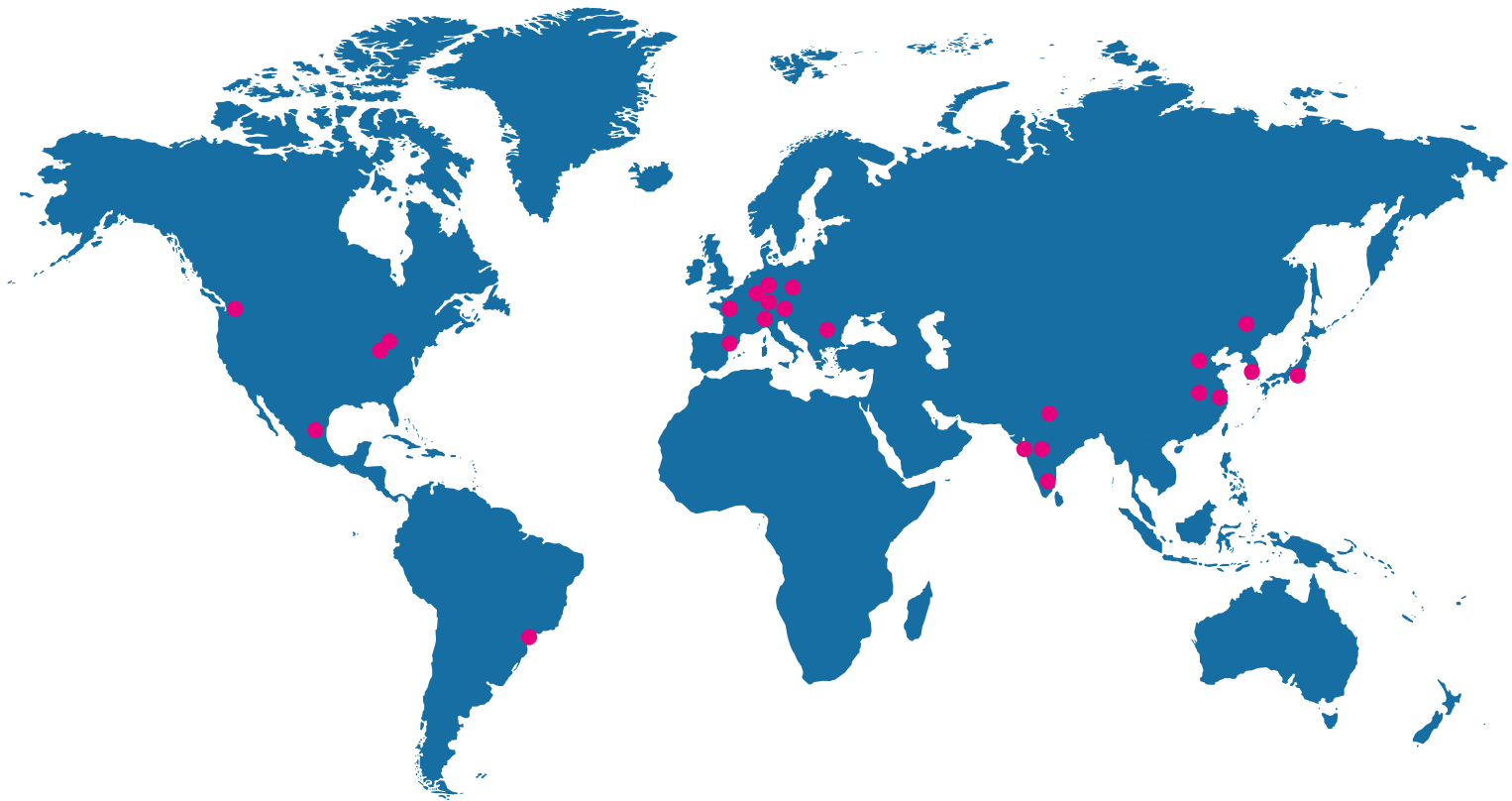


VOSS



- Effective control of the different cooling circuits by implementable VOSS own proportional valves with in-house developed actuators
- Improved assembly behavior due to ergonomic arrangement of the connection points and pre-checked functions
- Only one central electronic interface to the vehicle electrical system
- Minimized assembly time in the production line
- Optimized organizational effort through reduction of part numbers and responsibilities
- For maximum performance and battery life and thus increased vehicle range with minimal emissions
- Minimization of the CO₂ balance due to the use of recycled material

VOSS



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