

The comfortable and cost-effective road to the future

Heating and air-conditioning systems for trucks



When a good working climate also lowers costs. That's Feel the Drive.



Trucks are mobile workplaces, in which comfort has a direct impact on safety. Not just the driver, but your balance sheet will feel the positive effects of our heating and air-conditioning systems. You save fuel thanks to less engine idling time and a more focused driving style.

Our comprehensive climate expertise helps you reduce costly engine idling times. As it is, many countries have already prohibited these during rest stops. That's why the Webasto non-idling solutions generate and maintain a pleasant temperature in the driver's cab – totally independent of the engine. Thereby fuel consumption drops and – as a positive side effect – so do the emission of pollutants.

Deftly putting the brakes on costs

This way, your driving is not only cost-efficient, but conscientious. On average, an idling truck engine consumes three liters of fuel.

And that figure is hourly. What's more, there's also increased wear and tear that affects both the engine and the auxiliary equipment. These are costs that Webasto helps you save.

Breaks that relax – driving that is focused

Sit back, relax and enjoy the drive. Just like your drivers. Following a break with pleasant temperatures and without annoying engine noise, they are especially rejuvenated as they get back on the road. The driver can concentrate and drives with more control and awareness.

On the road with know-how

At Webasto, our focal point is our customers and their individual requirements. And we've been doing that for over 110 years. To accomplish this, we seek innovative solutions in all areas – both in original equipment and for retrofitting. Aside from our specific knowledge of the market, what helps us do this is the know-how that we have acquired as one of the 100 leading suppliers to the automotive and commercial vehicle industries. As a family-owned company with over 50 locations worldwide, we aspire to exceed expectations by always offering a bit more. That's what drives us. That is our motivation. And that's Feel the Drive.

When our know-how is an investment in the future.

Heating is our core competency. As the market leader, we constantly refine and develop it for our customers. We were early in identifying electromobility as a growth market.

The Webasto High-Voltage Heater (HVH) represents the future of heating solutions for electromobility. In developing this device, we have made substantial advances over other heaters. By using new technologies, we have succeeded in achieving superlative loss-free conversion of electricity into heat. The high-efficiency heater operates with an effectiveness level of up to 95 percent and can be used flexibly in a voltage range of up to 450 V DC.

Our promise

We are there for you from the initial concept. And we support you through all stages from design, development and validation all the way to after-sales. That is our promise. One that we can give you as a global systems supplier. That is a promise you can rely on.



When restorative breaks make driving more efficient.

Fuel consumption is one of the greatest cost drivers in the transportation business. Fuel-efficient engines alone cannot possible compensate for the huge spikes in fuel prices. However, a focused driver and a parking heater equipped with engine-off technology can make a significant contribution to cost reduction.

Concentration saves fuel

It is a well-known fact that fatigue at the wheel frequently leads to accidents. Mercedes-Benz wanted to determine whether there was a correlation between the driver's ability to concentrate and fuel consumption. Do well-rested drivers drive more economically? The conclusion of the study: Yes. Using real-life conditions, the study explored the influence of a short nap on driving performance. For example, the tests compared how often fatigued and well-rested drivers used the service brake or

the adaptive cruise control. The results: The braking behavior differs significantly – to the advantage of the rested truck drivers. Their trucks consume less fuel. In a comparison, that can amount to one liter of fuel per 100 km.* The reason: only those who can fully concentrate are capable of driving their vehicles with the necessary control and awareness required to avoid unnecessary braking and acceleration.

**Source: Mercedes-Benz TopFit trucker study, 2010*



Engine off and relax

Our engine-off technology ensures revitalizing breaks and downtime without engine noise – and without fuel consumption. It heats by using the residual heat of the powered down engine. So even on long breaks, thanks to the parking heater, the temperature

of the engine and the cabin remain constant. Webasto parking coolers also ensure pleasant temperatures without the engine running.



How great is the potential for savings in your vehicle? Our calculator on the Webasto website figures it out for you.

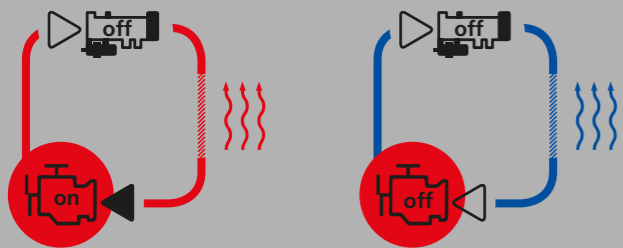
When the engine is off and the cabin has the right temperature.

Ideal for short downtimes as well as long breaks: With the Webasto engine-off technology your cabin always maintains the perfect temperature – and that with the motor switched off. Thus, right after your drive, the Webasto solution utilizes the residual heat of the engine to heat the cabin. Later the parking heater is automatically activated.

- Your benefits:**
- No unnecessary engine idling
 - The perfect cabin temperature at all times, without the engine running
 - Reduction of fuel costs
 - Efficient utilization of engine's residual heat

This is how the engine-off technology works:

Without engine-off technology



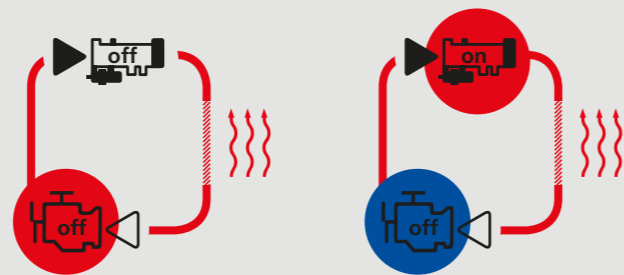
Engine is running:

The engine generates heat that is distributed via the cabin's heat exchanger.

Engine is off:

Turning off the engines, the heat transport is stopped through the interruption of the coolant flow to the cabin. The heat energy, which is stored in the engine, is not used anymore and the cabin temperature decreases.

With engine-off technology



Engine is off – use of residual heat:

The heater continues to use the available residual heat of the engine, since the Webasto circulation pump ensures the transfer of residual heat through the cooling circuit. Cabin temperature remains constant.

Engine is off – with parking heater feature:

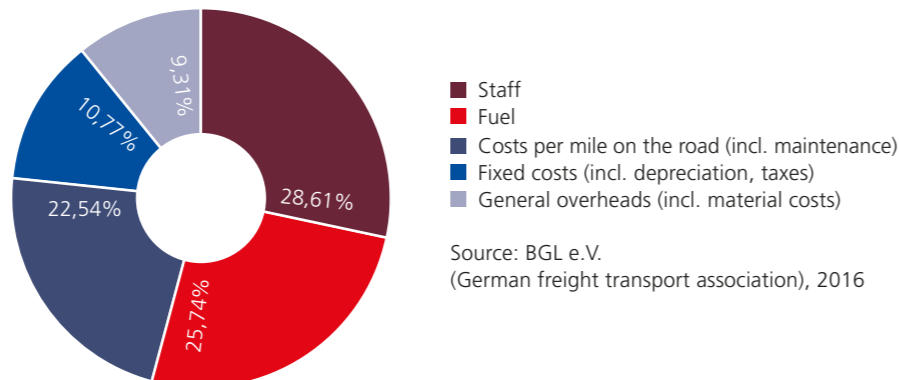
When the engine cools down further, the parking heater is automatically switched on. Engine and cabin temperature remain constant.

Engine
 Water heater
 Pump on
 Pump off
 Cabin interior heat exchange system

Fuel is the key cost driver

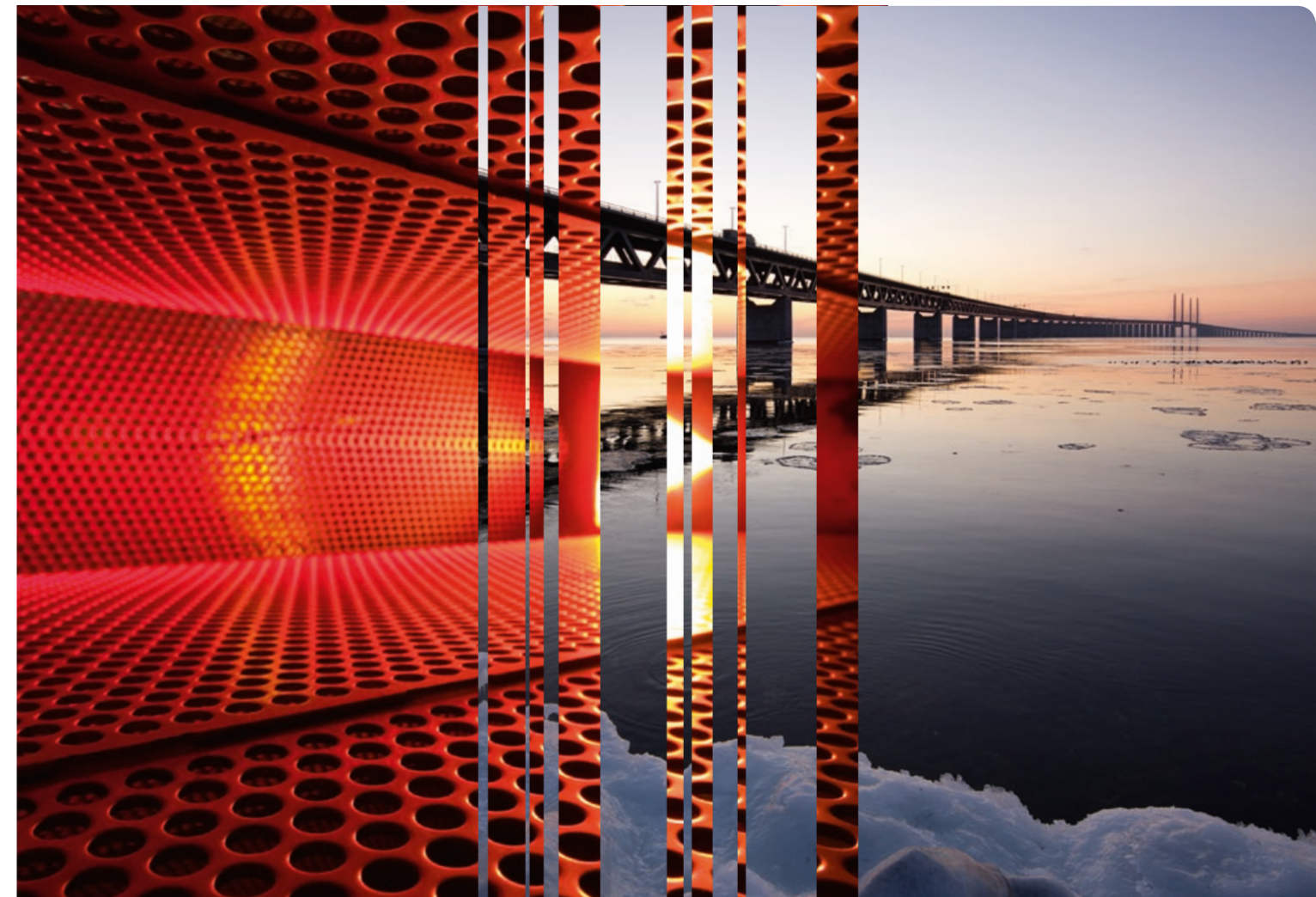
The largest cost pools

Expenditures for fuel constitute the second largest cost factor in the industry. A fact that is unlikely to change in the future. Therefore, savings in this area really add up.



Source: BGL e.V. (German freight transport association), 2016

The nearby chart illustrates the cost breakdown, using Germany as an example.

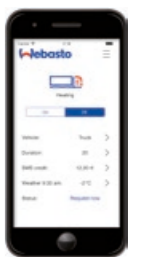


When the parking heater does its job and keeps out the cold.

With us you have a choice of air or water heaters, with the systems differing both in their functions and performance categories. What they do have in common: They are easy to operate and, depending on the customer's preferences, are available in a variety of models. The burner technology that we have developed also ensures that Webasto heaters operate in a very fuel-efficient manner. Aside from the driver's cab, they also heat the cargo space. On the following pages you will determine precisely what the individual strong points of the air and water heaters are.

Smart at the start

Our ThermoCall App ensures ahead of time that your Webasto parking heater will provide comfort when it's switched on. You can simply set the temperature and service time with the Smartphone App. Heating and ventilation at the touch of a button – and what's more, it all happens no matter where the user is located.



ThermoCall App

Webasto air and water heating systems are

- Efficient: They save resources and costs
- Compact: Space-saving installation in any vehicle
- Flexible: Option for interior and exterior installation



When the engine is turned off and the air heater turns on.

Quickly, efficiently and evenly, is how Air Top air heaters warm up your vehicle, even when it's still parked. The motto is: Get inside and feel good. And that also goes for rest periods. Thanks to air heating, you can enjoy these entirely without engine noise. The positive side-effects: Because the engine is turned off, fuel consumption and operating costs go down.

By offering heating output from 2.0 kW to 5.5 kW, we can provide you with just the right system for your requirements. The integrated altitude sensor guarantees that even at low air pressure in high-altitude locations – and the resulting low oxygen concentration – the heaters always deliver optimum heating performance.

Your benefits:

- Particularly even heat-up process with progressive performance regulation
- Low-noise operation
- Stable constant temperature
- Low power consumption
- Automatic altitude mode for Air Top Evo devices

| | Air Top 2000 STC | Air Top Evo 40 | Air Top Evo 55 |
|--|------------------|----------------|----------------|
| Heating capacity, control range/boost (kW) | 0.9 – 2.0 | 1.5 – 3.5/4.0 | 1.5 – 5.0/5.5 |
| Nominal voltage (V) | 12/24 | 12/24 | 12/24 |

Example of integration of an air heater

When not only fuel costs but emissions are reduced.

Twice as economical. That's how to describe the Webasto Thermo water heaters. For they heat not only the driver's cab, but the entirety of the vehicle's own coolant circuit. The engine is already preheated when the trip begins, so you avoid cold starts. Moreover, fuel consumption and pollutant emissions are reduced.

And the interior is already heated to a comfortable temperature before the drive begins. The cabin is preheated to a feel-good temperature level using a heat exchanger and fan. Here too, the integrated altitude sensor ensures optimum heating performance – even at high altitudes when the air pressure and oxygen concentration decline. So you're always on the road both cost-effectively and comfortably.

Your benefits:

- The engine is already at operating temperature before the drive begins
- Consistent, individually adjustable temperature
- Efficient use of residual heat
- Automatic altitude mode

| | Thermo Pro 50 Eco | Thermo Pro 90 |
|--|-------------------|---------------|
| Heating capacity, part load/full load/boost (kW) | 2.5/5 | 1.8/7.6/9.1 |
| Nominal voltage (V) | 24 | 12/24 |

Example of integration of a water heater



When Our Air-Conditioning Makes Your Work Easier.

The air-conditioning system in the cab must function reliably so that the driver to perform his task in a relaxed and efficient manner. The Cool Top RTE 16 rooftop air-conditioning system impresses with its high quality components and durable technology.

Ideal Climate in the Driver's Cab

The RTE 16 stationary air-conditioning system reliably ensures pleasant temperatures and humidity levels in truck cabs. The compressor-driven system is filled with coolant and is connected to the vehicle's 24 V battery.

Simple, Individual Operation

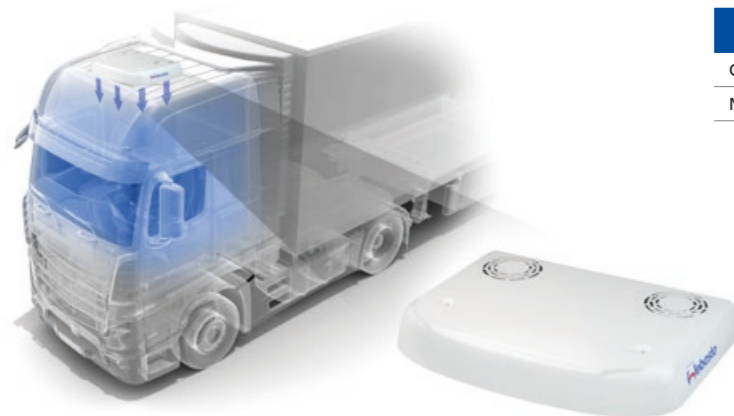
While the air conditioner offers automatic temperature control, it can also be set manually. Thanks to the easy-to-read display, the driver can maintain a constant overview of the system and is able to control it intuitively. The supplied remote controller also offers an extra degree of convenience.

Your Benefits:

- High-performance stationary air conditioning system (1,600 W) with a high degree of energy efficiency
- Optimum air distribution and quiet operation
- Lightweight construction
- Slimline design (just 14 cm high) allows installation on top of high cabs
- Low voltage disconnect function ensures that the engine starts
- Large selection of vehicle-specific installation kits

The high cooling capacity combined with a lightweight and slimline design delivers one of the best stationary air-conditioning systems available.

| | Cool Top RTE 16 |
|----------------------|-----------------|
| Cooling capacity (W) | 1,600 |
| Nominal voltage (V) | 24 |



Example integration of a stationary air-conditioning system

When E-mobility Becomes More Comfortable and Efficient with New Heating Technology.

Heating systems for electrically powered commercial vehicles not only need to heat the interior quickly and reliably – they must also operate highly efficiently and reduce the drain on the vehicle's battery to a minimum. Thanks to its novel heating layer technology, the Webasto high-voltage heater (HVH) converts electricity into heat with virtually no losses. The unit is suitable for all electric and hybrid commercial vehicles.

Technological Edge

The innovative technology from Webasto utilizes an extremely thin heating layer that is firmly bonded onto the heat exchanger, and a large contact area for heating the coolant. The HVH therefore achieves extremely fast heat-up times, high precision and maximum efficiency. Furthermore, the system is characterized by its low installation space requirements.

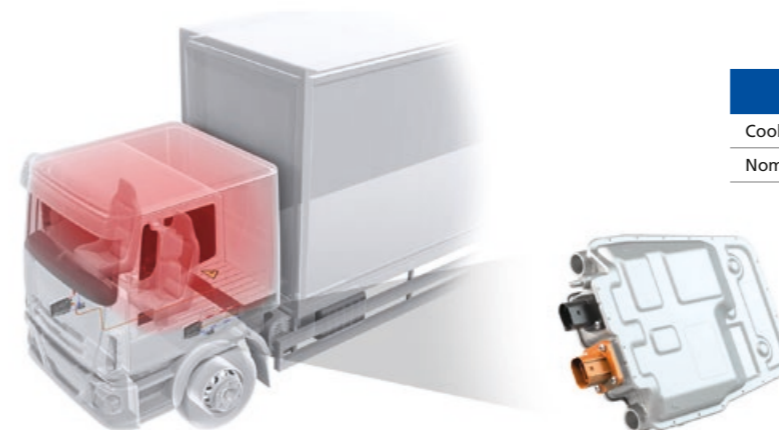
Your Benefits:

- Powerful and reliable heat output – constant comfort for the driver
- Fast and efficient power output – longer driving experience without wasting energy
- Precise and infinitely adjustable – better performance with maximum range
- Reliable and certified safety – three failure protection mechanisms for guaranteed safety

Good to know: The HVH 100 is the only high-voltage heater on the market that is designed for voltages of up to 870 V – as required by many busses, trucks and LCVs.

| | High-Voltage Heater |
|-----------------------|---------------------|
| Cooling capacity (kW) | 5/7/10 |
| Nominal voltage (V) | 12* |

* 24 V via external gateway (optional)



Example integration of a high-voltage heater



When Feel the Drive means always seeking to do things just a bit better.

For 110 years, we have had only one subject in mind: You. What drives us is to be capable of offering you precisely the solution that you need. Does this involve a system perfectly custom-tailored to your requirements? Or do you need a retrofit solution that can be easily integrated into your vehicle? We deliver both.

Individually developed

Are you looking for the perfect air-conditioning solution for your application? We would be pleased to take on your project. From the analysis of requirements to development and validation all the way to production, we guide you step by step as you get closer to exactly the product you want. Of course, our on-site experts work with you in close cooperation in every stage.

Easily installed

And when it comes to retrofitting, you're in the right company. Ensuring comfort doesn't begin when you use our products. It already starts during installation. Everything from the molded hose to the mounting brackets is synchronized and fits easily. The installation instructions describe the retrofitting specifically for your vehicle type.

From our home in Gilching – at home worldwide

As a regionally rooted family enterprise, being close to our customers is particularly important to us. Our specialists on the ground in 43 countries see to that by providing competent consulting, direct project coordination, without detours, and reliable spare parts management. Because we don't just want to meet your expectations, we want to exceed them.

The Webasto quality factor

All our products are subjected to extensive testing, with subsequent production adhering to the specifications of automotive standards. We also provide expert support with the integration of your application solution. Thus, we build specific applications components as needed and perform a prototype installation. As you can see, we do all it takes to deliver exactly the products that you need. With the quality that you expect.

Step by step to your customized solution.



Phase 1: Definition of customer requirements

In a first step we define your specific requirements and work together with you to determine what solution is right for you.



Phase 3: Design

Once the solution has been established, we develop both the mechanical and the thermodynamic design.



Phase 5: Documentation

Critical documents such as user manuals or installation instructions are created.



Phase 7: in actual use

Now it's time for the Webasto solution to really kick off. Even after completion of the project, we continue to look after you with personalized service.



Phase 2: Concept development and simulation

Various simulations help us in our development. Thus, for example, we simulate the design of air ducts or the temperature distribution within the vehicle.



Phase 4: Analyses and tests

From the analysis to EMC tests as far as vibration tests: We put the system to the acid test. And our products have to repeatedly prove their merit in the Webasto climate chamber.



Phase 6: Production/ installation

After all instructions have been drawn up, the fully developed system can be used in actual practice. You get the support of our experts during installation as well as commissioning.

When the business utility of all types of commercial vehicles can be enhanced thanks to innovative climate systems, that's Feel the Drive.

Vehicles change the world. And Webasto is changing vehicles and their world. Our solutions help trucks reach their destinations more economically. Buses and trains are more comfortable. Special and commercial vehicles are more efficient. Whether they are original parts or parts for retrofitting, our products provide sustainable solutions – that benefit the environment as well as companies.

Our dedicated people support you all around the world. Wherever commercial vehicles are planned, produced, redesigned or repaired, we are there for you. Professional, committed and helpful, we see to it that you, our customers, reach your destinations comfortably and efficiently. This is what drives us as a company and inspires our work.

And that is what we call Feel the Drive.

Webasto has developed innovative heating and air-conditioning solutions for the following markets.



Trucks

Efficient heating and compact air-conditioning systems maintain exactly the right temperature in the cabin interior, the engine compartment and the cargo area.



Light-duty vehicles

We provide heating and air-conditioning systems to match your individual requirements.



Buses

Our air-conditioning systems make driving more pleasant and safer.



Rail

Air-conditioning systems for passenger compartments and drivers' cabins, boosting efficiency and comfort the moment the vehicle enters operation.



Off-highway

We supply sturdy and efficient heating and air-conditioning systems for a pleasant working environment, whatever the weather.



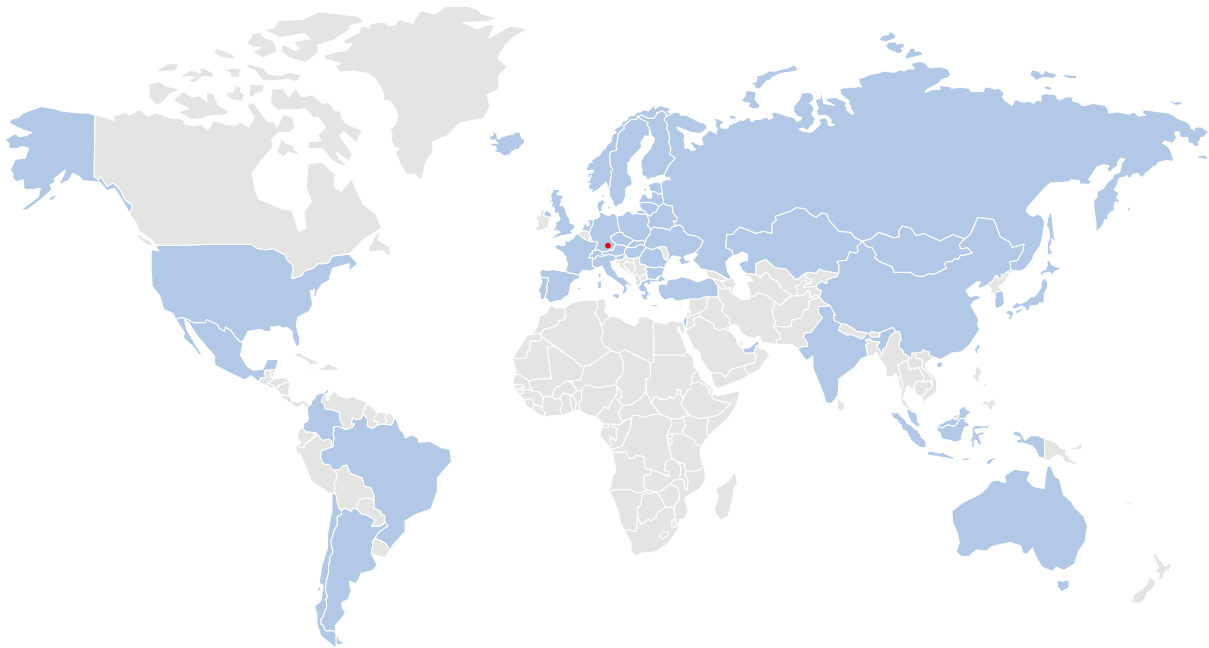
Defense

We provide special heating and air-conditioning systems to ensure vehicles are always ready for action.



Special vehicles

Our solutions make your job more comfortable, safer and more profitable.



The Webasto Group is a global innovative systems partner to almost all automobile manufacturers and among the top 100 suppliers in this industry sector. In its core business areas the company develops and produces sunroofs, panorama roofs and convertible roofs as well as thermo systems for all drive types. In addition, with battery systems and charging solutions Webasto is building up a product portfolio for electromobility. In 2017 the Webasto Group generated sales of 3.5 billion euros and has about 13,000 employees at more than 50 locations (with over 30 of these being manufacturing plants). The headquarters of the company, founded in 1901, is located in Stockdorf near Munich (Germany). For more information please visit webasto-comfort.com