

# Customer-Focused and Efficient. Heating & Cooling Solutions.

For the Construction and Agriculture Industry.





**Webasto – extensive competences,  
innumerable sectors, individual solutions.**



## Webasto – Feel the Drive

As one of the world's top 100 automotive suppliers, everything we do contributes substantially to comfort, convenience and efficiency. That includes customized engine-independent heating and air-conditioning solutions you have come to value as well as market-leading parking and auxiliary heaters for cars, commercial and recreational vehicles and marine. What's more, Webasto is the world leader in the development and production of convertible systems, standard-setting for cars. The parking heaters and sunroofs are available as original equipment and for retrofitting by end consumers. The knowhow acquired over decades in the automotive industry benefits all our markets with highly specialized solutions and top-notch services that meet the specific requirements of our discerning customers.

As Webasto customers, you have the certainty that we are consistently seeking the most innovative and market-driven technologies, investing in bringing them to market. That includes taking the lead in using new materials such as polycarbonate for lightweight design elements, an increasingly important factor in the reduction of fuel consumption. Our solutions for diverse challenges address the demand for value creation, premium quality and customized functionality. Our worldwide network, and our principle of being close to our customers ensures that in a constantly changing environment we are there for you wherever and whenever you need us.



# When our standard is to exceed your expectations.

## **With us, thinking ahead is a tradition**

In the course of our over 110 year history, there have been great changes in technology and market demands. Webasto has advanced ahead of these changes, upgrading our heating, cooling and ventilation competencies, enhancing our capacity to meet the needs of our customers – large and small – world-wide. However, one thing has not changed: At Webasto, the primary focus of every employee is you, our customers and your ability to serve your customers. Our foremost goal is to ensure your satisfaction by providing more than the cutting-edge technology you value. Our sophisticated quality management system guarantees that you can always rely on proven quality and sustainability. We offer you a broad-based, flexible product range from the individually manufactured heating and cooling system as original equipment to customized high-quality retrofit solutions. As the world leader for roofs and components we have the capacity to apply our expertise with large-scale series tailored to any production scope. We aspire to satisfy every customer we serve with every product we deliver. It is what we practice every day in our partnerships with international automotive and commercial vehicle manufacturers – from ambulances to construction equipment - and in meeting your specific needs.

## **Developed just for you – and together with you**

As a top systems provider we know that being prepared for any and all applications is key. Whether you're rolling out a small series of vehicles with original equipment or upgrading a large fleet by retrofitting it with our industry-leading heating or air-conditioning technology, we are ready for you. In our off-highway specialty departments we apply our competence and experience to developing your heating and air-conditioning solutions, from design to testing and validation through to production and installation.

## **We are local worldwide**

As a family enterprise we have a special relationship to our origins. Although our headquarters are in Germany, we believe in the importance of being close to our customers, wherever they may be. Therefore we manufacture our heaters both in Germany, where we have deep roots, and in locations throughout Europe. In fact, our climate competence center is located in Italy, a major production site. Along with a global service and dealer network, our specialists around the globe guarantee short distances, competent contact persons and rapid coordination times.





## When you get the right answer to every challenge.

### **Webasto provides customers with just the right heating and air-conditioning solution for their needs**

Every vehicle and each application is different. As the provider of comprehensive heating and air-conditioning solutions, our product range covers just about all requirements. Our solutions are comprised of three basic technologies with features tailored specifically to the requirements of our customers and their users. The performance categories we offer for each product group reflect the dimensions of the machines – from small equipment to large mining trucks and from small vineyard tractors to harvesters.

#### **Who needs an air heater?**

Imagine construction workers starting their shift on winter mornings by getting into a cab that is nice and warm, with perfect visibility because the windshield is free of ice and snow. And it all comes with no-hassle installation and easy operation. Air heaters are designed to optimize your vehicles' effectiveness and make them winter-ready without incurring huge expenses. Our air heaters offer a variety of power classes ranging from 0.9 to 22 kW.

#### **Who needs a coolant heating system?**

Cold engines are inefficient. They are subject to more wear and tear, so they don't last as long. That means higher costs, increased fuel consumption and more downtime while dealing with time and cost-wasting repairs.

The best way to ensure consistent productivity – even in freezing temperatures – is by installing the appropriate Webasto coolant heating system. Integrated into the machine's coolant circuit, the system brings all fuels and components up to operating temperature even before the engine is started. It also preheats the cab to a comfortable temperature without the need to waste fuel by idling the engine when the vehicle is not in use! With power classes ranging from 2.2 to 35 kW, our coolant heating systems cater to personal temperature preferences and individual situations; for example the new Thermo Pro 90, which we designed especially for professional applications.





Air heater



Coolant heating system



Air-conditioning system

### Who needs an air-conditioning system?

Today, air-conditioning is almost standard, especially in all-glass cabs. As with our cars, there is a growing focus on personal comfort for operators of commercial vehicles, as an effective way to maximize efficiency and meet increasingly stringent environmental requirements. As your professional systems partner, Webasto offers all types of individually customizable air-conditioning solutions, covering all power classes and fitting requirements. Thanks to our broad-based portfolio of compact

components that allow for multiple versatile combinations, we are capable of fulfilling most requirements on demand. What's more, we're also equipped to deliver customized solutions, adapted to your specialized needs and wishes. They range from prototypes, through in-house testing and validation, to flexible on-site cellular production at our manufacturing facilities. Our processes adhere to the highest quality standards – every step of the way.



## When decades of experience make you want to keep getting better – and even better still.

### **Here to help customers for more than 110 years and counting**

For us at Webasto, with our competence centers as well as our subsidiaries, one thing is always key: YOU. We're driven by our aspiration to provide you with exactly the solutions you need. From A to Z. This is not merely an empty promise – at Webasto it's part of our tradition. In fact, we've been doing precisely that for over 110 years.

Our project know-how, our strict quality management, and our no-compromise approach to service have been pulled together into a unique package which is designed to make your work easier, whatever the challenge. Day in and day out, we prove over and over again that our approach works, in joint projects with some of the world's leading off-highway companies – and in projects with companies like yours!

### **Development professionals – for professionals everywhere**

You may be seeking a solution that's a perfect match for your requirements from the moment we start development of your

vehicle(s) until your customer starts the system. Whatever your requirements may be, our development specialists are here to help. We can manage the whole project under one roof: Starting with a precise analysis of your needs, continuing with the development itself and testing, and finally moving into production. We come up just the solution you need – step by step. And of course, as we do this, our experts are there on site to review every individual stage with you in detail.

### **Originally from Stockdorf (Germany) – now at home everywhere in the world**

Our heritage as a company goes back to a traditional, regional, family-run business in Germany. Our roots still mean a great deal to us, as does the "Made in Germany" seal of quality. We're also a strong believer in understanding our customers, which is why we now have experts on the ground in no less than 53 countries worldwide, on hand to provide professional advice on your doorstep to coordinate projects without red tape, and to ensure the reliable supply of replacement parts and products.





## Working step by step to tailor solutions to your needs.



### Phase 1: Defining customer requirements

In the first step, we define your specific requirements and work with you to determine which solution is the right one for you.



### Phase 3: Design

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



### Phase 5: Documentation

Important documents, such as the maintenance manual and the operation manual, are produced.



### Phase 7: In service

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 analysis to EMC testing, all the way to shock and vibration tests: We subject the system to very thorough checks. And our products must demonstrate their fitness over and over again in Webasto's climatic chamber.



### Phase 6: Installation

After all instructions have been written, the climate control system can be put into practice. Our experts will assist you with the installation as well as commissioning.





## When customized air-conditioning solutions set standards.

Delivering technologically advanced, value-added products, Webasto is dedicated to providing energy-efficient and environmentally friendly thermal solutions to its customers around the globe. Webasto engineers design complete customized climate systems using components that stand out for their pioneering advanced technology. Our innovations and superior service come from listening, understanding and cooperating with our customers. Our competences include also rapid prototyping, simulations of systems and components, testing, deep assembly know-how and optimized logistic processes.

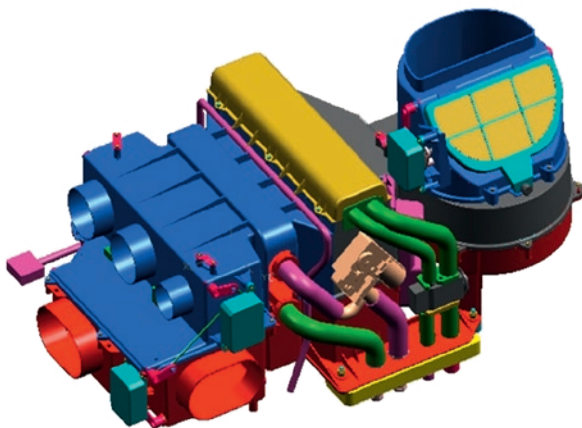
### **Construction of prototypes**

Key factor to successfully engineering an air-conditioning system is the prototyping activity. In order to meet customer needs to reduce time to market, Webasto experience in rapid prototyping really benefits our customers.

Construction of prototypes is carried out starting from the 3D model of the HVAC (Heating, Ventilation, Air Conditioning) unit by thermoforming technology by means of CAD/CAM system or injection molding technology using sinterized or silicon moulds.

Moreover Webasto arrays an experienced prototyping team capable of assembling the complete prototype up to the final functional tests.





Custom solution already planned in CAD



Rapid prototyping



State-of-the-art testing facilities

### Test engineering and on-site endurance testing

Webasto offers in-house testing and validation facilities in the climate competence centre in Italy and laboratories equipped with different test benches measuring various system and component parameters. The endurance test will be performed on shock, vibration and salt spray test benches.

In addition to these tests for specific components, thermal efficiency tests of the complete system installed on the vehicle are carried out in the Webasto climatic chamber which accommodates vehicles up to 12 meters in length. The climatic room recreates the over-the-vehicle airflows, temperatures, humidity rate and solar radiation required by the tests. This facility also allows Webasto – amongst other things – to carry out cooling and heating tests, air flow rate and pressurization tests in dynamic and recirculation mode, noise level tests to assess the noise level of the air conditioner with respect to the noise generated by the engine, electricity balance test to check that the energy supplied by the alternator is, under maximum electrical load conditions, greater than the one absorbed by the various devices.

The following ambient conditions can be simulated:  
temperature: 0 to +55° C, humidity rate: up to 60%, wind speed: up to 60 km/h and solar load: up 900 W/m<sup>2</sup>.

### Production

Even in production, we leave absolutely nothing to chance. Our state-of-the-art certified production facilities turn your concepts into reality.

### Innovative engineering – tried-and-trusted quality

Every single component we provide bears all the hallmarks of reliability and durability, catering to all quality standards laid down by the vehicle industry. Our many innovations and meticulously designed solutions guarantee efficient operation for almost every kind of installation and application.



In-house production

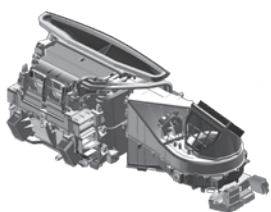
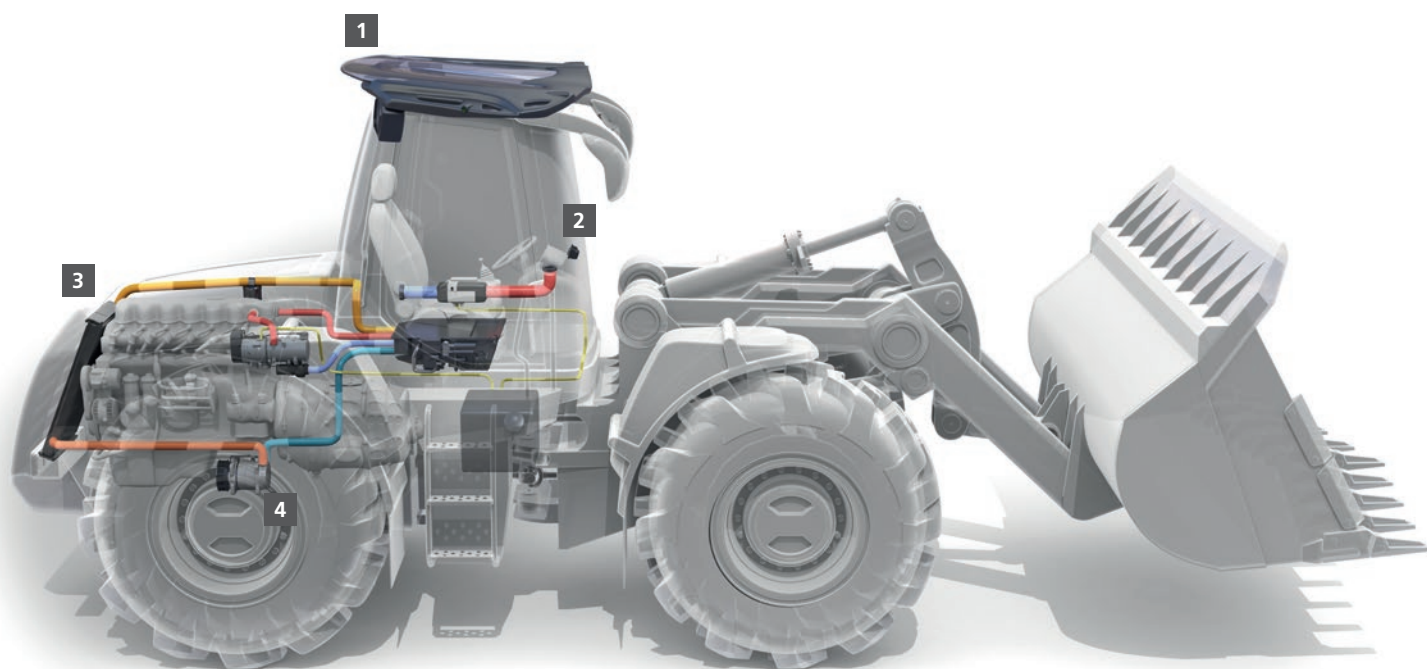


Integrated AC assembly



Optimized logistic processes

## When you get a complete climate system – to meet your specific requirements.



1

Installation optimized HVAC units designed for underseat, rooftop, in-roof or instrument panel integration provide enhanced interior design and driver comfort.



2

Fully automatic, semi-automatic and electrical control units with integrated cutting-edge electronics for regulating the temperature. Integration into the HMI (Human Machine Interface) is also an option.



3

Individual or standardized condensers that are designed specifically for use in construction and agricultural equipment.



4

High-quality compressors from leading automotive suppliers can be implemented as individualized or standardized, upon request.



## Control units for air-conditioning systems

One of the main components of an air-conditioning system is the AC control, the real interface between the operator and the system that allows for controlling and adjusting the air conditioning set point.

Achieving an efficient automatic control of climatic conditions inside a vehicle cabin is a rather complex task due to the great number of influencing factors. This notwithstanding, Webasto – thanks to its great knowhow and experience – has developed its own range of controls and has the capability to customize them both functionally and aesthetically.

In addition to specific developments in terms of your requirements, Webasto offers a full range of controls from simple manual control units to more sophisticated semiautomatic and fully automatic controls managing several functions. They can be mechanical, electric or electronic, featuring a variety of technical and aesthetic content.



Fully automatic control  
– customized version



Electrical control



Semi-automatic control



Fully automatic control

- With an **electrical control**, the software controls the water valve position electrically.
- With **semi-automatic mode**, the temperature is automatically adjusted by the software to achieve the setpoint temperature defined by the operator, while the blower speed is manually controlled.
- With **fully automatic mode**, once the operator has programmed the desired temperature setpoint, both temperature and blower speeds are automatically managed by the software of the control panel.

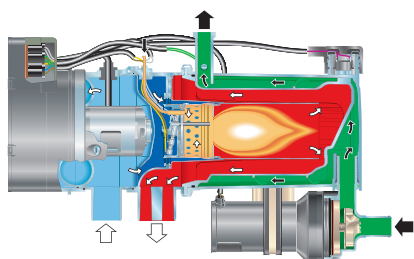
All controls feature a compact design, LED illumination backlighting, silicon face plate technology and up to IP 65 grade face plate dust and water protection

Webasto Automatic Temperature Controls are designed by using the most advanced electronic technology and utilize modern logic. They can operate at different automatic levels, allowing so much flexibility that operators can choose the very best solution to satisfy their comfort need.

With this broad selection of controls, Webasto can really meet every customer requirement.

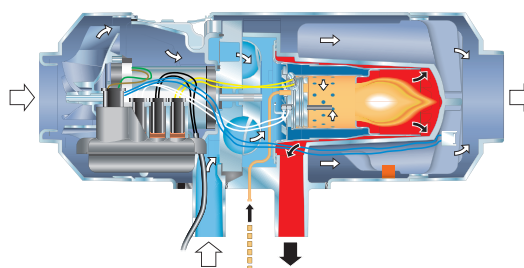


**When heating systems not only keep the machine operators warm, but also save time, money and the environment.**



**When driving is twice as efficient thanks to water heaters.**

In cold climates it can sometimes be difficult to start the engine. It must first be brought up to the optimal operating temperature. Webasto water heaters are directly connected to the coolant circuit of the engine and preheat the engine and the interior by means of the vehicle's own heat exchanger while the vehicle is parked. That protects the engine and reduces consumption right from the start. And you not only save on fuel, but on repair costs. Cost-intensive idling is a thing of the past.



**When your air heater quickly generates warmth.**

The easy to install air heaters heat driver's cabs or transporter interiors. Even when the engine is switched off, they allow for deployment in the fields or at construction sites with particularly low fuel costs. Weighing only 2.6 kg and made of sustainable materials, our air heater is not only the most lightweight device on the market, it's also first choice when it comes to environmental considerations.

**Advantages of water heaters**

- Eliminates cold starts
- Reduce costly DPF maintenance
- Reduce emission burdens
- Reduce fuel costs

**Advantages of air heaters**

- Sustained constant temperature when engine is off
- Low-noise and cost-efficient operation during reconnaissance and monitoring missions
- Flexible and uncomplicated installation



## Control units for heating systems

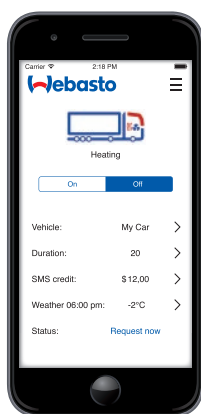
One of the key component of heating systems is the control unit, that enables the operator to control and adjust settings and timing. Webasto offers a wide range to satisfy every comfort or technical requirement.



### MultiControl: Always way ahead

Combining attractive, modern design with minimal installation costs, the MultiControl preset timer is very user-friendly thanks to a large TFT display and multifunction button along with a self-explanatory menu for heating, ventilation and timer control. Programmable 7 days in advance, it also features selection of 3 preset on-times per day.

The MultiControl can also be easily set up and programmed to suit your exact operating needs using the Webasto Diagnostic software. Installation is also flexible thanks to it's flexible ribbon cable which can be bent to 80 degrees. The MultiControl also provides diagnostics for service purposes.



### ThermoCall

The ThermoCall allows for convenient anytime, anywhere control of parking heaters, by phone call/text message or via the app. All it takes is a phone and the ThermoCall control unit installed alongside the Webasto heater inside the vehicle.

The ThermoCall control unit is available in two new versions:

- The entry-level version **ThermoCall Entry** controls your parking heater simply with the on/off function.
- The comfort model **ThermoCall Advanced** which can control multiple vehicles features a variety of functions such as 7-day advance programming, selection of settings for heating, ventilation and automatic, an alarm for unpleasant weather conditions, a display indicating remaining credit on the ThermoCall SIM-card\*, as well as a search function for the nearest Webasto dealer.

### The app for parking heaters – it doesn't get more convenient

The ThermoCall app is free. Navigation through the menu is easy and intuitive and all essential information is listed on the home screen. The restructured, clear menu allows for convenient management of vehicle data and personal settings.

## Unparalleled range – Webasto remote controls



### Telestart T91

The Telestart T91 has an on/off function with feedback and a range of up to 1,000 meters. It is the smallest remote control for parking heaters and features an attractive, compact design.



### Telestart T100 HTM

In addition to temperature monitoring and an on/off function with feedback, the Telestart T100 HTM also offers the option of setting the desired departure time. The intelligent remote control calculates the required heating time based on the current interior temperature. It has a range of up to 1,000 meters.

\* To operate the ThermoCall you need a SIM card with a sufficient balance. Depending on your contract type, the feedback function incurs text message costs.



## When comfort is rewarded with cost savings.

**Webasto presents: automated Engine-Off technology for heating and air-conditioning.**  
**An ingenious way to maintain personal comfort and machine efficiency all day – and still cut costs effectively!**

It is common practice to let the engine run to keep it at working temperature and operators in the cab comfortable. But engine idling comes at a price. Although not in productive use, the machine is still consuming fuel. More than just driving up costs, it also has a huge impact on vehicle maintenance cycles and warranties. With Webasto Engine-off technology for heating and air-conditioning idling becomes superfluous. Your coolant system or compressor keep the engine and cabin at the right temperature even when the engine is off.

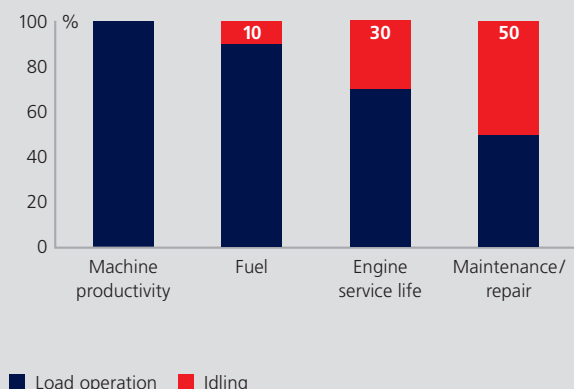
### Engine off – heater or cooling on

When the automatic Engine-Off system is activated, the coolant heater switches on for heating, or the external cooling compressor switches on for air-conditioning as soon as the engine stops. The result: The temperature stays in the optimum range for operators and machinery. So restarting the engine is easier and more efficient – and no more cold starts.

### Longer service life for diesel particulate filters

Diesel particulate filters are necessary to comply with emission controls. When an engine idles, the combustion temperature is too low for the filter to work efficiently. The system must be cleaned more frequently and parts wear out more quickly. Thus, automated Engine-Off technology also helps extend the life of particulate filters.

### Cost distribution across productive and idling time



### Cost reduction due to fewer idling phases

Fuel costs saved when idling in the following percentages is avoided

Excavator (148 hp)



(1,800 annual operating hours, 684 idling hours, 6.4 liters per hour, 1.40 Euros fuel cost per liter)

Wheel loader (527 hp)



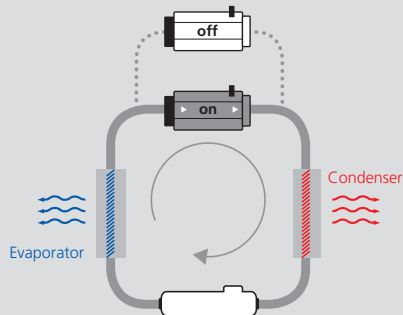
(2,000 annual operating hours, 760 idling hours, 32.5 liters per hour, 1.40 Euros fuel cost per liter)



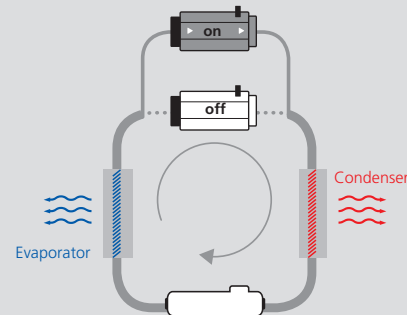
# Always at optimum operating temperature, no matter what the weather. How the Engine-Off Technology works:

## When heating:

The Engine-Off heating system is activated when the engine is switched off. The parking heater is integrated into the coolant circuit and keeps the engine and the cabin at optimum temperature.



The engine-independent heater also optimally heats up large-scale interiors and cabins for several hours.



## Engine off – with residual heat usage:

The residual heat in the engine continues to be used by the heater since the Webasto circulation pump ensures that the residual heat is transmitted through the cooling circuit. The cabin temperature remains constant.

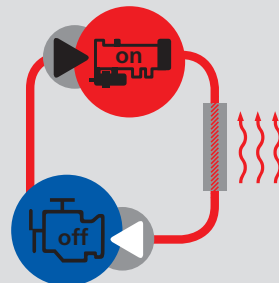
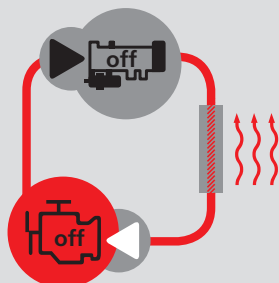
## Engine off – with parking heater functionality:

When the engine continues to cool off, the parking heater automatically switches on. Engine and cabin temperature remain constant.

## When cooling:

The vehicle's own compressor switches off when the engine is off. On the other hand, an external compressor obtains energy

from the vehicle battery and is operated by an external engine. It is activated when the vehicle engine is turned off.



## Engine on – its own compressor on:

The engine runs, the vehicle's own HVAC unit cools the cabin. The engine-driven compressor runs.

## Engine off – external compressor on:

The engine is turned off by the start-stop function of the vehicle. The external Engine-Off cooling compressor replaces the vehicle's own compressor during the break.



## When complete system solutions are designed to meet your exact requirements.

Heating and cooling solutions from a single source. That's our strong point. As the market leader, we have used our competence and knowledge to benefit our customers for decades. Using this experience, we are able to provide you with a comprehensive system to meet all your requirements – with tried and tested products or customized solutions.

### A variety to combinations

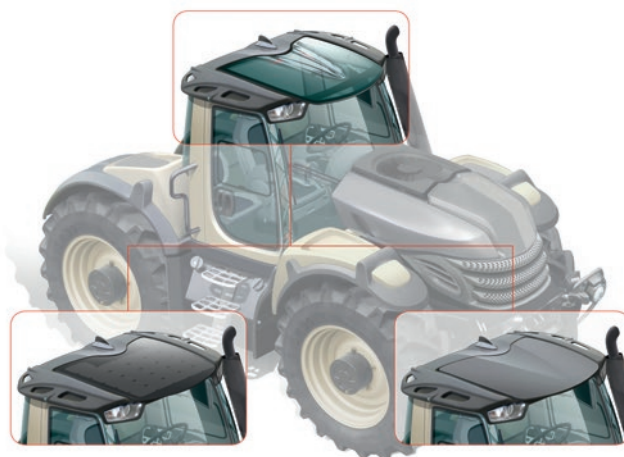
If you are looking for more than just individual products and prefer a complete comfort solution, Webasto is the right place for you. After all, our components can be freely combined to suit your specific circumstances and those of your customers. Moreover, our modular concept offers you a variety of power levels and sizes as well as the kind of flexibility that even extends to interfaces and accessories. For refurbishments, our concept allows you to quickly assemble a cost-effective system that is indistinguishable from a custom-built product – except in terms of availability and cost, of course. Plus, you always have the certainty that all units have been inspected multiple times and tested under operating conditions.

### Customized production at the Competence Center

In addition to the platform alternative, we also offer you the option of a completely individual solution – the “tailor-made suit,” as it were. The know-how gained from many years of development, production, service, and consultation is aggregated at our Competence Center. This allows us to accompany you competently and purposefully on the road towards your specific climate control solution. No matter which alternative you decide on, the development and installation service are always a key part of what we offer you.

### When new opportunities appear on the horizon

The Webasto polycarbonate roof solutions will allow for the creation of a new generation of cabin interiors. How about a transparent panel that can be adapted precisely to any cabin shape or car interior? With a nanotech coating that's almost scratchproof – similar to strong glass, only without the risk of splintering? That keeps the interior cool, even in hot sunlight? That's lighter in weight and even cheaper than comparable glass panels? Thanks to polycarbonate injection molding and coating, all of this and more is possible.





# When close collaboration leads to greater profit and enhanced sustainability.

**Improved performance, lower fuel consumption:** To meet the increasingly complex demands of many markets, it is essential that all components work together in total synchronization. By being instrumental in avoiding engine idling, Webasto heating and air-conditioning systems save on two fronts.

## **Fit for the future**

Efficiency, the sensible use of resources, and comfortable working conditions are becoming increasingly important in agriculture and in the construction industry. The main drivers of change are international emission guidelines such as interim and final TIER IV, and Stage IIIB and IV, which are boosting demand for ever more efficient engines. To do justice to customer requirements, every single part in a machine not only has to be of superlative quality in itself, but also has to work in harmony with all the other parts.

## **Team spirit wins the day**

That is why leading international companies bank on Webasto solutions – not merely based on our strong track record in professional system design and project management, but also because of our innovative technology. All this has made our products key components in the race to create more economical machines. We're proud of our long-standing partnerships with clients and the trust these continue to place in us. And we always enjoy a new challenge!





## **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.



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



**Light-duty vehicles**  
We provide heating and air-conditioning systems to match your individual requirements.



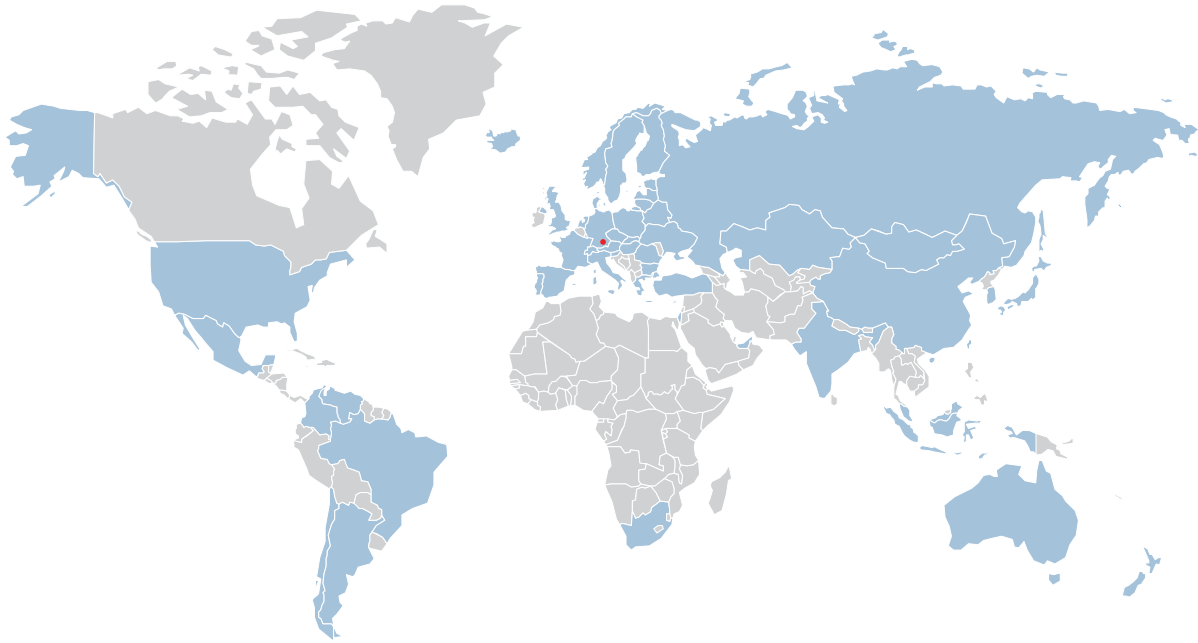
**Defense**  
We provide special heating and air-conditioning systems to ensure vehicles are always ready for action.



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



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



For more than 75 years, the Webasto group has continued to set new technological standards – in both the original equipment sector and the aftermarket. As one of the 100 biggest suppliers in the automotive industry worldwide, we develop and produce roof, convertible as well as heating, cooling and ventilation systems. Our products help provide a better atmosphere on the road, more comfort and security, as well as increased efficiency for cars, commercial and special vehicles, motor homes and boats. An outstanding network of production facilities and dealers guarantees high-quality products, installation standards and services worldwide.