

## EBERSPÄCHER SÜTRAK – THERMAL MANAGEMENT FOR BUSES



MORE THAN A CENTURY OF  
AIR-CONDITIONING EXPERTISE:  
EBERSPÄCHER SÜTRAK

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A WORLD OF COMFORT



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## 100 % THERMAL MANAGEMENT

## PLEASANT CLIMATE FROM EBERSPÄCHER SÜTRAK:

Are you looking for a thermal management partner who will give you expert advice on the ideal climate control system in your vehicle? Someone who offers customised system solutions for cooling, heating and ventilation? And who will provide you with qualified service and a comprehensive supply of spare parts after your purchase? Then Eberspächer Sütrak is just the partner you need.

For more than 50 years, we have been developing your individual system solution for every requirement and every need, ensuring an optimum, comfortable climate in buses and coaches as well as in airport, school and double-decker buses. As the systems developer and supplier, we are capable of combining air-conditioning and heating elements into a single system. Best of all: all our products can be connected with each other effortlessly. We plan all the climate control concepts together with you right from the start, and systematically design all the components according to your performance requirements.

SYSTEMS DEVELOPER AND SUPPLIER

CUSTOMER-SPECIFIC APPLICATIONS

CONCEPT DEVELOPMENT

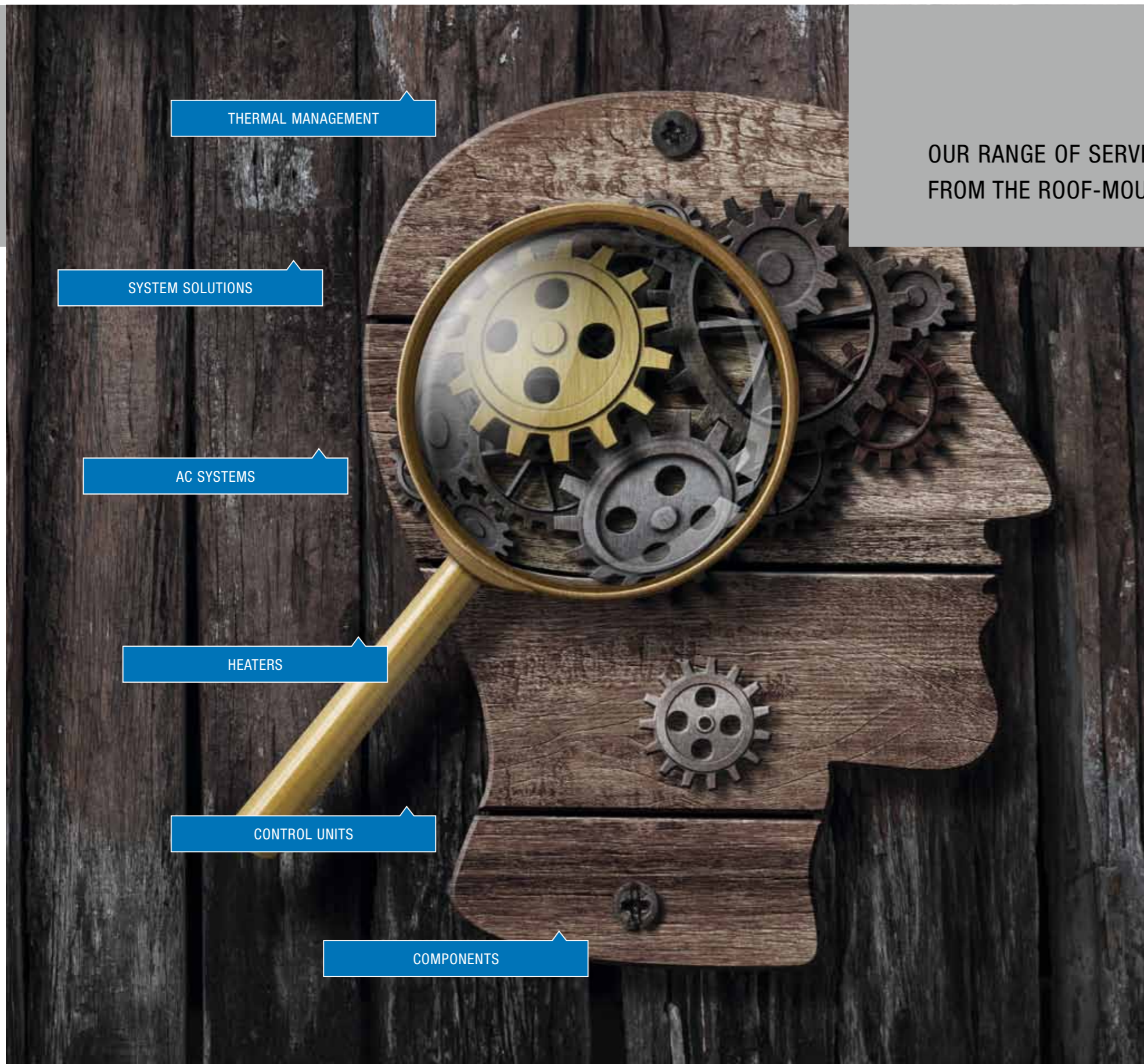
COMPLETE SYSTEMS COOLING, HEATING &amp; VENTILATION

CONSULTATION

GLOBAL PRESENCE



# 1 | EBERSPÄCHER SÜTRAK



THERMAL MANAGEMENT

SYSTEM SOLUTIONS

AC SYSTEMS

HEATERS

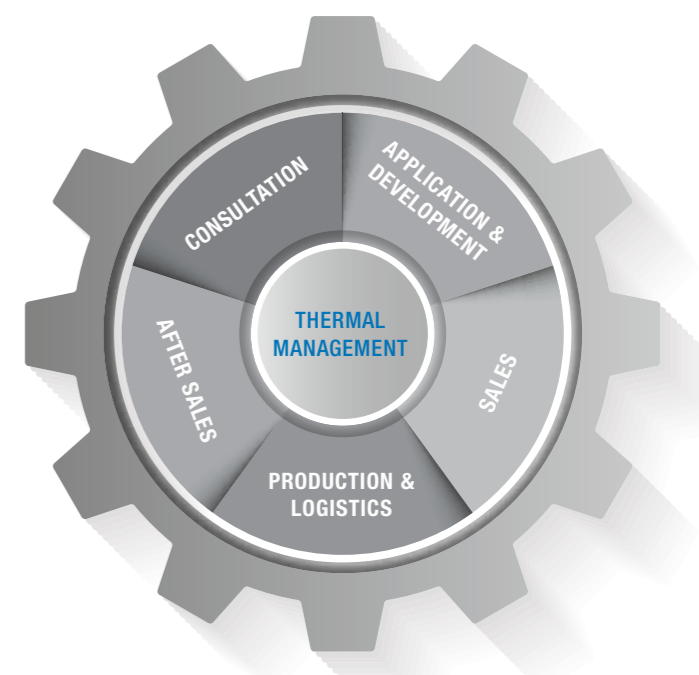
CONTROL UNITS

COMPONENTS

OUR RANGE OF SERVICES –  
FROM THE ROOF-MOUNTED AC SYSTEM TO THE OPERATOR CONTROL SYSTEM

Effective vehicle air conditioning covers both heating and cooling components – requirements for which Eberspächer Sütrak, as a thermal management specialist, offers effective solutions for all types of buses, both for diesel as well as for gas, electric and hybrid drives.

All the elements of a thermal management solution must be simple and robust and perfectly tailored to one another. All our products – from the roof-mounted AC system to the operator control system – are impressive in the very high quality they offer, and are ideally prepared to work together smoothly. From a multitude of components, we put together the right systems for you, and configure them individually for your needs.





## 2 | PRODUCT OVERVIEW

### INLINE ROOF-MOUNTED AC SYSTEMS:



PRODUCT FAMILY  
AC420



PRODUCT FAMILY  
AC520



PRODUCT FAMILY  
AC353



PRODUCT FAMILY  
AC353 NARROW

### PARALLEL ROOF-MOUNTED AC SYSTEMS:



PRODUCT FAMILY  
AC515



PRODUCT FAMILY  
AC136



PRODUCT FAMILY  
AC136 AE "ALL ELECTRIC"



PRODUCT FAMILY  
AC136 AE HEAT PUMP

### ELECTRICAL DRIVER SEAT AIR CONDITIONING, INTEGRATED ROOF-MOUNTED SYSTEMS AND REAR-MOUNTED SYSTEMS:



AC403 E



K403 E



AC188



R488

### WATER HEATERS & WATER PUMPS:



HYDRONIC M



HYDRONIC L



FLOWTRONIC 5000



FLOWTRONIC 6000 SC

### CONTROL ELEMENT:

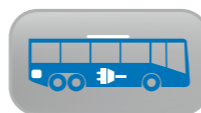
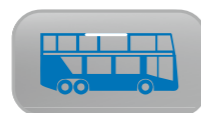
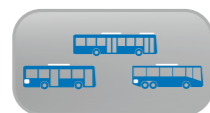


E-CONTROL

### APPLICATION:

Midi buses (8–12m)  
Typical cooling output 6–30 kW  
Typical heating output 8–30 kW

Buses > 12 m  
Typical cooling output 24–48 kW  
Typical heating output 30–35 kW



### 3 | INLINE ROOF-MOUNTED AC SYSTEMS



#### AC420

##### PRODUCT FEATURES:

- For use with small buses
- Available in different power ratings  
max. cooling output: 8-13 kW  
max. heating output: 7-9 kW
- Modular system
- Lightweight design
- For use with micro channel heat exchangers (MCHX)
- Less refrigerant due to shortened refrigerant lines
- Shorter assembly times and improved serviceability due to standardised mounting surfaces
- Refrigerant R134a

##### SPECIAL FEATURES:

- Particularly low life-cycle costs due to longer operating times through brushless fan technology
- For use in temperate climate zones and in hot countries

##### OPTIONS:

- This system can also be fitted with an electric compressor for electric buses.

#### AC520

##### PRODUCT FEATURES:

- For use with mid-size buses (midi)
- Available in different power ratings  
max. cooling output: 15-30 kW  
max. heating output: 30 kW
- Modular system
- Lightweight design
- For use with micro channel heat exchangers (MCHX)
- Reduced refrigerant due to shortened refrigerant lines
- Refrigerant R134a

##### SPECIAL FEATURES:

- Compact design with transverse condenser
- For use in temperate climate zones and at ambient temperatures of up to 55 °C/131 °F

##### OPTIONS:

- Fresh-air option with up to 100% fresh air
- Air intake openings in the centre of the vehicle or at the sides according to roof design
- Brushless fan technology
- This system can also be fitted with an electric compressor for electric buses.

#### AC353

##### PRODUCT FEATURES:

- For use with large buses (Large)
- Available in different power ratings  
max. cooling output: 27-48 kW  
max. heating output: 24 –38 kW
- Modular system permits simple installation
- Lightweight design
- For use with micro channel heat exchangers (MCHX)
- Energy efficient thanks to new air-conditioning technology
- Refrigerant R134a

##### SPECIAL FEATURES:

- Complete performance range for applications in temperate climate zones and hot countries with a cooling capacity of up to 48 kW
- Standardised mounting surface for all model variants
- Lower life cycle costs and even easier to maintain
- Ultra-lightweight for reduced fuel consumption and lower emissions

##### OPTIONS:

- This system can also be fitted with an electric compressor for electric buses.

#### AC353 N (NARROW)

##### PRODUCT FEATURES:

- For use with large buses (Large), especially for school buses
- Available in different power ratings  
max. cooling output: 25-39 kW  
max. heating output: 38 kW
- Modular system permits simple installation
- Lightweight design
- For use with micro channel heat exchangers (MCHX)
- Energy efficient thanks to new air-conditioning technology
- Refrigerant R134a

##### SPECIAL FEATURES:

- Especially for use with reduced roof radii
- For use in challenging climate zones

##### OPTIONS:

- This system can also be fitted with an electric compressor for electric buses.

PRODUCT FAMILY AC420



PRODUCT FAMILY AC520



PRODUCT FAMILY AC353



PRODUCT FAMILY AC353 NARROW



##### APPLICATION:



##### APPLICATION:





## 4 | PARALLEL ROOF-MOUNTED AC SYSTEMS



### AC515

**PRODUCT FEATURES:**

- For use with mid-size buses (Midi)
- Available in different power ratings  
max. cooling output: 13-22 kW
- For use with micro channel heat exchangers (MCHX)
- Optimised system weight
- Lower fuel consumption
- Smaller refrigerant charge through shorter refrigerant lines
- Refrigerant R134a

**SPECIAL FEATURES:**

- For use in hot countries
- Particularly low life-cycle costs due to longer operating times through brushless evaporator fans

**OPTIONS:**

- Max. heating output: 18 kW and other options possible
- 20% fresh air supply
- AC515 with electric compressor for electric buses

### AC136

**PRODUCT FEATURES:**

- For use with large buses (Large)
- Available in different power ratings  
max. cooling output: 27-39 kW  
max. heating output: 37-49 kW
- Modular system permits simple installation
- Lightweight design
- Available in narrow and wide designs
- For use with micro channel heat exchangers (MCHX)
- Lower fuel consumption
- Highly efficient condenser fans produce less noise
- Easy to service
- Refrigerant R134a

**SPECIAL FEATURES:**

- For use in hot countries
- Particularly low life-cycle costs due to longer operating times of the condenser and evaporator fans
- High leak resistance thanks to block connections made to automotive standards

**OPTIONS:**

- More options are available on request
- AC136 also available as an "All Electric" (AE) system for electric buses

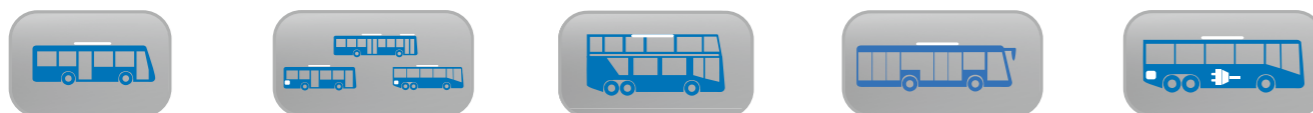
PRODUCT FAMILY AC515



PRODUCT FAMILY AC136



**APPLICATION:**



## 5 | PARALLEL ROOFTOP-MOUNTED AC SYSTEMS – ELECTRICAL

### AC136 AE (ALL-ELECTRIC)

**PRODUCT FEATURES:**

- For use with hybrid and electric buses
- Available in different power ratings  
max. cooling output: 28-37 kW  
max. heating output: 39 kW
- Even air flow
- Modular system permits simple installation
- Lightweight design
- Energy efficient thanks to modern air-conditioning technology
- Refrigerant R134a

**SPECIAL FEATURES:**

- Central air duct system, air intake from window
- Cooling capacity independent of engine speed
- Greater effectiveness though lower heat loss via the windows
- Fans with optimised blade geometry for higher air flow and lower power consumption
- Particularly low life-cycle costs due to longer operating times thanks to brushless fan technology
- For use in temperate climate zones and in hot countries

**OPTIONS:**

- Other options on request

PRODUCT FAMILY AC136 AE  
(ALL ELECTRIC)



### AC136 AE HP (ALL-ELECTRIC/HEAT PUMP)

**PRODUCT FEATURES:**

- For use with trolley and electric buses
- Systems' heating and cooling output can differ
- Modular system permits simple installation
- Lightweight design
- For use with micro channel heat exchangers (MCHX)
- Energy efficient thanks to modern air-conditioning technology
- For use with brushless fan technology
- 100% fresh air supply
- Refrigerant R134a

**SPECIAL FEATURES:**

- Combined heating and cooling thanks to reversible refrigerant circuit
- Condenser suitable for tropical conditions in cooling mode
- Particularly low life-cycle costs due to longer operating times thanks to brushless fan technology

**OPTIONS:**

- Other options on request

PRODUCT FAMILY AC136 AE HP  
(ALL-ELECTRIC/HEAT PUMP)



**APPLICATION:**



## 5 | ELECTRICAL DRIVER SEAT AIR CONDITIONING



### AC403 E/K403 E

#### PRODUCT FEATURES:

- For use with driver seat air conditioning in buses and coaches
- Available in different power ratings  
nominal cooling output: 3.5 kW  
max. cooling output: 4.5 kW
- No refrigerant hose installation required in the vehicle
- Pre-filled refrigerant circuit
- Low assembly costs thanks to shorter installation times

#### SPECIAL FEATURES:

- Fulfills the requirements of VDV236/1
- Two alternatives possible for positioning the air intake in the vehicle

#### OPTIONS:

- Available as a K403 E split version
- Fresh air
- Heater

**CERTIFIED TO**  
VDV DIRECTIVE 236/1

## 6 | INTEGRATED ROOF-MOUNTED SYSTEMS AND REAR-MOUNTED SYSTEMS

### AC188 (INTEGRATED ROOF-MOUNTED SYSTEM) R488 (REAR-MOUNTED SYSTEM)

#### PRODUCT FEATURES:

- For use as integrated split roof-mounted systems in coaches and long-distance buses
- Available in different power ratings  
max. cooling output: 35 kW  
Total heat output: 42 kW
- Partial integration into the air-distribution duct
- Easy to service through simple access to serviceable parts in the bus interior
- Easier to install due to simple assembly
- Refrigerant R134a

#### SPECIAL FEATURES:

- Very low roof installation height
- Improved air resistance and efficiency due to lower height of the system
- Greater effectiveness though lower heat loss via the windows
- Reduced weight
- Integrated outgoing-air opening with patented recirculation, fresh-air and outgoing-air valve

#### OPTIONS:

- Fresh-air option with up to 100% fresh air
- This system is also available as a V188 split system.

#### PRODUCT FEATURES:

- For use as a rear-mounted system for coaches, long-distance buses and double-decker buses
- Available in different power ratings with a maximum cooling output of 53 kW
- Lightweight design
- Reduced weight from 320 kg to 276 kg thanks to new technologies
- Brushless condenser and evaporator fans
- CSDD CAN controller
- Fast installation
- Improved serviceability

#### SPECIAL FEATURES:

- For special use in humid tropical climate zones

#### OPTIONS:

- Other options on request

AC403 E



K403 E



#### APPLICATION:



SPLIT SYSTEM  
V188 + CONDENSER  
= AC188



REAR-MOUNTED  
SYSTEM  
R488



#### APPLICATION:



## 7 | WATER HEATERS



### HYDRONIC M

**PRODUCT FEATURES:**

- For use with midibuses and large bus types
- Available in different power ratings  
M8 diesel/biodiesel: 1,500–8,000 W  
M10 diesel: 1,500–9,500 W  
M12 diesel: 1,200–12,000 W
- Works independently of the engine
- Pre-heats the vehicle interior and engine from residual heat

**SPECIAL FEATURES:**

- Two-fold benefit: pre-heated interior plus pre-heated engine – starting up is more gentle on the engine, uses less fuel, and is environmentally friendly
- Pre-heating protects the engine, the environment and saves costs
- Fully electronic function sequence control

### HYDRONIC L

**PRODUCT FEATURES:**

- For use with all midibuses and large bus types
- Available in different power ratings  
L16 diesel/fuel oil: 16,000 W  
L24 diesel/fuel oil: 24,000 W  
L30 diesel/fuel oil: 30,000 W  
L35 diesel/fuel oil: 35,000 W
- Works independently of the engine
- Pre-heats the vehicle interior and engine from residual heat

**SPECIAL FEATURES:**

- Two-fold benefit: pre-heated interior plus pre-heated engine – starting up is more gentle on the engine, uses less fuel, and is environmentally friendly
- Pre-heating protects the engine, the environment and saves costs
- Fully electronic function sequence control

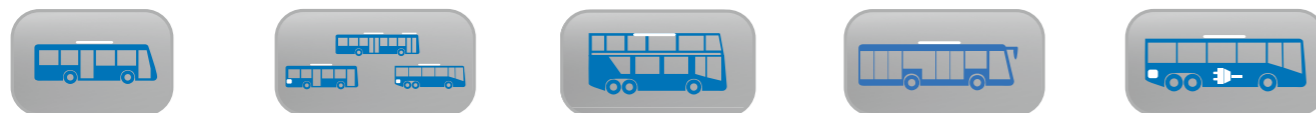
HYDRONIC M



HYDRONIC L



**APPLICATION:**



## 8 | WATER PUMPS

### FLOWTRONIC 5000/5000 S

**PRODUCT FEATURES:**

- For use with midibuses and large buses
- Rapid distribution of heat inside the vehicle
- Delivery rate: 5,200 l/h at 0.2 bar

**SPECIAL FEATURES:**

- Sealing by magnetic coupling (5000 S)

### FLOWTRONIC 6000 SC

**PRODUCT FEATURES:**

- For use with midibuses and large buses
- Rapid distribution of heat inside the vehicle
- Delivery rate: 6,000 l/h at 0.2 bar

**SPECIAL FEATURES:**

- Sealing by magnetic coupling
- Long service life though wear-free drive

FLOWTRONIC 5000



FLOWTRONIC 6000 SC



**APPLICATION:**





## 9 | SYSTEM CONTROLLER



### E-CONTROL

#### PRODUCT FEATURES:

- E-Control is a modular control platform consisting of hardware and software
- E-Control can be used for gas, diesel, hybrid and electric buses
- System integration to the AC roof-mounted system I+II, electric AC system, AC driver's seat system, compressor, convector, heater, floor heater, etc. is simple
- The software parameters can be set to the customer's specifications
- System communicates via CAN (Controller Area Network)
- The software nodes communicate based on the "master/slave" principle via a CAN fieldbus
- Easy to operate thanks to quick-selection buttons
- Clearly structured functions menu

#### SPECIAL FEATURES:

- Vehicle data (telemetry and diagnostics) can be read out via the CAN bus interface at any time
- Settings for different vehicle types can be defined according to customer requirements thanks to an individual control strategy
- Quick and simple programming

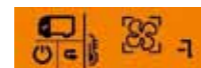
#### ADVANTAGES:

- Individually programmable according to the customer's requirements
- Interface to customer-specific control elements is possible
- Separate use of E-Control Box is possible
- Quick implementation and reprogramming and changes of customer specification possible at any time

#### APPLICATION EXAMPLES:



Selection of areas to be air conditioned



Selection of fans



Selection of fan speed

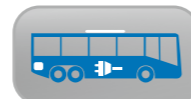
E-CONTROL INTERFACE



E-CONTROL BOX (CONTROLLER)



#### APPLICATION:



## 10 | THERMAL MANAGEMENT COMPONENTS & SERVICES

### COMPONENTS

In addition to integrated solutions for cooling, heating and ventilation for all types of buses, Eberspächer Sütrak also offers high-quality components as well. As a thermal management specialist, we know: the whole is only as good as the sum of its parts. We integrate all the components into your specific system – from compressors, blowers and fans up to condensers and front boxes – for the optimum thermal management solution in your vehicle.

#### INVERTER:



#### BLOWERS AND FANS:



#### COMPRESSORS:

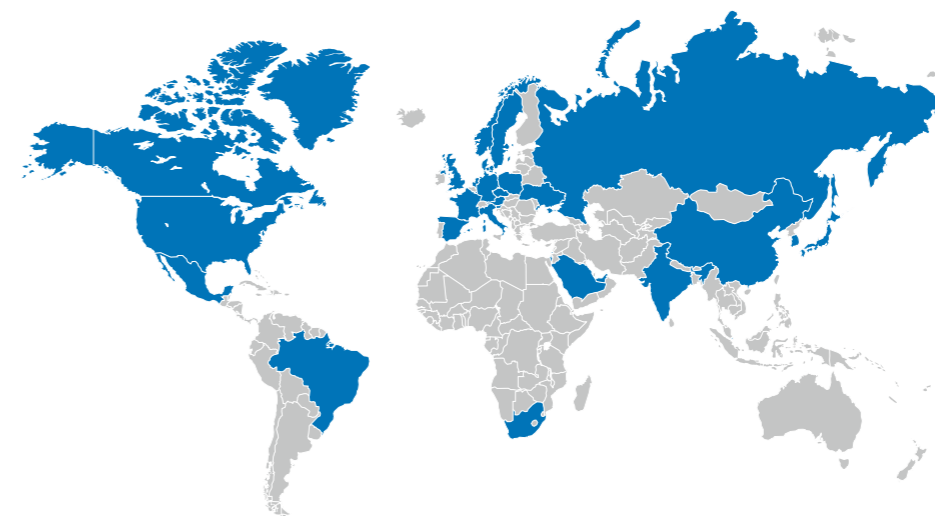


#### REFRIGERANT HOSES AND FITTINGS:



### WORLDWIDE SERVICE

With over 700 service centres worldwide, we're never far away no matter where you are in the world. Specially trained specialists support you during installation, system integration and acceptance of all the thermal management components. Our technical support is specialised in reducing downtimes with fast solutions to any problems. A permanent spare parts supply we guarantee through 3,500 parts held in stock.



## 11 | WORLDWIDE BUS THERMAL MANAGEMENT



- Canada
- USA
- Mexico
- Mexico City
- Monterrey
- Norway
- Netherlands
- United Kingdom
- Germany
- Renningen
- France
- Spain
- Italy
- Brazil
- Sorocaba
- Austria
- Czech Republic
- Poland
- Olawa
- Israel
- Saudi Arabia
- UAE
- China
- Republic of Korea
- Japan
- Russia
- Sweden
- Denmark
- South Africa
- Ukraine
- India
- Bangalore
- Singapore

Many roads lead  
to Eberspächer –  
always close at hand  
all over the world.



### Bus thermal management locations

100 % thermal management from a single source – worldwide. With six locations and more than 700 service stations worldwide, we are represented in all core markets of the bus industry. And never far away when you need us.



Headquarter Renningen, Germany  
Research and development facility  
thermal management bus



Singapore  
Sales and service location  
thermal management bus



Bangalore, India  
Production site thermal management bus



Mexico City, Mexico, Sales and service location thermal  
management bus  
Monterrey, Mexico, Production site thermal management bus



Sorocaba, Brazil  
Production site thermal management bus



Olawa, Poland  
Production site thermal management bus

## MORE THAN A CENTURY OF AIR-CONDITIONING EXPERTISE: EBERSPÄCHER SÜTRAK

### 1906

Wilhelm Weckerle establishes Sümak, shortened from "Süddeutsche Maschinen- und Metallwarenfabrik" (English: South German machine and metal work company), in Stuttgart, Germany. It manufactures commercial refrigerators and compressors.

### In the 30s

Production of transport air-conditioning systems begins.

### 1965

The first bus air-conditioning system is developed.

### 1968

Using a 'Sümak' refrigeration system, the world's first cooled bobsled and toboggan run is built in Königssee-Berchtesgaden, in southern Bavaria.

### 1976

The mobile refrigeration and air-conditioning systems division branches off. Sütrak is founded as a new company. Mass production of bus air-conditioning systems begins.

### In the 80s

The company's global expansion continues with strong growth in the bus air-conditioning sector. The new headquarters in Renningen, near Stuttgart, are opened.

### 1996

The Carrier Corporation, the world's largest supplier of air-conditioning and refrigeration equipment, acquires the Sütrak business.

### 2010

The Eberspächer group acquires Sütrak's bus air-conditioning business in Europe, the Middle East and Africa from the Carrier Corporation. Eberspächer Sütrak's Renningen location becomes a centre of competence for bus air-conditioning and heating systems.