Public

Webasto Defence Competence

A trusted brand for extreme climate operations

MSPO 2024
Kielce, September 3 – 6

Why Choose Webasto?

Global Innovative Systems Partner

Our competencies:

- Many years of trust-based cooperation with Defence and Security OEMs worldwide
- Competence centers including manufacturing and supply chain management
- Profound understanding of customer requirements, meeting low, medium and high-level specifications
- International Project Management
- Diverse range of Products

Products and Integrated Systems from a Single Source

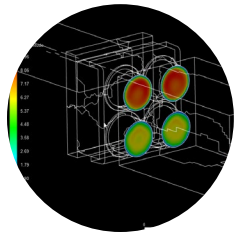
Our broad, robust, standard product portfolio supports many defence vehicle and equipment applications; however, we also recognize, understand and can comply with the special requirements appropriate to defence applications.

Competence from Enquiry to Delivery

In order to support our customer project, we offer integration design support, validation to defence standards and the creation of ILS packages. Everything we offer to defence is done so in line with prevailing government and NATO regulations or restrictions.

Phase 1:
Definition of Customer Requirements

Phase 2:
Concept Development and Simulation



Phase 3:
Design

Phase 4:
Prototype Construction

Phase 5:
Verification, Validation and Documentation

Phase 6:
Production and Testing

Phase 7:
Installation and commissioning

Phase 8:
Integrated Logistics Support

Defence Standards
Webasto understands the requirements to achieve compliance to many of the Worlds most commonly applied defence standards and will support validation activities to those selected by the customer. For reference during development, we use the requirements detailed in the AECTP range of environmental standards

In-house Test Facilities	External Test Facilities
Climatic Chambers	EMC
Acoustic Chambers	Ingress Protection
Salt Spray Chamber	Sand and Dust
Solar Radiation	Altitude
Endurance Testing	…
Shock & Vibration	

Experience on Multiple System Platforms

Armored Vehicles

Personnel Carriers

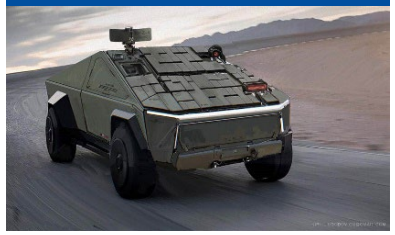
Tracked Vehicles

Off Road Trucks

Logistics Trucks

Protected Cars

Concept Vehicles



Requirements

Rapid vehicle deployment in all climatic conditions, high levels of performance and durability, low RFI signature

Webasto Products

Electric and Fuel Operated Heaters
Integrated and Split Air Conditioners, Ventilation and CBRN Products
Traction Batteries and Battery Management
Fully integrated climate and thermal management systems

Shelters and Special Equipment

Deployable Shelters

Operational Support Equipment

Requirements

Innovative solutions for heating and cooling, deep integration into control systems, low RFI footprint

Webasto Products

Electric and Fuel Operated Heaters
Shelter Cooling and Ventilation Products
Innovative customised air conditioning solutions
Batteries to support power demands and peaks

Heating Systems

For Mission Readiness in Arctic Conditions

With a deep understanding of operating equipment in extreme climate conditions, we provide integrated heating systems that offer maximum performance and efficiency

Vehicle Winterization

- The engine is pre-heated to ensure cold starting and other vehicle systems simultaneously heated to provide rapid operational capability
- Crews experience a warm operating environment in which to remain alert and efficient
- Fuel operated heaters also support the off-grid capability of deployable shelters
- To provide the full benefit of our fuel operated heaters, Webasto offer a wide range of optimized HVAC systems and winterization components

Fuel saving during idling

- Cold starting an engine is, due to the cold start devices and the frictional losses, recognized as a cause of excessive fuel consumption. Pre-heating the engine using a Webasto coolant heater reduces this to a minimum
- Instant drivability improves operational efficiency
- Running the engine during standby or observation duties causes high fuel consumption, engine wear and environmental damage using the preheater as a standby heater provides crew comfort without any of the high-cost disadvantages
- Studies have highlighted that transporting fuel to a theatre of operation is both expensive, and poses a risk of hostile attack
- Webasto helps minimize fuel usage during operational deployment

World Leader for Fuel Operated Heaters

Since the introduction of fuel operated heaters, over 60 years ago, Webasto have been supporting the operational readiness of defence and security vehicles in extreme cold climates around the globe.

Air Top Evo 40 and 55 – Customised Application

Air Heating System for crew and equipment spaces

Key Advantages

- High heating capacity
- Quick and easy installation
- Low noise level
- Low maintenance costs
- F34 and F54 Fuels declared in ECE R 122 Heater Type Approval (E1 00 0385 / 6)
- Commercial Product adapted to defence requirements
- Carbon Fibre casing and RFI filtration reduce the EMC signature
- Suitable for vehicle, shelter and special equipment applications

	Air Top Evo 40	Air Top Evo 55
Heating capacity (kW)	1.5 – 3.5 (4.0*)	1.5 – 5.0 (5.5*)
Nominal voltage (V DC)	24	24
Power consumption (W)	15 – 40 (55*)	15 – 95 (130*)
Fuel types	diesel EN 590, other fuels possible	diesel EN 590, other fuels possible
Fuel consumption (l/h)	0.18 – 0.43 (0.49*)	0.18 – 0.61 (0.67*)
Max. heating air volume flow (m³/h)	132 (140*)	200 (220*)
Operating temperature range (°C)	-40 to +40	-40 to +40
Storage temperature range (°C)	-40 to +85	-40 to +85
Dimensions, ±5 mm (W x H x D) (mm)	422 x 198 x242	422 x 198 x242
Weight (kg)	5.9	5.9
Automatic altitude compensation (m)	2,200 High Altitude: 5,500	2,200

* Values in brackets refer to the temporary increased heating power of the device.

Thermo Pro 50 Eco HA

5kW Heating Power in a compact size

Key Advantages

- Engine-independent heating mode for commercial vehicles with a 2.5 to 5 kW heating capacity
- Weighting just 2.2 kg, this is the lightest heater in its class
- Economical and with low emissions thanks to high efficiency
- Automatic altitude adjustment up to 4,000m above sea level
- Multiple fuel compatibility with F34, F35, F44, F54, F63, F75 included in ECE R 122 Heater Type Approval (E1 00 0471)

Thermo Pro 50		
		Diesel
ECE approval number	ECE R122 (heater)	E1 00 0471
	ECE R10 (EMC)	E1 06 7609
Heating capacity (kW)	Part load - full load	2.5/5.0
Fuel consumption (l/h)	Part load - full load	0.3/0.65
Nominal voltage (V)		24
Rated power consumption without coolant pump(W)	Part load - full load	28/46
Fuels	Suitability for special fuels	Diesel EN 590 Diesel B20 – B30 DIN EN 16709
Operation temperature range (°C)		-40 to +80
Dimensions, ±5 mm (W x H x D) (mm)		218 x 91 x 147
Weight (kg) incl. adaptor and wiring harness		2.2
Automatic altitude compensation (m)		4,000

Thermo Pro 90 HDD

Industry proven coolant heater for demanding military vehicles

Key Advantages

- Engine-independent heating for military vehicles, offering up to 9.1 kW of heating power
- Fast warm-up, even at the lowest temperatures, thanks to the Arctic Start function (-46°C)
- Low heater power consumption due to highly efficient design
- Highest product quality with long service life
- Automatic altitude adjustment up to 3,500 m (standard)
- High altitude operation up to 4,500m possible
- Compliance with various elements of MIL 461F, Mil810G and Mil1275D
- Multiple fuel compatibility with F34, F35, F44, F54, F63, F75 included in ECE R 122 Heater Type Approval (E1 00 0443)

Thermo Pro 90 HDD		
		Diesel
ECE approval number	ECE R122 (heater)	E1 00 0443
	ECE R10 (EMC)	E1 04 7225
Military Standards Compliance (Partial)	EMV	MIL-STD-461F (Ground Army)
	Electrical	MIL-STD-1275D
	Environmental	MIL-STD-810G
Diagnosis		SAE J1939, Off-Board
Heating performance (kW)	Part load - full load/boost	1.8 - 7.6 / 9.1
Fuel consumption (l/h)	Part load - full load/boost	0.2 - 0.9 / 1.1
Nominal voltage (V)		24
Nominal power consumption (W) (with U4840)	Part load - full load/boost	37 - 83 / 90
Fuels	Suitability for special fuels	Diesel EN 590 Arctic-Diesel, up to 100%PME EN 14214,
Operation temperature range (°C)		-40 to +80 successfully started at –46
Dimensions, ±5 mm (W x H x D) (mm)		355 x 131 x 224
Weight (kg) incl. adaptor and wiring harness		5.2

Thermo Top Pro 120/150

High performance coolant heater for the most demanding of cold conditions

Key Advantages

- Tested according to military standards*
- Compact, lightweight and slim design
- Approved for use with paraffinic diesel fuels (HVO, GTL) ECU and all connections on one side
- Easy access to connections for fast installation
- Low noise emissions
- Automatic altitude compensation up to 3,500 m above sea level fitted as standard
- Wide variety of safety and diagnostic functions
- Suitable for use in trucks transporting hazardous goods (ADR)
- Versatile fuel compatibility with F34, F35, F44, F54, F63, included in ECE R 122 Heater Type Approval (E1 00 0480 / 1)

	Thermo Top Pro 120	Thermo Top Pro 150
	Diesel	
ECE Approval Number ECE R122 (heater)	E1 00 0480	E1 00 0481
ECE Approval Number ECE R10 (EMC)	E1 05 7735	
Heat output (kW)	12	15
Fuel consumption (kg/h)	1.37	1.45
Rated voltage (V)	24	
Rated power consumption without coolant pump (W)	80	100
Fuels*	Diesel EN 590, Diesel B20-B30 EN 16709, Paraffinic Diesel EN 15940 (HVO, GTL)	
Operating temperature range (°C)	-46 to +80	
Dimensions L x W x H (mm)	470 x 200 x 200	
Weight (kg)	11	
Automatic altitude compensation (m)	3,500	

*) MIL Standards passed

Shock	MIL STD 810F	FIGURE 516.5-10; TABLE 516.5-II; 4.5.2.3 Procedure I
Vibration	MIL STD 810F	ANNEX C, figure 514.5C-2
Low Temperature Operation	MIL STD 810F	TABLE 502.4-II Cold (C2) 4.5.3 Procedure II – Operation
High Temperature Storage	MIL STD 810F	TABLE 501.4-II 4.5.2 Procedure I – Storage
EMC	MIL STD 461G	CE101+102; CS114-116+118; RS103; RE102 partially

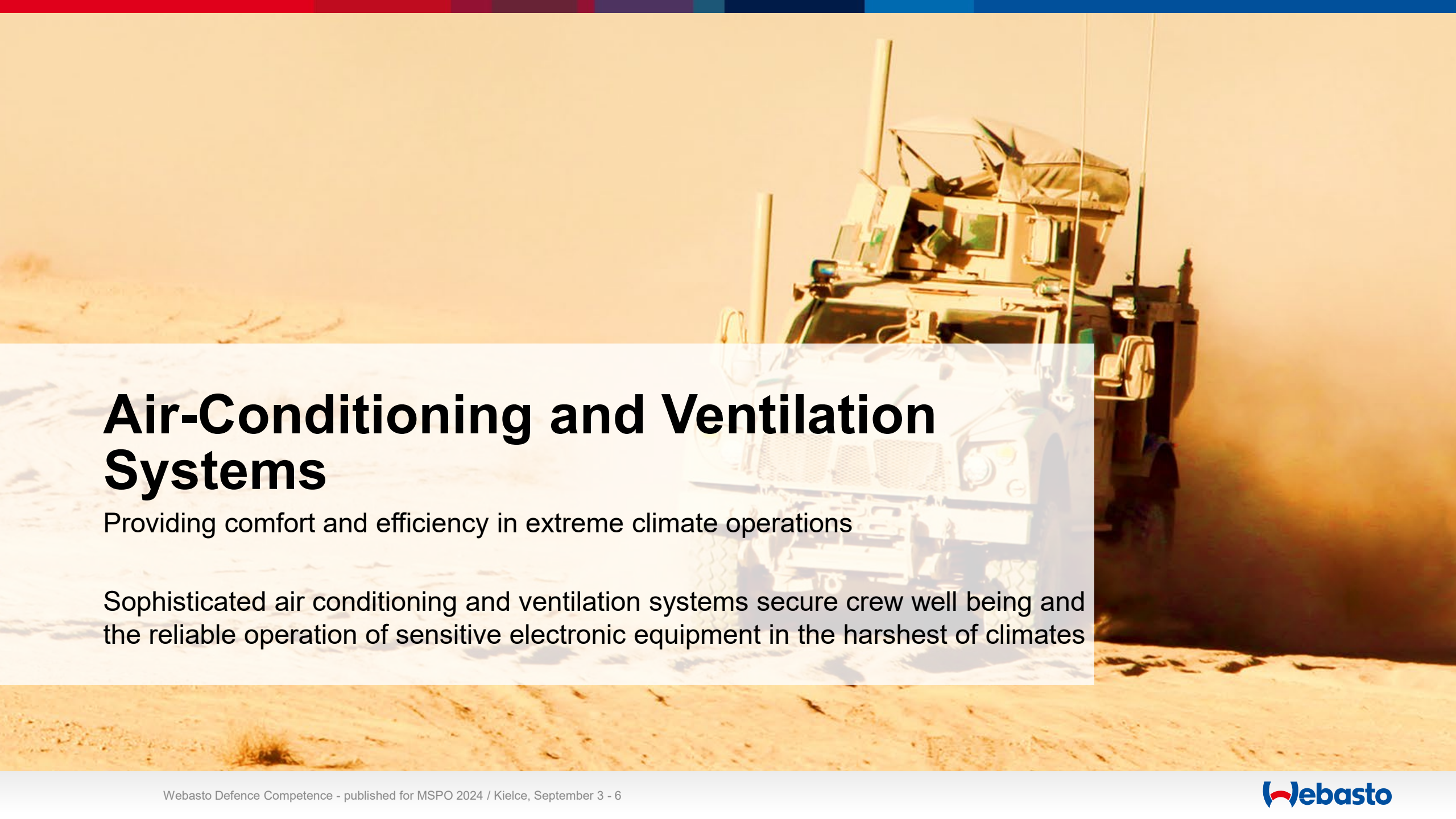
U4818

Coolant pump for all military applications

Key Advantages

- Excellent reliability
- High life expectancy
- Fully compatible with U4815 predecessor
- NATO MIL-STD-461D
- Self supporting water ports. No additional mounting elements required
- NATO supply numbers for all variants available

	U4818
Volume flow (l/h)	4,800
Nominal voltage (V)	24
Nominal power consumption (W)	140
Weight (kg)	3.3
Dimensions, ±5 mm (W x H x D) (mm)	218 x 106 x 106
Ø Coolant connection (mm)	27



Air-Conditioning and Ventilation Systems

Providing comfort and efficiency in extreme climate operations

Sophisticated air conditioning and ventilation systems secure crew well being and the reliable operation of sensitive electronic equipment in the harshest of climates

High Performance HVAC Systems for Vehicle Operational Readiness

Modular and Flexible Air Conditioning Systems are adapted specifically for defence vehicles to provide efficient cooling of the vehicle and its drivers. The systems are flexible, modular design, capable of deep integration and provide a wide range of cooling capacities along with various mounting orientations and versatile connection options.

Fresh air, chemical and bacteriological filters work with our air conditioning to provide occupant safety in the most hostile of environments

Shelter Air-Conditioning ensures Personnel Readiness

Webasto takes cooling to the next level with its reliable and robust range mobile shelter cooling products using field experience gained from all over the world.

These units provide outstanding performance and high quality. A full line of split and compact air-conditioning systems are available, so the solution is engineered to fit the precise operational needs.

Air-Conditioning Systems Suitable for defence Applications

With a broad portfolio of standard and custom designed systems Webasto supports both crew well being and the reliable operation of sensitive electronic equipment in the harshest of climates

Webasto

Breeze 6
Shelter Air-Conditioning System

Key Advantages

- Quick and easy installation
- Universal solution – can be installed in different types of shelters
- Durable construction
- Low noise level
- 230V AC and 3x400V AC version
- Colour customised to system specification

	Breeze 6		
	Evaporator Module	Condenser Module	Compressor Module
Cooling capacity (kW)	6.0		
Refrigerant	R134a		
Power supply (V AAC, 50 Hz)	230	230	3 x 400
Weight (kg)	16	21	42
Total Weight (kg)	79		
Dimensions, ±5 mm (W x H x D) (mm)	829 x 201 x 396	825 x 519 x 295	364 x 257 x 232
Maximum current consumption during operation (A)	2	2	5
Maximum current consumption at start-up (A)	30		
Operating temperature (°C)	-30 to +50		
Storage temperature (°C)	-30 to +50		

Breeze 7E
Shelter Air-Conditioning System

Key Advantages

- Easy and fast installation
- Durable construction
- Automatic controls (auto and manual mode) that may control up to three Breeze 7E and UKG12 A/C units
- Adjustable compressor efficiency
- Logging of alarms and the ability to readout
- Ability to control the air conditioner remotely over Modbus TCP/IP protocol (SNMP possible)
- RCP control box – integrated solution to control ACU and CBRN system

RCP01 (Option)

Breeze 7E	
Max. cooling capacity (kW)	8.5
Max. heating capacity, electric heater (kW)	6.0 (electricheater)
Refrigerant	R134a
System Weight(kg)	182
Dimensions, condenser module, ±5 mm (W x H x D) (mm)	1,160 x 585 x385
Dimensions, evaporator module, ±5 mm (W x H x D) (mm)	844 x 222 x480
Electrical data	
Condenser module voltage (V AC)	3 x400
Evaporator module voltage, +10 %, -15 % (V AC)	3 x 400 – power supplied from condenser module
Nominal frequency, ±2 Hz (Hz)	50
RCP01 module voltage (V DC)	28
Working Conditions	
Operating temperature (°C)	-32 to +50

UKG12
Shelter Air Conditioning System

Key Advantages

- Easy and fast installation
- Durable construction
- Automatic controls (auto and manual mode) that may control up to three UKG 12 A/C units
- Adjustable compressor efficiency
- Possibility to switch on/off remotely
- Additional manual (emergency) control
- Logging of alarms and the ability to read-out
- Ability to control the air conditioner remotely (option) Modbus TCP/IP protocol (SNMP possible)
- Prepared for working with CBRN system
- Operation via integrated RCP control box possible
- CBRN ready, fresh air intake flap controlled

RCP01 (Option)

UKG 12	
Max. cooling capacity (kW)	12
Max. heating capacity, electric heater (kW)	7 kW
Evaporator fan airflow, max. (m³/h)	2,200
Refrigerant	R134a
Weight (kg)	211
Dimensions, ±5 mm (W x H x D) (mm)	1,820 x 582 x565
Electrical data	
Nominal voltage, +10 %, -15 % (V AC)	3 x400
Nominal frequency, ±2 Hz, Hz	50
Power consumption	
Heating, at maximum efficiency (kW)	7.5
Cooling, at maximum efficiency (kW)	6
Working conditions	
Operating temperature (°C)	-32 to +50

RCP

Control Panel for Shelter Air Preparation Systems

Basic Version

Key Advantages

- Easy and quick assembly
- Durable and sturdy housing construction
- Automatic controls (auto and manual mode) may control up to three Breeze 7E and UKG12 A/C units
- 3-step regulation of fans speed
- Ready for CBRN detection system integration
- Audio and visual alarms for overpressure loss in the shelter/vehicle

RCP	
Rated power supply (V DC)	24
Power consumption (W)	max. 700
Operating temperature (°C)	-32 to +49
Storage temperature (°C)	-33 to +71
Dimensions, ±5 mm (W x H x D) (mm)	480 x 180 x 390
Weight (kg)	21.6

RCP

Control Panel for Shelter Air Preparation Systems

Including Heater Control and Air Delivery Volume

Key Advantages

- Easy and quick assembly
- Durable and sturdy housing construction
- Automatic controls (auto and manual mode) may control up to three Breeze 7E and UKG12 A/C units
- Stepless regulation of fans speed
- Ready for CBRN detection system integration
- Audio and visual alarms for overpressure loss in the shelter/vehicle
- Air velocity and air flow meter

RCP	
Rated power supply (V DC)	24
Power consumption (W)	max. 700
Operating temperature (°C)	-32 to +49
Storage temperature (°C)	-33 to +71
Dimensions, ±5 mm (W x H x D) (mm)	480 x 180 x 390
Weight (kg)	21.6

UFK 120

Shelter Air Filtration and Ventilation System

Key Advantages

- Easy and quick assembly
- Durable and sturdy housing construction
- Stepless regulation of fans speed
- Easy and quick exchange of filters
- Ready for CBRN detection system integration
- Audio and visual alarms for overpressure loss in the shelter/vehicle
- Can be used in Active or By-pass (Ventilation) mode

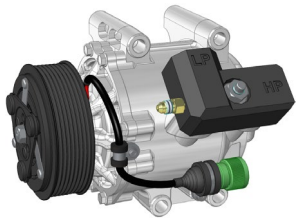
UFK120	
Nominal air flow (m³/h)	120
Maximum air flow (m³/h)	150
Rated power supply (V DC)	24
Nominal power consumption (W)	220
Maximum power consumption (W)	500
Type of CBRN filter	FPT-200B or FPT-200M/P
Operating temperature (°C)	-30 to+50
Storage temperature (°C)	-30 to+50
Dimensions, ±5 mm (W x H x D) (mm)	455 x 855 x480
Weight, incl. filters (kg)	68.5

SVC System

HVAC System Components for various Configurations for Shelters and Military Vehicles

Key Advantages

- Power supply 24 V DC
- Powered by electrical or engine driven compressor
- To be used with simple controls or CAN controls (CAN communication optional)
- Various compressor modules possible (24V DC or 3x400V AC)
- Various system configurations (1-3 HVACs)
- HVACs modules with water or electrical heaters



SVC	
Cooling capacity, max. (kW)	5.5
Heating capacity, max. (kW)	2
Rated power supply (V DC)	24
Refrigerant[1)]	R134a
Operating temperature range (°C)	–30 to+50
Dimensions, ±5 mm (W x H x D) (mm)	
Evaporator module MUK5	574 x 532 x323
Condenser module MSK12	1,066 x 190 x471
Compressor module SIERRA03	485 x 275 x220
Heater module MUG2	400 x 313 x200
Weight ±1 kg (kg)	
Evaporator module MUK5	18
Condenser module MSK12	26.5
Compressor module SIERRA03	19
Heater module MUG2	5.8

1) Refrigerant charge vary depending on application – see compressor module nameplate..

R07AC
Vehicle HVAC module

Key Advantages

- Universal solution – can be installed in different types of vehicles
- Durable construction
- Low noise level

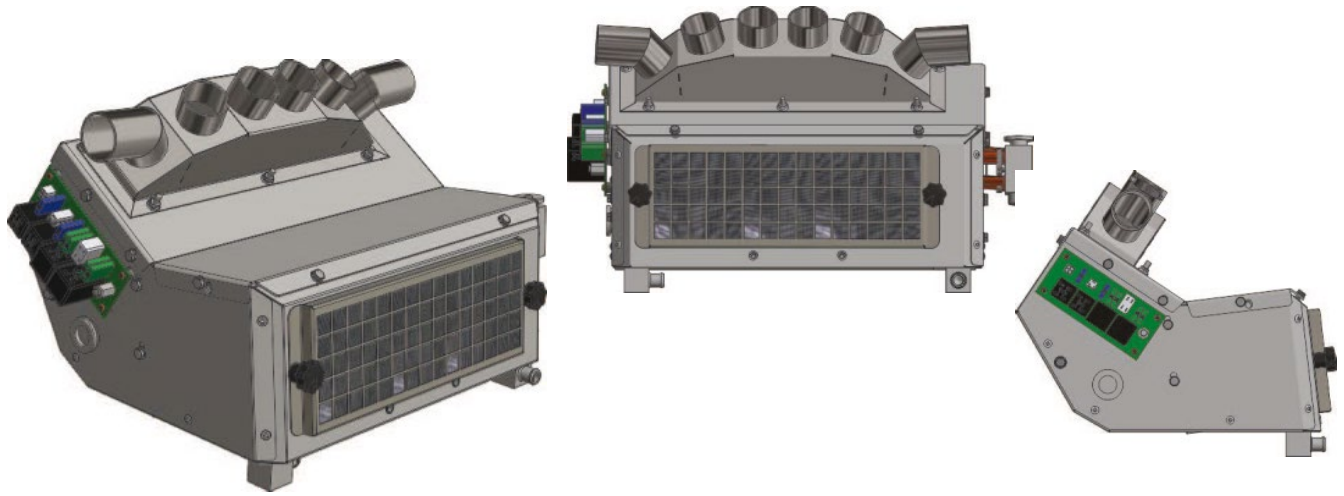
R07AC	
Cooling capacity (kW)	4.5
Heating capacity (kW)	6.5
Refrigerant	R134a
Air flow (m^3/h)	1,050
Voltage input (V DC)	24
Weight (kg)	16.5

Evaporator Units

Customized solutions for vehicle dashboard

Key Advantages

- Cooling performance up to 10.5 kW for A1 conditions
- Optional heating function
- Designed to operate at harsh climate conditions
- Variety of installation position options enables optimum integration in different vehicle designs
- Require very low maintenance
- Durable, high-quality components sourced from tried and tested
- Series production



Range of Evaporator Units	
Nominal cooling capacity of one coil (kW)	5.0 – 10.5
Heating capacity (optional) (kW)	6.7 – 11.0
Refrigerant	R134a
Nominal voltage (VDC)	24 – 28
Max. operation temperature (°C)	50.0
Max. power consumption (A)	8.5 – 16.0
Air flow (m^3/h) ~0Pa	750 – 1,290
Weight (kg)	10.0 – 16.0

Vehicle Crew Space Evaporators

Modular and flexible

Key Advantages

- Cooling performance up to 10.5 kW for A1 conditions
- Optional heating function
- Designed to operate at harsh climate conditions
- Variety of installation position options enables optimum integration in different vehicle designs
- Require very low maintenance
- Durable, high-quality components sourced from tried and tested series production

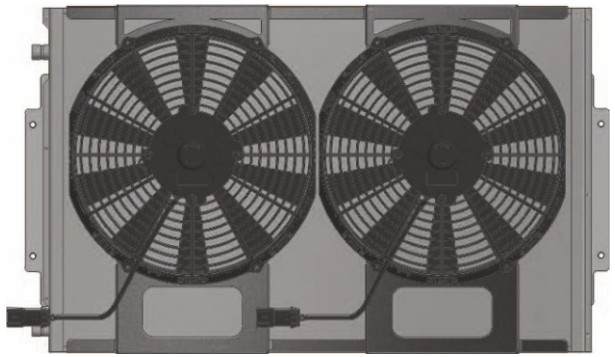
Range of Crew Space Evaporator Units	
Nominal cooling capacity of one coil (kW)	5.0 – 10.5
Heating capacity (optional) (kW)	6.7 – 10.0
Refrigerant	R134a
Nominal voltage (VDC)	24 – 28
Max. operation temperature (°C)	50.0
Max. power consumption (A)	8.5 – 16.0
Air flow (m^3/h) ~0Pa	750 – 1,290
Weight (kg)	10.0 – 14.0

Single / Double Condenser Unit

Robust and efficient

Key Advantages

- High capacity with condenser unit
- Designed for diverse vehicle types
- Customized design to best match for customer requirements
- High-quality and reliable components
- Easy installation and long maintenance period
- High efficiency with multi flow condenser coils



	Single Condenser Unit	Double Condenser Unit	Double Condenser Unit – High Air Flow Speed
Nominal cooling capacity of one coil (kW)	15.0	15x2	15x2
Heating capacity (optional) (kW)	-	-	-
Refrigerant	R134a	R134a	R134a
Nominal voltage (VDC)	24-28	24-28	24-28
Max. operation temperature (°C)	50.0	50.0	50.0
Max. power consumption (A)	10.0	10.0	30.0
Air flow (m^3/h) ~0Pa	3,360	3,360	6,450
Weight (kg)	14.0	14.0	18.0

Vehicle Roof Integrated Air Conditioner

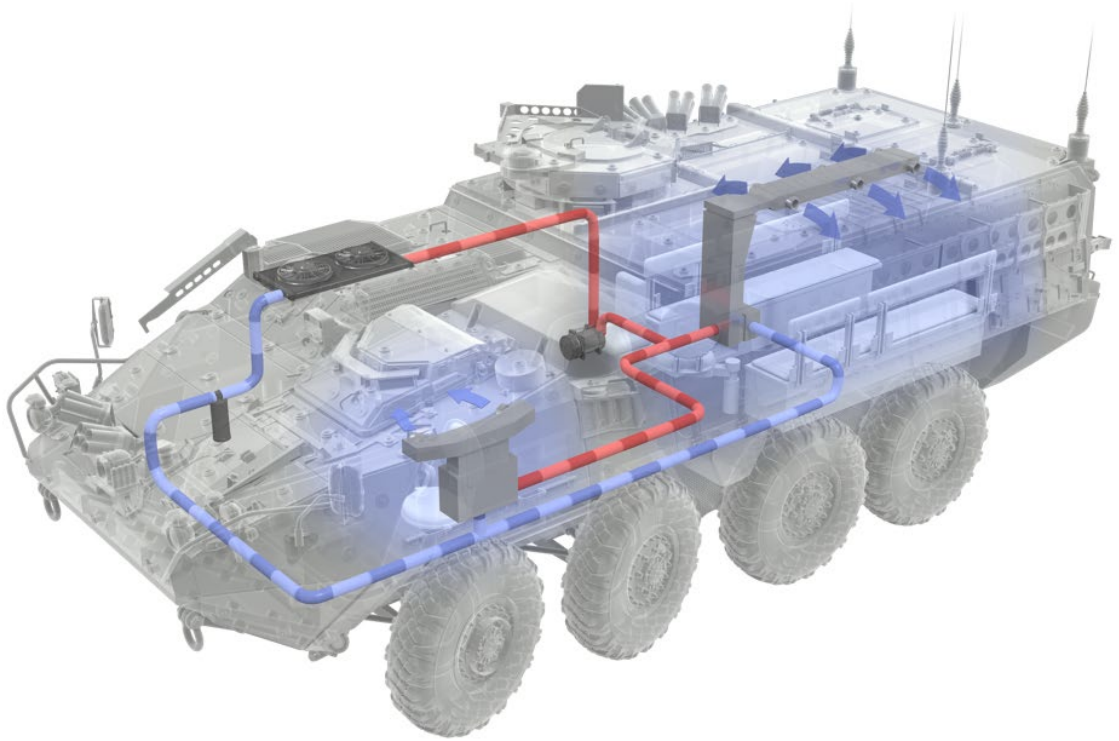
Powerful and Space Saving

Key Advantages

- Mounted in the top of the cab for maximum cooling effect
- High cooling performance
- Low EMC signature
- High-quality and reliable components

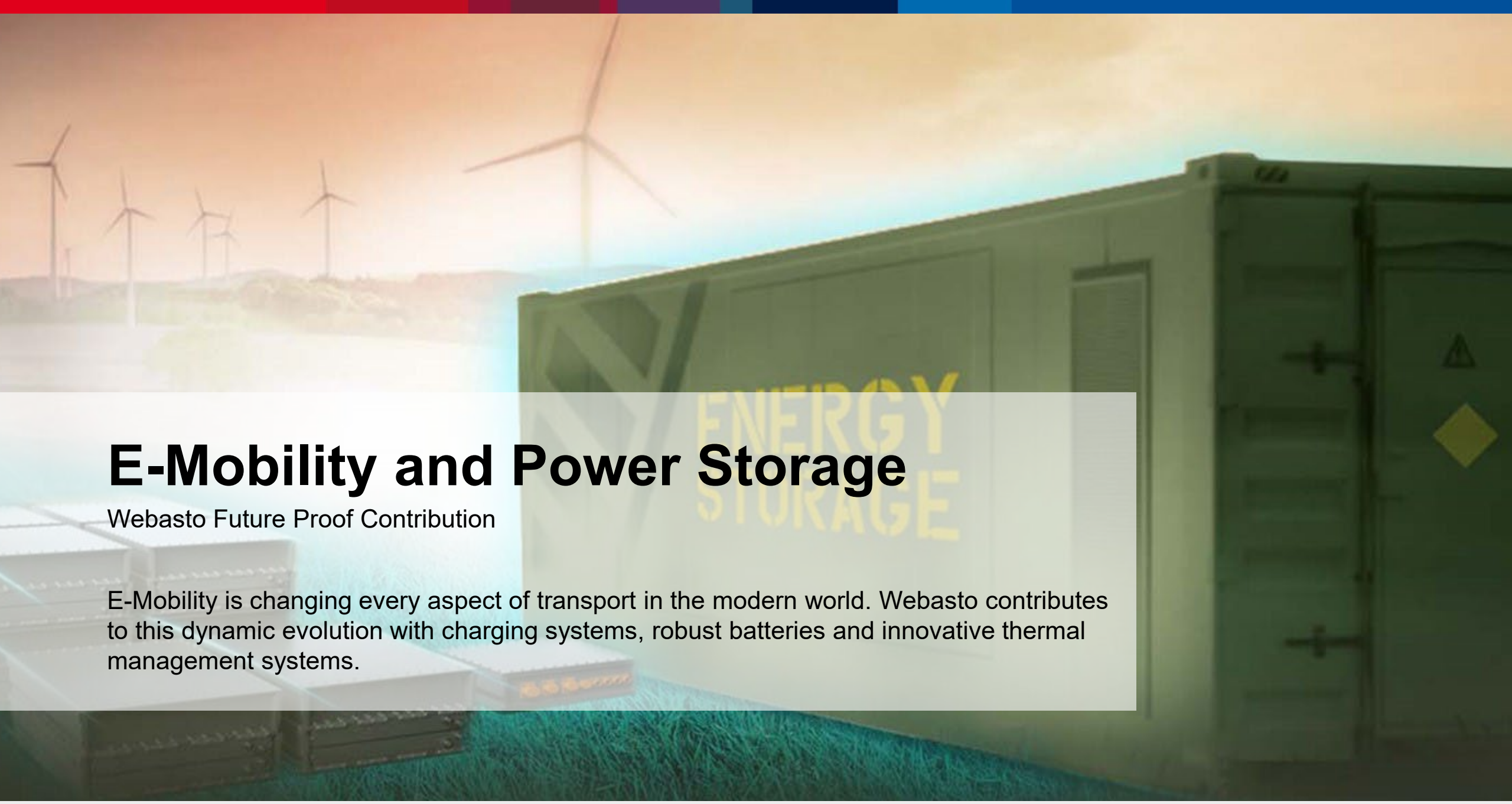
Roof Integrated Air Conditioner	
Cooling capacity (kW)	10
Evaporator Fan, volume flow (free blowing)	1100m3/h , stepless control
Dimensions, ±5 mm (W x H x D) (mm)	950 x 700 x 260
Weight (kg)	40
Nominal Voltage (V)	24 (Range 16 to 32)
Max. power consumption (A)	30
Max. working pressure (bar)	28.0
Charge (kg)	2.0
Refrigerant	R134A

Heating / Cooling System Competence



Climate Management Solutions from a single source

- Fuel operated heater integrated into the engine, the crew heater and other vehicle systems to optimize vehicle readiness in cold climates
- High-Performance Air-Conditioning systems to ensure crew efficiency and equipment cooling it the hottest of climates
- Ventilation, filtration and CBRN systems provide clean air to the vehicle occupants
- Scope of delivery to include all installation components dedicated to the application
- Single control panel or integration into vehicle control systems possible



E-Mobility and Power Storage

Webasto Future Proof Contribution

E-Mobility is changing every aspect of transport in the modern world. Webasto contributes to this dynamic evolution with charging systems, robust batteries and innovative thermal management systems.

E-Mobility

Power and Thermal Management Systems for the next generation of defence vehicles

- High Performance Battery Packs for motive power
- Intelligent Battery Management Systems to optimize energy consumption
- Whole Vehicle Thermal Management to maximize energy efficiency

Power Storage

Lithium-Ion technology to provide high power density

- Battery Packs to support off-grid operations
- Battery and Thermal Management to optimize performance
- Ideal ‘second life’ battery usage solution

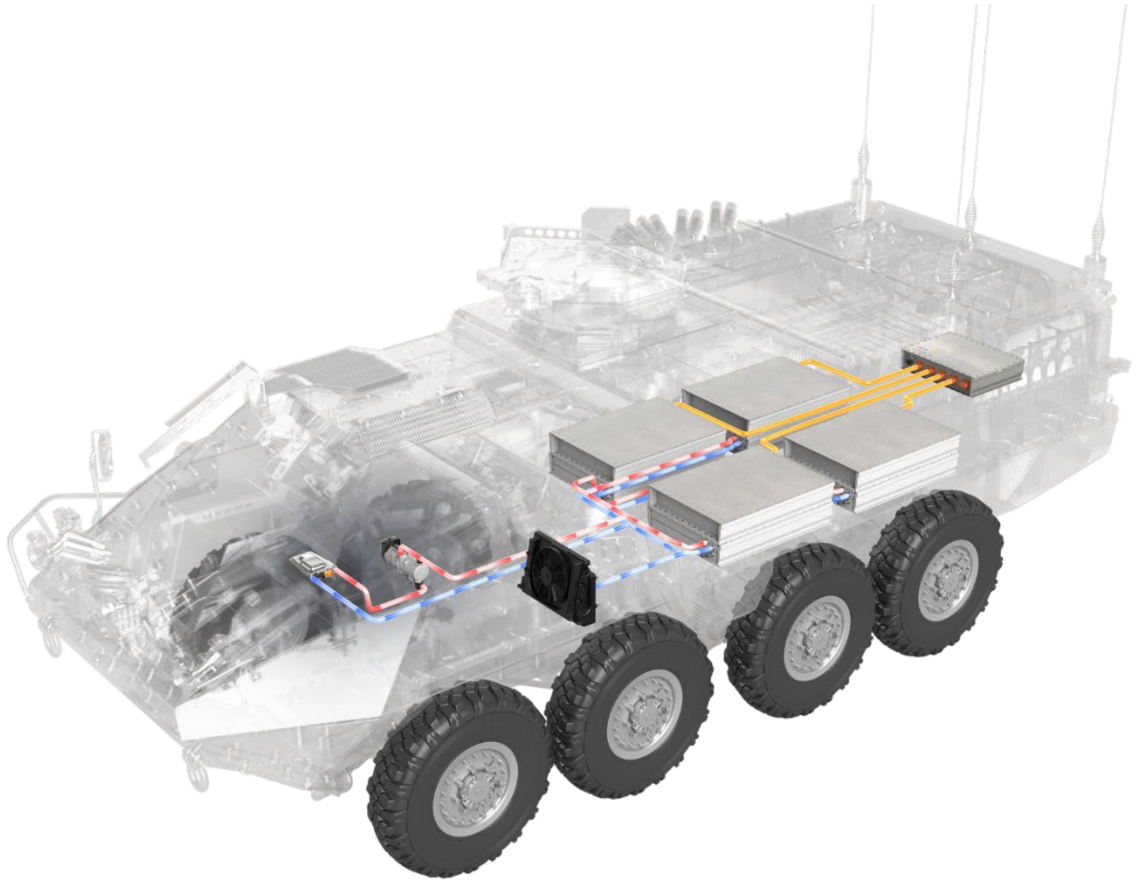
E-Mobility and Power Storage

Innovative application of Webasto’s groundbreaking E-Mobility technology to support defence manufacturers in their transition to low emissions technology

Webasto

Battery & Thermal Management Competence

Innovation based upon Webasto's engagement in the field of E-Mobility



The future of mobility adapted into the defence environment

- High density battery packs provide power for heavy duty operations
- Battery and Thermal Management Systems maximise energy capture and useage
- Integration of the crew climate control system ensure vehicle operability and energy efficiency

Thank you for your attention