



# ATHENIA™ MKII ELECTRIC SERIES

Electrically driven HVAC roof units  
for hybrid & electric buses



### Greener efficiency, lower energy consumption, zero emissions

Electric buses consume less energy and produce significantly fewer emissions. The Athenia™ MkII Electric and Electric Heat Pump are the greenest products of our range and the most suitable for low and zero emissions zones. Both series are in accordance with the latest F-gas regulations.

Moreover, the Athenia™ MkII Electric series offers the highest ratio between cooling capacity and unit weight and size, featuring extra light aluminium frames and plastic covers. In addition, a reversible refrigerant circuit has been implemented to guarantee maximum passenger comfort in heating and cooling mode. The Heat Pump series can be equipped with an independently-working battery cooling connection to recycle the battery heat loss generated during the electric/hybrid bus operation.

In heating mode, the Athenia™ MkII Electric Heat Pump is able to transfer external air heat to the inside passenger area with a COP of up to 4. This means up to 4kW of heating generated for each 1kW of electricity consumed. In cooling mode, the unit operates just as the Athenia™ MkII Electric HVAC unit.

In order to lower total power consumption, Athenia™ MkII Electric and Electric Heat Pump units use electric variable speed compressor with a cooling and cooling/heating capacity modulation range of up to 60%, even when the bus is at bus station.

Athenia™ MkII Electric and Electric Heat Pump Series units use modular expandable control system CANAIRE® which guarantees efficient operation and low power consumption. Thanks to the CAN-bus communication, the unit is able to communicate bi-directionally with other devices in the bus connected to the tool.

The CANAIRE® control system can manage up to three temperature zones with precise temperature control for single, articulated and double-articulated buses. The unit can be equipped with a built-in CO<sub>2</sub> sensor that monitors air quality and efficiently provides up to 100% of fresh air intake into the bus via an electric servomotor control.



Athenia™ MkII Electric



**REDUCED POWER CONSUMPTION**

### Low Global Warming Potential (GWP)

The electrical heat pump technology increases the power efficiency ratio of the unit while reducing the impact of CO<sub>2</sub> emissions.

The Athenia™ MkII Electric unit provides improved environmental performance with a low global warming potential (GWP) thanks to its innovative micro-channel coils with a reduced refrigerant charge of 50% compared to conventional coils.

To improve environmental-friendliness, the Athenia™ MkII Electric and Athenia™ MkII Electric Heat Pump units are pre-filled with refrigerant and feature a hermetic refrigerant circuit which reduces the of leakage to a minimum. For additional safety, the units run on non-flammable refrigerants with an A1 classification.



### Noise is minimised

Step-less RPMs regulation of the fans and blowers are offered as standard on the Athenia™ MkII Electric and Electric Heat Pump range. Fans and blowers consist of blades with shapes designed to reduce the noise level over the full range of RPMs.

**Reliability**

We only use the most reliable and internally validated components in our A/C systems. That is why Thermo King products are continuously tested and our designs are developed to meet the high demands of bus temperature control applications.

We carry out a range of rigorous functional and performance tests to validate all our transport refrigeration equipment in a controlled environment such as special 3D multi-axial vibration and twist profiles tests. Thermo King units regularly exceed the standard bus homologation requirements (ECE R10.05).

Our Thermo King manufacturing plant is ISO 9001: 2008, ISO 14001: 2004 and BS OHSAS 18001: 2007 accredited which demonstrates our dedication to quality and reliability.



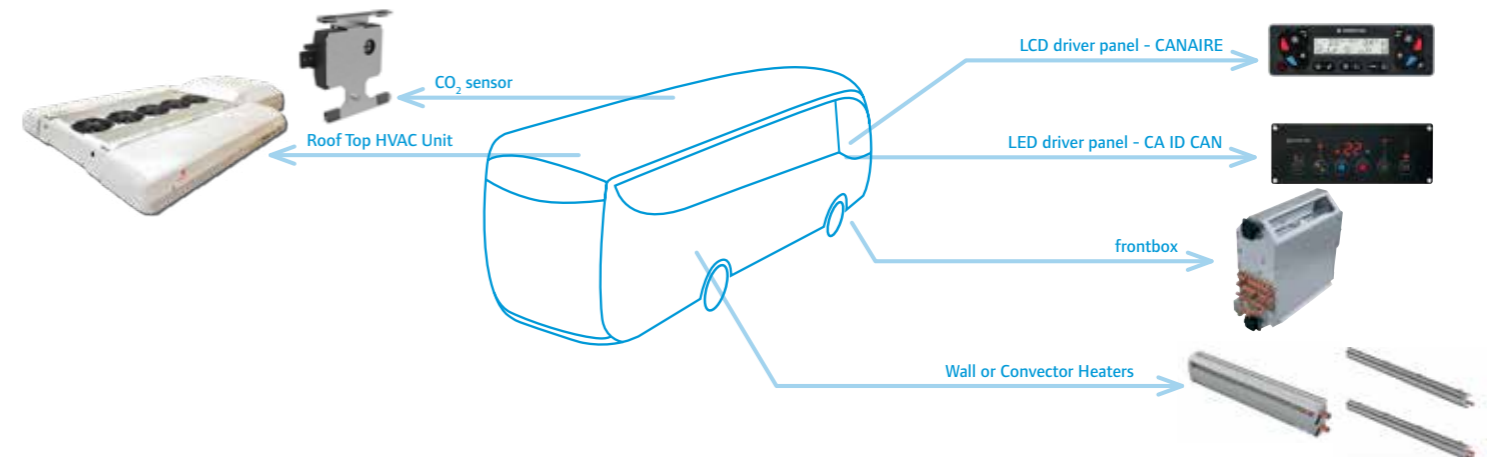
**QUALITY CONTROL**  
(ISO 9001:2008, ISO 14001:2004, BS OHSAS 18001:2007)

**Ease-of-use and service**

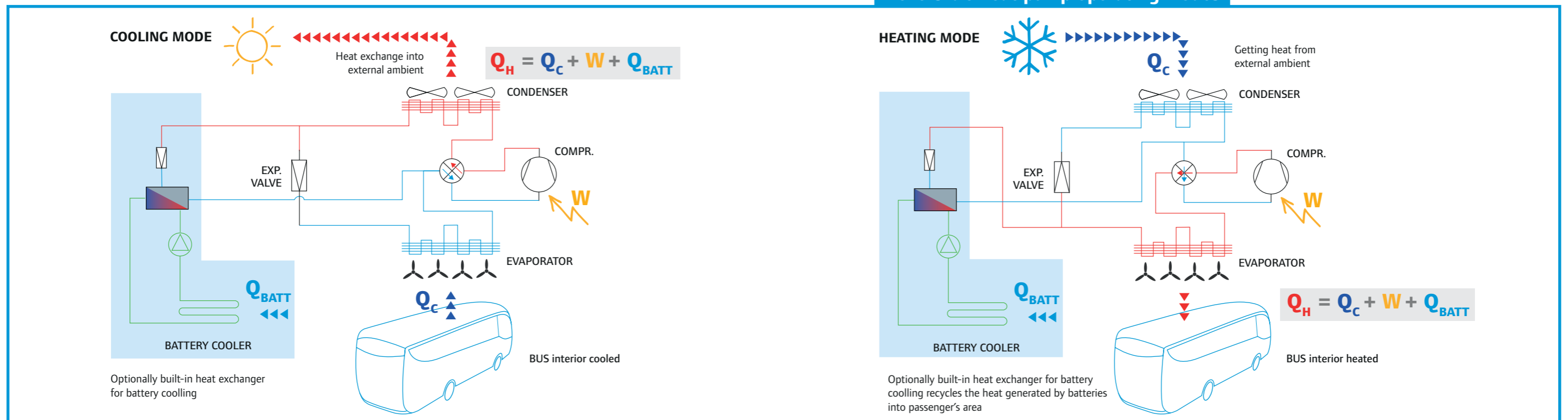
Athenia™ MkII Electric and Electric Heat Pump units are compatible with bus roofs with a radius ranging from 7,5m to flat. To increase flexibility of use, the units are suitable for screw or glue installation. Moreover, all units are delivered prefilled with refrigerant for immediate use.

To drive down further installation costs and facilitate installation, the electrical compressor has been integrated in the roof unit. In the Athenia™ MkII Electric Heat Pump version an optionally built-in heat exchanger for battery cooling helps to maintain ideal battery operating temperature for hybrid and electric buses and thus, extends battery life and guarantees maximum power capacity. The HVAC unit can be optionally equipped with front-box connection.

The CANAIRE® control system features an ergonomically-designed LCD driver panel which allows for the control of the A/C roof unit in parallel with a front box unit placed in the driver's area. The control system features can be changed via a service and diagnostic software tools to adapt to the operating conditions and customer needs.



**Reversible heat pump operating modes**



### Thermo King Dealer Network for low cost of ownership

The electric range offers a more sustainable and efficient operation compared to regular diesel A/C units, benefitting your business and your service. Moreover, as an Athenia™ MkII Electric owner you will have access to Thermo King's worldwide dealer and service network to minimise cost of ownership and maximise uptime. Thermo King Dealers have been servicing transport temperature control equipment for more than 75 years now.

#### Our Dealer Service Network:

- More than 500 service points in 75 countries
- Non-stop availability 24/7/365
- Always in your area: most locations are within a two-hour drive
- Direct telephone contact
- Immediate assistance in your language
- Optimised fleet maintenance

#### Our qualified CERTI-TECH technicians:

- Fully trained & certified
- Gold, silver and bronze CERTI-TECH expertise certifications
- > 1,400 CERTI-TECH trained and certified service technicians

For more information, visit: [dealers.thermoking.com](http://dealers.thermoking.com)



## ATHENIA™ MkII ELECTRIC SERIES

SPECIFICATIONS ELECTRIC SERIES	E-700	E-960
<b>Layout unit</b>	<b>Narrow (N)</b>	
Listed cooling capacity <sup>1</sup> [kW] / [kBtu/h] / [kcal/h]	36 / 123 / 31000	38 / 130 / 32700
Rated cooling capacity <sup>2</sup> [kW] / [kBtu/h] / [kcal/h]	13,6 / 47 / 11700 @ 40Hz 16,1 / 55 / 13900 @ 50Hz 21,3 / 73 / 18300 @ 75Hz	13,7 / 47 / 11800 @ 40Hz 16,7 / 57 / 14400 @ 50Hz 21,6 / 74 / 18600 @ 75Hz
Heating capacity <sup>3</sup> [kW] / [kBtu/h] / [kcal/h]	47 / 160 / 40400	47 / 160 / 40400
Evaporator air capacity <sup>4</sup> [m <sup>3</sup> /h]	4400 (4920)	6600 (7380)
Fresh air range [%]	0-100	0-100
Current draw <sup>5</sup> [A]	81	99
Power supply of integrated compressor <sup>6</sup>	3PH 280V 38Hz - 460V 75Hz AC	
Dimensions roof unit (W x L x H) [mm]	1850 x 2500 x 305	1850 x 2500 x 305
Refrigerant type / average filling volume [kg]	R407C / 3,2	R407C / 3,2
Weight (cool/cool+heat) [kg]	231 / 238	235 / 242
Control system	CANAIRES (EN/DE/CZ/IT/FR/SP)	
Compressor integrated	Variable speed compressor (38-75Hz)	
Driver unit evaporator extension availability	Yes (EDS-700)	Yes (EDS-960)

<sup>1</sup> Simulated at conditions 40°C/40°C/95% @ 75Hz

<sup>2</sup> Measured at conditions 35°C/27°C/19°C

<sup>3</sup> Measured at conditions -20°C/+80°C/16,7 l/min

<sup>4</sup> Free blow capacity for brush (brushless) blowers

<sup>5</sup> Current consumption for unit at 27 VDC

<sup>6</sup> Measured at conditions 35°C/27°C/19°C

SPECIFICATIONS ELECTRIC SERIES WITH HEAT PUMP	E-700H	E-960H
<b>Layout unit</b>	<b>Narrow (N)</b>	
Listed cooling capacity <sup>1</sup> [kW] / [kBtu/h] / [kcal/h]	36 / 123 / 31000	38 / 130 / 32700
Rated cooling capacity <sup>2</sup> [kW] / [kBtu/h] / [kcal/h]	15,3 / 52 / 13100 @ 50Hz 19,5 / 66 / 16800 @ 75Hz	16,0 / 55 / 13800 @ 50Hz 19,9 / 68 / 17100 @ 75Hz
Heating capacity - heat pump w/o battery cooler compressor@50Hz, air inlet 20°C	10,9 / 37 / 9400 @ ambient +7°C 7,1 / 24 / 6100 @ ambient -5°C	13,3 / 45 / 11400 @ ambient +7°C 7,4 / 25 / 6400 @ ambient -7°C
Heating capacity - heat pump w/ battery cooler compressor@50Hz, air inlet 20°C	15,0 / 51 / 12900 @ ambient +7°C 10,5 / 36 / 9000 @ ambient -5°C	16,4 / 56 / 14100 @ ambient +7°C 12,1 / 41 / 10400 @ ambient -7°C
Heating capacity - water coil <sup>3</sup> [kW] / [kBtu/h] / [kcal/h]	19 / 65 / 16300	19 / 65 / 16300
Evaporator air capacity <sup>4</sup> [m <sup>3</sup> /h]	4920	7380
Fresh air range [%]	0-100	0-100
Power supply of integrated compressor <sup>5</sup>	3PH 360V 45Hz - 460V 75Hz AC	
Dimensions roof unit (W x L x H) [mm]	1850 x 2925 x 305	1850 x 2925 x 305
Refrigerant type / average filling volume [kg]	R407C / 6,5	R407C / 6,5
Weight (cool+heat) [kg]	295	300
Control system	CANAIRES (EN/DE/CZ/IT/FR/SP)	
Compressor integrated	Variable speed compressor (45-75Hz)	
Driver unit evaporator extension availability	Yes (EDS-700H)	Yes (EDS-960H)

<sup>1</sup> - Simulated at conditions 40°C/40°C/95% @ 75Hz

<sup>2</sup> - Measured at conditions 35°C/27°C/19°C

<sup>3</sup> - Measured at conditions +20°C/+80°C/16,7 l/min

<sup>4</sup> - Free blow capacity for brushless blowers

<sup>5</sup> - Measured at conditions 35°C/27°C/19°C



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For further information please contact:

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