



III. Roof Mount AC

Roof Mount Unit **Eco 136**

Parallel roof mount Air-conditioning and ventilation systems

The Eco 136 product family offers very adaptable and flexible heating, ventilation and air conditioning solutions for ideal passenger comfort in city buses, intercity buses and coaches.

Within this powerful model range, cooling capacities from 24kW/81900 Btu to 44kW/150000 Btu are available.

Thanks to its very compact dimensions and extremely light-weight construction, the Eco 136 fits on any large bus roof, regardless of model configuration.

Outstanding energy conservation performance is another key benefit of this product family, delivering air conditioning capacity while consuming less current.

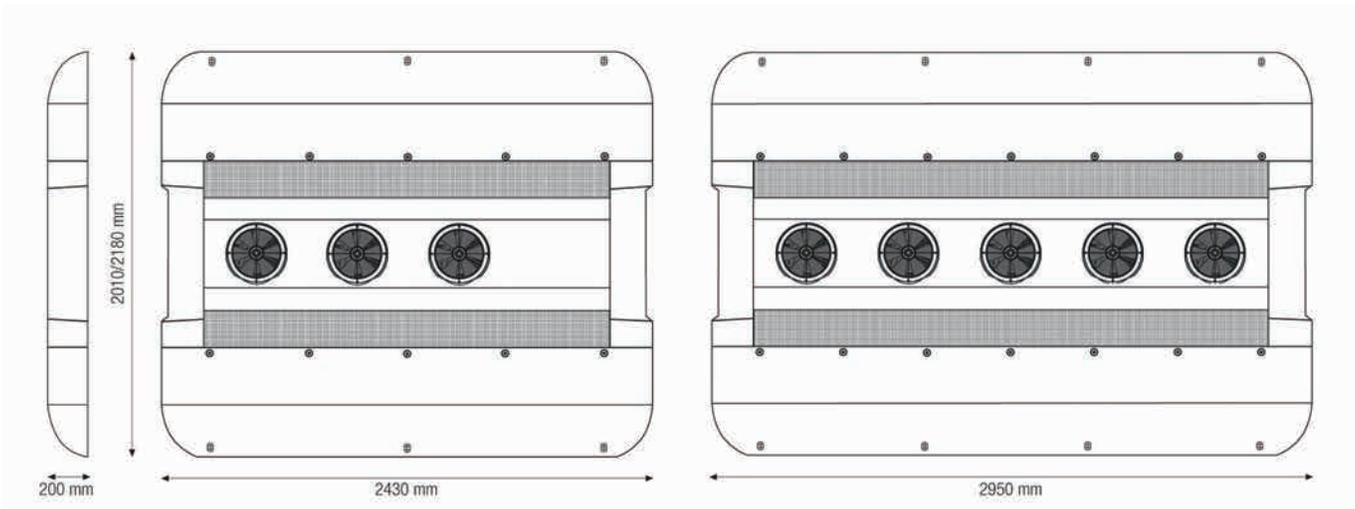


Features

- Service friendly due to easy access to maintenance parts
- Compact design frees up roof space for hybrid and CNG-Bus applications
- Brushless blower technology available as option
- Variety of other options available upon customer request
- Advanced coil and airflow technology offers 15% performance improvement over competitive systems
- Proven track record for performance, installation and reliability

Eco 136-V24

Eco 136-V28 & V32



Technical Data

	Eco 136 - V24	Eco 136 - V28	Eco 136 - V32
Cooling capacity @ max ^[1]	109000 Btu/hr (32 kW)	133000 Btu/hr (39 kW)	150000 Btu/hr (44 kW)
Cooling capacity @ ARI ^[2]	82000 Btu/hr (24 kW)	96000 Btu/hr (28 kW)	109000 Btu/hr (32 kW)
Heating @ 7 gpm (100F Δ T)	130000 Btu/hr (38 kW)	130000 Btu/hr (38 kW)	130000 Btu/hr (38 kW)
Length	96" (2430 mm)	116" (2950 mm)	116" (2950 mm)
Width	79-86" (2010-2180 mm)	79-86" (2010-2180 mm)	79-86" (2010-2180 mm)
Height	8" (200 mm)	8" (200 mm)	8" (200 mm)
Weight	352 lbs (160 kg)	455 lbs (207 kg)	470 lbs (214 kg)
Evaporator air capacity	3900 CFM (6600 m ³ /hr)	3900 CFM (6600 m ³ /hr) 5	5200 CFM (8800 m ³ /hr)
Total power input	73 A	97 A	114 A
Refrigerant	R134a	R134a	R134a

[1] Max conditions 95°F (35°C)/104°F (40°C)/50% RH
 [2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH

Electric Roof Mount A/C Eco 136e

Parallel Roof Mount Air-Conditioning and Ventilation Systems

MCC's newest family member Eco 136e completes the portfolio of compact and super efficient roof mount A/C systems designed to meet all OEM bus requirements.

The family offers very adaptable and flexible heating, ventilation and air conditioning solutions for best in class passenger comfort in transit, intercity buses and coaches.

The Eco 136e is a self-contained unit, including the glycol battery cooler option which simplifies installation and reduces life cycle cost.

The aluminum electric piston compressor integrated into the unit offers reduced weight using speed control and cylinder unloading. The wide modulation range allows ef-

ficient power management without having to cycle the compressor, leading to optimal energy use.

Noise, vibration and harshness (NVH) reduction was achieved by selecting a low NVH compressor, a semi-hermetic system, with special mount design and minimized compressor cycling.

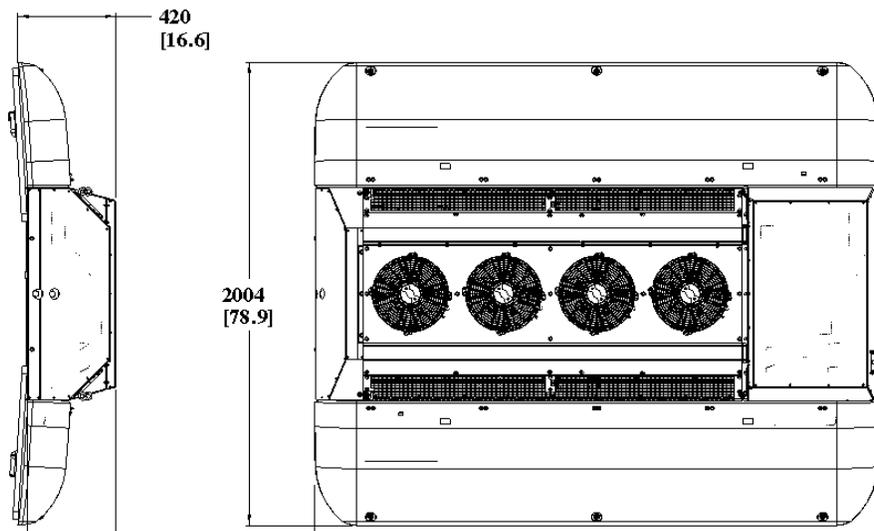
A robust inverter, very efficient and reliable, drives the compressor. Air cooling of the inverter improves the overall reliability by reducing complexity.

This unique simply designed air cooled inverter drives the compressor with fewer components resulting in greater reliability.



Features

- Self contained, fully sealed, factory charged and tested
- Variable speed semi-hermetic compressor with unloadable cylinder bank
- Long life brushless fan motors
- Reliable CAN enabled microprocessor-based controls
- Heavy duty aluminum fin/copper tube coils
- Easy access for serviceability
- Two year parts and labor warranty
- Zero ozone depleting, high efficiency HFC R134a



Advantages

- Best in class efficiency saves fuel
- Proven variable speed compression technology optimizes capacity control as well as power consumption and maximizes efficiency over the life of the system
- Sealed system means no leaking hoses, seals, or fittings
- Outstanding performance at idle saves fuel
- Constant temperature at idle lowers time to pre-cool bus interior
- Elimination of compressor clutch and belts reduces maintenance costs
- Unmatched life cycle cost

Technical Data

Refrigerant	R134a	
Cooling capacity @ max ^[1]	109000 Btu/hr (32kW)	
Cooling capacity @ ARI ^[2]	82000 Btu/hr (24 kW)	
Glycol Heating @ 7 gpm (100F Δ T)	130000 Btu/hr (38 kW)	/ Electric Heating 54500 Btu/hr (16 kW)
Evaporator air capacity	3900 CFM (6600 m ³ /hr)	
Length	96" (2430 mm)	
Width	79-86" (2010 - 2180 mm)	
Height	15" (380 mm) max (at the compressor enclosure)	
Weight	660 lbs (300 kg)	
Low voltage power consumption	100 A @ 26 VDC	
High voltage power consumption ^[3]	20 A @ 650 VDC or 480 VAC 3-PH	40 A @ 330 VDC or 240 VAC 3-PH
OPTION: Refrigerant to glycol chiller	12000 Btu/hr (3.5 kW)	

[1] Max conditions 95°F (35°C)/104°F (40°C)/50% RH
 [2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH
 [3] Nominal w/o electric heat

Roof Mount Unit **Eco 353**

Inline roof mount Air-conditioning, ventilation and heating system

The Eco 353 inline rooftop bus air-conditioning system has been enhanced to meet the demanding and varied needs of the Global market. The lightweight, high capacity heavy duty transit bus rooftop air conditioning system offers improved overall fuel consumption, enhanced reliability, reduced life cycle, service costs compared to its predecessors.

When combined with MCC's industry leading O5G compressor, the Eco 353 also offers optimum cooling capacity.

There are four versions with capacities covering all climate zones and a wide variety of options to meet customer requirements and expectations.

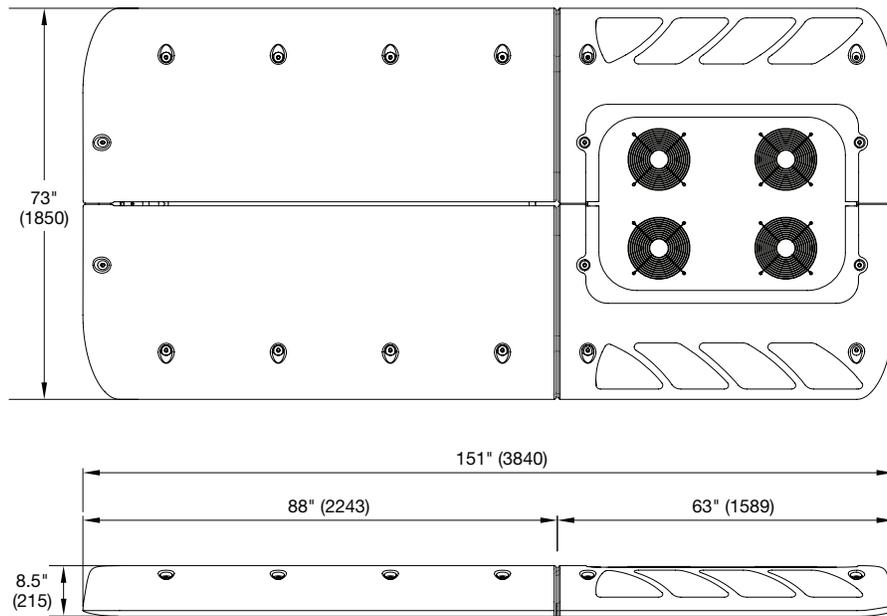
The system uses MCC's micro-channel heat exchanger (MCHX) coil technology, which delivers significant performance improvements through better heat transfer and thermal performance. Extended motor life is available through the use of brushless motors.



Eco 353 Narrow

Features

- Optimum performance for a wide range of cooling requirements
- Microchannel Heat Exchanger Coil technology for improved reliability, corrosion resistance and reduced refrigerant charge
- Up to 20% shorter and 16% lighter than previous models
- Fully accessible for easy installation and maintenance from inside the bus
- One basic platform with 3 major capacities



Eco 353 Standard

Technical Data

	Eco 353 - V24	Eco 353 - V28	Eco 353 - V32
Cooling capacity @ max ^[1]	109000 Btu/hr (32 kW)	130000 Btu/hr (38 kW)	143000 Btu/hr (42 kW)
Cooling capacity @ ARI ^[2]	82000 Btu/hr (24 kW)	96000 Btu/hr (28 kW)	109000 Btu/hr (32 kW)
Heating @ 7 gpm (100F Δ T)	130000 Btu/hr (38 kW)	130000 Btu/hr (38 kW)	82000 Btu/hr (24 kW)
Length	151" (3840 mm)	151" (3840 mm)	151" (3840 mm)
Width Standard	73" (1850 mm)	73" (1850 mm)	73" (1850 mm)
Width Narrow	58" (1490 mm)	58" (1490 mm)	58" (1490 mm)
Height	8.5" (215 mm)	8.5" (215 mm)	8.5" (215 mm)
Weight	385 lbs (175 kg)	420 lbs (190 kg)	450 lbs (204 kg)
Refrigerant	R134a	R134a	R134a
Airflow (Max)	3900 CFM (6600 m ³ /hr)	3900 CFM (6600 m ³ /hr)	5200 CFM (8800 m ³ /hr)
Current Draw (Max)	95 A	95 A	128 A

[1] Max conditions 95°F (35°C)/104°F (40°C)/50% RH

[2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH

Eco Xcel

Inline roof mount HVAC system

The new Eco Xcel is another example of MCC's performance engineered HVAC products. Our innovative rooftop HVAC system delivers the ultimate in passenger comfort in the most energy efficient way with best in industry fuel economy.

The results are staggering with 18% reduction in weight, 24% reduction in electrical power consumption and up to 36% increase in cooling capacity compared to market published data.

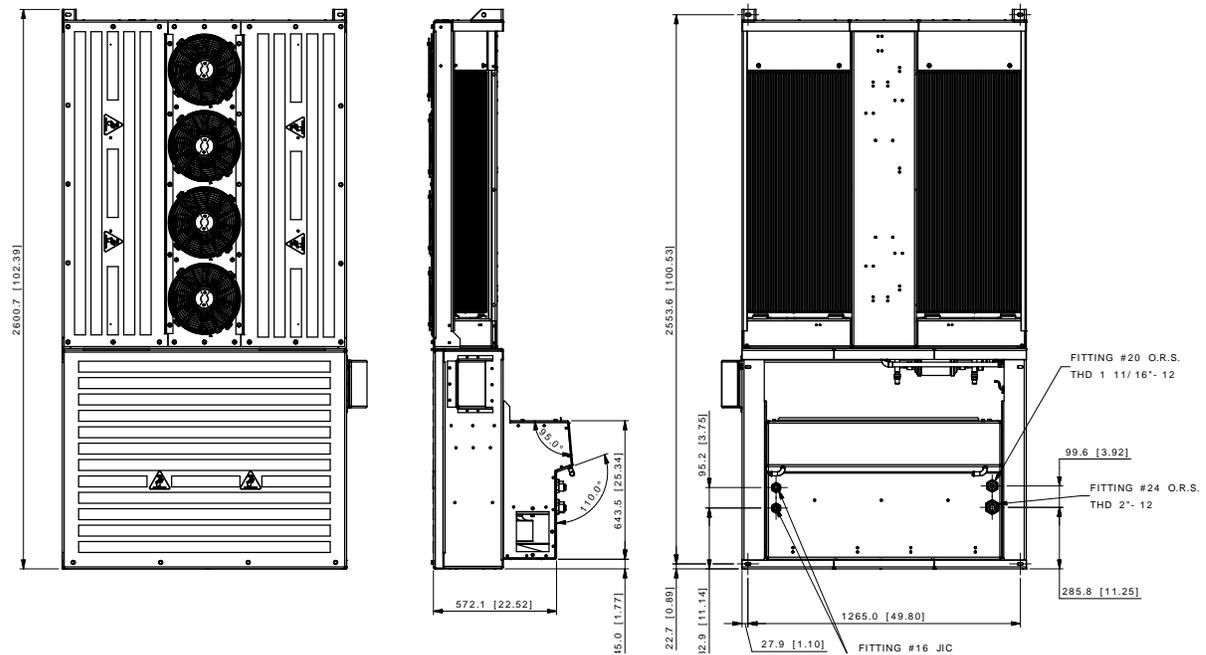


Features

- Brushless impeller with backward inclined blades
- Micro Channel Condenser Coil
- R134a refrigerant with optimal system design
- Large interior maintenance access panel
- Increased heating and cooling capacity
- Separate evaporator heater coil
- EcoTemp NG Controller
- O5G compressor with compressor unloading

Benefits

- 40 000 hrs + longer life cycle
- Higher efficiency translates to lower power consumption
- Lower noise for quieter operation
- Improved performance, lower weight, higher efficiency
- Lower cost, less system weight, less refrigerant
- Ease of access for maintenance
- Provides better comfort for all weather conditions
- Easier to service
- Ensures optimal driver comfort at all conditions
- Latest electronic design for optimized control
- OLED display provides outstanding display no matter from what angle or lighting conditions
- Industry proven most reliable compressor
- Reduces power consumption which translates into fuel savings



Technical Data

Cooling capacity (ARI) ^[1]	120,000 Btu/hr (35kW)
Heating capacity ^[2]	126,000 Btu/hr (37 kW)
Air flow	2400 CFM (4100 m ³ /h)
Refrigerant	R134a
Current	71.5 A at 28 V
Weight	410 lbs (186 kg)
Dimensions (LWH)	102.4" (2600.7 mm) x 52" (1320.8 mm) x 25.5" (647.5mm)

[1] ARI: 95°F (35°C) / 80°F (27°C) / 50% RH.

[2] Heating Rating Conditions: 8 GPM (30 l/min) coolant flow rate (50% glycol) and 100°F (55°C) Δ T between fluids at inlet.

EcoFlex:

Fully flexible modular climate control system with a full range of options.



drive. You can also choose a model with just a condenser and compressor for a split system (EcoFlex 4ES).

EcoFlex is the brand new A/C family. The self-contained unit (EcoFlex 4E) consists of all components including scroll compressor and brushless motor

A third model (EcoFlex 6) is available which includes all components except the compressor. This model can be used as a passenger A/C for minibuses.

All models are manufactured with extensive use of aluminum components and ABS attractive covers, in order to keep the weight to a minimum. The cooling systems have been optimized to provide the maximum cooling performance with a minimal R134a refrigerant charge.



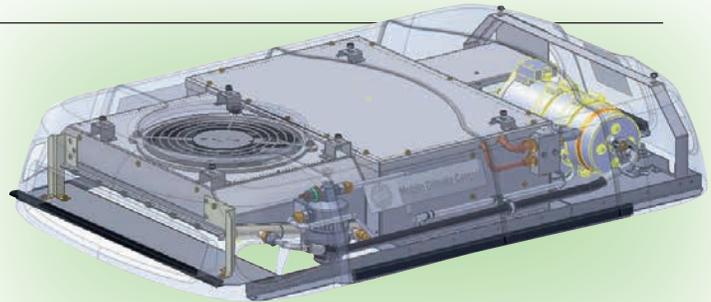
Summary of advantages

- Low weight thanks to aluminum parts and ABS Cover
- Low refrigerant charge
- Improved performance, using high performance heat exchangers
- Less vibration, with a quiet scroll compressor
- Attractive design
- Modular system
- Easy to install

EcoFlex 4E (Electric)

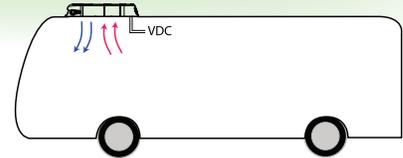
This is the DC powered complete, factory charged system AC. Just install and connect to the electrical system and it is ready to deliver cold air. Comes with all components including, reliable brushless motor drive, scroll compressor, evaporator, condenser and fans.

Can be used as a driver A/C for citybus, small commercial van vehicles, truck cabs, or any machine/ vehicle with a small cab.

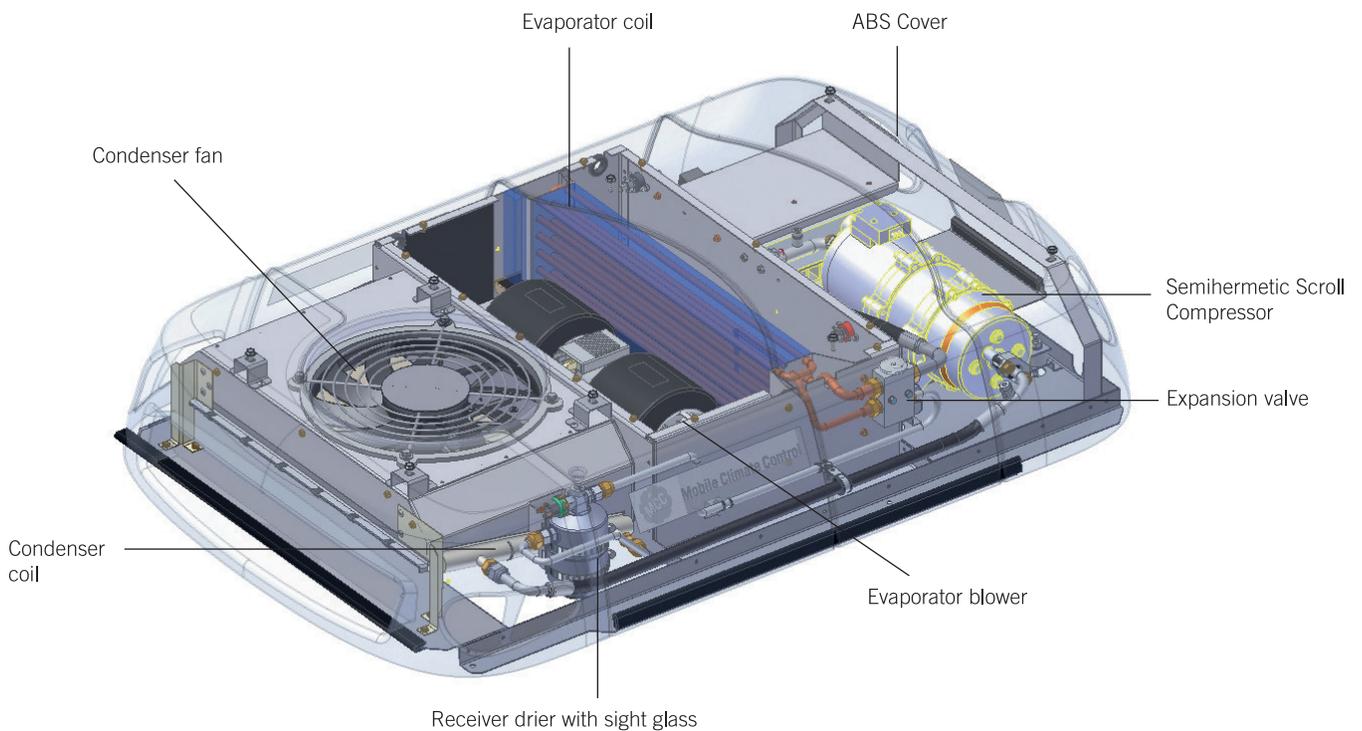


Main components:

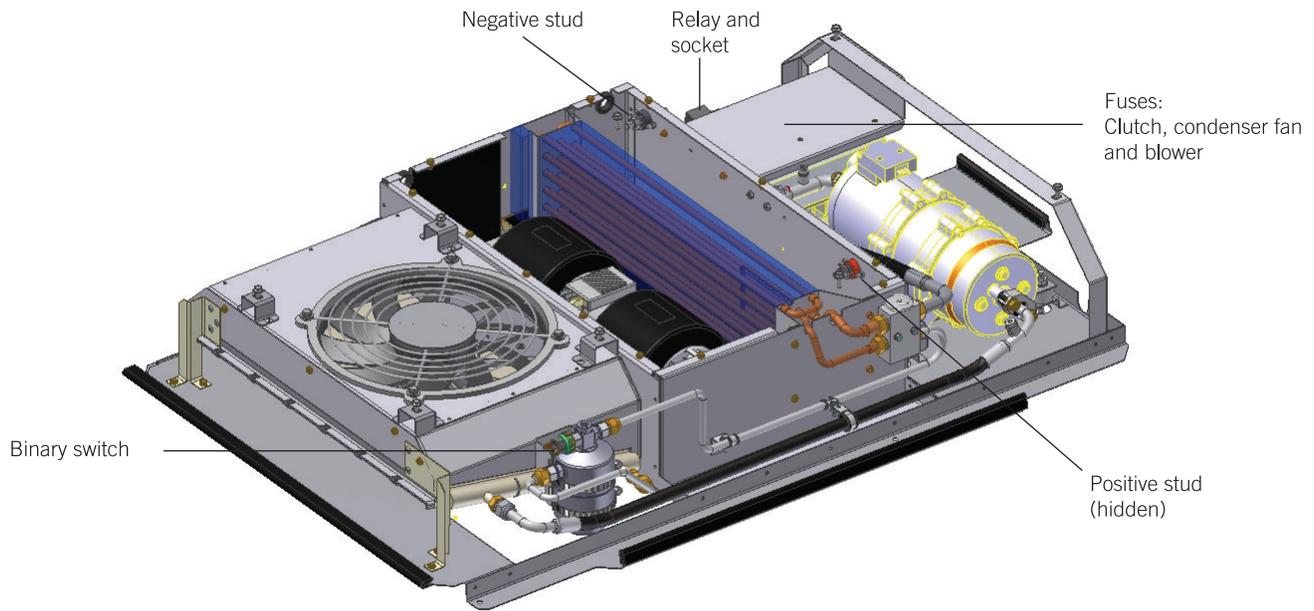
- Compressor
- Brushless motor
- Evaporator and blower
- Condenser and fan



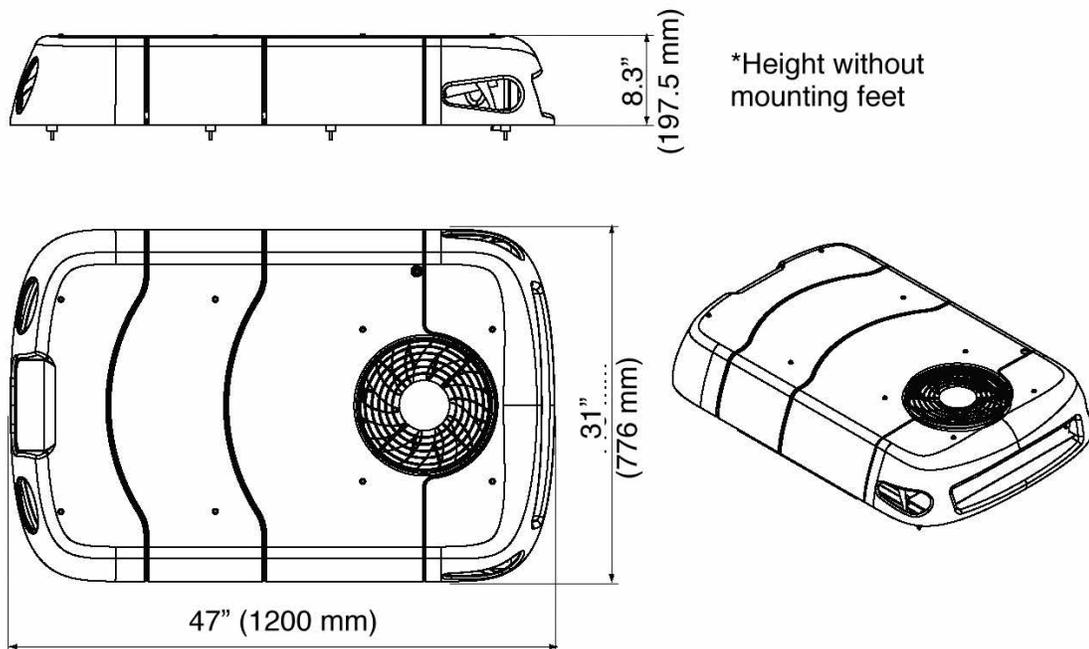
EcoFlex 4E: Major components



EcoFlex 4E: Electrical components (cover removed)



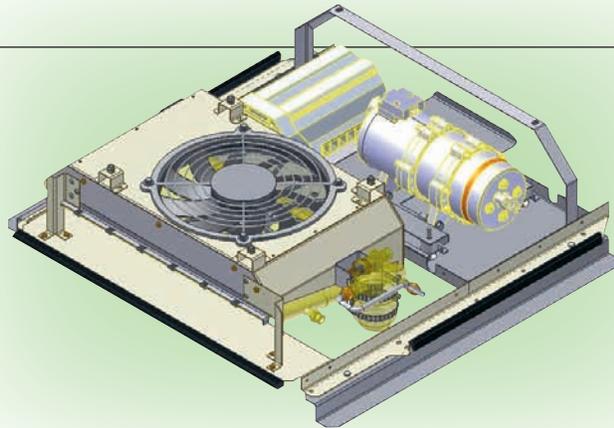
EcoFlex 4E: Dimensions



EcoFlex 4ES (Electrical Split)

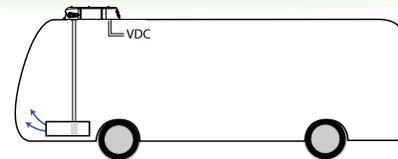
This is the model to choose if you want a remote evaporator.

The EcoFlex 4ES includes reliable brushless motor drive and scroll compressor, condenser and condenser fan.

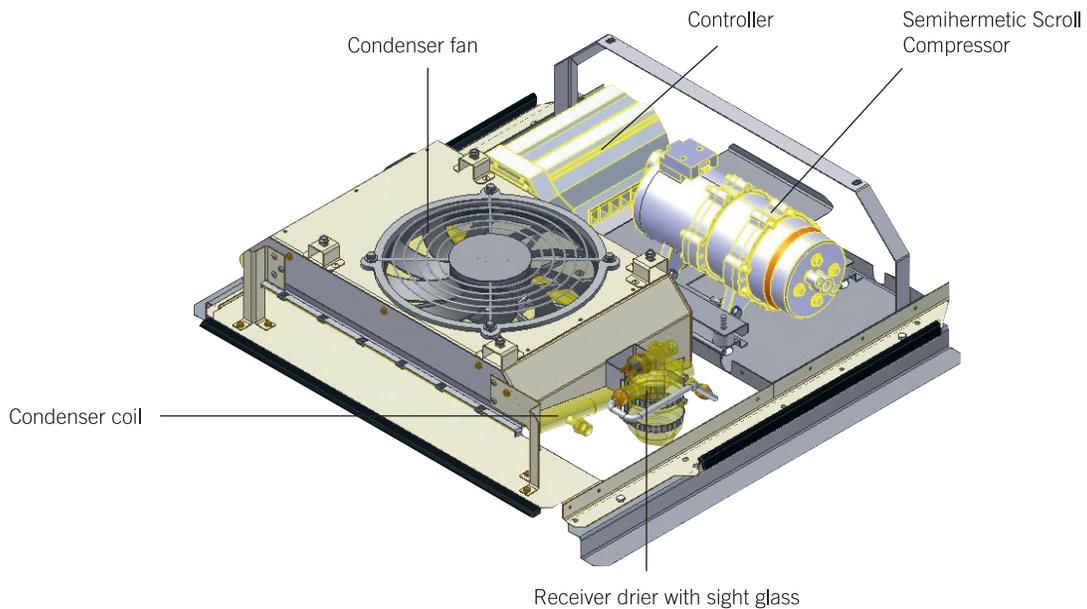


Main components:

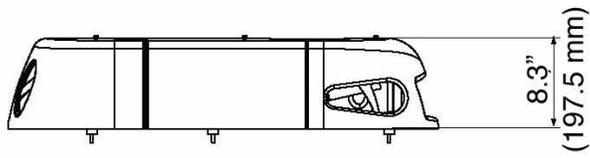
- Compressor
- Brushless motor
- Condenser and fan



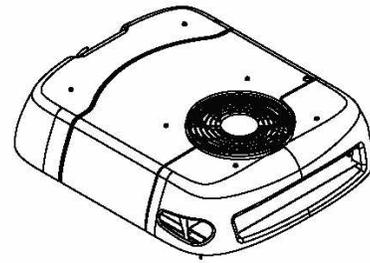
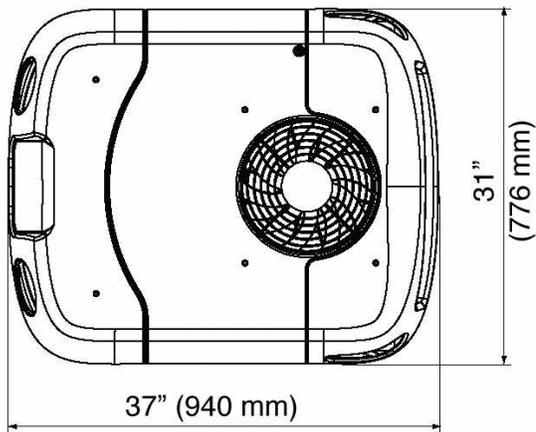
EcoFlex 4ES: Connections and major components (cover removed)



EcoFlex **4ES**: Dimensions



*Height without rail



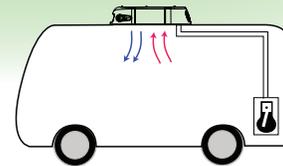
EcoFlex 6

This model is the non-electric EcoFlex, ready to connect to the engine driven compressor, remote evaporator, condenser, fans, and all necessary components.



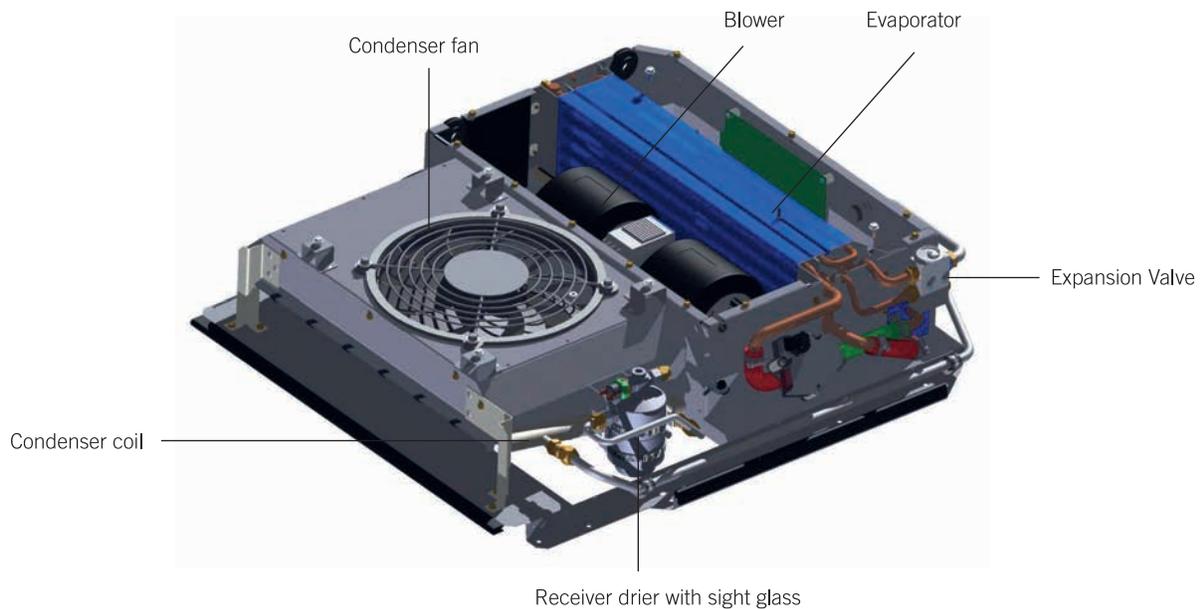
Main components:

- Evaporator and blower
- Condenser and fan



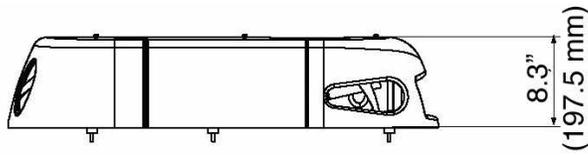
Overview of the components

EcoFlex 6: Connections and major components

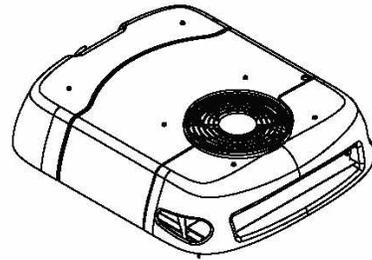
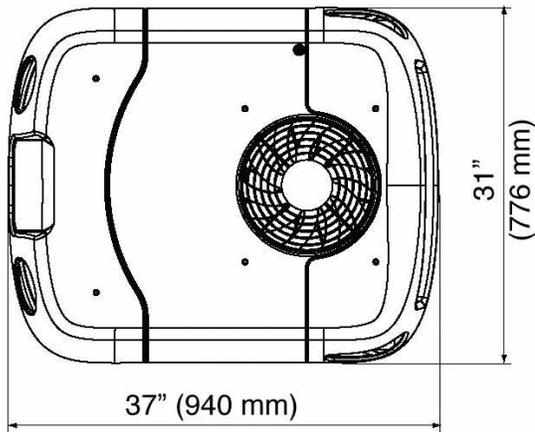




EcoFlex 6: Dimensions



*Height without rail



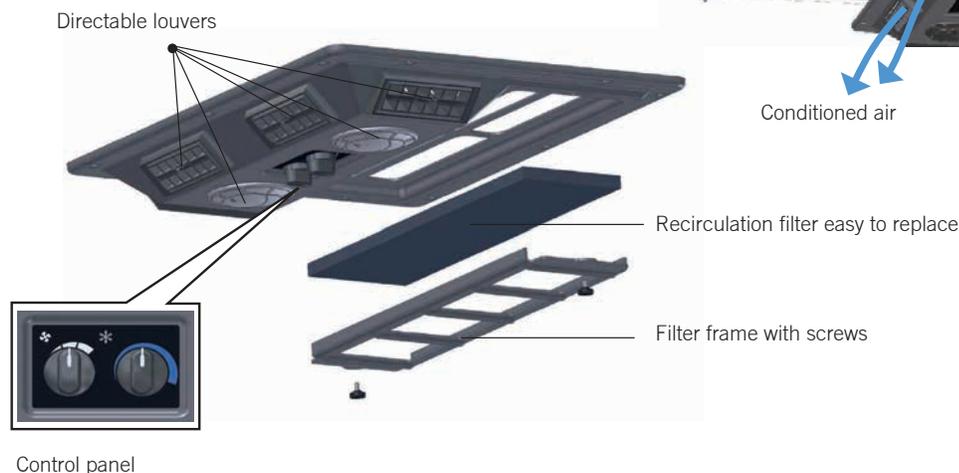
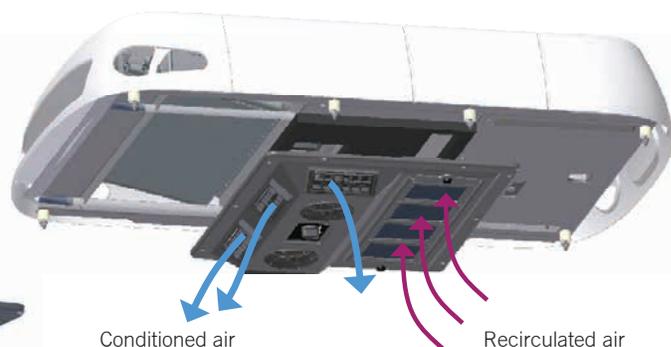
Technical Specification

	EcoFlex 4E	EcoFlex 4ES	EcoFlex 6
Application	DC Powered AC	DC Powered AC	Conventional AC
Type	Complete AC System	Compressor/Condenser	Condenser/Evaporator
Compressor type	Scroll, Semihermetic	Scroll, Semihermetic	NA
Cooling capacity (ARI) ^[1]	8500 Btu/hr (2.3 kW) for 12V / 13000 Btu/hr (3.8 kW) for 24V	8500 Btu/hr (2.3 kW) for 12V / 13000 Btu/hr (3.8 kW) for 24V	Up to 20500 Btu/hr (6 kW)
Voltage	12/24 V	12/24 V	12/24 V
Heating capacity (low speed)	No	No	No
Fresh air (Yes/No)	No	Yes	No
Width	31" (776 mm)	31" (776 mm)	31" (776 mm)
Length	47" (1200 mm)	37" (940 mm)	37" (940 mm)
Height ^[2]	7.5 + 0.8" (190 + 20 mm)	7.5 + 0.8" (190 + 20 mm)	7.5 + 0.8" (190 + 20 mm)
Air flow (free)	350 CFM (600 m ³ /h)	Depends on application	350 CFM (600 m ³ /h)
Current consumption, max	65/70 A	60/65 A	11A@27V 22A@13.5V
Refrigerant charge	1.65 lb (750 g)	Depends on application	Depends on application
Weight (total)	103.6 lb (47 kg)	73 lb (33 kg)	41.8 lb (19 kg)

[1] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH
 [2] + 0.8" (20 mm) for Sprinter bus van rails

Optional Air Distributor

To complete your purchase, the EcoFlex 4E and EcoFlex 6 can be combined with the air distributor panel, mounted to the bus ceiling, consisting of recirculation inlets, recirculation filter, and directable louvers. Integrated or remote control panel options are available.



EcoLine:

High performance, low profile, low weight, easy to install. All under an attractive cover.



for a reliable A/C for your minibus.

The EcoLine is the new standard for minibus A/C. With its improved performance, low weight and low-profile appearance, it is the easy choice if you're looking

To keep weight to a minimum, EcoLine models are manufactured with aluminum components and ABS covers. Exceptional engineering has allowed us to lower refrigerant charge, while increasing performance capabilities.



Summary of advantages

- Attractive low-profile design
- Low refrigerant charge
- Low weight thanks to aluminium parts and ABS covers
- Improved performance, using high performance heat exchangers
- Easy to maintain
- Easy to install
- Low product life cycle costs



EcoLine 8 AC/Heat / EcoLine 10 AC ONLY

MCC's Ecoline series consists of integrated compact roof mounted HVAC units designed specifically for minibus application.

Design Features Include:

- Low weight
- High performance MCX coil technology
- Ease of installation (OEM or retrofit)
- Improved reliability due to reduced hose/fittings

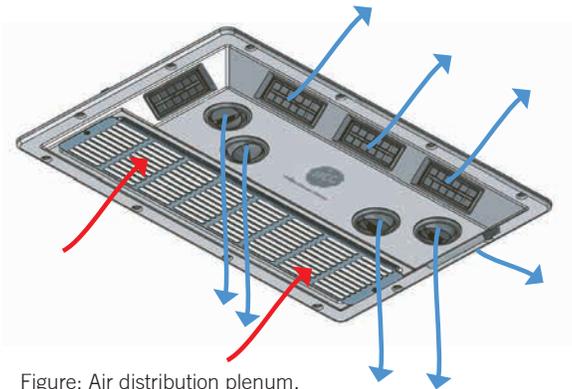


Figure: Air distribution plenum.

The EcoLine 8/10's airflow adjustment options and high performance capacity allows for a pleasant interior climate no matter where you may be.

The EcoLine 8/10's easy maintenance and installation, along with its superior quality and engineering, warrant low life cycle costs, saving you money now and in the future.

The elegant design of the ceiling mounted air distributor allows air to be directed throughout the vehicle through its multi-position louvers.

The tested and proven design of the Ecoline series rooftop A/C will provide reliable service and superior performance now and in years to come.

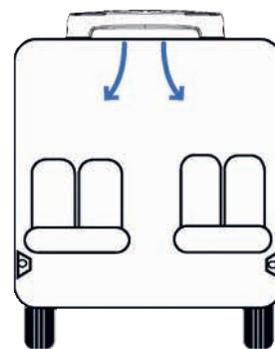
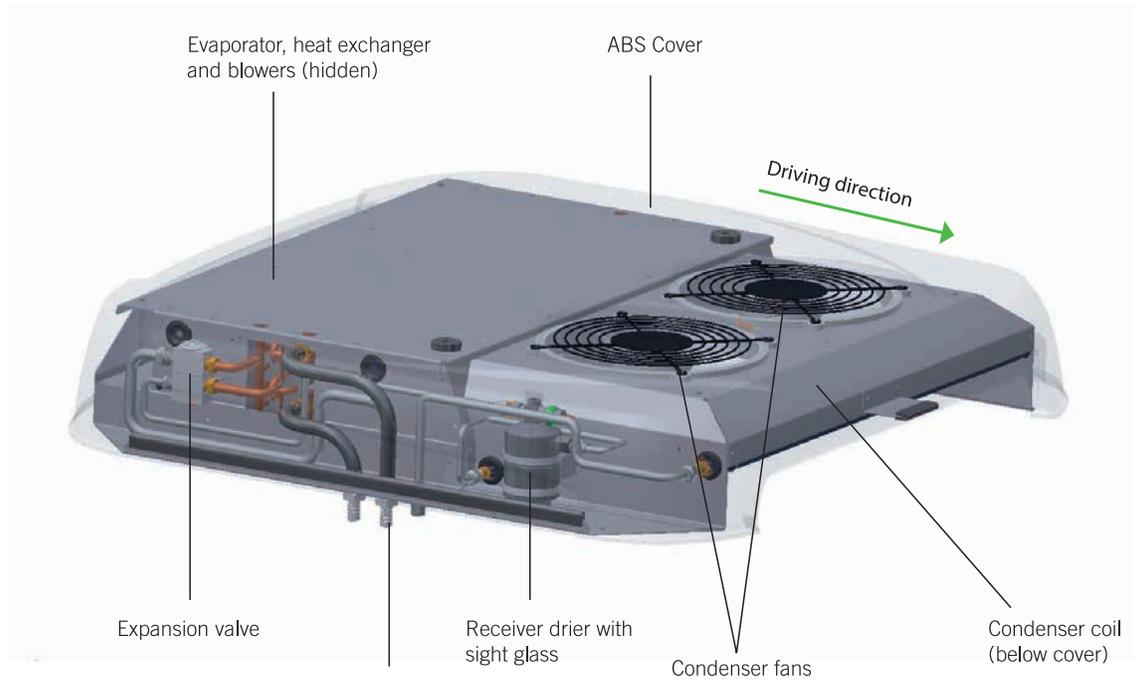


Figure: The EcoLine 8/EcoLine 10 blows directly into aisles of the minibus.

Overview of the components

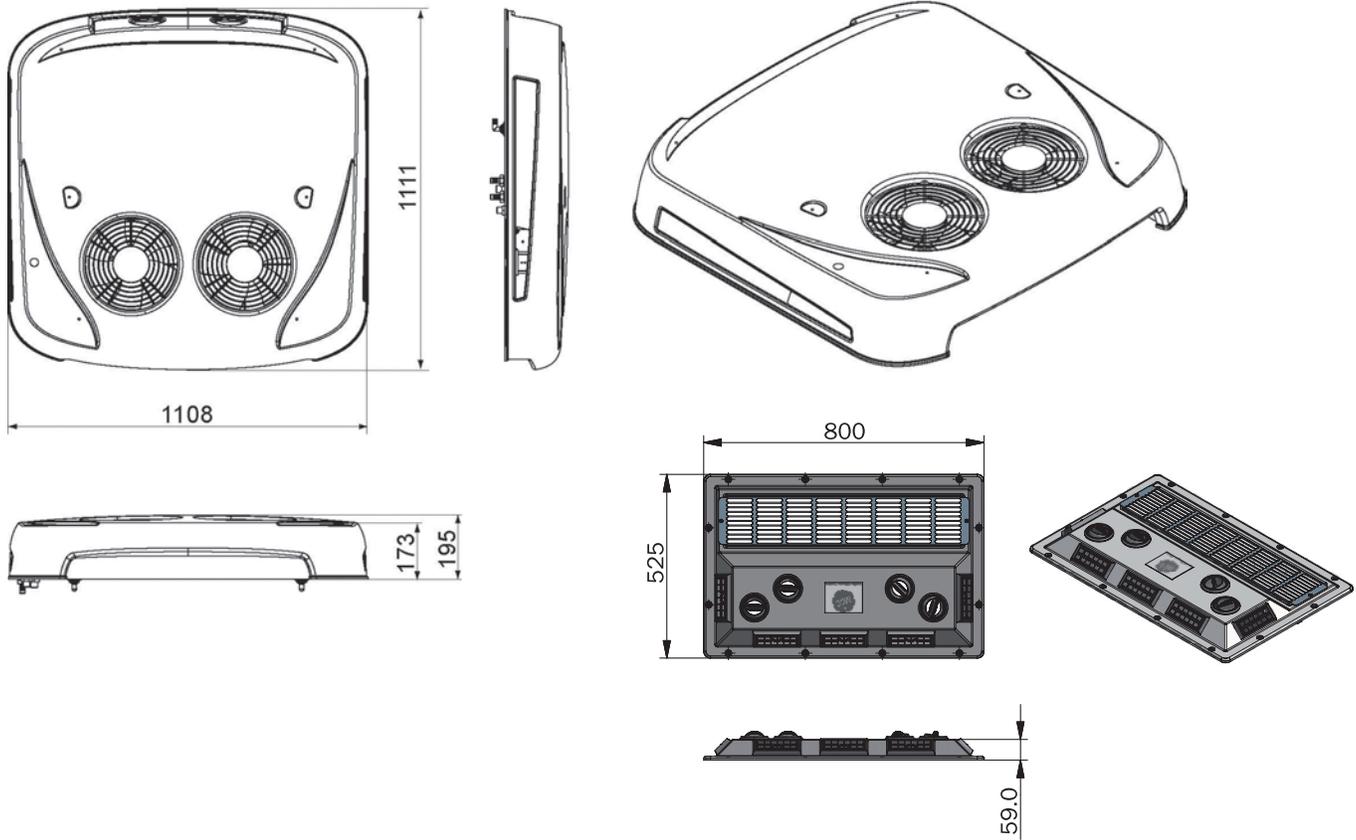
EcoLine 8 / EcoLine 10: Major Components



Connection both for water and refrigerant possible from below = great advantage!



EcoLine 8 / EcoLine 10: Dimensions



Measurements end Millimeters

Technical Specification

	Ecoline 8	Ecoline 10
Application	Conventional A/C	Conventional A/C
Cooling capacity	27000 Btu/hr (8.5 kW) ARI ^[1]	33000 Btu/hr (12 kW) ARI ^[1]
	55000 Btu/hr (16 kW) IMACA ^[2]	60000 Btu/hr (17.5 kW) IMACA ^[2]
Heating capacity	34121 Btu/hr (10 kW)	n/a
Voltage	12/24V	12/24V
Width	43.62" (1108 mm)	43.62" (1108 mm)
Length	43.74" (1111 mm)	43.74"(1111 mm)
Height ^[3]	7.68" (195 mm)	7.68" (195 mm)
Air flow evaporator, max	706 CFM (1200 m ³ /h)	706 CFM (1200 m ³ /h)
Current consumption max	49 A (12V)	60A (12V)
	25 A (24V)	30A (24V)
Weight (total)	106 lbs (48 kg)	104 lbs (47 kg)

[1] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH
 [2] IMACA condition: 100°F (38°C) / 90°F (32°C) / 50% RH
 [3] + 0.8" (20 mm) for Sprinter bus van rails

EcoLine 12

The EcoLine 12 is the next level of minibus A/C, specially adapted for minibuses with extra comfort requirements.

Choose between free blow or ducted options. The cooled/ heated air blows through ducts, allowing passengers to adjust air flow to their individual preference. With more cooling power it will give quicker cooldown, and of course higher comfort in hot climates. Very low profile.

Comes equipped with four double radial evaporator/ heater blowers and two condenser fans.



Features Include:

- larger capacity
- Fully integrated unit
 - with condenser and evaporator
- High performance MCX coil technology

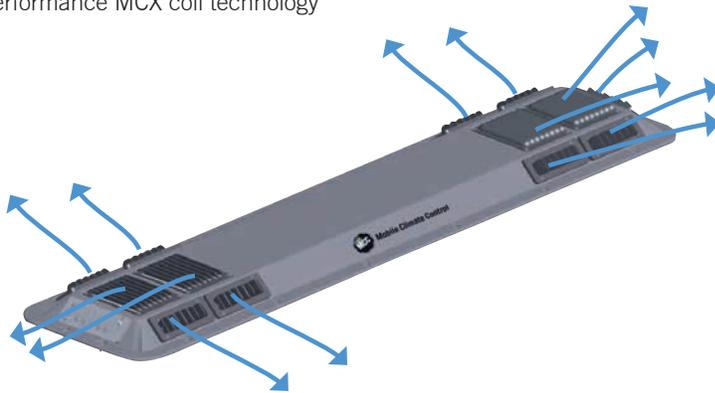


Figure: (Option 1) Air distribution plenum.

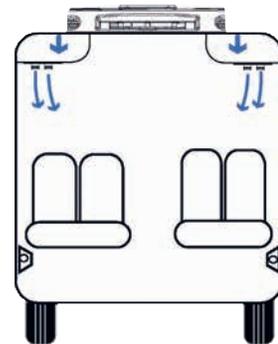
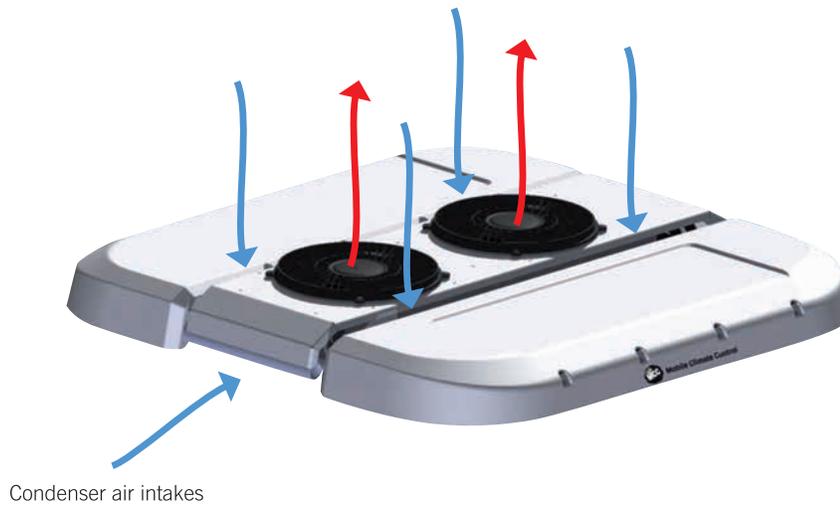
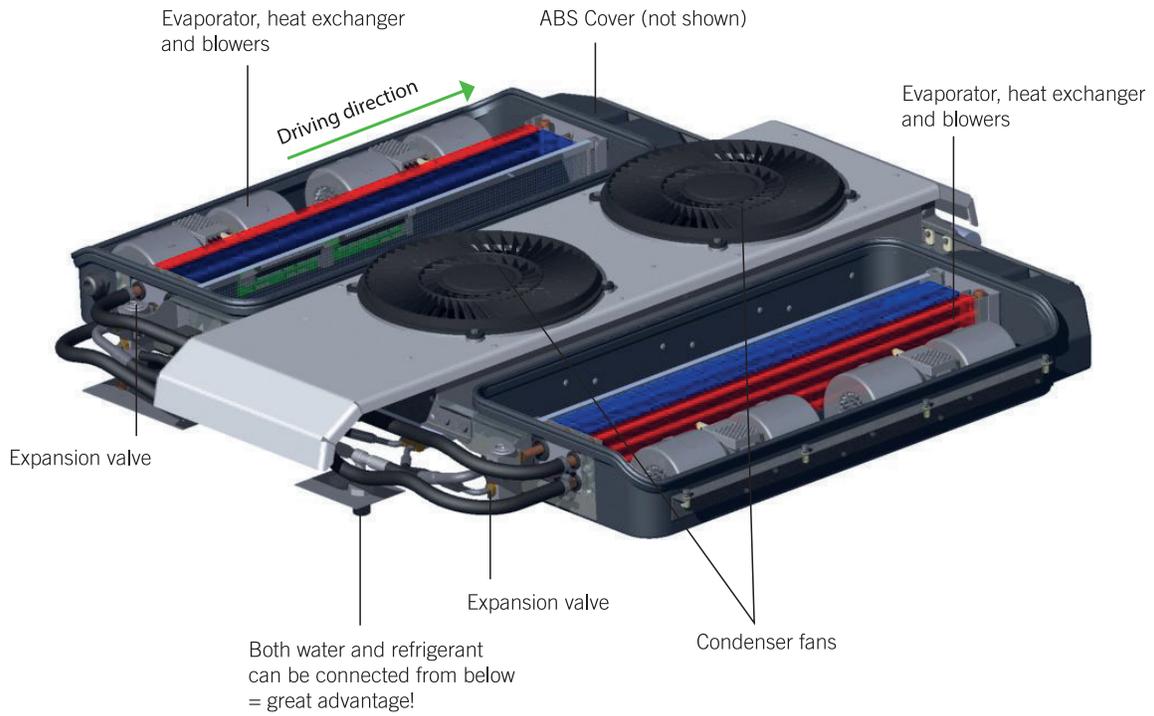
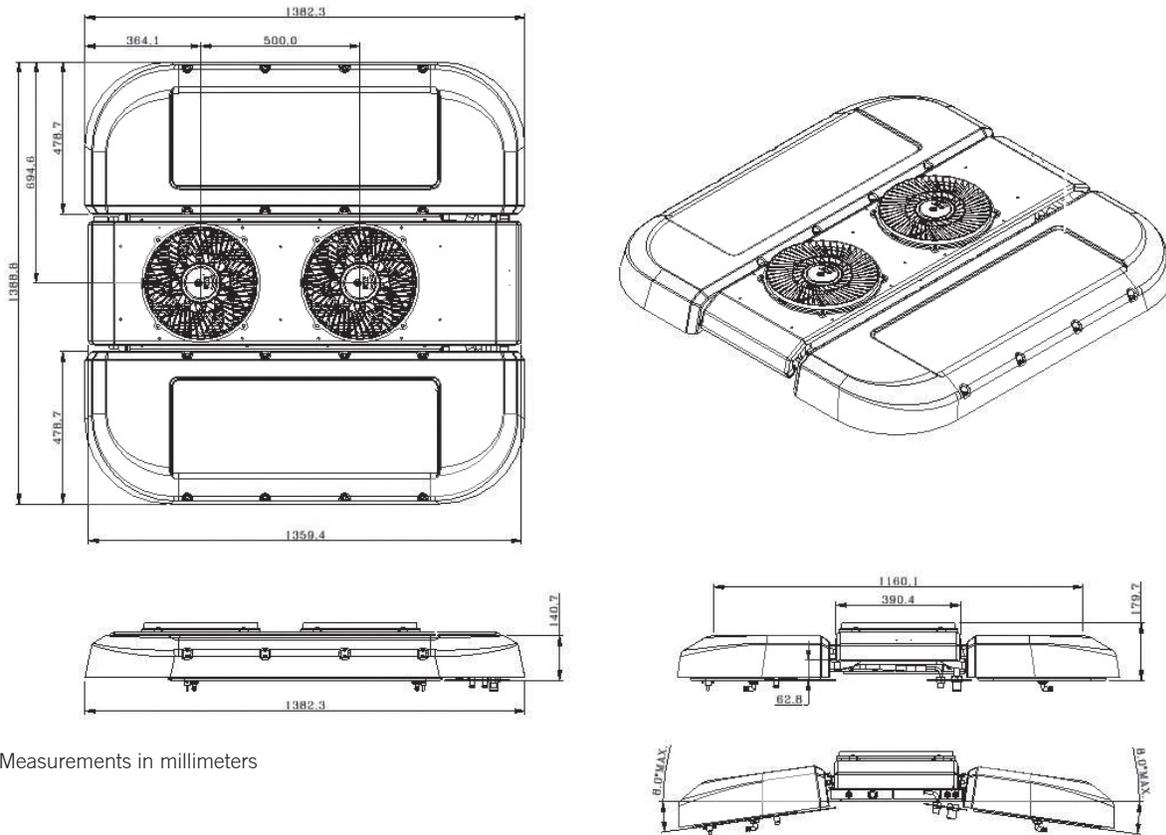


Figure: (Option 2) The EcoLine 12 blows directly into the minibus ducts.

EcoLine 12: Major components



EcoLine 12: Dimensions



Measurements in millimeters

Technical Specification

Application	Minibuses
Cooling capacity	41000 Btu/hr (12 kW) ARI ^[1] 66000 Btu/hr (19.3 kW) IMACA ^[2]
Heating capacity	54000 Btu/hr (15.9 kW)
Voltage	12/24V
Width	54.72" (1390 mm)
Length	54.53" (1385 mm)
Height ^[3]	7.09" (180 mm)
Air flow evaporator, max	1200 CFM (2000 m3/h)
Current consumption,max	76A (12V) 38A (24V)
Weight (total)	130 lbs (59 kg)

[1] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH
 [2] IMACA condition: 100°F (38°C) / 90°F (32°C) / 50% RH
 [3] + 0.8" (20 mm) for Sprinter bus van rails