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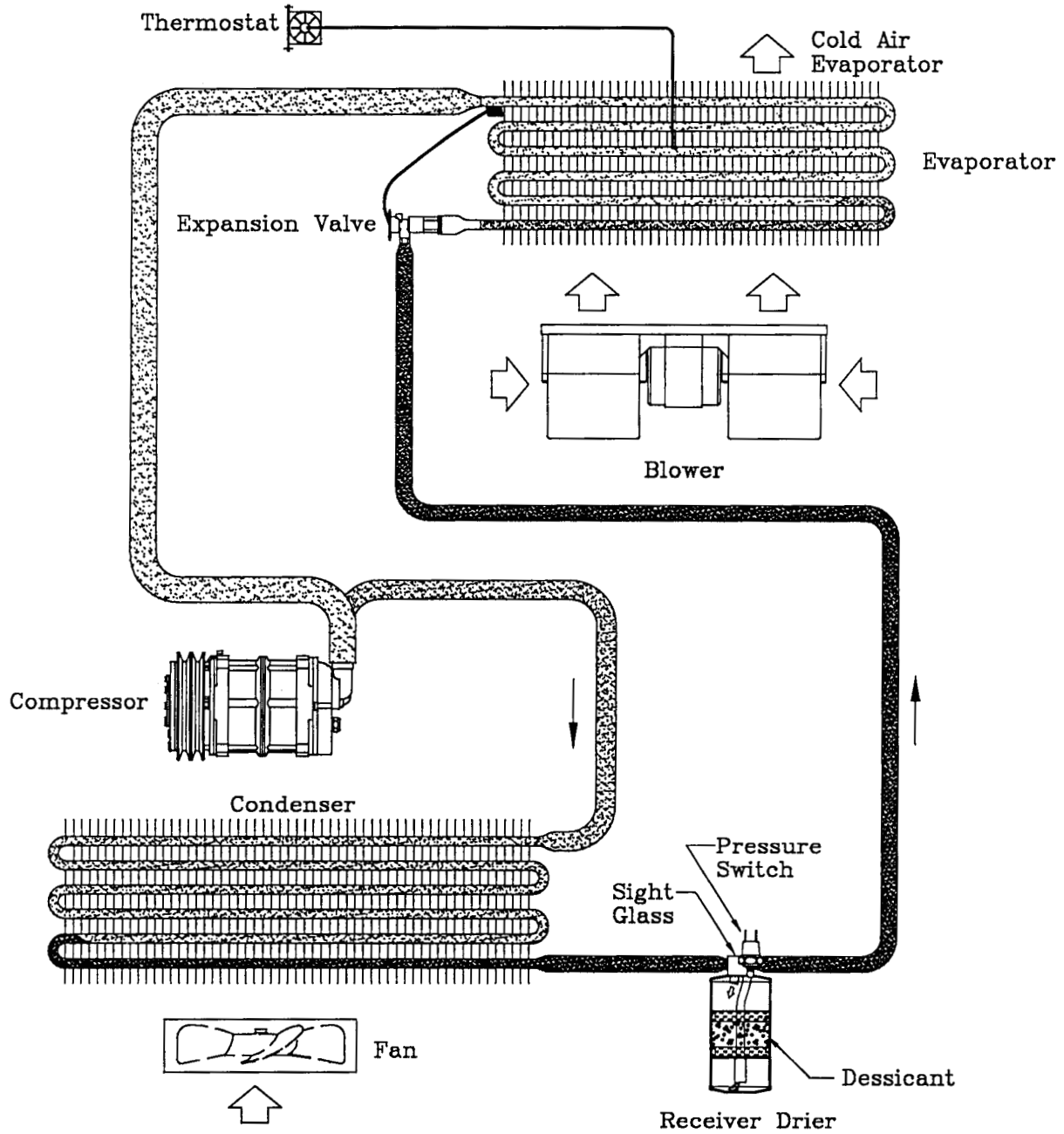
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# I. Introduction to AC



# Air Conditioning/Refrigeration Cycle



### Status Of R134a

 High Pressure Gas	 Low Pressure Gas
 High Pressure Liquid	 Low Pressure Liquid



# MCC Coil Manufacturing And Oil Coolers

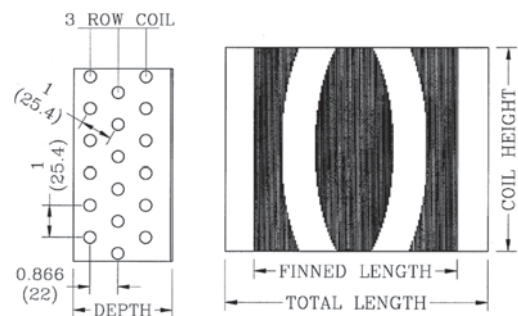
## MCC Coil Manufacturing

To ensure product quality MCC decided in the beginning to invest in a tube and fin production line. As a result of this decision it has been proven early that MCC’s customers enjoy a higher degree of design flexibility. Additionally MCC decided to adapt the machinery to produce rough coils for the heavy-duty vehicle market. This meant low fin density, thick fins and heavy duty mounting brackets. With the realization by most off-road vehicle manufacturers that coils designed for the on-road and light vehicle markets would not stand up to the off-road environment, the MCC coils soon became a winner. At MCC coils are designed to fulfill each customer’s individual needs.

## Design Specifications

The tube spacing selected for MCC coils are 1” (25.4mm) x0.866” (22mm) staggered 30°. The coils can be produced with a height of even inches (25.4mm) and with a depth of multiples of 0.866” (22mm) .

The width can be made to any dimension. Copper tubes with a burst pressure of 1790 PSI or 12.3 MPa are the preferred choice for refrigeration and water. Headers and connectors can be changed to fit each customer’s unique requirements. Tubes are brazed and can therefore be easily customized.



The most common fin material for coils is aluminum. Copper is also used in difficult high corrosion and abrasive environments. Copper enjoys a higher degree of heat transfer but is also heavier and more costly. Fins can be produced to a maximum thickness of 0.02” or 0.5 mm. MCC has two common fin shapes. An aggressive sinus waved shape with high heat transfer and high pressure drop makes it possible to reduce fin density for dirty conditions. The corrugated fin shape has a lower heat transfer and pressure drop than the sinus waved fin. Wet paint, dry powder coating and several other special anti-corrosive coatings are available for the MCC coils.

The copper tubes, end plates and fins are mechanically expanded together to ensure a strong and effective coil. The tube is expanded against the aluminum collar of the fin, which results in a very strong assembly. Headers and fittings are then brazed on the open side of the copper tubes. Every coil is pressure tested to confirm its integrity.

In addition to the above we can also offer other fin and tube products plus microchannel coils.

## Oil Coolers

Primary difference between a refrigeration/water coil and an oil cooler coil is the turbulator. Due to the boundary layer effects of oil, customized turbulators are used in each tube of the MCC oil cooler. The turbulator improves heat transfer greatly and can be designed to modify the degree of pressure drop. The MCC designed and manufactured turbulators are highly effective and produce a high liquid pressure drop. The liquid pressure drop is adjusted through header design. Generally copper tubes with a burst pressure of 2310 PSI or 15.9 MPa are used for oil coolers.

# R134a Temperature Pressure Chart

NORMAL EVAPORATOR RANGE			
TEMP°F	TEMP°C	PSIG	BAR (g)
16	-8.9	15.69	1.082
18	-7.8	17.04	1.175
20	-6.7	18.43	1.271
22	-5.6	19.87	1.370
24	-4.4	21.35	1.472
26	-3.3	22.88	1.578
28	-2.2	24.47	1.688
30	-1.1	26.10	1.800
32	0.0	27.79	1.917
34	1.1	29.52	2.036
36	2.2	31.32	2.160
38	3.3	33.17	2.288
40	4.4	35.07	2.419
42	5.6	37.03	2.554
44	6.7	39.05	2.693
45	7.2	40.09	2.765
50	10.0	45.48	3.137
55	12.8	51.27	3.536
60	15.6	57.47	3.963
65	18.3	64.10	4.421
70	21.1	71.19	4.910
75	23.9	78.75	5.431
80	26.7	86.80	5.986
85	29.4	95.40	6.579
90	32.2	104.40	7.200
91	32.8	106.30	7.331
92	33.3	108.20	7.462

NORMAL CONDENSER RANGE			
TEMP°F	TEMP°C	PSIG	BAR (g)
93	33.9	110.27	.600
94	34.4	112.17	.731
95	35.0	114.17	.869
100	37.8	124.38	.572
102	38.9	128.58	.862
104	40.0	132.99	.166
106	41.1	137.39	.469
108	42.2	141.99	.786
110	43.3	146.5	10.103
112	44.4	151.3	10.434
114	45.6	156.1	10.766
116	46.7	161.1	11.110
118	47.8	166.1	11.455
120	48.9	171.3	11.814
122	50.0	176.6	12.179
124	51.1	182	12.552
126	52.2	187.5	12.931
128	53.3	193.1	13.317
130	54.4	198.9	13.717
135	57.2	213.7	14.738
140	60.0	229.4	15.821
145	62.8	245.8	16.952
150	65.6	263	18.138
155	68.3	281.1	19.386
160	71.1	300.1	20.697
165	73.9	320	22.069
170	76.7	340.8	23.503

The numbers above represent boiling points for R-134a. All values are rounded two places.

## Evaporator

Pressures represent gas temperatures inside the coil, and not the coil surfaces. Add to temperature for coil air-off temperatures (8-10°F) .

Example: 90°F ambient temperature  
 +40°F  
 130°F condenser temperature = 200 PSIG\*  
 \*(Based on 30 MPH air flow)

## Condenser

Temperatures are not ambient temperatures. Add to ambient (35-40°F) for proper heat transfer, then refer to pressure chart.

# R134a – your best choice Based on hard facts and figures

## 9 facts you need to know about R134a

### Can I get the same cooling performance with R134a as a system with R407C?

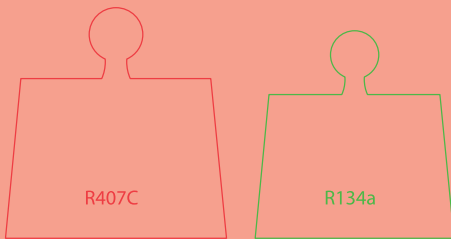
Yes. Any cooling capacity can be obtained from a correctly designed system using any type of refrigerant, given the refrigerant is suitable for the evaporating and condensing temperatures of the application. The coils and the quantity of air moved remain essentially the same. Only the size of the compressor and refrigerant lines need to be designed to match the required capacity.

**Example:**

MCC Eco 353 series using R134a  
and a 6TFC Bitzer compressor ..... 113 k Btu/hr (33 kW)  
Standard market available unit using R407C  
under same rating conditions ..... 113 k Btu/hr (33 kW)

### Will my R134a system weigh more than an R407C equipped system of the same capacity?

No. System weight will vary by construction and options. This is much more of a factor in system weight than refrigerant.



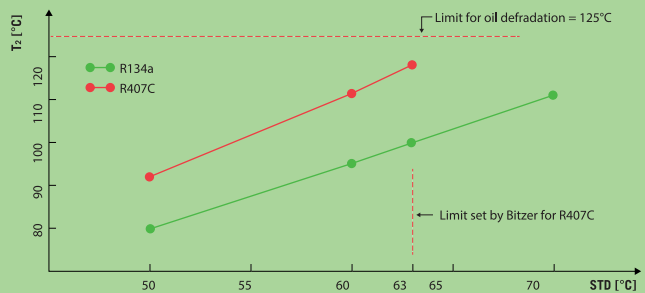
Example: Eco 353 roof mounted AC unit with R134a weight 450 lb (204 kg) with Bitzer 6TFC compressor weight – 113 lb (51.5 kg). The equivalent capacity roof unit on the market with R407C weight 513 lb (233 kg) and piston compressor weight – 115 lb (52.2 kg).

### Will I be able to get a replacement for R134a if it's ever phased out in the future?

Yes there is an identified replacement for R134a, HFO1234yf, which GM will use. The future for R407C is uncertain. Other things to consider; R407C is a blend which requires total change replacement after 50% loss of charge; this also limits the reuse of refrigerant on site and the recycling of the used refrigerant.

### Will my system run higher temperature with R134a?

No. With air-conditioning systems that are similarly optimized, the compressor discharge temperature in an R134a system shall be 18 – 30 °F (10 – 17 °C) lower than that in an R407C system.



### Is R134a more expensive per pound?

No R407C is.

Example: Recent price quote per 1000 lb cylinder at a major refrigerant distributor

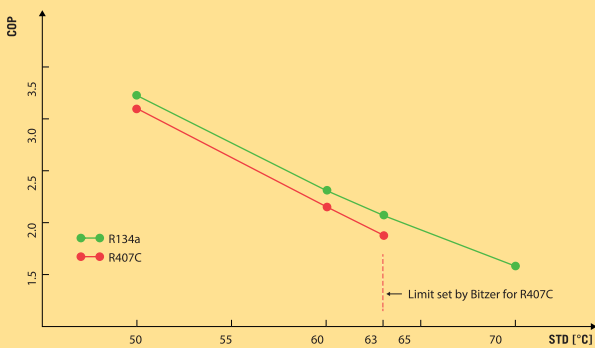
R407C: ..... \$12,000/1000 lbs (\$12/lb)

R134a: ..... \$5,875/1000 lbs (\$5.88/lb)

### Is R407C a more energy efficient refrigerant?

No. With air-conditioning systems that are similarly optimized, R134a is more energy-efficient than R407C. This fact is explained by the below graph and is demonstrated by the calculation of both cycles using the data and tools published by the leading refrigerant manufacturer – DuPont.

The chart shows the relationship between COP (coefficient of performance) and condensing temperature. The green line represents the curve for R134a and the red the one for R407C.



### Will I use more fuel with a properly designed R134a system as compared to one running with R407C?

No, an optimized R134a system when compared to a similarly optimized R407C system shall consume less fuel to produce the same cooling capacity. That difference becomes even greater when the ambient temperature or the load on the unit increases beyond the design point. However, a sub-optimized system will always consume more fuel no matter what the refrigerant. This is illustrated in the following chart which shows some system examples.

	R407C (optimized)	R134a (optimized)
Cooling Capacity [kW]	28.0	28.0
(Btu/hr)	(95,560)	(95,560)
Compressor Power [kW]	9.63	8.70
(HP)	(13.1)	(11.8)
COP	2.91	3.21
(Btu/hr per HP)	(7295)	(8098)

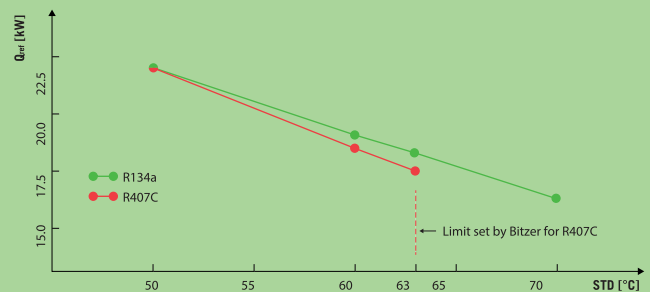
### What is the best refrigerant for high ambient temperature?

It is R134a. Common refrigeration oils have an ultimate service temperature of around 265°F (125°C) after which oil degradation is unavoidable.

As the ambient temperature increases, the condensing temperature (SDT-Saturated Discharge Temperature) has to follow. This increase in condensing temperature shall be accompanied with an even bigger increase in compressor discharge temperature (T2) that shall reach the oil degradation temperature far before an R134a system will. The below chart represents the relationship for both refrigerants where the red line is the curve for R407C and the green for R134a.

That fact explains why compressor manufacturers limit the condensing temperature for R407C to around 145 – 150°F (60°C – 65°C) whereas for R134a compressors, the top limit for condensing temperature is 158 – 175°F (70 – 80°C) for air conditioning applications.

Another reason why R134a is the choice refrigerant for high ambient is that in air-conditioning systems that are similarly optimized to deliver the same cooling capacity, an R407C system shall lose more cooling capacity than an R134a when the ambient temperature increases beyond the design point. This at the time when the cooling capacity is most needed.



### Is R407C a more environmentally friendly refrigerant?

No, GWP (Global Warming Potential) Value:

R407C – 1653

R134a – 1300

Both refrigerants have 0 ODP (Ozone depleting potential)



# Operating Instructions For Small AC Systems

## Hot Climate

1. Turn on AC mode.
2. Close heater control valve.
3. Set air recirculation to maximum for the first 5-10 minutes to assure rapid cool down.
4. Set AC thermostat to maximum.
5. Turn blower switch to high.

When desired cab temperature has been reached, increase fresh air blend by adjusting air recirculation towards minimum. Adjust AC thermostat setting and fan speed as desired.

## High Humidity and Demisting

Even though the ambient temperature is in your comfort zone, the air humidity might reach unacceptable levels. The HVAC system can also be used as a dehumidifier.

1. Turn on AC mode.
2. Set air recirculation to medium position.
3. Set AC thermostat to minimum.
4. Turn blower switch to low/medium.
5. Adjust heater control valve as desired.

## Cold Climate

1. Turn off AC mode.
2. Open heater control valve to maximum.
3. Set air recirculation to maximum for the first 5-10 minutes to assure rapid warm-up.
4. Turn blower switch to high.

When desired cab temperature has been reached, increase fresh air blend by adjusting air recirculation towards minimum. Adjust heater control valve setting and blower speed as desired.

## Maintenance

The fresh air filter must be cleaned sometimes as often as twice a day, depending on the operating environment. This is done by removing the filter and shaking it. Air pressure can also be used to blow out dust. The filter will clean outside air when pressurizing the cab. The filters should be replaced when required.

The recirculation air filter is made of aluminum mesh or open cell foam and should be cleaned with water. A mild detergent may also be used. It does not require cleaning as frequently as the fresh air intake filter.

The AC system must be turned on for at least 5 minutes weekly throughout the year to lubricate internal components.

Inspect the sight glass on the Receiver Drier (RD) weekly, or if the AC system does not perform to its fullest capacity, Bubbles indicate that the system is due for recharging. This occurs approximately every second year. If the RD is equipped with a moisture indicator, make sure the color is blue (OK) . If beige, the system needs to be recharged and refrigeration oil replaced. Please see AC installation instructions.

If recharging is required more frequently, a complete system leak test should be performed.

It is a good rule to regularly inspect (weekly) the compressor drive belt tension and wear. The condenser should be kept clean and the function of the electrical motors on the remote condensers (if any) should be checked frequently. To minimize compressor damages and repair costs, do not use the AC system when recharging is due or when the system is not operating adequately.

# Installation Instructions For Small AC Systems

For MCC designed systems using the TM13HD, TM15HD and TM16HD compressors.

## Condenser:

The larger condenser inlet fitting (#8 hose) which is connected to the compressor discharge side, should be located at the top of the radiator mounted condensers. The refrigerant condenses to a liquid in the condenser. The outlet (#6 hose) which is connected to the receiver drier, should be located at the bottom. **The condenser can be installed flat, but must never be installed with the liquid outlet higher than the inlet.**

## Receiver Drier:

Do not open seals on fittings until the system is ready to be vacuumed. The desiccant material in the receiver drier is very moisture sensitive. It is designed to attract moisture in the refrigerant. Nitrogen (N) is injected into the receiver drier to prevent moisture from using up the desiccant material prior to installation. Some receiver driers from MCC are equipped with a moisture indicator. A blue “dot” on a screw threaded into the tank will turn beige when the moisture content reaches an unacceptable level. If this occurs, follow the procedures under “Leaking Systems and Replacing Components”.

## Refrigerant Hose With Fittings:

When performing leak testing on a refrigerant hose, pay special attention to pin pricking and hose ends. A double braided hose is used for refrigerant systems. The hose is pin pricked down to the braiding for evacuation of air when the hose is under pressure. Do not confuse a refrigerant leak with the purging of air. Use an electronic refrigerant leak detector to determine refrigerant leaks. A thermoplastic inner-liner installed inside of the braiding will break if the hose radius is less than 4 times the hose OD.

Lubricate O-rings with mineral or ester oil prior to installation. There are two different types of fittings used in A/C systems: All steel for heavy duty applications like construction machinery and aluminum for lighter duty applications like agricultural machinery. A steel ferrule and nut are also used on aluminum fittings.

The following torque specifications should be used for the various fittings. Use the table as follows: If steel fittings are installed on a receiver drier, cast iron compressor connection or charge fitting, use the “steel to steel” column. If installed on an aluminum block valve or brass condenser connection, use the “one side aluminum or brass” column.

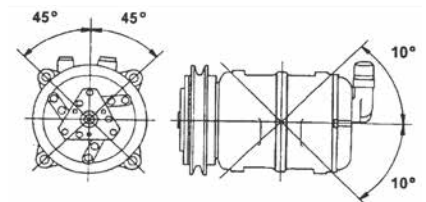
For aluminum fittings, use the “one side aluminum or brass” column.

Metal tube OD	Thread size	Steel to Steel		One side Alu or Brass	
		lb. ft.	Nm	lb. ft.	Nm
0.375	5/8	30-35	41-48	11-13	15-18
0.5	3/4	30-35	41-48	15-20	20-27
0.625	7/8	30-35	41-48	21-27	29-37
0.75	1-1/16	30-35	41-48	28-33	38-45

*Note: Do not connect hoses to moisture sensitive parts like the receiver drier and compressor if the system cannot be vacuumed and charged within 1 hour.*

## Compressor: See Also The Compressor Service Manual.

Do not open seals on fittings until the system is ready to be vacuumed. The compressor is filled with refrigeration PAG oil (which is very moisture sensitive) and with nitrogen (N). Unlike engine oil, it is not necessary to check or change the compressor oil. Never leave the compressor upside down for periods longer than 30 seconds. The permissible compressor speed is 700-6000 RPM. It is important that the compressor speed is adapted to the performance of other components in the system. The compressor must be positioned within the range indicated in the picture.





# Installation Instructions For Small AC Systems

## Refrigerant Charge:

Vacuum the system for 30 minutes, preferably with a two stage pump. There are two methods in determining the correct refrigerant charge. Run the system at maximum capacity and the blower at highest speed with the cab doors fully open for 5 minutes after the initial charge.

1. Have one person inspecting the sight glass on the receiver drier at all times. Remove the protective foil covering the glass. Pre-charge the system with an amount below correct estimated charge. The bubbles will make the glass grayish. Charge with 3 oz (0.09 kg) of refrigerant and allow the system to stabilize for 2 minutes. Repeat until sight glass clears. Liquid will be present at the receiver drier when the glass clears. Add 8 oz (0.23 kg) of refrigerant to top up the receiver drier.
2. Charge the system with an amount estimated to be the correct amount. Add 3 oz (0.09 kg) of refrigerant and allow to stabilize for 2 minutes. Repeat until the high pressure increases rapidly. The receiver drier contains 100% liquid at this time. Remove 8 oz (0.23 kg) of refrigerant.

## Refrigeration Oil Charge:

The compressor is pre-filled with PAG (Poly Alkelene Glycol) oil. The pre-filled amount will support an A/C system charged with up to 2 lb. 14 oz or 1.3 kg of refrigerant. This amount represents the size of an A/C system in a passenger car. Most off-road A/C systems are considerably larger and require an additional oil charge as listed below.

To retain a valid warranty, PAG oil must be used. Add oil to the suction port of the compressor prior to vacuuming, or use the automatic oil injector on the charge station (if available) . Add an estimated correct amount of oil to the system when initially determining the refrigeration charge.

*Note: If the amount of refrigeration oil used is lower than recommended, the life expectancy of the compressor will be reduced.*

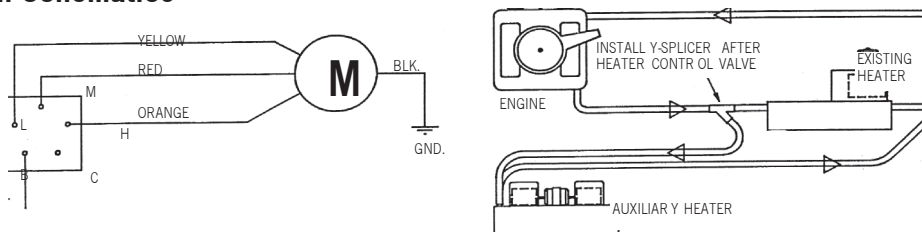
REFRIGERANT CHARGE (WEIGHT)						ADD PAG OIL (VOLUME)				
lb.	oz	-	lb.	oz	kg	-	kg	fl oz	dl	cm <sup>3</sup>
2	14	-	3	5	1.3	-	1.5	2.0	0.6	60
3	5	-	3	11	1.5	-	1.7	2.4	0.7	70
3	11	-	4	10	1.9	-	2.1	3.0	0.9	90
4	3	-	4	10	1.9	-	2.1	4.1	1.2	120
4	10	-	5	2	2.1	-	2.3	5.0	1.4	140

## Leaking Systems And Replacing Components:

Refrigerant leaks and component replacement require the oil and receiver drier to also be replaced.

1. Drain the oil in the compressor through the drain plug, suction and discharge fittings while rotating clutch simultaneously.
2. Replace the oil in the compressor with the original amount (printed on the compressor) plus the add on amount established for the system, minus one fl oz (30 cm<sup>3</sup>) .
3. Replace the receiver drier.

## Heater Installation Schematics

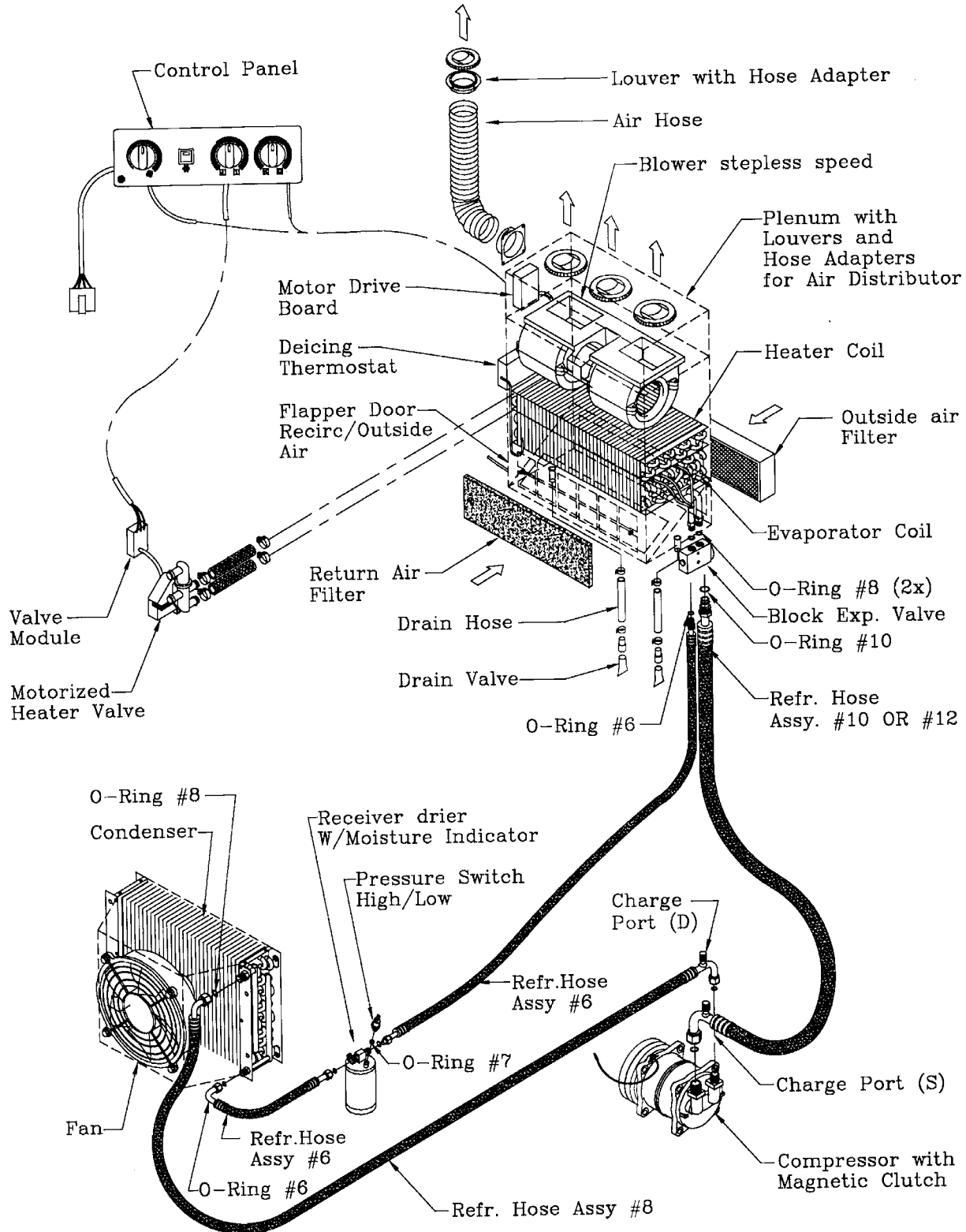


POWER SUPPLY B + MUST BE FUSED. USE 15 - 20 AMP FUSE. L= LOW SPEED M = MEDIUM SPEED HIGH = HIGH SPEED

The hose clamp torque specification for the 5/8" ID heater hose varies from 16 lb. ft. or 22 N•m to 35 lb. ft. or 47.6 N•m. It is essential to re-tighten non constant torque clamps regularly. For ducted units, use air hose to connect to louvers. Avoid running blower with all louvers closed as this will reduce motor life.



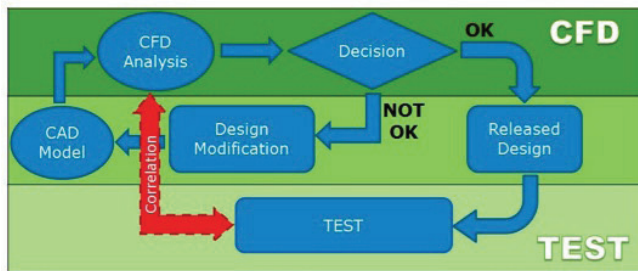
# Installation Schematic For Small AC Systems



## Virtual Testing Problems **Finding Solutions**

# Mobile Climate Control's CFD Technology

Here at MCC, by using the latest developments in Computational Fluid Dynamics (CFD) analysis, we are able to embed CFD technology into the design process at an early stage of design cycle. This ensures that as soon as a reasonable CAD model is available, a CFD analysis can be conducted to verify whether there are any flow or thermal issues. This assures that design can be changed and optimized at the earlier CAD stage, instead of waiting for prototypes to be built, thereby guaranteeing significant savings of time and money.



Mobile Climate Control prides itself on the outstanding quality of its engineering support. MCC Provides a complete range of Computational Fluid Dynamics consulting services including laminar, turbulent, steady state, transient, conjugate heat transfer and multiphysics analyses to drive products from concept to reality.

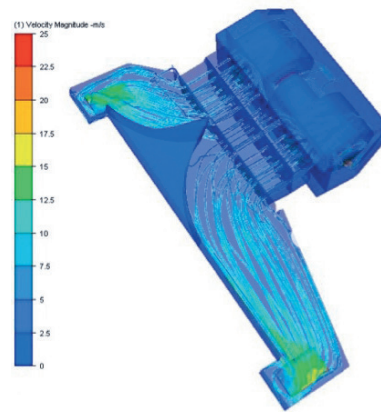
### Experience and skills

Within MCC, the most recent CFD technology is used across various applications in on-road, off-road, utility vehicles and customized special designs to prove and improve designs in a cost effective manner. We are highly experienced in variety of applications in automotive industry including:

- Passenger comfort
- Defrost/Demist
- HVAC System
- Rotating Machinery

- Optimization studies for various flow path profiles
- Aerodynamics
- Fluid Structure Interaction
- Underhood flow
- Electronic Cooling

Our CFD consulting service has consistently met or exceeded the expectations and demands from all our clients. Some of our clients are Blue Bird, New Flyer, Gillig, MCI, Nova Bus, and Dousan/Bobcat.



CFD analysis of a custom designed HVAC unit

### State of the art CFD tools

We have considerable experience with the world's class CFD/ FEA tools such as:

- Autodesk Simulation CFD
- Autodesk Simulation Mechanical
- OpenFoam
- SpaceClaim
- STAR-CCM+
- Ansys-CFD

The default CFD tools at MCC are Autodesk CFD Simulation and OpenFoam, however we could accommodate CFD projects on other CFD tools based on customer request.

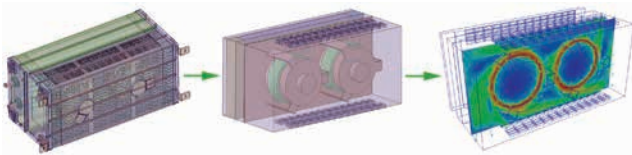
**MCC CFD Process**

The MCC CFD process includes the following steps:

- Define and specify the Flow Problem
- Elaborate the (Computational) Geometry
- Determine the Flow Domain
- Create and Optimize Mesh
- Devise Overall Simulation Strategy
- Set the CFD simulation Input and Boundary Conditions
- Execute & Monitor the CFD Simulation Process
- Post processing of the CFD Results
- Make Comparisons of the Results and Provide Design Recommendations
- Repeat the Analysis if it is needed
- Document Findings and Provide a Professional Report

**CFD Applications**

These are some of the most common analyses which are conducted at MCC on a daily bases:

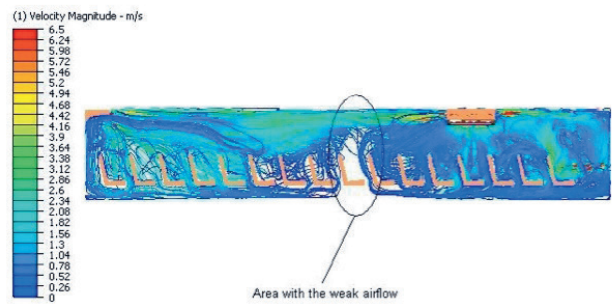


- Analyze climate control functions and passenger comfort under various harsh conditions.
- Defrost analysis of windshields to optimize the defroster system of vehicles.
- Flow analysis of HVAC systems to design and optimize of their casing and ducting system.
- Flow analysis of blowers to optimize their performance curve.
- Thermal analysis of coils.
- Aerodynamic analysis of bus to determine the aerodynamic forces on the rood unit case.

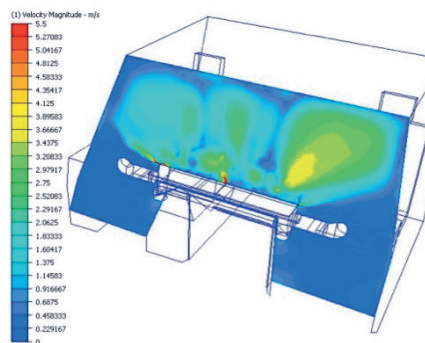
We provide exceptional CFD/FEA consulting analysis service to help our clients to reduce the design costs and shorten the design cycle.



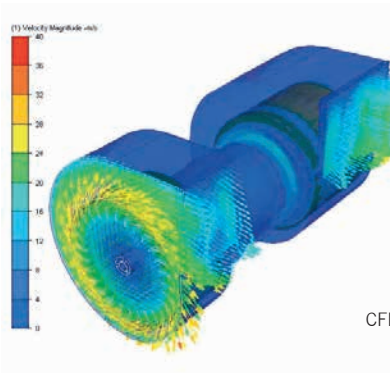
Aerodynamics analysis of a transit bus



Passenger comfort analysis of a transit bus.



Defrost analysis of a military vehicle



CFD analysis of a centrifugal blower

## Notes



# II. Test Facilities

## Test Facility

Since 1975 MCC has been involved in the testing and validation of HVAC products and systems for transit, off-road, utility, military, and specialty applications. With our sophisticated and flexible test chambers and analysis equipment, we are able to quantify performance, robustness, and reliability of all types of equipment, in all types of conditions.



### Test Facility Capabilities

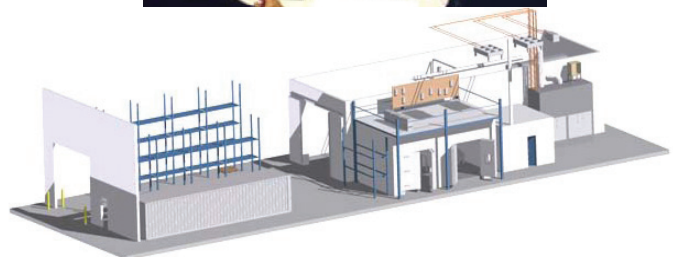
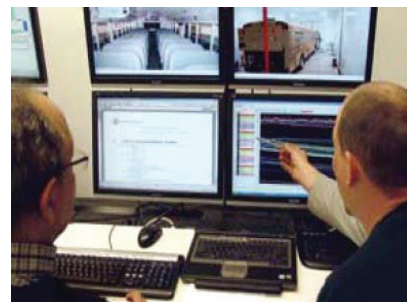
MCC's research & development testing facilities include extensive equipment for testing the performance of HVAC systems as well as components within the systems. Our custom-built climate chamber, the core of our test facility, enables MCC to provide a chamber with a large internal volume capable of accepting large articles. In our climate chamber, we are able to simulate the most severe environmental conditions and put our client vehicles or HVAC systems through the most demanding tests. MCC's Vaughan test facility meets the demanding expectations of being a sophisticated and flexible engineering tool. This, along with our experience, enables us to develop and tailor test processes and configurations for each client while providing fast and cost-efficient solutions.

### Experience and Skills

MCC has expertise working in the global market within the mass-transit, off-road, construction/utility, and military industries. Our products have consistently met or exceeded our clients specifications and expectations. Our on-site engineering staff has extensive experience with a broad spectrum of test standards and procedures such as: SAE, ISO, MIL, and ASHRAE. With these in mind, we work to provide the best possible technical and economical solutions for testing to the required specification. Our test team has many years of experience providing summarized data, data analysis, images, thermal images, summary reports, and comprehensive reports. Having licensed refrigerant mechanics on staff allows us not only to provide thorough results but also to put our experience at your disposal for further guidance.

### Real Time System Evaluation

Testing in the Large Environmental Drive-In Chamber and the Calorimeter are controlled from the Central Control Room. To improve personnel safety, cameras and hazardous gas detectors are installed in the chamber. 1000+ channels of I/O are available for measurement acquisition. In-house designed DAQ software and a wide range of instruments are used, providing highly accurate results throughout the various test conditions. Equipment includes, pressure transducers, thermocouples, humidity sensors, mass flowmeters, and tachometers. Every measurement is viewed in real-time in the Central Control Room using our customizable software. We can quickly provide custom software to meet your needs.





# Qualified, certified, reliable. We are ready when you are!

## In Vehicle Heating and AC Testing

In order to fully characterize and map the performance of a vehicle's HVAC system, tests can be conducted throughout the system operating range and design conditions. These include analyzing the performance of the system when faced with extreme conditions, analyzing the effects of cabin heating via solar load, mapping airflow, and optimizing the system refrigerant charge. The purpose is always to ensure maximum performance throughout the design conditions.

Tests may include but are not limited to:

- Vehicle A/C Pull-Down Testing
- Heating System Pull-Up Testing
- Vehicle Level Refrigerant Charge optimization
- Thermal Imaging
- Windscreen Airflow Velocity Profile for Defroster
- Solar Load Simulation for Cab A/C System Testing
- Vehicle Defrosting Performance Test
- Vehicle Defogging Performance Test

## System Testing at Component Level

When designing or implementing new components, validation is needed to ensure the performance and durability requirements are met. These components can be cycle tested in one of our many Test Chambers, thereby assuring fast and cost-effective customized testing. Customized data acquisition and measurements, combined with one of our many Wind Tunnels provides for quick and precise airflow validation for blowers and fans.

Tests may include but are not limited to:

- Evaporator Heat Exchange Testing
- Condenser Heat Exchange Testing
- System Capacity Testing
- System Airflow Testing

## Component Durability Testing

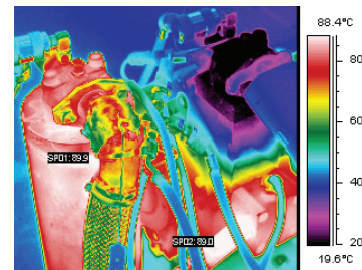
Our products are built for function, reliability and longevity and we are able to validate these components for the intended design condition.

Tests may include but are not limited to:

- Corrosion Salt Fog Chamber Testing as per B117
- Thermal & Pressure Cycle Testing
- Mechanical cycling



Windscreen Velocity Profile



Thermal Imaging



Defrosting Performance Test



In-house developed software



Airflow Test Cell

## Notes





# 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.



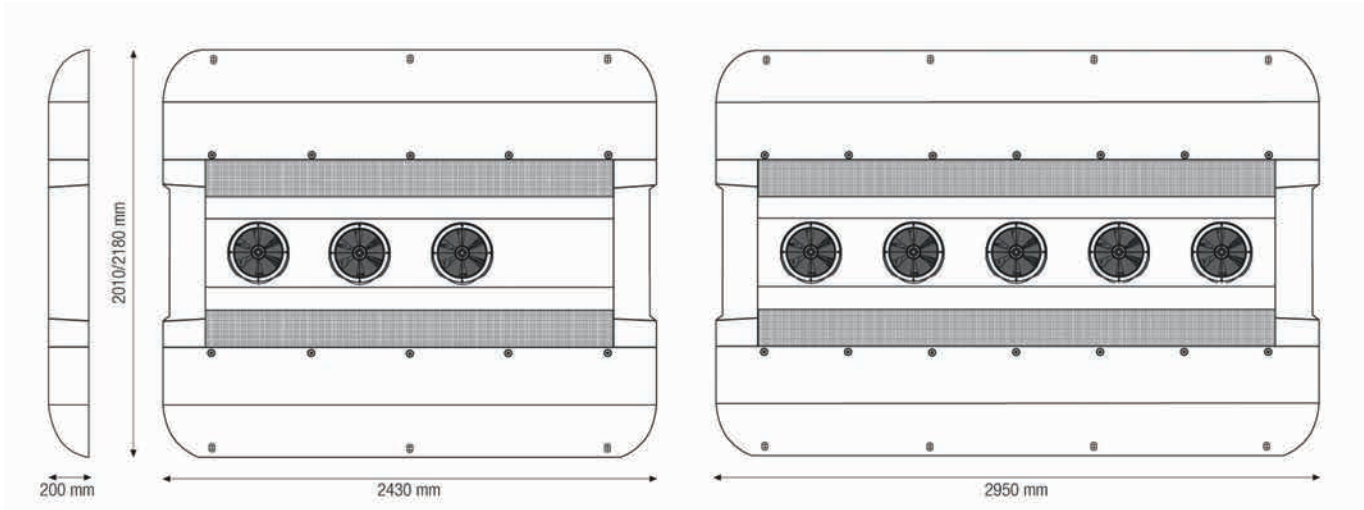
### Features

- 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 <sup>[1]</sup>	109000 Btu/hr (32 kW)	133000 Btu/hr (39 kW)	150000 Btu/hr (44 kW)
Cooling capacity @ ARI <sup>[2]</sup>	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 <sup>3</sup> /hr)	3900 CFM (6600 m <sup>3</sup> /hr) 5	5200 CFM (8800 m <sup>3</sup> /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.

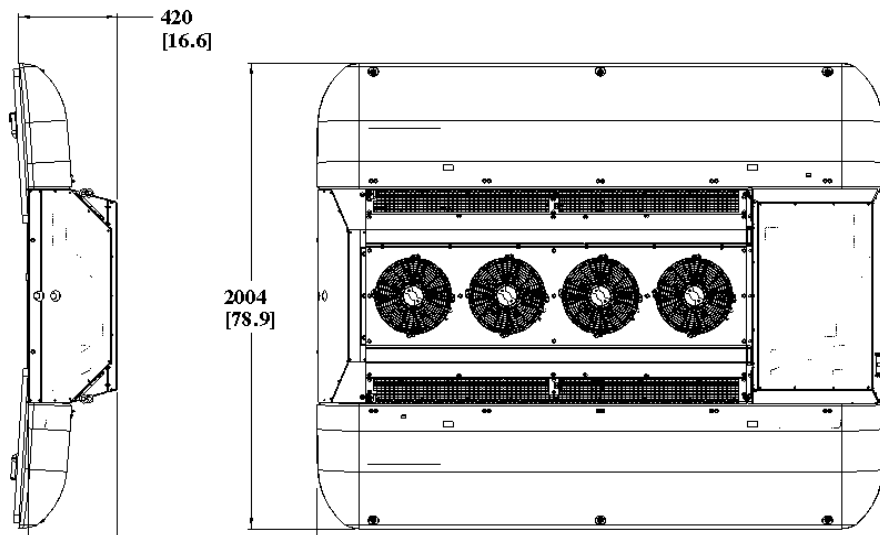
A robust inverter, very efficient and reliable, drives the compressor. Air cooling of the inverter improves the overall reliability by reducing complexity.

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 <sup>[1]</sup>	109000 Btu/hr (32kW)	
Cooling capacity @ ARI <sup>[2]</sup>	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 <sup>3</sup> /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 <sup>[3]</sup>	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.

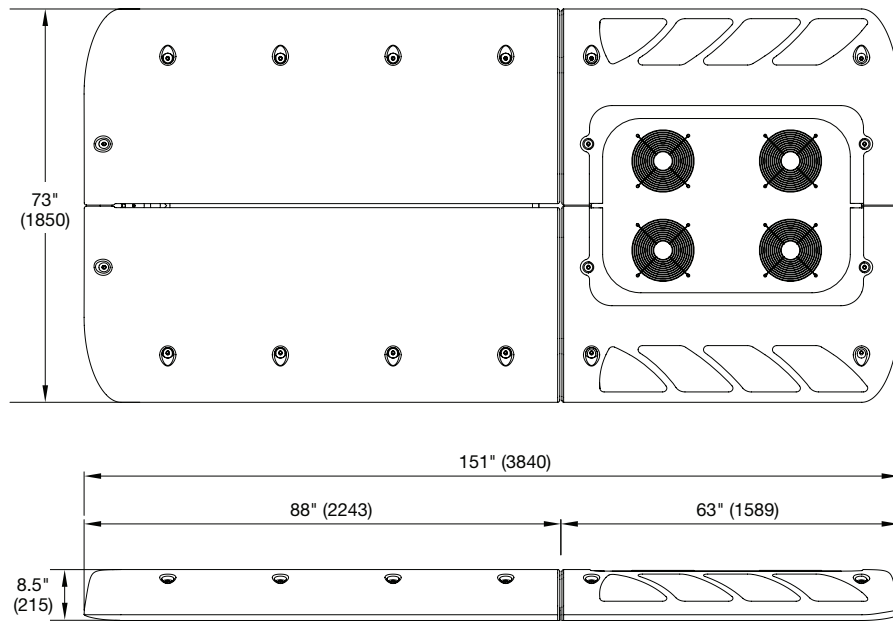
The system uses MCC's micro-channel heat exchanger (MCHX) coil technology, which delivers significant performance improvements through better heat transfer and thermal performance. Extended motor life is available through the use of brushless motors.



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 <sup>[1]</sup>	109000 Btu/hr (32 kW)	130000 Btu/hr (38 kW)	143000 Btu/hr (42 kW)
Cooling capacity @ ARI <sup>[2]</sup>	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 <sup>3</sup> /hr)	3900 CFM (6600 m <sup>3</sup> /hr)	5200 CFM (8800 m <sup>3</sup> /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.



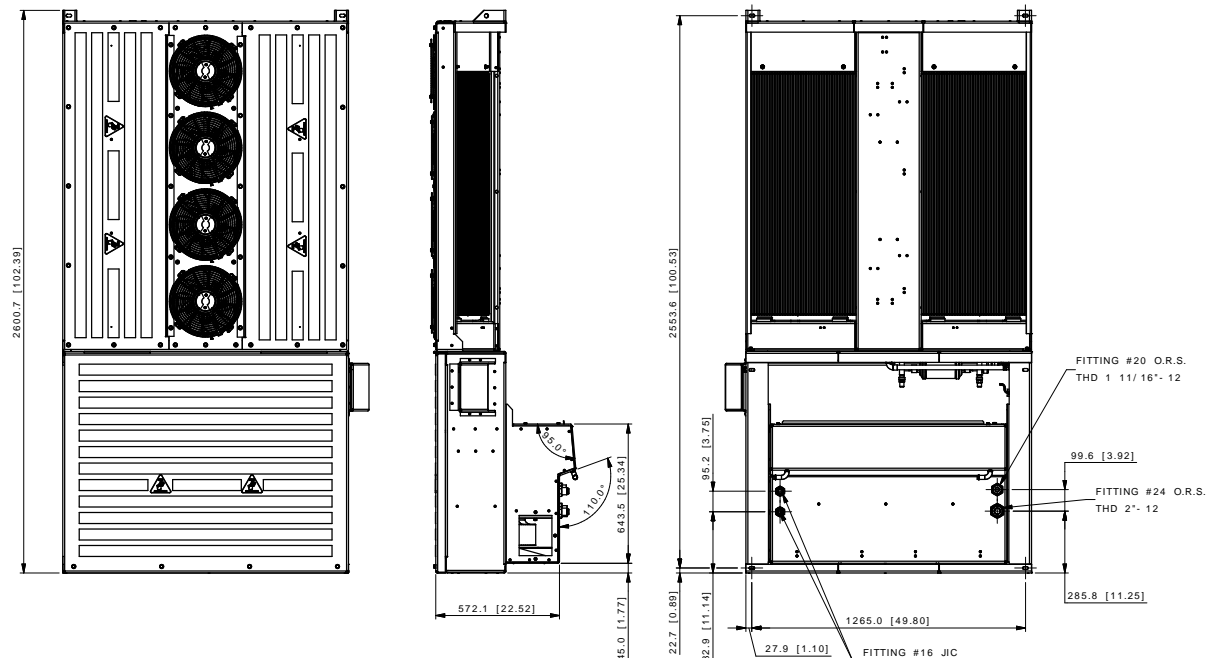
### Features

- 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) <sup>[1]</sup>	120,000 Btu/hr (35kW)
Heating capacity <sup>[2]</sup>	126,000 Btu/hr (37 kW)
Air flow	2400 CFM (4100 m <sup>3</sup> /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.



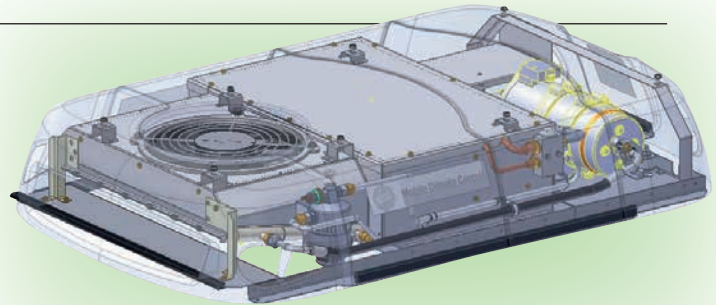
## Summary of advantages

- 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)

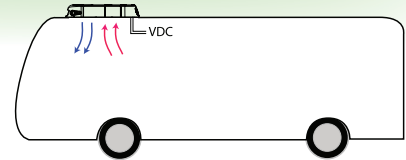
This is the DC powered complete, factory charged system AC. Just install and connect to the electrical system and it is ready to deliver cold air. Comes with all components including, reliable brushless motor drive, scroll compressor, evaporator, condenser and fans.

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

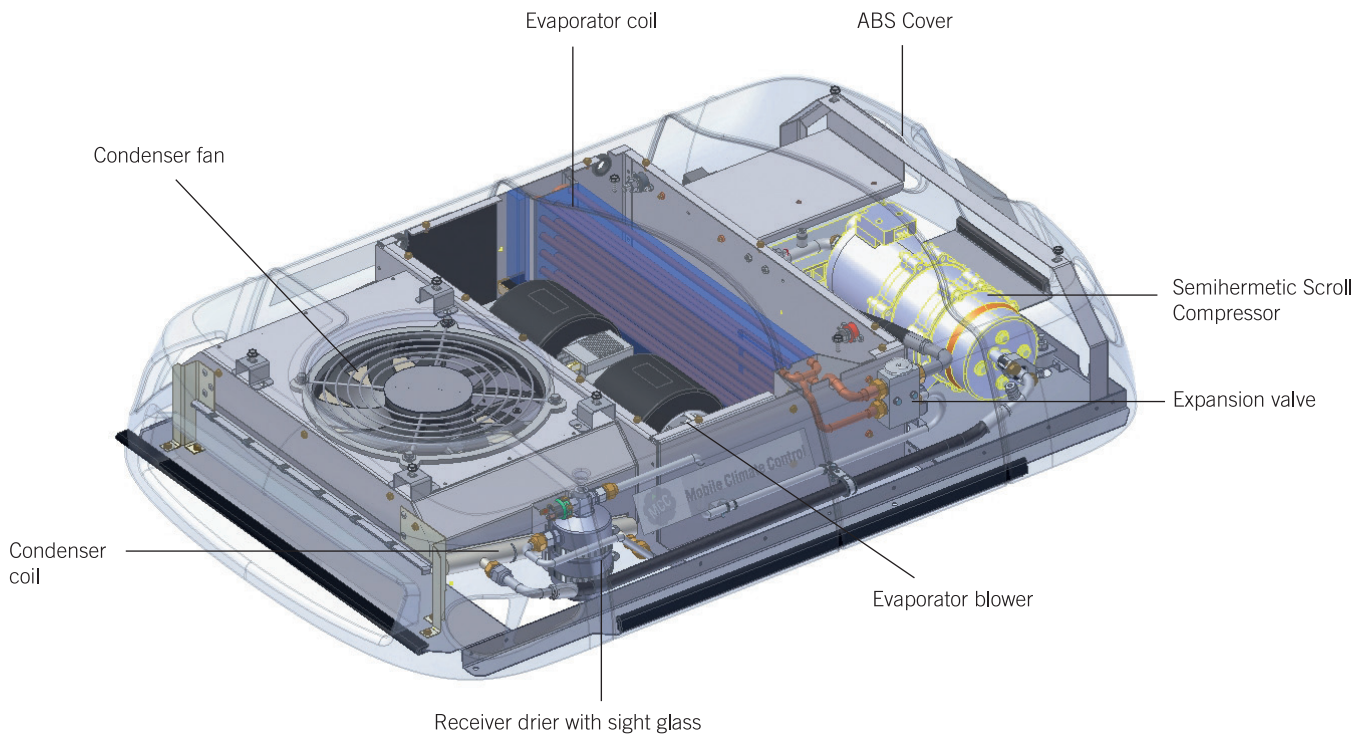


**Main components:**

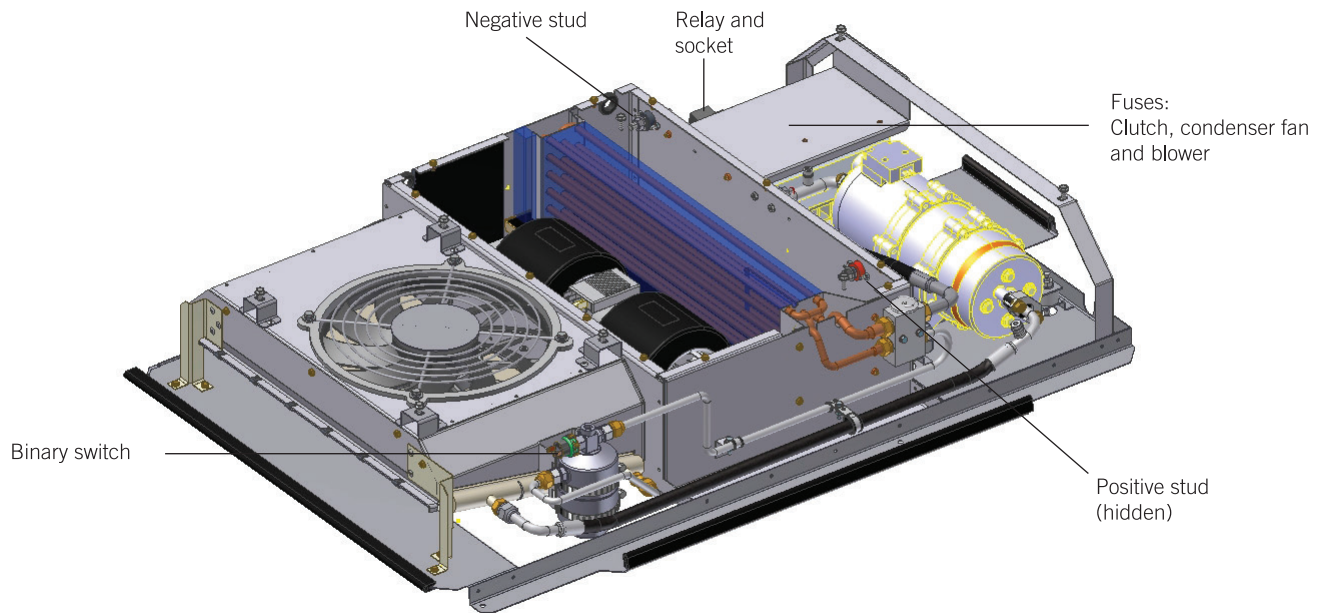
- Compressor
- Brushless motor
- Evaporator and blower
- Condenser and fan



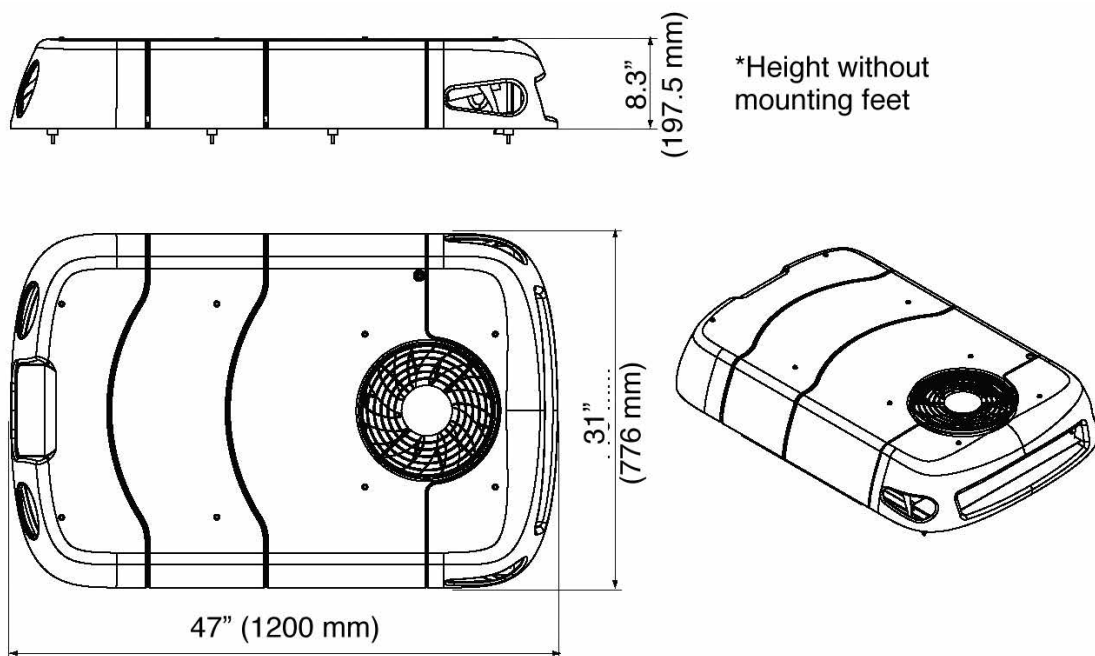
### EcoFlex 4E: Major components



EcoFlex 4E: Electrical components (cover removed)



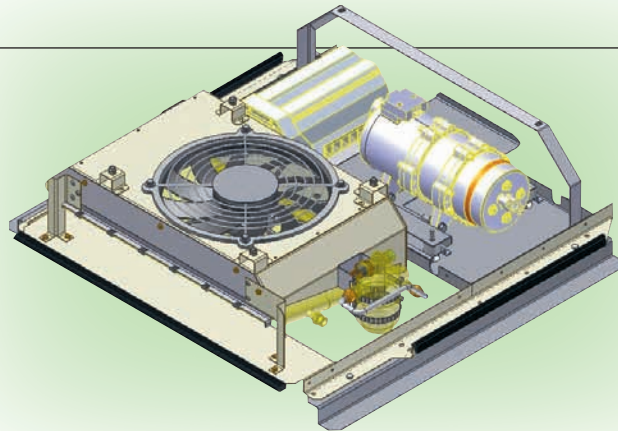
EcoFlex 4E: Dimensions



### EcoFlex 4ES (Electrical Split)

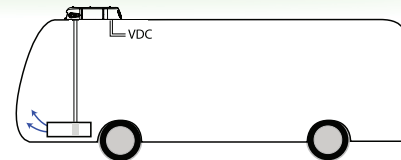
This is the model to choose if you want a remote evaporator.

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

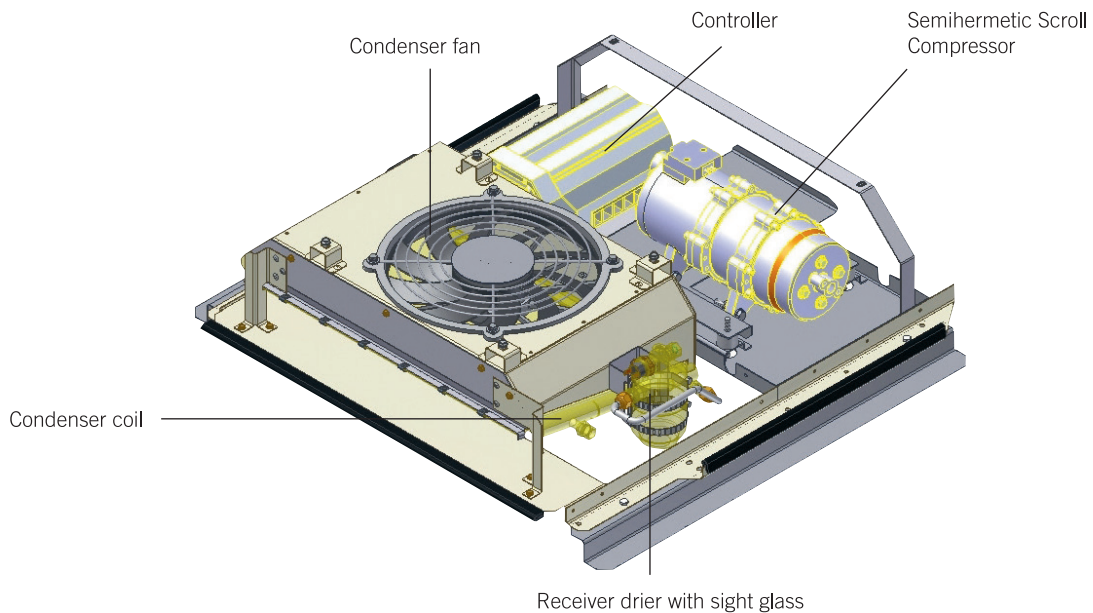


**Main components:**

- Compressor
- Brushless motor
- Condenser and fan

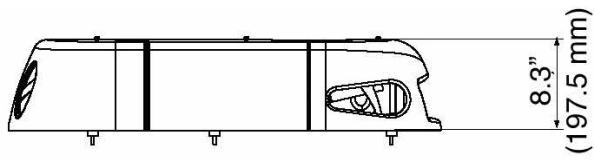


### EcoFlex 4ES: Connections and major components (cover removed)

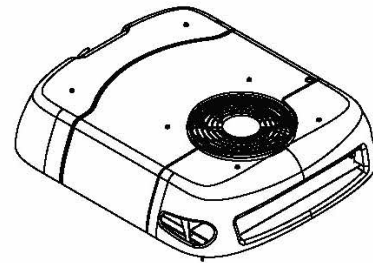
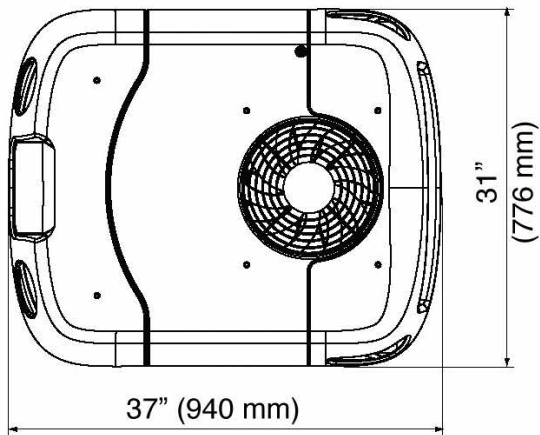




EcoFlex **4ES**: Dimensions

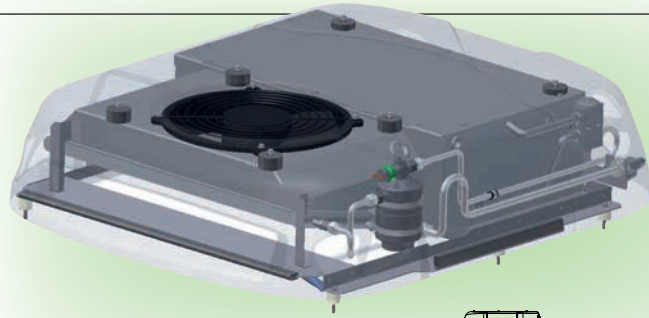


\*Height without rail



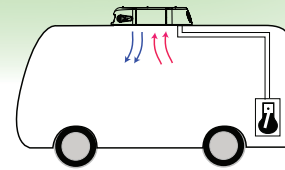
## EcoFlex 6

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



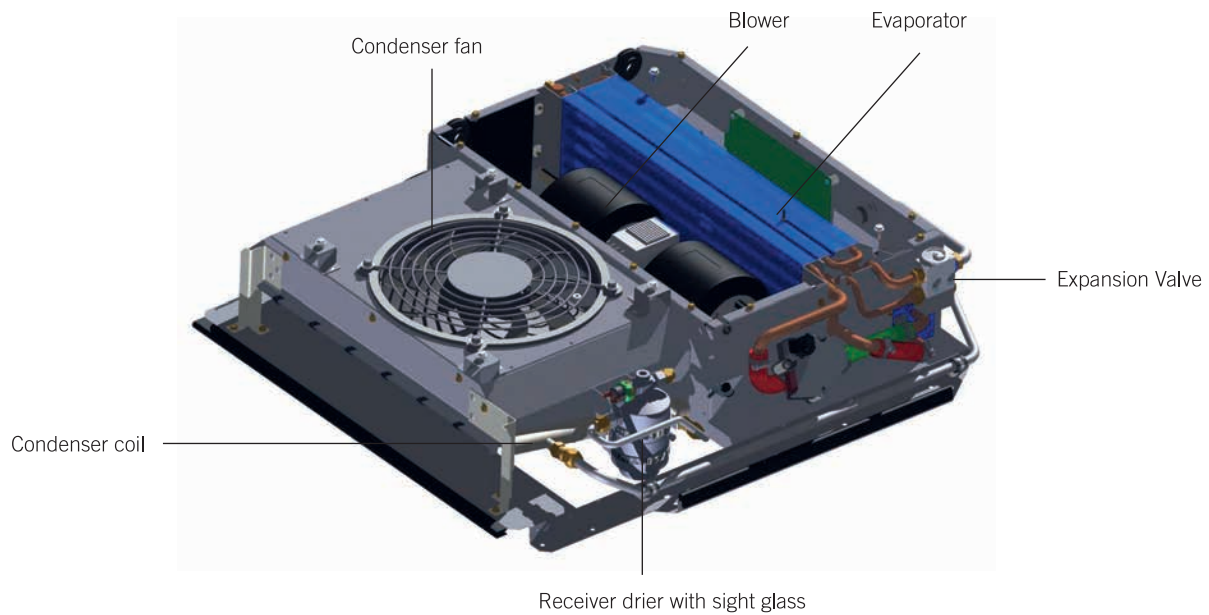
**Main components:**

- Evaporator and blower
- Condenser and fan

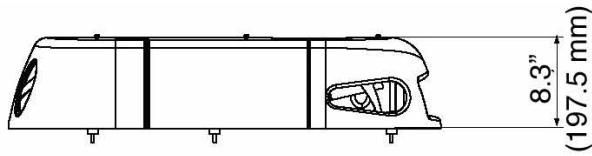


## Overview of the components

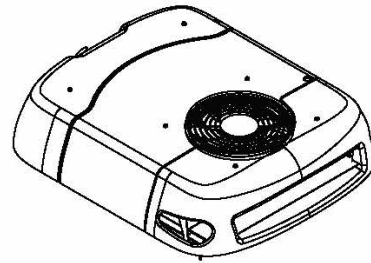
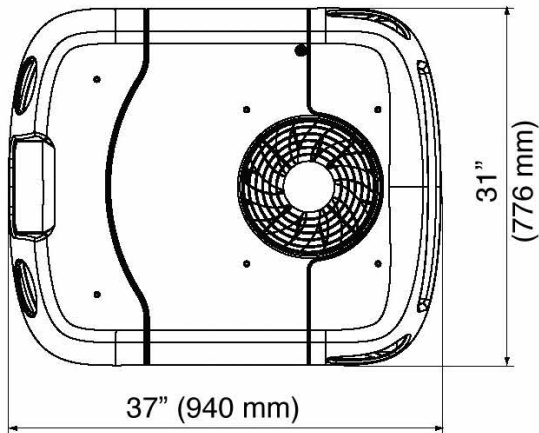
### EcoFlex 6: Connections and major components



EcoFlex 6: Dimensions



\*Height without rail





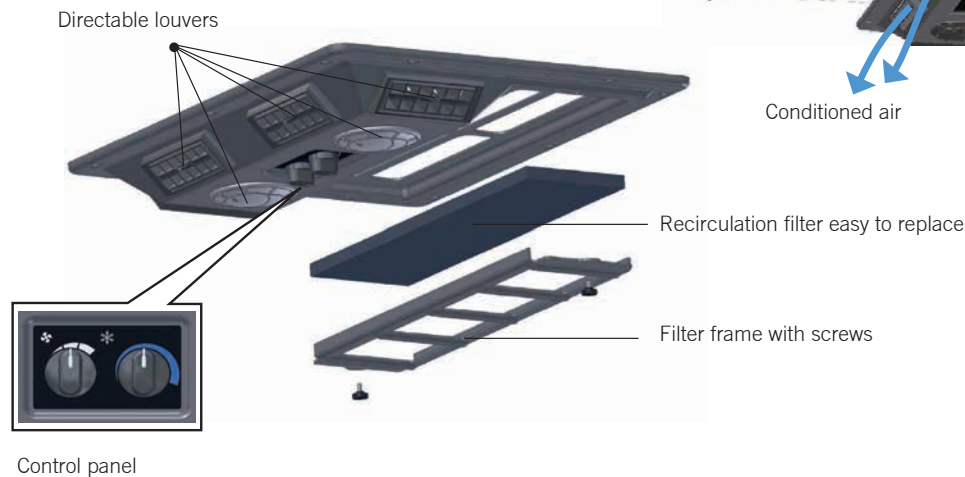
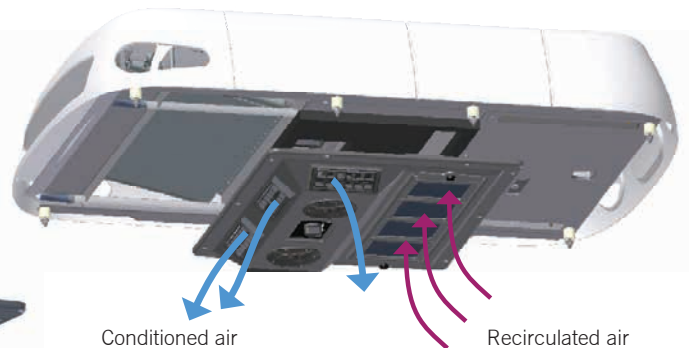
**Technical Specification**

	<b>EcoFlex 4E</b>	<b>EcoFlex 4ES</b>	<b>EcoFlex 6</b>
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) <sup>[1]</sup>	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 <sup>[2]</sup>	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 <sup>3</sup> /h)	Depends on application	350 CFM (600 m <sup>3</sup> /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

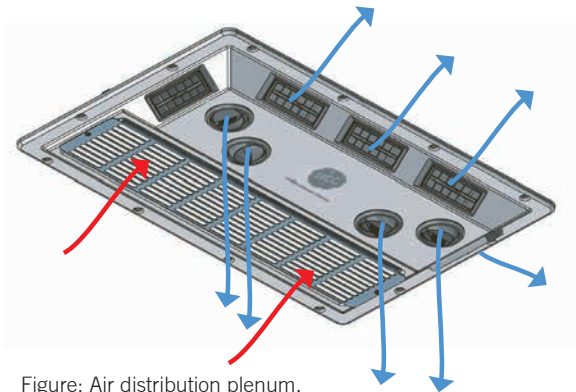


Figure: Air distribution plenum.

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.

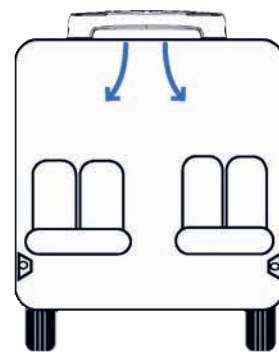
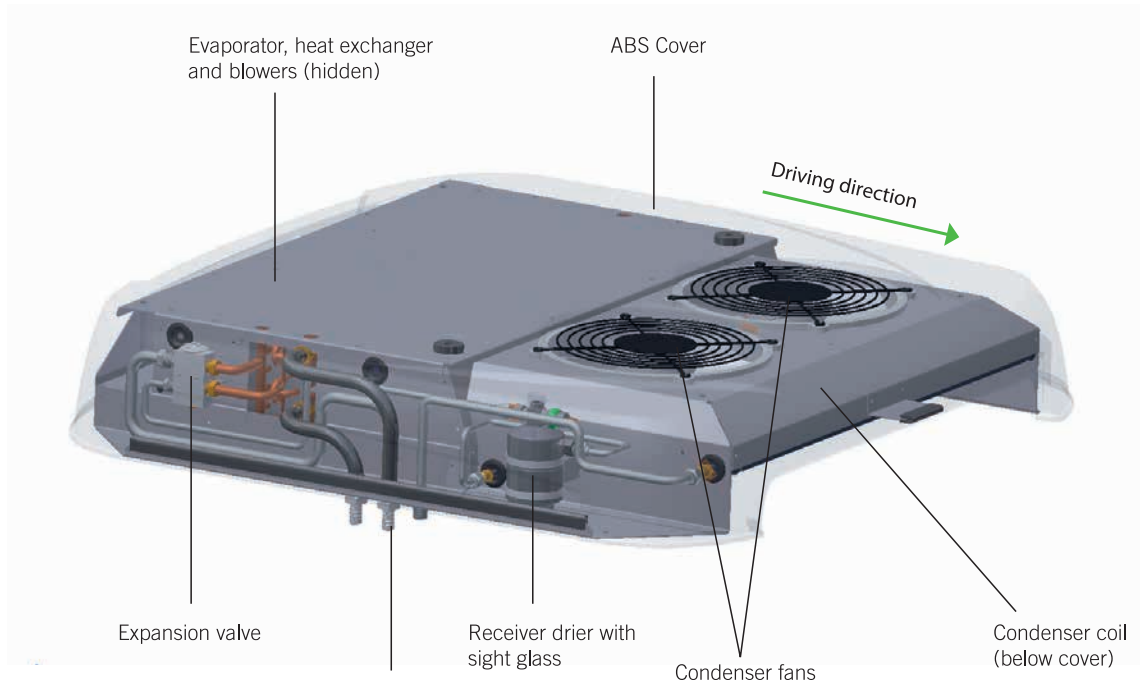


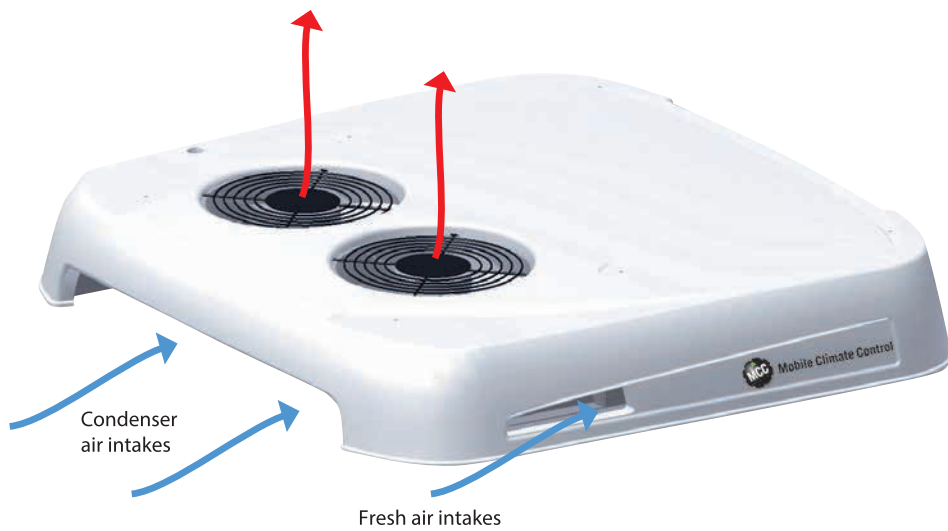
Figure: The EcoLine 8/EcoLine 10 blows directly into aisles of the minibus.

**Overview of the components**

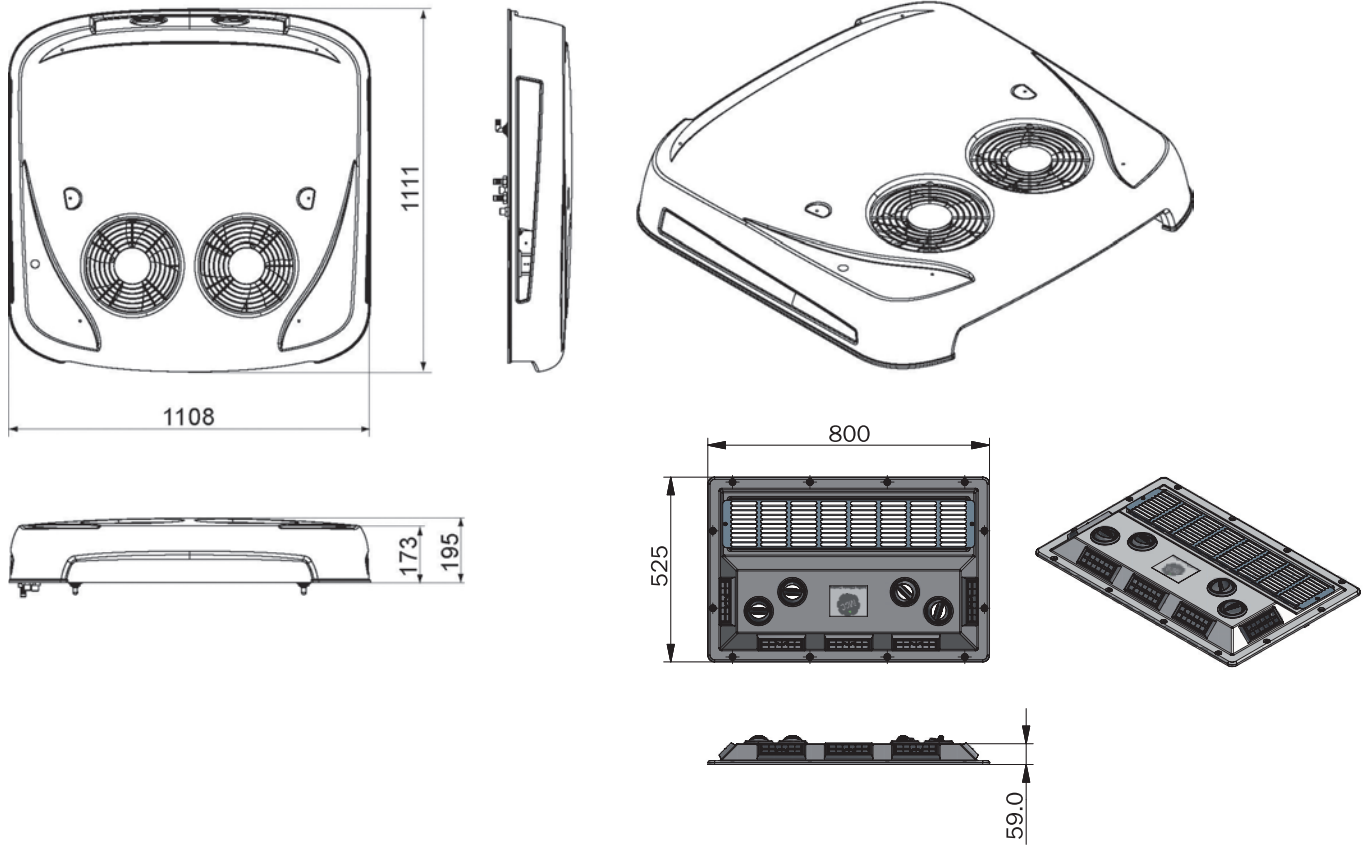
EcoLine 8 / EcoLine 10: Major Components



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



EcoLine 8 / EcoLine 10: Dimensions



Measurements end Millimeters

**Technical Specification**

	<b>Ecoline 8</b>	<b>Ecoline 10</b>
Application	Conventional A/C	Conventional A/C
Cooling capacity	27000 Btu/hr (8.5 kW) ARI <sup>[1]</sup>	33000 Btu/hr (12 kW) ARI <sup>[1]</sup>
	55000 Btu/hr (16 kW) IMACA <sup>[2]</sup>	60000 Btu/hr (17.5 kW) IMACA <sup>[2]</sup>
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 <sup>[3]</sup>	7.68" (195 mm)	7.68" (195 mm)
Air flow evaporator, max	706 CFM (1200 m <sup>3</sup> /h)	706 CFM (1200 m <sup>3</sup> /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

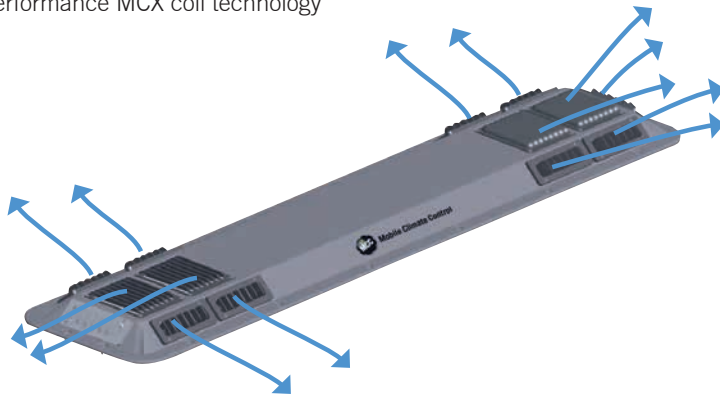


Figure: (Option 1) Air distribution plenum.

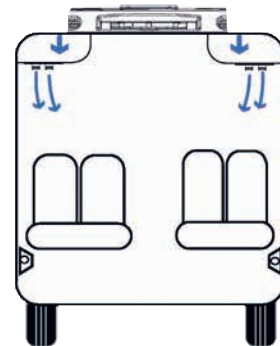
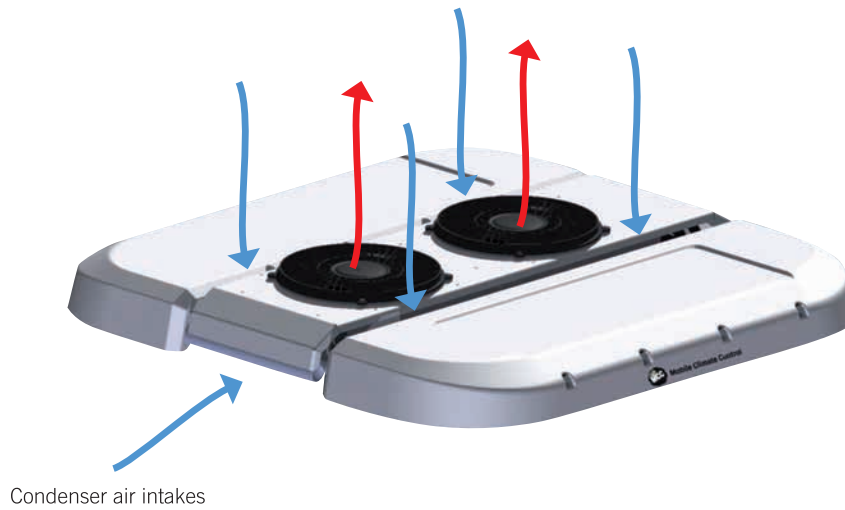
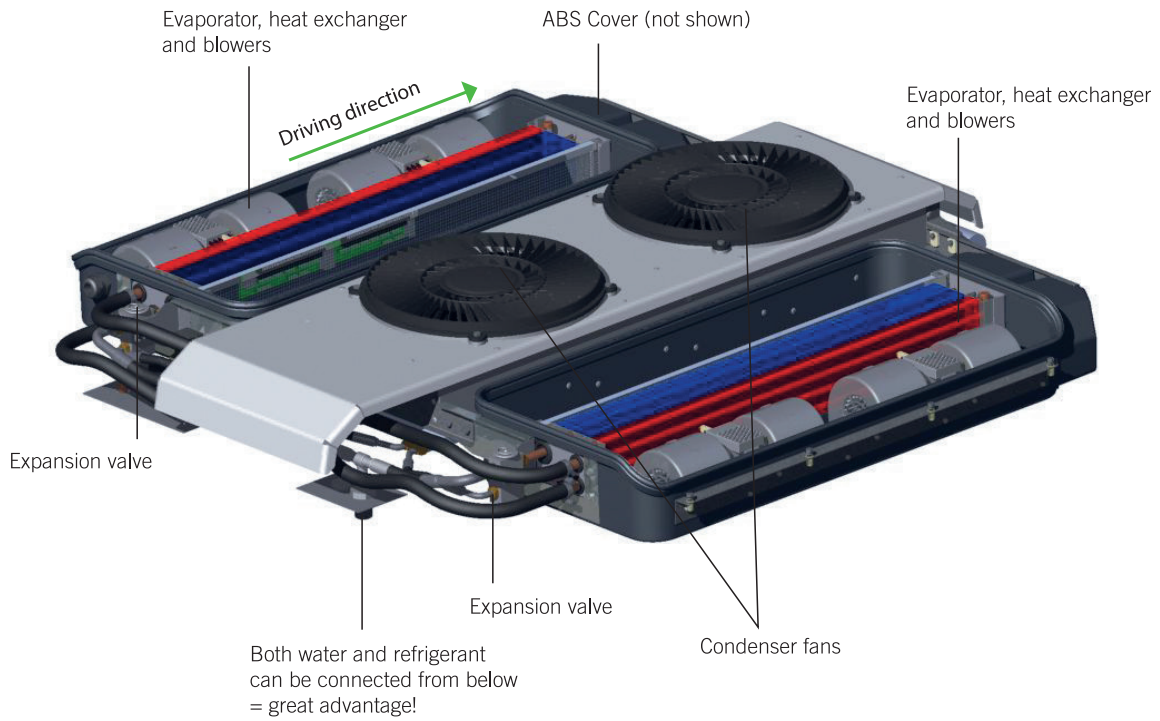


Figure: (Option 2) The EcoLine 12 blows directly into the minibus ducts.

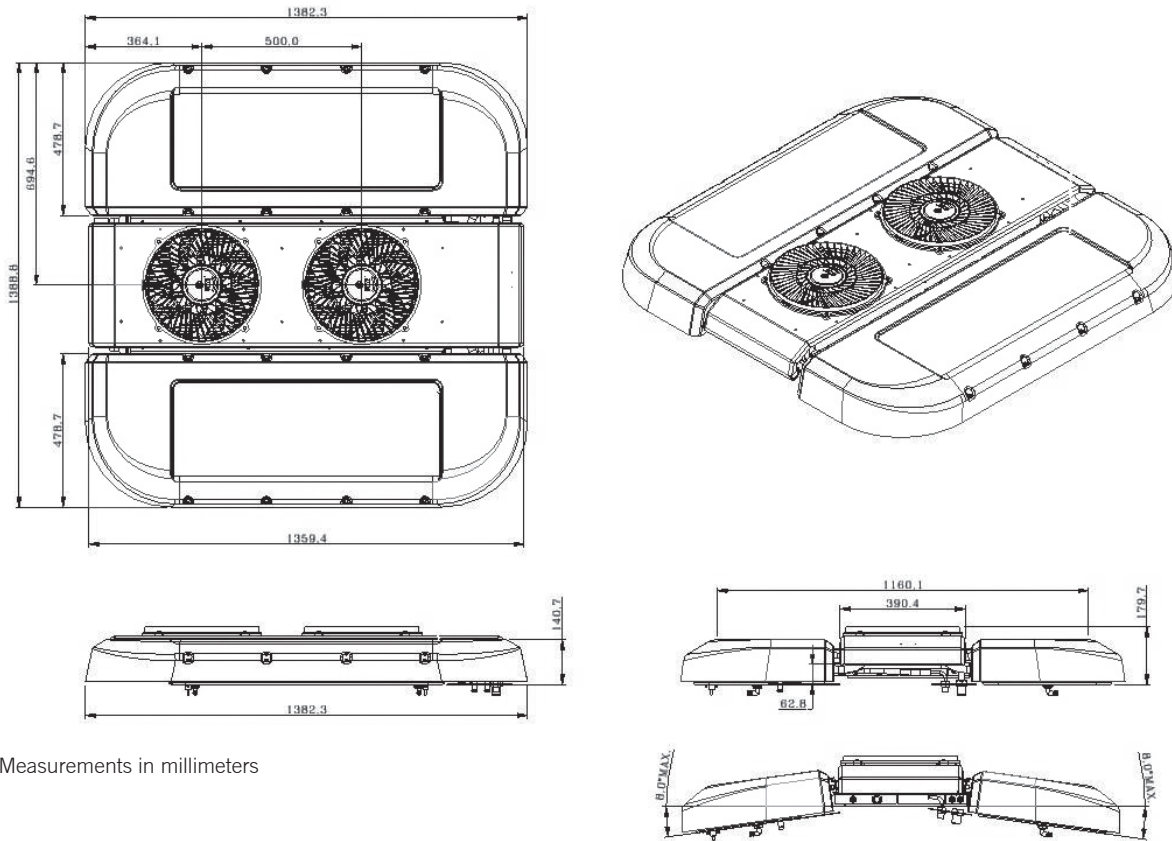


EcoLine 12: Major components





EcoLine 12: Dimensions



Measurements in millimeters

**Technical Specification**

Application	Minibuses
Cooling capacity	41000 Btu/hr (12 kW) ARI <sup>[1]</sup> 66000 Btu/hr (19.3 kW) IMACA <sup>[2]</sup>
Heating capacity	54000 Btu/hr (15.9 kW)
Voltage	12/24V
Width	54.72" (1390 mm)
Length	54.53" (1385 mm)
Height <sup>[3]</sup>	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

## Notes



# IV. Rear Mount System

## Rearmount Air Conditioning System **Eco RM**

# Capacity, Reliability, and Serviceability

MCC Eco RM unit, selected as preferred equipment by leading bus manufacturers, delivers significantly higher operating capacity and efficiency, less maintenance, longer

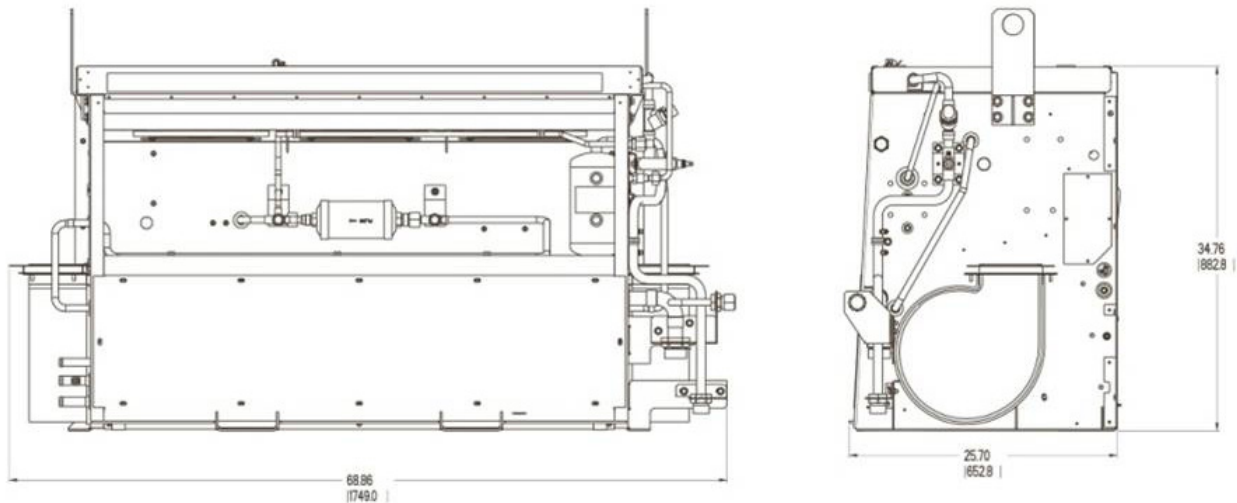
system life, and reduced engine loads and fuel consumption. Meets or exceeds all industry recognized specifications in both the heating and cooling modes.



### Features

- Six-cylinder 41-CID (672 cm<sup>3</sup>) 05G compressor with housing-mounted clutch
- R134a
- Aluminum fin/copper tube evaporator
- Two-speed condenser fan motors (brushless motors)
- Solid-state electronic controls
- Two-speed evaporator fan motors (brushless motors)
- 300 Series stainless steel motor shafts
- Aluminum frame
- Electrostatic powder paint corrosion protection coating
- Aluminum fin/copper tube heater

## Rearmount Air Conditioning System **Eco RM**



### Advantages

- One-piece construction for simplified installation
- Rugged, lightweight all-aluminum construction
- Full accessibility, ease of serviceability
- Exclusive O5G six-cylinder compressor
- Heavy-duty coils, longer service life
- Extended maintenance, lower operating costs
- Reliable electromechanical controls
- Two-year parts and labor warranty
- Heavy-duty fan motors, lower life-cycle cost
- Aluminum micro-channel condenser – reduces weight, refrigerant charge, improves performance in high ambients

### Technical Data

Cooling capacity	108000 Btu/hr (32 kW) ARI <sup>[1]</sup>
Heating	95000 Btu/hr (28 kW) assumes coolant flow rate at 8.0 GPM (1817 l/h) and 100°F (38°C)
Refrigerant	R134a
Air flow rate	High 2400 CFM (4078 m <sup>3</sup> /h) Low 1350 CFM (2294 m <sup>3</sup> /h)
Current	105 A @ 24 V dc
Dimensions (W x D x H)	68.86" (1749.0 mm) x 25.7" (653 mm) x 34.76" (882.8 mm)
Weight	380 lbs (172 kg)

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

## Electric Rear Mount Air Conditioning **Eco RMe**

# A product of forward thinking design

Mobile Climate Control Eco RMe rear mount Series HVAC system delivers significantly higher operating capacity and efficiency, considerably less maintenance, measurably longer system life and reduced engine loads and fuel consumption.

Mobile Climate Control AC rear mount Electric Series HVAC system meets or exceeds all industry recognized specifications in both the cooling and heating

modes. All this with using non-Ozone depleting standard HFC R134a.

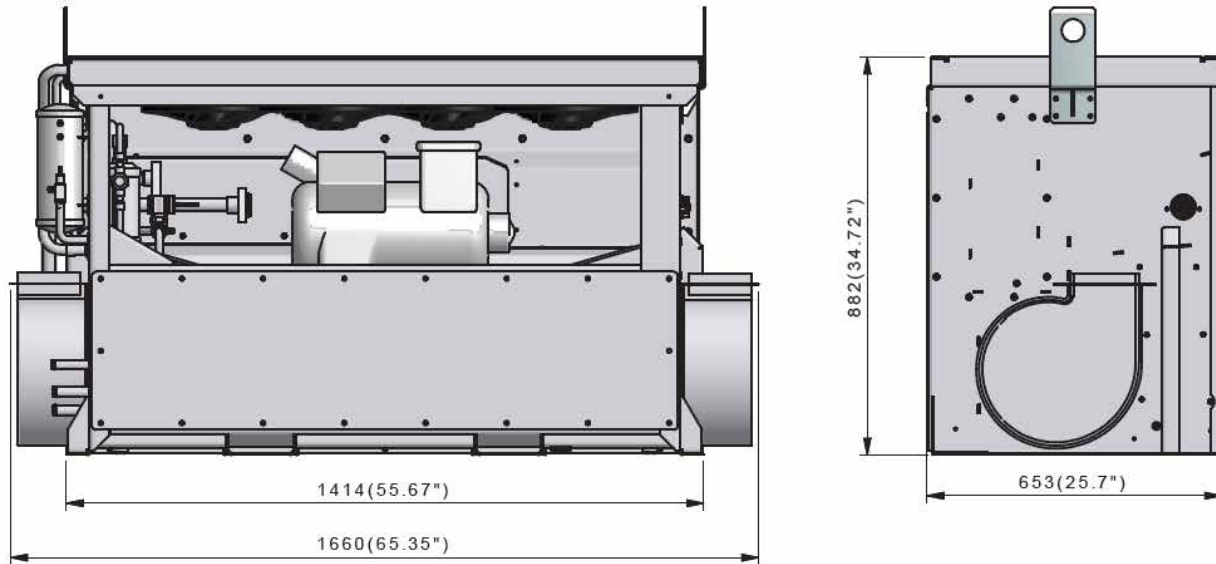
Proven under the most demanding conditions and backed by a nationwide aftermarket support network second to none, Mobile Climate Control Eco RM systems offer the lowest life cycle cost in the industry.



### Features

- Variable speed semi-hermetic compressor for optimum efficiency
- One piece construction for simplified installation
- Self contained, fully sealed, Factory charged and tested
- No hoses, belts or clutches to maintain
- Heavy duty brushless fan motors, lower life-cycle cost
- Reliable CAN enabled microprocessor-based controls
- Heavy duty coils, longer service life
- Full accessibility, full serviceability
- Two year parts and labor warranty
- Electrostatic powder coating system for corrosion protection
- Designed to meet all OEM bus requirements
- Application proven Bock semi hermetic compressor
- ZERO Ozone depleting, high efficiency HFC R134a
- Aluminum micro channel condenser – reduces weight, refrigerant charge, improves performance in high ambients
- Aluminum fin/copper tube evaporator and heater coils for long life
- Three speed condenser fan motors (brushless)
- Two speed evaporator fan motors (brushless)
- Rugged, Light weight and durable aluminum frame

## Electric Rear Mount Air Conditioning **Eco RMe**



### Unmatched Life Cycle Cost advantages

- Best In Class efficiency saves fuel. Proven variable speed compression technology optimizes capacity control and power consumption and maximizes efficiency over the life of the system
- Best In Class performance at idle saves fuel. Improved temperature pull-down at idle lowers time to pre-cool bus interior compared to conventional systems at high-idle
- Refrigerant savings. Sealed system means no leaking hoses, seals, or fittings  
Lower Maintenance, parts, and disposal costs.
- Sealed system means no periodic maintenance required (driers, oil, clutches, etc.)

### Technical Data

Cooling capacity (max)	92000 Btu/hr (27 kW) ARI <sup>[1]</sup>
Cooling capacity (rated)	85000 Btu/hr (25 kW) ARI <sup>[1]</sup>
Heating	119000 Btu/hr (35 kW) assumes coolant flow rate at 5.3 GPM (1200 l/h) and 150F (83°C) TD
Refrigerant	R134a
Air flow rate	High 2250 CFM (3800 m <sup>3</sup> /h) Low 1550 CFM (2600 m <sup>3</sup> /h)
Voltage	400 V / 3-ph / 50 Hz (480 V / 3-ph / 60 Hz) – nominal – other voltages are available
Dimensions (W x D x H)	65.35" (1660 mm) x 25.7" (653 mm) x 34.72" (882 mm)
Weight	625 lbs (283 kg)

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

# Notes





# V. Split System Air Conditioning

## Evaporator **EM-1**

Our EM-1 ceiling mount air conditioning evaporator has been engineered for maximum serviceability and ease of installation in commercial and school buses. Because the drain pan is part of the basic system, the EM-1 can be completely installed, charged and tested before the cover is put in place, greatly reducing installation time. Sim-

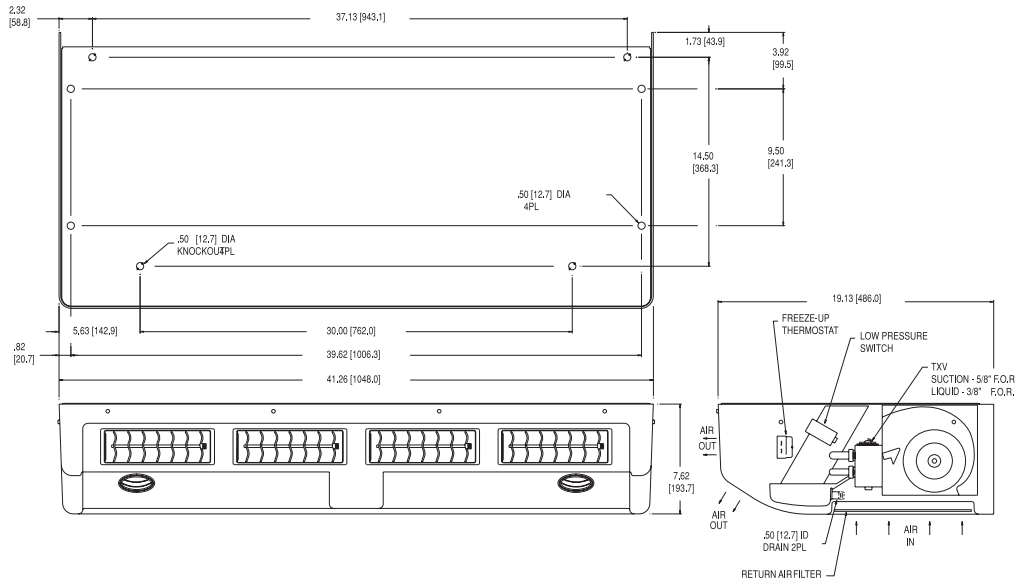
ple cover removal provides ready access to all serviceable components\* . This evaporator is available for non-ducted free blow applications in 25" – 30" (635 – 762 mm) length passenger areas.

\* See EM-3



### Features

- New, efficient, transverse blower technology reduces AMP draw and provides increased, uniformly distributed air flow
- Higher capacity unit in a smaller package (height reduced over 20% from existing models, significantly increasing head clearance)
- Reduced service time and overall life cycle cost with single, easily accessible motor, bottom mounted air filter, 10% fewer parts and fasteners than previous models
- Return air filters can be removed and cleaned without removing the units cover
- High volume air flow, widely dispersed through bi-directional louvers for total passenger comfort
- State-of-the-art enhanced coils for maximum cooling capacity and increased efficiency
- Variable speed blower allows for full air flow adjustment to optimize system to individual cooling preferences
- Heavy-duty steel frame is reinforced for added strength
- Can be front/rear center or front/rear side mounted in all makes/models of buses



## Technical Data

Cooling capacity	60000 Btu/hr (17.5 kW) IMACA <sup>[1]</sup>	27000 Btu/hr (8 kW) ARI <sup>[2]</sup>
Air flow	1600 CFM (2718.4 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	41.25" (1048 mm)	
Width	19" (486 mm)	
Height	7.62" (193.5 mm)	
Weight	60 lbs (27 kg)	
Condensate Drain Connection	½" (12.7 mm) O.D	
Max amperage requirement	29.5 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **EM-2**

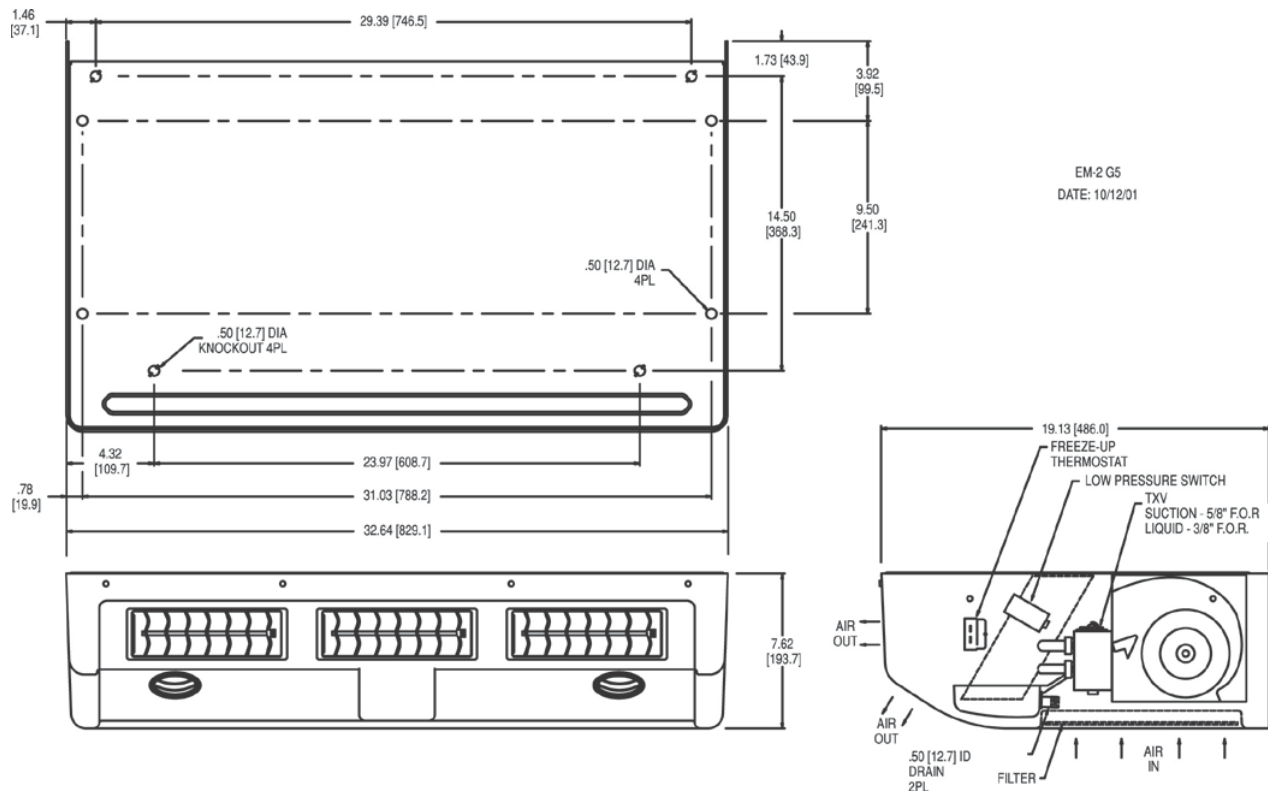
MCC's EM-2 ceiling mount air conditioning evaporator has been engineered for maximum serviceability and ease of installation in commercial and school buses application. Because the drain pan is part of the basic system, the EM-2 can be completely installed, charged and tested be-

fore the cover is put in place, greatly reducing installation time. Simple cover removal provides ready access to all serviceable components. The EM-2 evaporator is available for non-ducted, free blow applications in 20' – 25' (610 – 762 cm) length passenger areas.



### Features

- New, efficient, transverse blower technology reduces AMP draw and provides increased, uniformly distributed air flow
- Heavy-duty galvanized steel frame is reinforced for added strength
- High volume air flow, widely dispersed through bi-directional louvers for total passenger comfort
- State-of-the-art enhanced coils for maximum cooling capacity and increased efficiency
- Return Air filter can be removed and cleaned without removing the unit cover
- Higher capacity unit in a smaller package (height reduced over 20% from existing models, significantly increasing head clearance)
- Three or variable speed blower allows for full air flow adjustment to optimize system to individual cooling preferences
- Reduced service time and overall life cycle cost with single, easily accessible motor, bottom mounted air filter,
- 10% fewer parts and fasteners than previous models
- Can be front/rear, center or front/rear side mounted indifferent bus applications



## Technical Data

Cooling capacity	45000 Btu/hr (13 kW) IMACA <sup>[1]</sup>	18500 Btu/hr (5.4 kW) ARI <sup>[2]</sup>
Air flow	1200 CFM (2039 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	33.9" (862 mm)	
Width	19.13" (486 mm)	
Height	7.62" (203 mm)	
Weight	49 lbs (22 kg)	
Condensate drain connection	½" (12.7 mm) O.D	
Max amperage requirement	24.3 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

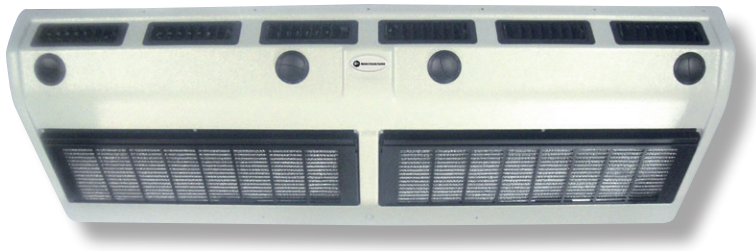
[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **EM-3**

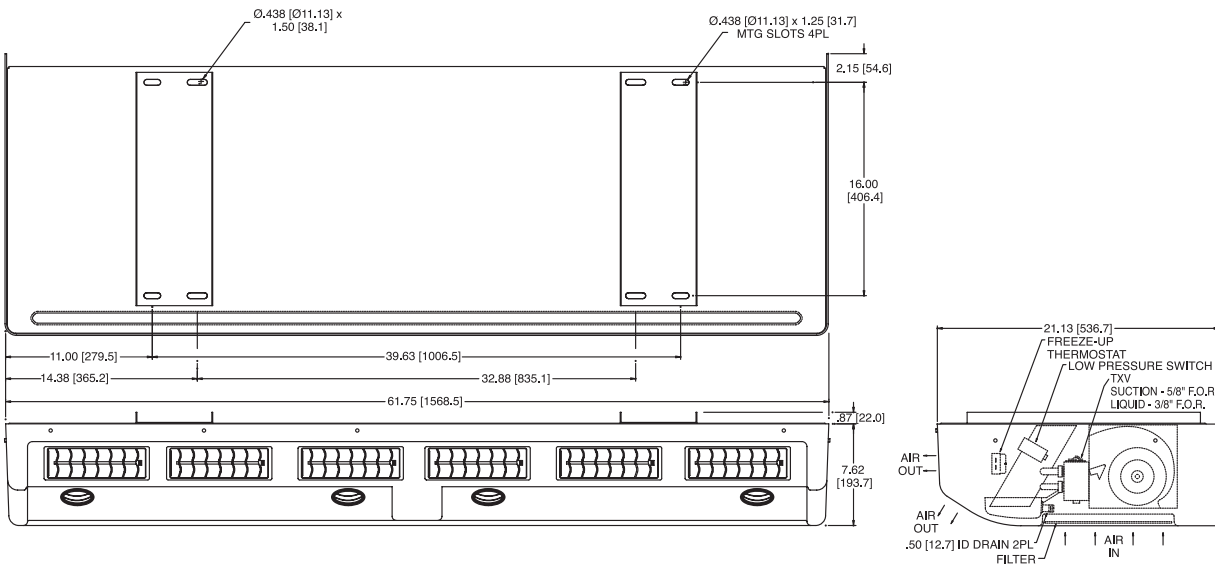
MCC EM-3 rear ceiling mount air conditioning evaporator has been engineered for maximum serviceability and ease of installation in light and medium duty buses. Because the drain pan is part of the basic system, the EM-3 can be completely installed, charged and tested before the cover is put

in place, greatly reducing installation time. Simple cover removal provides ready access to all serviceable components. EM-3 is available for non-ducted free blow applications in (30 – 35)' (914 – 1067)cm length passenger areas.



### Features

- New, efficient, transverse blower technology reduces AMP draw and provides increased uniformly distributed air flow
- Higher capacity unit in a smaller package (height reduced to over 20% less than existing models, thereby significantly increasing head clearance)
- Heavy-duty steel frame is reinforced for added strength
- High volume air flow, widely dispersed through bi-directional louvers for total passenger comfort
- Return air filter can be removed and cleaned without removing the unit's cover
- State-of-the-art-enhanced coils for maximum cooling capacity and increased efficiency
- Three or variable speed blower allows for full airflow adjustment to optimize system to individual cooling preferences
- Reduced service time and over all life cycle cost with single, easily accessible motor, bottom mounted air filter,
- 10% fewer parts and fasteners than previous models
- Can only be rear center ceiling mounted in all makes and models of buses



## Technical Data

Cooling capacity	90000 Btu/hr (26 kW) IMACA <sup>[1]</sup>	47000 Btu/hr (14 kW) ARI <sup>[2]</sup>
Air flow	2400 CFM (679.6 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	61.75" (1566 mm)	
Width	21.13" (537 mm)	
Height	8.49" (215.6 mm)	
Weight	95 lbs (43 kg)	
Condensed drain connection	½" (12.7 mm) O.D	
Max amperage requirement	46 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **EM-7**

MCC EM-7 ceiling mount air conditioning evaporator has been engineered for maximum serviceability and ease of installation in commercial and school buses and vans. Because the drain pan is part of the basic system, the EM-7 can be completely installed, charged and tested before the cover is put in place, greatly reducing installation time.

Simple cover removal provides ready access to all serviceable components.

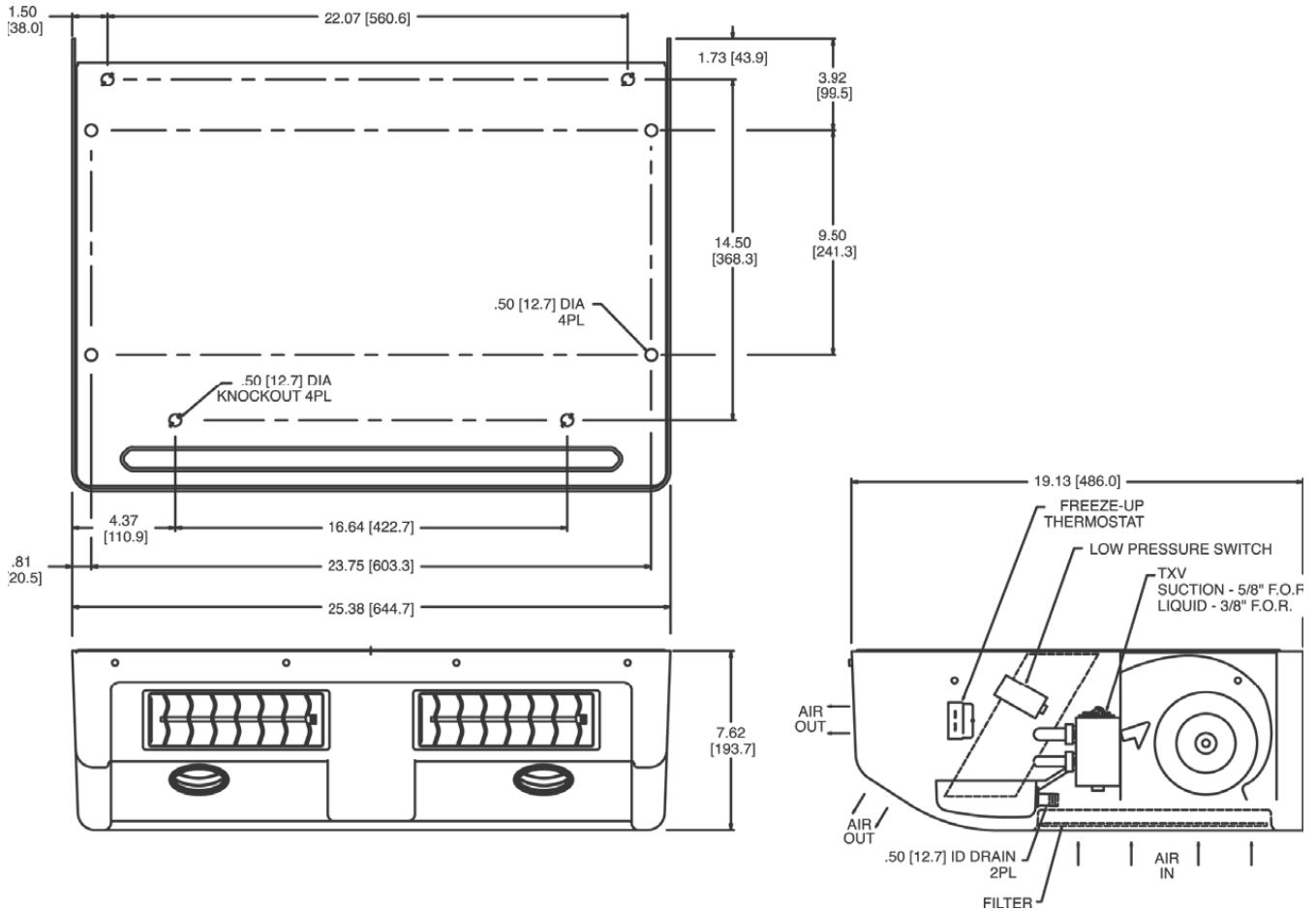
This evaporator is available for non-ducted free blow applications in (15 – 20)” (381 – 508)mm passenger areas.



### Features

- New, efficient, transverse blower technology reduces AMP draw and provides increased, uniformly distributed air flow
- Higher capacity unit in a smaller package (height reduced over 20% from existing models, significantly increasing head clearance)
- Reduced service time and overall life cycle cost with single, easily accessible motor, bottom mounted air filter, 10% fewer parts and fasteners than previous models
- Return air filters can be removed and cleaned without removing the units cover
- High volume air flow, widely dispersed through bi-directional louvers for total passenger comfort
- State-of-the-art enhanced coils for maximum cooling capacity and increased efficiency
- Variable speed blower allows for full air flow adjustment to optimize system to individual cooling preferences
- Heavy-duty steel frame is reinforced for added strength
- Can be front/rear center or front/rear side mounted in all makes/models of buses





### Technical Data

Cooling capacity	35000 Btu/hr (10.25 kW) IMACA <sup>[1]</sup>	13700 Btu/hr (4 kW) ARI <sup>[2]</sup>
Air flow	800 CFM (1359 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	25.38" (645 mm)	
Width	19" (486 mm)	
Height	7.62" (193.5 mm)	
Weight	41 lbs (19 kg)	
Condensate drain connection	½" (12.7 mm) O.D	
Max amperage requirement	15.9 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: F (38°C) / 90°F (32°C) / 50% RH  
 [2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH

## Evaporator EM-9

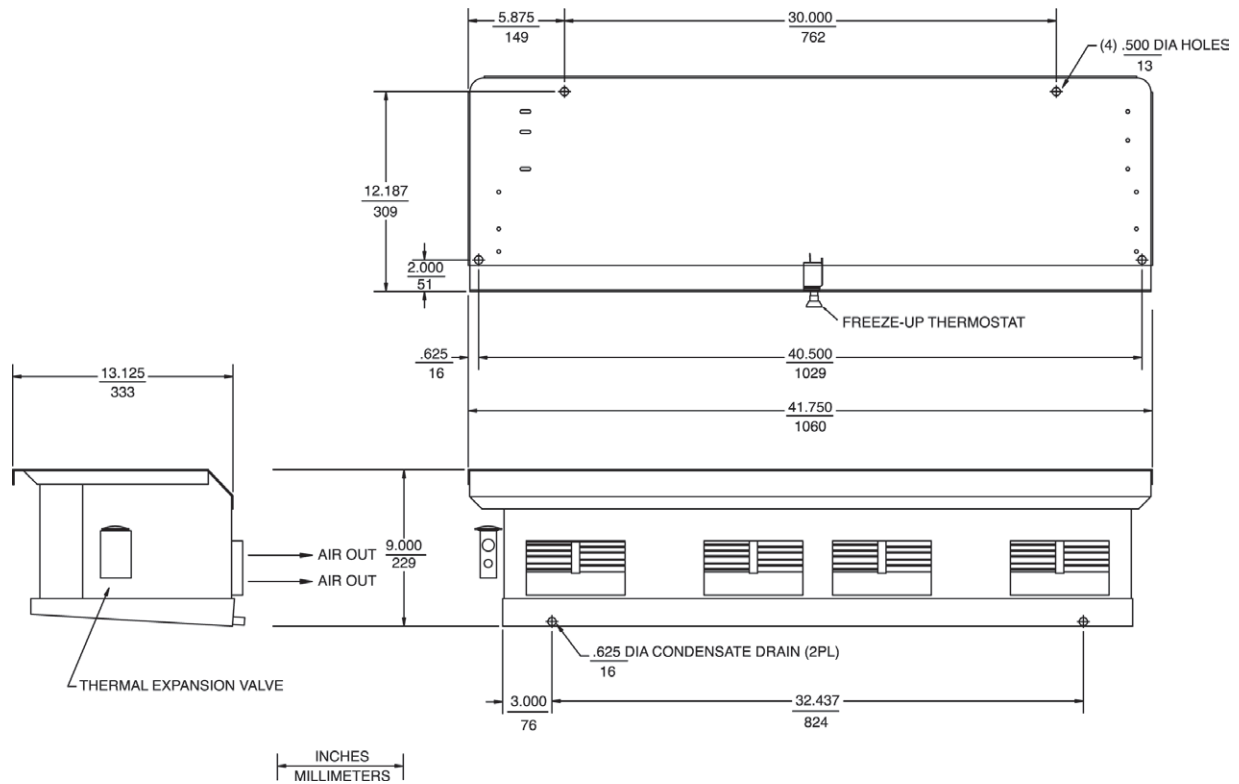
MCC EM-9 ceiling mount air conditioning evaporator has also been engineered for maximum serviceability and ease of installation in commercial and school buses. Because the drain pan is part of the basic system, the EM-9 can be completely installed, charged and tested before the cover is

put in place, greatly reducing installation time. Simple cover removal provides ready access to all serviceable components. This evaporator is available for ducted applications only up to 35" (889 mm) passenger areas.



### Features

- Heavy-duty steel frame is reinforced for added strength
- High volume air flow that delivers performance in to any shape of duct work
- State-of-the-art enhanced coils for maximum cooling capacity and increased efficiency
- Flexible mounted positions offer airflow where you need it
- Three speed blower allows for full air flow adjustment to optimize system to individual cooling preferences
- Unit incorporates coil freeze up protection. The result is increased trouble-free compressor life
- Return air Filter can be removed and cleaned without removing the unit cover



## Technical Data

Cooling capacity	60000 Btu/hr (17.5 kW) IMACA <sup>[1]</sup>	27000 Btu/hr (8 kW) ARI <sup>[2]</sup>
Air flow	1600 CFM (2718 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	41.75" (1060 mm)	
Width	13.125" (333 mm)	
Height	9" (228 mm)	
Weight	85 lbs (38.5 kg)	
Condensate drain connection	½" (12.7 mm) O.D	
Max amperage requirement	37.5 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **EM-17**

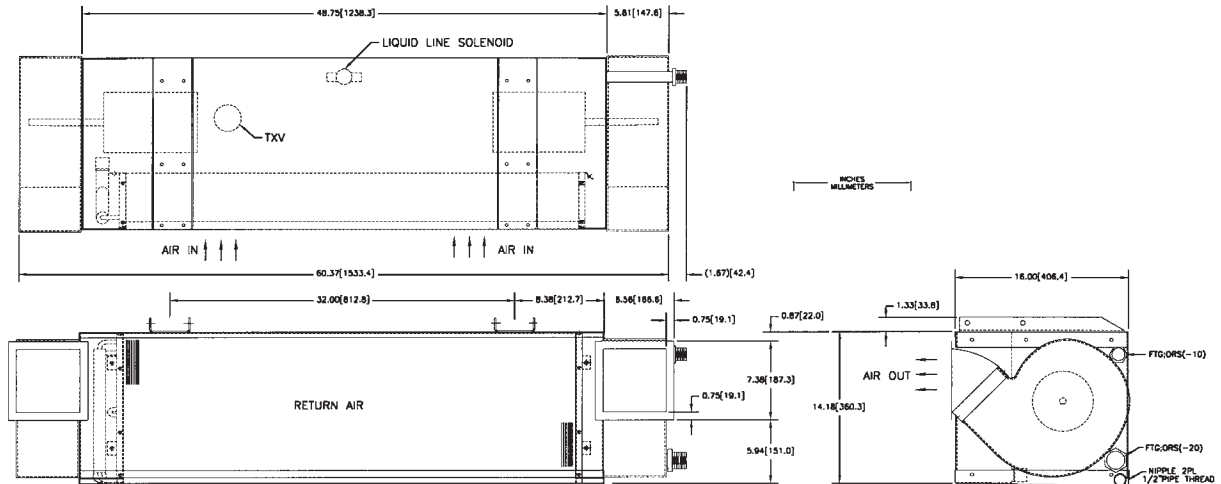
MCC's EM-17 rear ceiling mount air conditioning evaporator has been specifically engineered for use in vehicles with an overall length of 35 – 40' (1067 – 1219 cm) and which are used in the severest of climates and operating conditions. This unit was designed with the term "heavy-duty" in mind: from its long life large frame transit style motors to

its own power supply being generated by a 24V batteryless alternator. This is the unit that needs to be experienced to be appreciated. It has conquered transit-duty school bus applications in the desert, now let it conquer your unique application.



### Features

- Internally-enhanced rugged coil design delivers the highest capacity in its class while using R-134a as its refrigerant
- Heavy-duty steel frame construction coupled with stainless steel fasteners equal rugged construction
- The highest air volume in its class is generated by two re-buildable 56-series cast frame constructed motors which drive two large diameter metal scroll blower wheels. This is then evenly dispersed through the use of ductwork to provide total passenger comfort
- State-of-the-art electronic controls are incorporated to provide minimum wiring, improved reliability, and maximum protection
- All refrigerant connection points are O-ring for added leak protection and are coupled with hoses constructed to meet or exceed SAE Spec J2064 Type E
- A vinyl-clad steel cover is included in your choice of two colors (snow white or dove gray) which are custom fit to your vehicles unique contours
- A durable aluminum mesh filter is mounted in an easy to service hinged air return grill for minimized service time and maximum operating time



## Technical Data

Cooling capacity	130000 Btu/hr (38 kW) IMACA <sup>[1]</sup>	32760 Btu/hr (9.61 kW) ARI <sup>[2]</sup>
Air flow	2400 CFM (4080 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	16" (406.4 mm)	
Width	48.75" (1238.3 mm)	
Height	15.5" (394 mm)	
Weight	196 lbs (89 kg)	
Condensate drain connection	½" (12.7 mm) O.D	
Current draw	57 amps at 27 VDC (Rated @ high speed and ½" static)	
Cooling coil	6 rows deep, galvanized steel tube sheets with internally enhanced 0.4" (9.5 mm) diameter copper tubes expanded into 0.006" (0.15 mm) aluminum fins	
Motors	Fully re-buildable 56-series frame construction capable of a constant duty design life rating of no less than 10000 hours. Motor shafts are a series-300 stainless steel for corrosion resistance. Motors are two speed (hi/low) through use of an external voltage dropping resistor.	
Blowers	Rated at 2060 CFM (3500 m <sup>3</sup> /hr) @ 0.5" (13 mm) static @ 27 volts and dynamical balanced for quiet operation.	
Blower housings	Steel construction coated with a heat-resistant sound dampening foam to aid in noise reduction	
Expansion valve	Externally equalized right-angle valve with a replaceable power head and cage assembly. The superheat is factory preset.	
Return air filter	Constructed of a durable aluminum mesh rated to pass FMVSS302.	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator IW-1

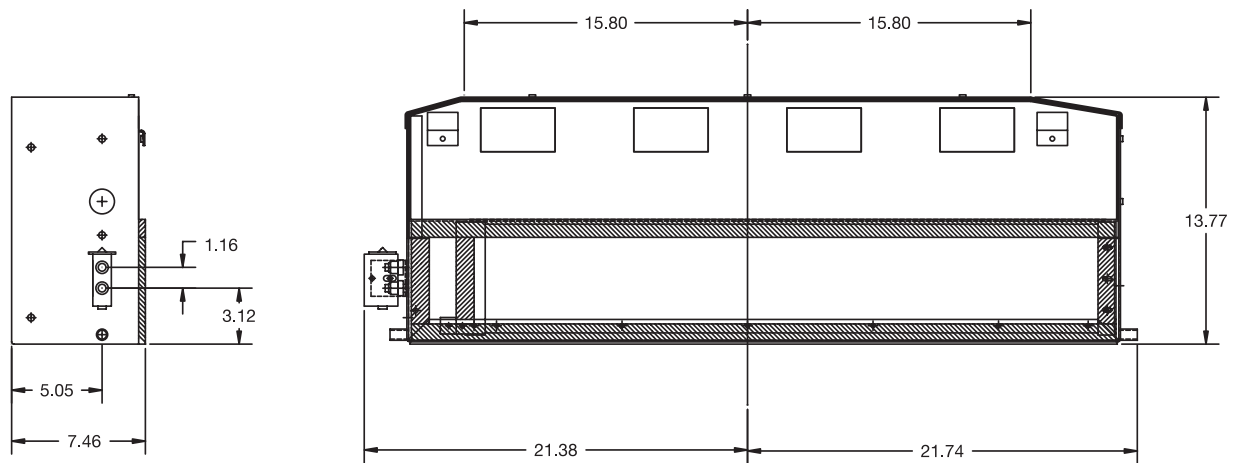
The IW-1 is designed to free up the overhead compartment where traditional evaporators are located. The IW-1 evaporator can also be matched with other MCC components to

provide a complete air conditioning system that meets your exact vehicle size, operating mode, and climate.



### Features

- Lightweight aluminum frame construction
- Flexible mounting configurations for every make of body
- Integrated motor cover panel for ease of service
- State-of-the-art enhanced coils for maximum cooling capacity
- Flush mount installation provides maximum head clearance and clean OEM appearance
- Easy access hinged return air filter provides for reduced service time



## Technical Data

Cooling capacity	55000 Btu/hr (16.11 kW) IMACA <sup>[1]</sup> 27005 Btu/hr (8 kW) ARI <sup>[2]</sup>
Air flow	1600 CFM (2718.42 m <sup>3</sup> /hr)
Refrigerant	R134a
Length	43.12" (1095.2 mm)
Width	7.46" (189.5 mm)
Height	13.77" (349.8 mm)
Weight	50 lbs (22.7 kg)
Condensate drain connection	½" (12.7 mm) OD
Max amperage requirement	23.7 A @ 13.5 V dc (High Speed)
Voltage	12 or 24 VDC
Cover color	Snow White or Dove Gray

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH  
 [2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH



## Evaporator **IW-2**

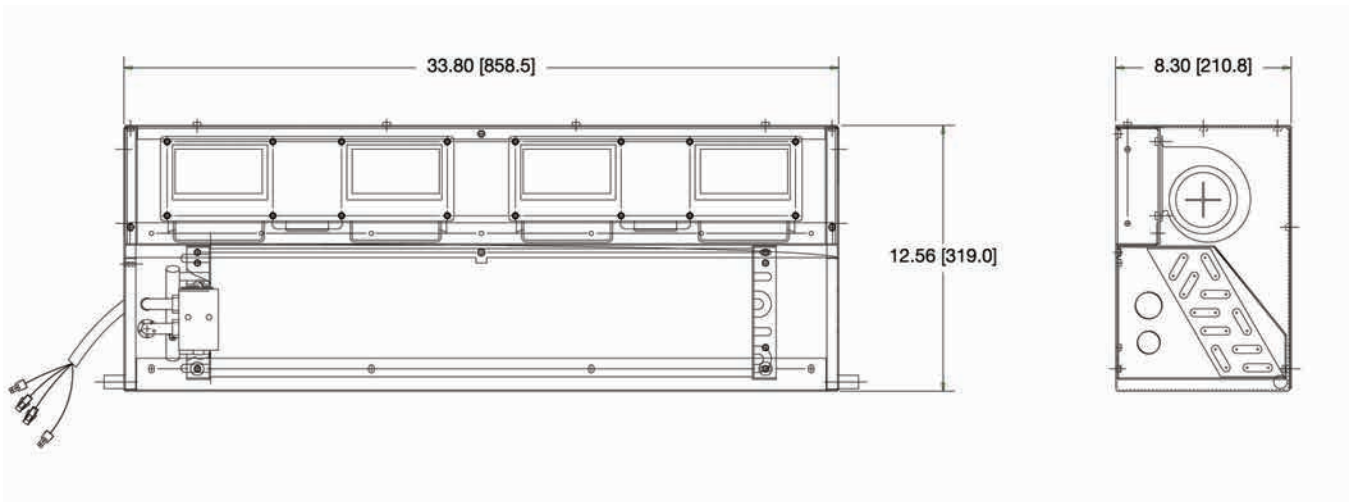
The IW-2 is designed to free up the overhead compartment where traditional evaporators are located. The IW-2 evaporator can also be matched with other MCC components to

provide a complete air conditioning system that meets your exact vehicle size, operating mode, and climate.



### Features

- Lightweight aluminum frame construction
- Flexible mounting configurations for every make or body
- Integrated motor cover panel for ease of service
- State-of-the-art enhanced coils for maximum cooling capacity
- Flush mount installation provides maximum head clearance and clean OEM appearance
- Easy access return air filter provides for reduced service time



## Technical Data

Cooling capacity	45000 Btu/hr (13.2 kW) IMACA <sup>[1]</sup>	18500 Btu/hr (5.42 kW) ARI <sup>[2]</sup>
Air flow	800 CFM (1359.2 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	33.8" (858.5 mm)	
Width	8.30" (211 mm)	
Height	12.56" (319 mm)	
Weight	45 lbs (20.41 kg)	
Condensate drain connection	½" (12.7 mm) OD	
Max amperage requirement	23.7 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **IW-4**

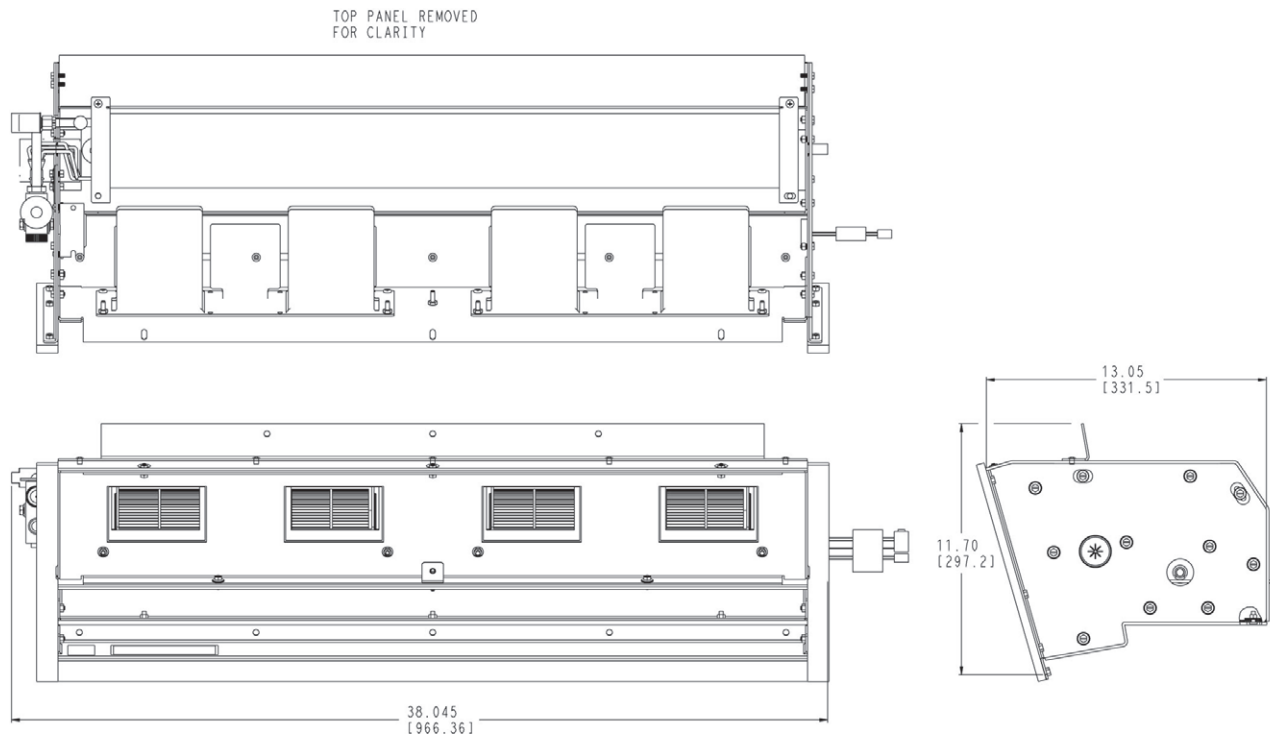
The IW-4 unit frees up the front bulkhead of Thomas Built Buses C2 conventional buses. The IW-4 evaporator can also be matched with other MCC components to provide

a complete air-conditioning system that meets your exact vehicle size, operating mode and climate.



### Features

- Lightweight aluminum frame construction
- Integrated motor cover panel for ease of service
- Enhanced coils for maximum cooling capacity
- Easy access return air filter helps to reduce service time
- Drop-in one-piece construction simplifies installation time and provides maximum head clearance and clean OEM appearance



## Technical Data

Cooling capacity	55000 Btu/hr (16.1 kW) IMACA <sup>[1]</sup>	28450 Btu/hr (8.33 kW) ARI <sup>[2]</sup>
Air flow	1500 CFM (2548.5 m <sup>3</sup> /hr)	
Refrigerant	R134a	
Length	38.10" (967.7 mm)	
Width	13.64" (346.5 mm)	
Height	10.30" (261.6 mm)	
Weight	40 lbs (18.1 kg)	
Condensate drain connection	½" (12.7 mm) OD	
Max amperage requirement	23.7 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Evaporator **IW-10**

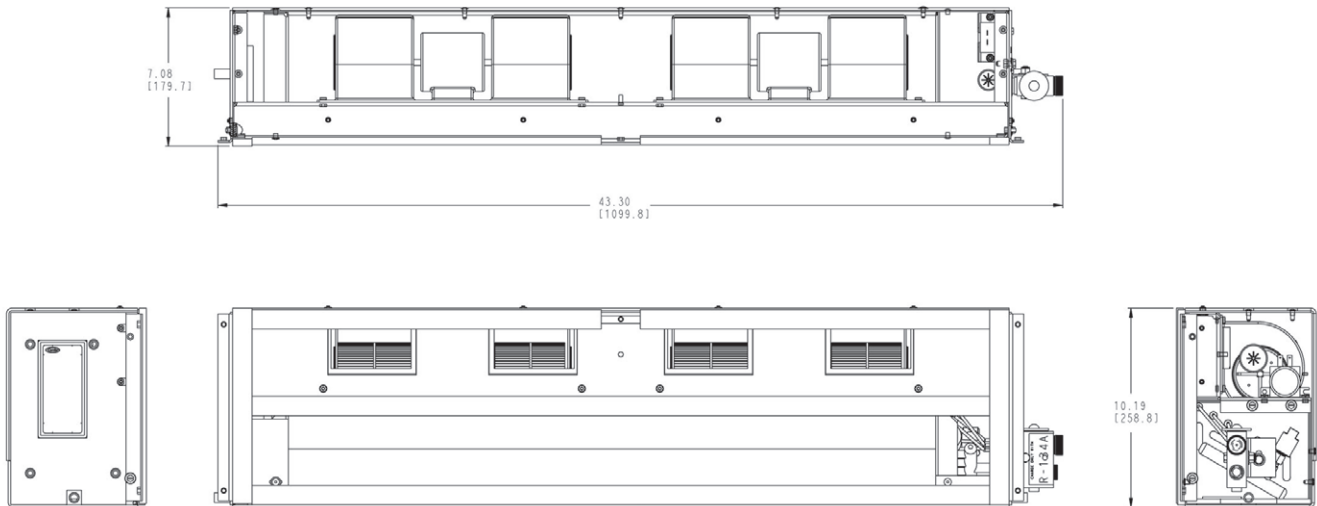
The IW-10 unit frees up the overhead compartment where traditional evaporators are located. The IW-10 evaporator can also be matched with other MCC components to

provide a complete air conditioning system that meets your exact vehicle size, operating mode and climate.



### Features

- Lightweight aluminum construction
- Flexible mounting configurations
- Enhanced coils for maximum cooling capacity
- Easy access return air filter helps to reduce service time
- Flat or formed ABS cover
- Covers available in white or gray
- Flush mount installation provides maximum head clearance and clean OEM appearance



## Technical Data

Cooling capacity	55000 Btu/hr (16.1 kW) IMACA <sup>[1]</sup>	20580 Btu/hr (6.87 kW) ARI <sup>[2]</sup>
Air flow	1300 CFM (2208.7 m <sup>3</sup> )	
Refrigerant	R134a	
Length	43.30" (1100 mm)	
Width	7.00" (177.8 mm)	
Height	10.19" (259 mm)	
Weight	32 lbs (14.5 kg)	
Condensate drain connection	½" (12.7 mm) OD	
Max amperage requirement	23.7 A @ 13.5 V dc (High Speed)	
Voltage	12 or 24 VDC	
Cover color	Snow White or Dove Gray	

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

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

## Slim Line Series **Condenser CM-2**

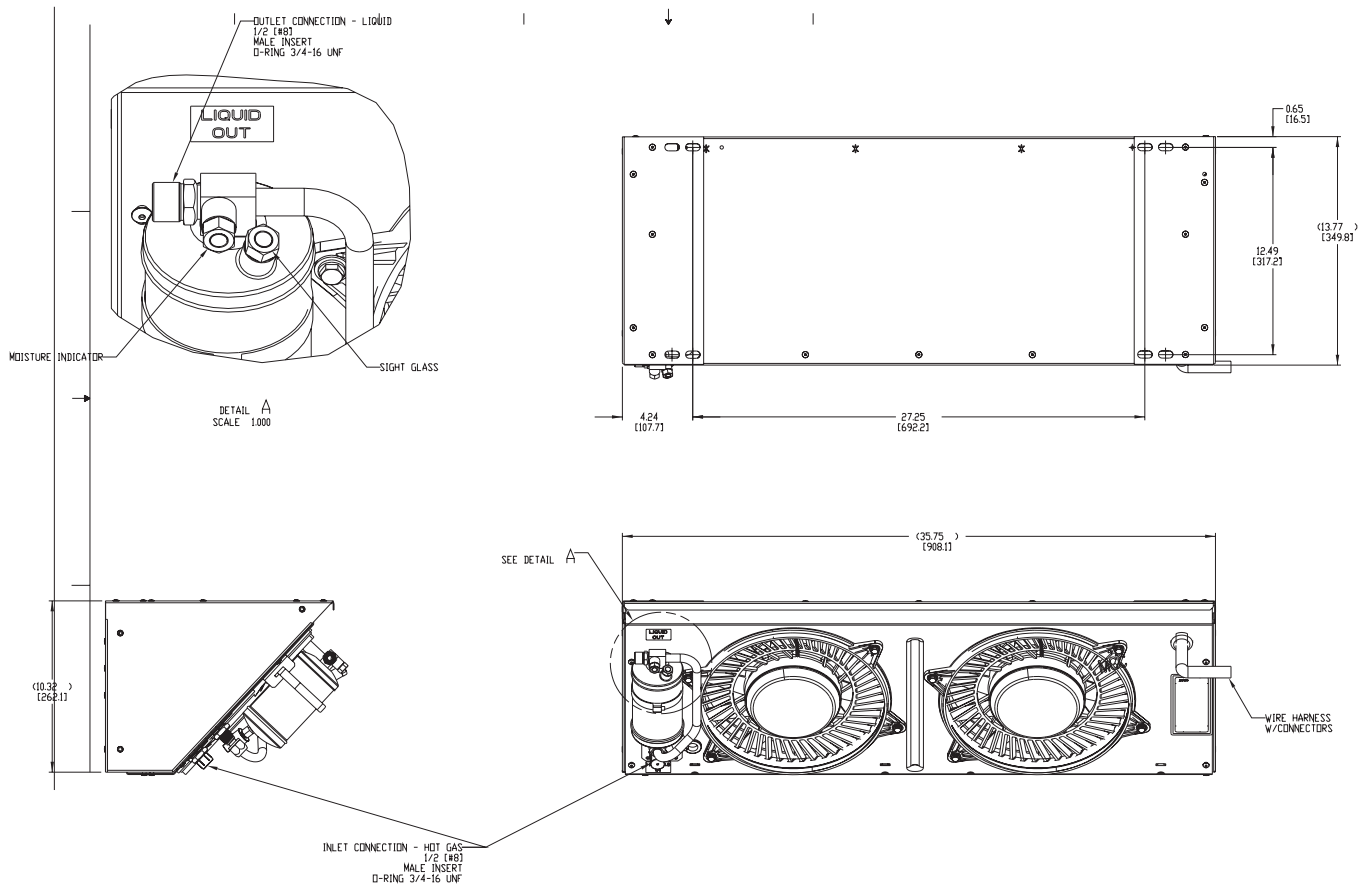
Field experience led to our innovative CM-2 condenser design for commercial and school bus air conditioning. Lower condensing temperatures and pressures result in enhanced cooling, longer compressor life and more efficient system operation. In this MCC unique design, air is channeled away from the vehicle undercarriage, eliminating recircu-

lation of hot air. Need high performance in new or retrofit applications, specify the MCC CM-2 condenser. The CM-2 condenser can be matched with other MCC components to provide a complete air conditioning system that meets your exact vehicle size, operating mode and environment.



### Features

- Slim Line CM-2 cabinet is constructed using rugged, powder coated, steel construction
- Zinc coated for added durability and corrosion protection.
- Integrated high pressure safety switch as standard equipment
- Unitized motor/fan package increases service access and decreases service time
- Winter protection package
- Skirt mount or component mount air inlet grill
- 12V or 24V operation
- Stackable kit available
- Plug-n-Play connectors on unit and fan motor provide for ease of installation and motor service
- Incorporated single piece receiver/dryer and system moisture indicator reduced possible leak joints



## Technical Data

Capacity	60000 Btu/hr (17.58 kW) IMACA <sup>[1]</sup>
Air flow	900 CFM (1529 m <sup>3</sup> /hr)
Condenser coil	Advanced technology Micro Channel Heat Exchanger (MCHX)
Condenser fans	Unitized, low-profile, axial-flow type propeller fans balanced for quiet, vibration-free operation with finger guard
Fan motors	Totally enclosed, pancake-style, permanent-magnet type with extended-life, permanently lubricated bearings
Max amperage requirement	14 amps @ 13.5 VDC; 7 amps @ 27.0 VDC
Safety controls	High refrigerant pressure cut-out 400 psi (28 bar); cut-in 300 psi (21 bar)
Receiver filter dryer	16 in <sup>3</sup> (262 cm <sup>3</sup> ), 1/2" [#8] Male Insert O-Ring (MIOR)
Weight	45 lbs (20.5 kg)
Available color	Midnight black

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH



## Slim Line Series **Condenser CM-3**

Field experience led to our innovative CM-3 condenser design for commercial and school bus air conditioning. Lower condensing temperatures and pressures result in enhanced cooling, longer compressor life and more efficient system operation. In this MCC unique design, air is channeled away from the vehicle undercarriage, eliminating recirculation of

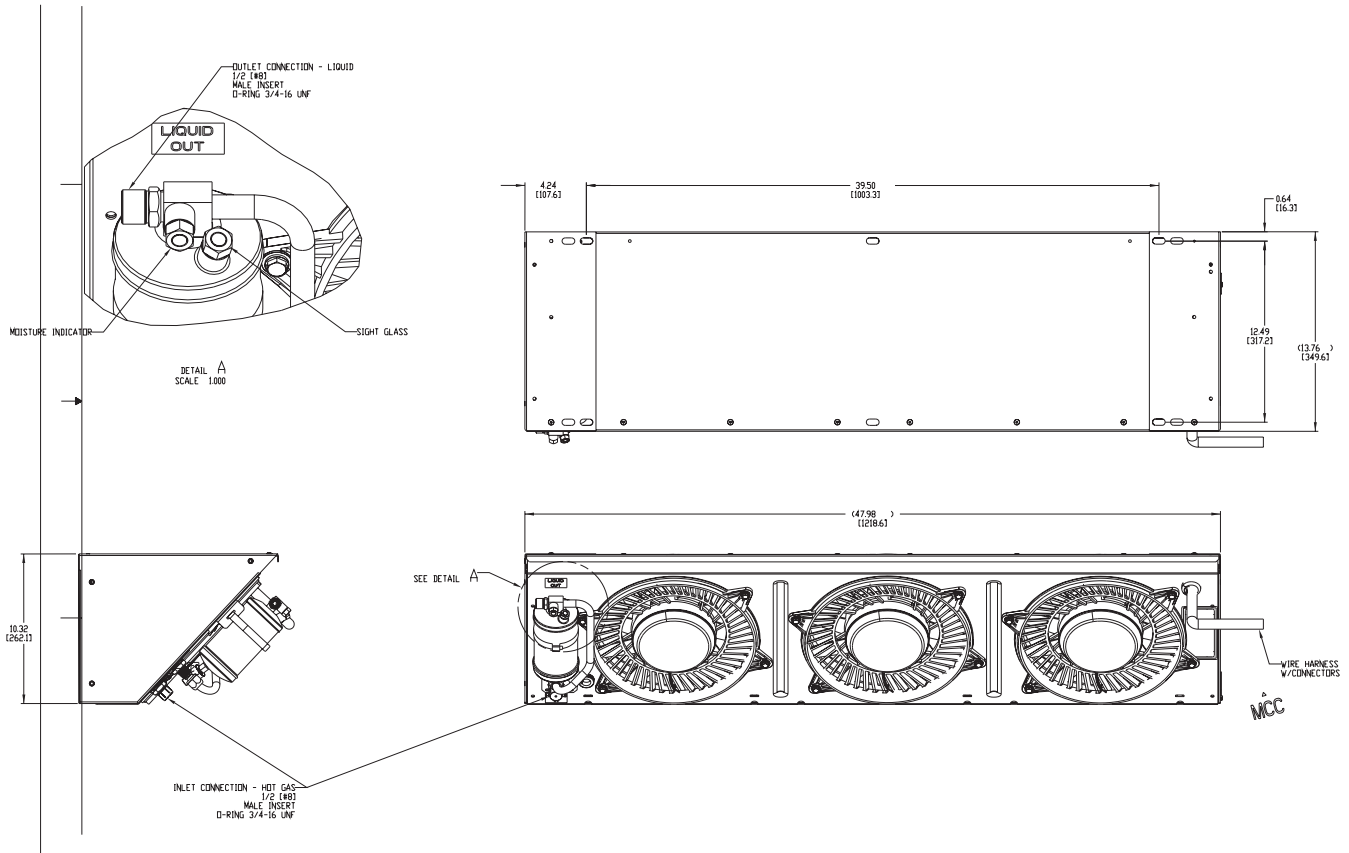
hot air. For high performance in new or retrofit applications, specify the MCC CM-3 condenser. The CM-3 condenser can be matched with other MCC components to provide a complete air conditioning system that meets your exact vehicle size, operating mode and climate.



### Features

- Micro channel all aluminum coil design for unmatched-heat transfer
- Zink coated for added durability and corrosion protection
- Rugged coated steel construction
- Integrated high pressure safety switch as standard equipment
- Unitized motor/fan package increases service access and decreases service time
- Winter protection package
- Skirt mount or component mount air inlet grill
- 12V or 24V operation
- Stackable kit available
- Incorporated single piece receiver/dryer and system moisture indicator reduced possible leak joints
- Plug-n-Play connectors on unit and fan motor provide for ease of installation and motor service

# Slim Line Series **Condenser CM-3**



## Technical Data

Capacity	80000 Btu/hr (23.44 kW) IMACA <sup>[1]</sup>
Air flow	1350 CFM (2294 m <sup>3</sup> /hr)
Condenser coil	Advanced technology Micro Channel Heat Exchanger (MCHX)
Condenser fans	Unitized, low-profile, axial-flow vector fans balanced for quiet, vibration-free operation with finger guard
Fan motors	Totally enclosed, pancake-style, permanent-magnet type with extended-life, permanently lubricated bearings
Max amperage requirement	21 amps @ 13.5 VDC; 11.5 amps @ 27.0 VDC
Safety controls	High refrigerant pressure cut-out 400 psi (28 bar); cut-in 300 psi (21 bar)
Receiver filter dryer	16 in <sup>3</sup> (262 cm <sup>3</sup> ), ½" [#8] Male Insert O-Ring (MIOR)
Weight	51 lbs (23.2 kg)
Available color	Midnight black

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

## Condenser **CM-14**

Field experience led to our innovative CM-14 condenser design for commercial and school bus air conditioning. Lower condensing temperatures and pressures result in enhanced cooling, longer compressor life and more efficient system operation. In MCC unique design, air is channeled away from the vehicle undercarriage, eliminating recirculation of hot air.

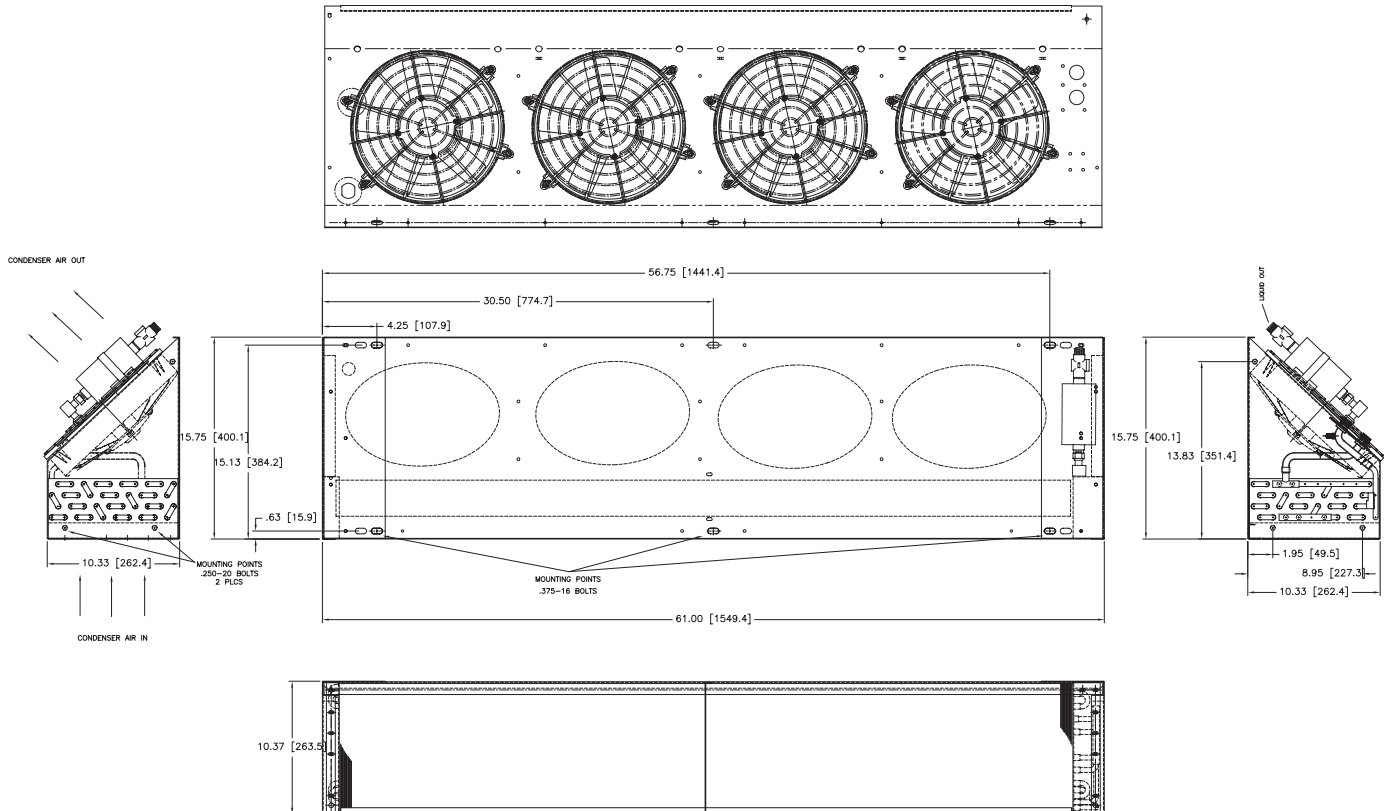
For best possible performance in new or retrofit applications, specify the MCC CM-14 condenser. The CM-14 condenser can be matched with other MCC components to provide a complete air conditioning system that meets your exact vehicle size, operating mode and climate.



### Features

- Enhanced Copper Tube and Aluminium fin coil design for unmatched heat transfer coil
- Zinc coated for added durability and corrosion protection
- Rugged coated steel construction
- Integral high-pressure switch eliminates high-side compressor cycling
- Unitized motor/fan package increases service access and decreases service time
- Winter protection package
- Incorporated single piece combination filter drier and sight glass with system moisture indicator reduces possible leak joints
- Skirt mount or component mount air inlet grille
- 12 V or 24 V operation
- Stackable kit available
- Plug-n-Play connectors on unit and fan motor provide for ease of installation and motor service

# Condenser **CM-14**



## Technical Data

Capacity	107000 Btu/hr (31.35 kW) IMACA <sup>[1]</sup>
Air flow	3200 CFM (5437 m <sup>3</sup> /hr)
Condenser coil	Four rows deep, patented, internally enhanced copper tubes expanded into aluminum fins
Condenser fans	Unitized, low-profile, axial-flow vector fans balanced for quiet, vibration-free operation with finger guard
Fan motors	Totally enclosed, pancake-style, permanent-magnet type with extended-life permanently lubricated bearings
Max amperage requirement	29 amps @ 13.5 VDC; 26 amps @ 27.0 VDC
Safety controls	High refrigerant pressure cut-out 400 psi (28 bar); cut-in 300 psi (21 bar)
Receiver filter dryer	16 in <sup>3</sup> (262 cm <sup>3</sup> )
Weight	95 lbs (43.1 kg)
Available color	Midnight Black

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

## Condenser **KR-4**

MCC's KR-4 high-capacity roof mount condenser has been specifically engineered for use in school and commercial buses that are 20'– 40' (7620 – 12192 mm) long.

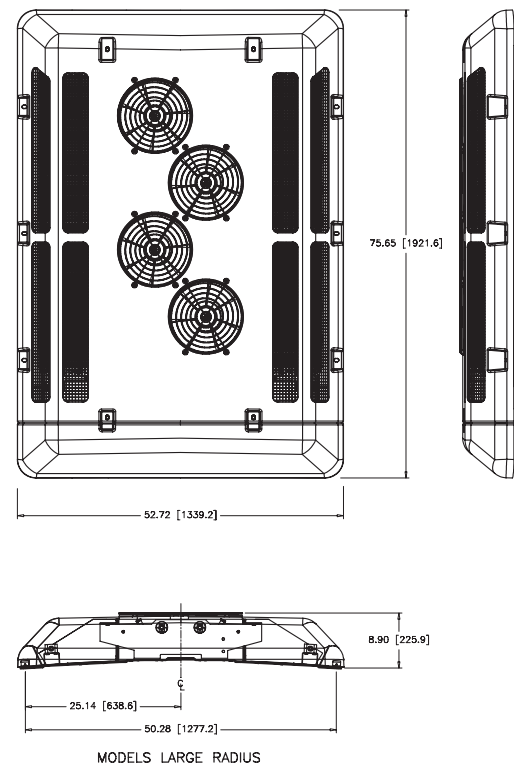
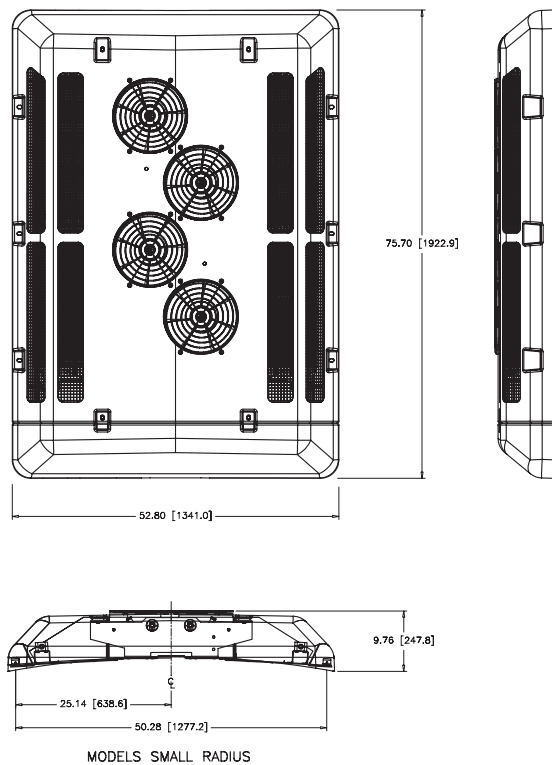
The ultra-low-profile KR-4 roofmount condenser frees up the skirt area for a variety of options including CNG tanks, wheel-chair lifts and luggage boxes. Simply mount it on the roof and free up space inside.



### Standard Features

- Delivers the highest capacity in its class using R134a
- The sleek, low-profile design looks like part of the roof
- Transit-duty construction: Combines the toughness of steel with the light weight and corrosion resistance of aluminum fiberglass
- Swiss-made, stainless steel shaft with long-life, ball-bearing motors
- Available in both 12V and 24V configurations
- All refrigerant termination points feature O-ring connections for ease of installation and leak-free reliability
- The KR-4 can be matched with a wide variety of MCC evaporators including our EM-1, EM-3, EM-9 and EM-17
- MCC's newest "whisper quiet" fan technology, which delivers the highest-rated CFM at the industry's lowest decibel rating
- Two cover radiuses available to better fit your application. Small (15" red) and larger (300" red)

## Condenser KR-4



### Technical Data

Capacity	163000 Btu/hr (47.7 kW) IMACA <sup>[1]</sup>
Coil	Four rows deep. Aluminum tube sheets with MCC's patented, internally enhanced 3/8" diameter copper tubes expanded into .008"-thick aluminum-coated fins
Motors	Four permanent-magnet fan motors. Stainless steel shafts and sealed ball-type bearings rated at 20000 hours
Air flow	3500 CFM (5946.5 m <sup>3</sup> /hr) at 2950 rpm; zero-static rating condition
Fan blade	Four tri-blade glass-filled ABS propeller-type fans, 14" in diameter
Housing	Corrosion-resistant, lightweight, hand-laid fiberglass with UV-resistant gel-coated exterior layer
Fitting connections	Single Circuit – Outlet – #12 male ORFS Inlet – #16 male ORFS Dual Circuit – Outlet – # 8 (3/4"-16) male insert O-ring Inlet – #10 (7/8"-14) male insert O-ring
Max amperage requirement	44 amps @ 13.5 VDC; 22 amps @ 27.0 VDC
Weight	187 lbs (85 kg)

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH

## Roof top Condenser **K-410**

Our K-410 high capacity roof mount condenser has been specifically engineered for use in commercial, light transit and school bus applications. This unit is the perfect marriage of sleek, low profile European styling and American innovation.

The rugged fiberglass cover shrouds the high strength steel and lightweight aluminum structure underneath, while allowing complete service access without cover removal.

The highly adjustable mounting rails are designed to attach this unit to any exterior roof radius without leaving visually unsightly gaps between roof and unit cover.

MCC's innovative introduction of the roofmount condenser series to the North American bus market has given body builders the opportunity to free up skirt space for a variety of options including CNG tanks, wheelchair lifts and luggage compartments, while maintaining an aerodynamic exterior appearance to your vehicle.

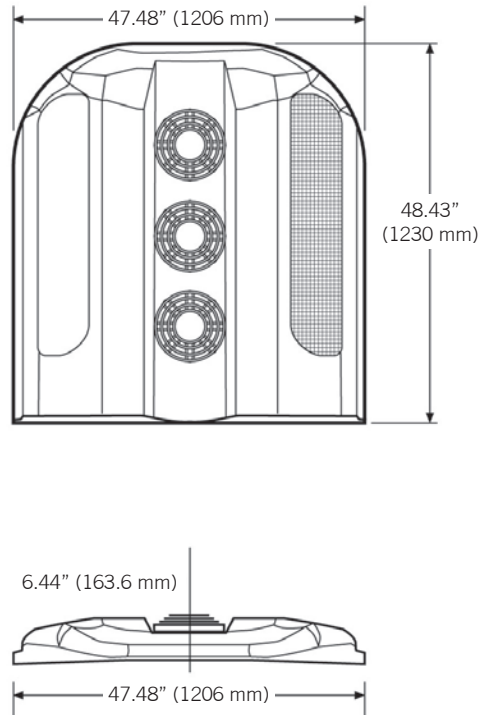
The roofmount condenser is the answer to severe road salt corrosion and high radiant ground temperature environments.



### Features

- Half the height of current models
- Lower condensing temperatures and pressures than skirt-mounted condensers provide enhanced cooling and better efficiency
- Adaptable to 12V and 24V applications
- Corrosion resistant, lightweight frame
- Lightweight, durable fiberglass cover
- Optional fan winter guard kit

## Condenser **K-410**



### Technical Data

Capacity	82000 Btu/hr (24 kW) IMACA <sup>[1]</sup> 57000 Btu/hr (16.7 kW) ARI <sup>[2]</sup>
Air flow	1700 CFM (288 m <sup>3</sup> /hr)
Condenser coil	Two coils each, two rows deep with internally enhanced copper tubes expanded into aluminium fins
Condenser fans	3
Fan motors	Totally enclosed, pancake-style, permanent-magnet type with extended-life permanently lubricated, sealed bearings and 4-pole graphite brushes
Max amperage requirement	23 amps @ 13.5 VDC; 11 amps @ 24 VDC
Safety controls	High refrigerant pressure cut-out 400 psi (28 bar); cut-in 300 psi (21 bar)
Filter dryer	16 in <sup>3</sup> (262 cm <sup>3</sup> )
Weight	Installed weight 80 lbs (36.3 kg)
Available color	Gel coat white

[1] IMACA conditions: 100°F (38°C) / 90°F (32°C) / 50% RH  
 [2] ARI conditions: 95°F (35°C) / 80°F (27°C) / 50% RH



# Notes



# VI. Pex Piping Systems

## Piping System **MCC Pex**

# Easy, economical, reliable and revolutionary

The MCCPex is an innovative and economically priced piping system for glycol based heating systems. MCC's Pex proven design has been used in buses for over a decade. Unlike traditional rigid copper piping, the MCCPex uses

flexible polyethylene piping and combined with simple installation/ coupling process, it greatly reduces weight, the amount of parts used during installation, thus reducing total system and labour cost.



### Features

- State of the art crosslink thermoplastic design
- Designed for vehicles with glycol based heating systems
- Pipes will not corrode
- Easy to install (ideal for prototyping)
- High R value
- Simple tooling (No welding and brazing)
- Low flow resistance
- Substantial savings compare to traditional system
  - Cost considerably less than copper piping systems
  - Save up to 30% in weight compare to copper pipes (improved fuel savings)
  - Save up to 50% installation time (reduced labour time)

**Quick and easy mounting –  
Quick and simple installation**



1. Push support ring over the PEX pipe



2. Expand the PEX pipe with the hydraulic expanding tool



3. Insert coupling. The PEX pipe will contract and create a tight connection. (Allow one hour for PEX pipe to set before pressure testing.)

**Standard MCCPex range**

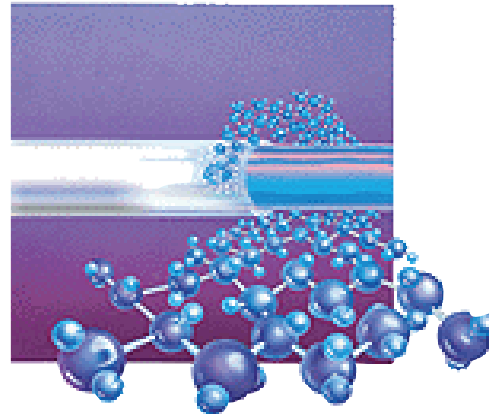
Available dimension	Ø 16, 20, 25, 32, 40 mm
Standard lengths	5, 6 and 50 m
Connection variants	straight, elbow, T-pipe

**Customized MCCPex**

MCCPex can be ordered with customized bends and couplings. MCC will bend and insert couplings according to the customer’s drawings. To make installation simple and effortless, MCC can also pre-bend PEX piping according to customer’s specifications, to be delivered in a kit for immediate installation

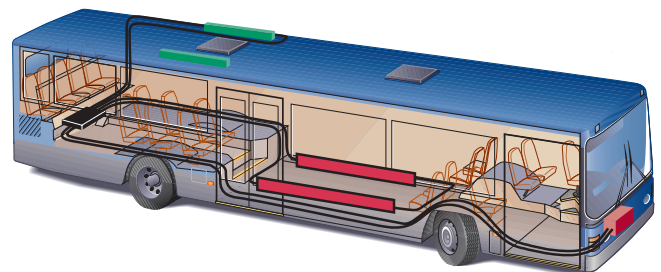
**About the material**

The MCCPex piping is made of crosslink (X) polyethylene (PE) where long polyethylene chains are cross-linked with peroxide to improve high temperature properties.



**Typical bus installation**

With its flexible design, heating components can be connected by bending the PEX pipe without the use of elbows and couplings thus reducing installation labour and maintenance costs.



## Notes



# VII. Convertors

## Convector **UC-1**

# All the heat you need in one light and compact convector

Combining modern design and high capacity, the UC-1 single pipe convector is the lightest in MCC's product range and small enough to fit in tight spaces. The UC-1 Convector

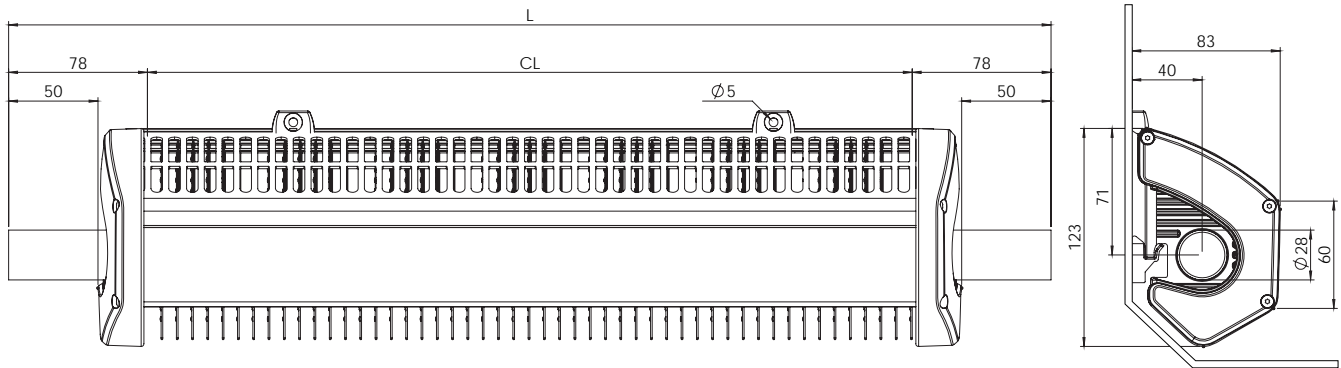
is built around a single pipe made of aluminum or copper. This means the convector is very compact and requires a small mounting footprint.



### Features

- Suitable for heating in buses and coaches
- Designed for vehicles with water glycol based heating systems
- Quiet and draft-free heating
- Maintenance free
- Single pipe for compact design
- Shaped to fit reinforced wall structures

## Convector UC-1



Face is shaped for reinforced wall structure

Dimensions in mm

### Technical Data

Heat output	1604 Btu/hr (0.47 kW) $Q_{60}^{[1]}$	2661 Btu/hr (0.78 kW) $Q_{100}^{[1]}$
Piping	Copper or aluminium Ø 1.1" (28 mm) for hose connection	
Weight	Copper 14 lbs/ft (1.93 kg/m) , aluminium 12 lbs/ft (1.71 kg/m)	
Maximum length	197" (5 m)	
Color	Silver anodized aluminium	
	Please contact your MCC representative for more details	

[1] The  $Q_x$  value stands for the power in kW emitted from a unit length (1 m) of the convector at a temperature difference between coolant inlet and room air equal to the subscript (x) .

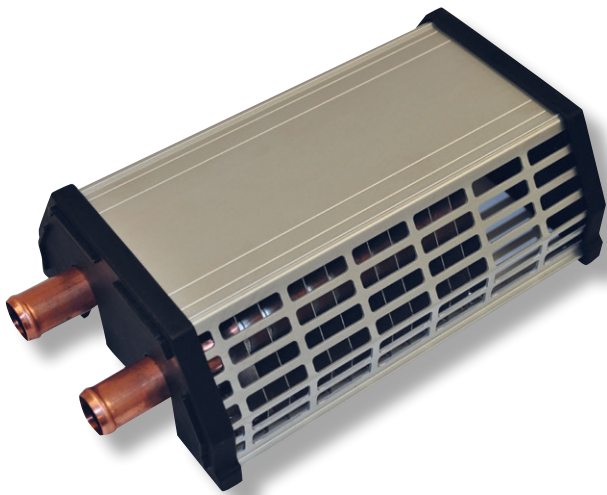


## Convector P-90

# Highly efficient and comfortable bus heating

MCC Convector P-90 is based on a twin copper pipe system that supplies efficient heat in a space saving design. Can be used as a stand alone unit or part of a complete heat-

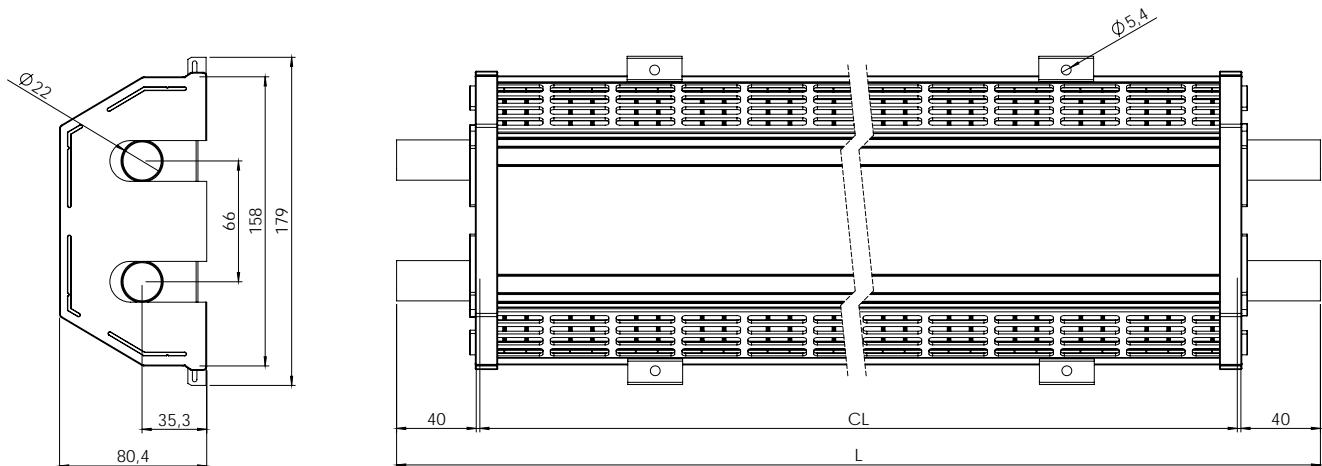
ing system. Transition pieces are available to accommodate bulk heads, wheel wells and doors.



### Features

- Suitable for heating buses, coaches and other vehicles
- Designed for vehicles with water/glycol heating systems
- Quiet and draft-free heating
- Maintenance free
- Robust design
- Twin pipe design for optimized heat output

# Convector P-90



Dimensions in mm

## Technical Data

Heat output	1880 Btu/hr (0.55 kW) $Q_{60}^{[1]}$	3347 Btu/hr (0.98 kW) $Q_{100}^{[1]}$
Piping	Copper $\varnothing$ 0.8" (22 mm)	
Weight	25 lbs/ft (3.14 kg/m)	
Maximum length	197" (5 m)	
Color	Silver anodized aluminium	
	Please contact your MCC representative for more details	

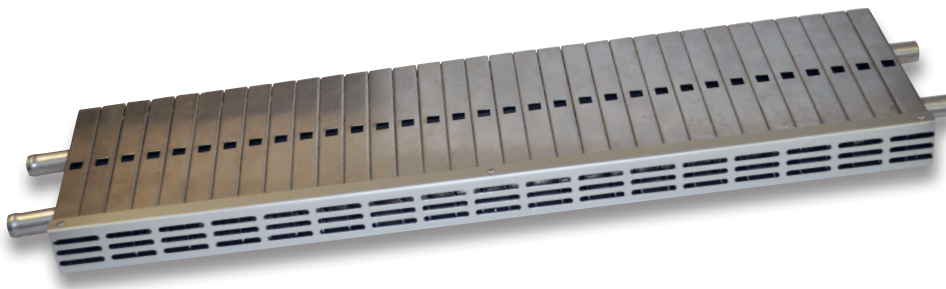
[1] The  $Q_x$  value stands for the power in kW emitted from a unit length (1 m) of the convector at a temperature difference between coolant inlet and room air equal to the subscript (x) .

## Convector P-20

# Compact design for small spaces

MCC Convector P-20 is designed for use in small spaces such as boats, caravans and bus sleeping cabins and driver compartments. The P-20 distributes heat uniformly, cre-

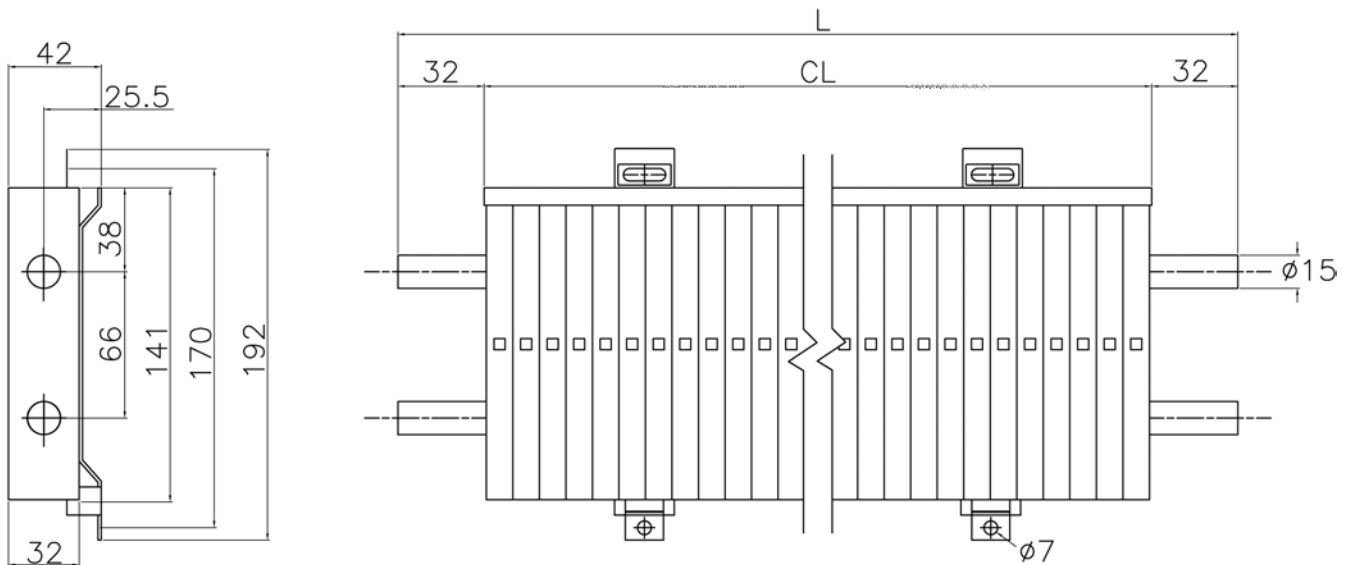
ating a comfortable environment with gentle air flow. The advantage with the P-20 convector is of course its small footprint which make maintenance and installation simple.



### Features

- Suitable for heating in buses, minivans, caravans, mobile homes and marine applications
- Designed for vehicles with water/glycol heating systems
- Quiet and draft free heating
- Maintenance-free
- Very compact design
- Twin pipe design for optimized heat output

## Convactor P-90



### Technical Data

Output	Heat output 384 W/m $Q_{60}^{[1]}$ (640 W/m $Q_{100}^{[1]}$ )
Piping	Copper or aluminum Ø 15 mm
Weight	Copper 1.54 kg/m, aluminium 1.31 kg/m
Flow rate	0.30 l/m
Depth	32 mm
Height	141 mm
Lengths	250, 500, 750, 1000 mm
Fins	Anodized aluminium

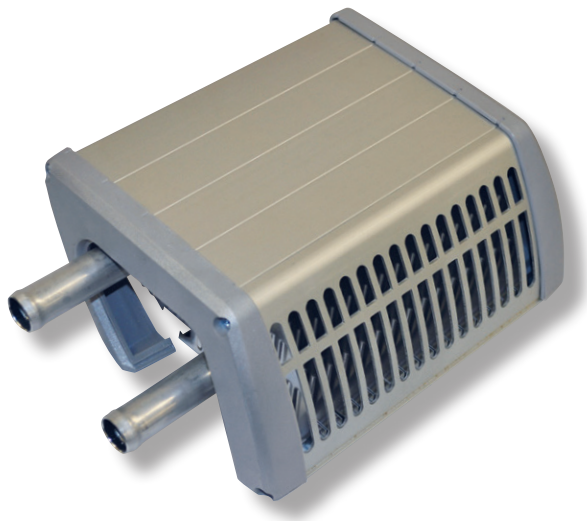
[1] The  $Q_x$  value stands for the power in kW emitted from a unit length (1m) of the convactor at a temperature difference between coolant inlet and room air equal to the subscript (x).

## Convector **UC-9**

# High heat output at a low weight

The new MCC Convector UC-9 provides efficient heating in a compact design. This convector has been specially designed to deliver maximum heat output. It is designed to fit

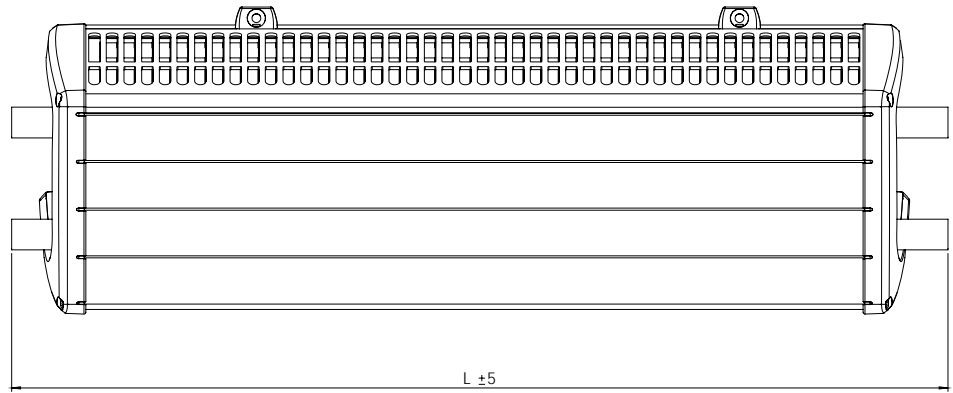
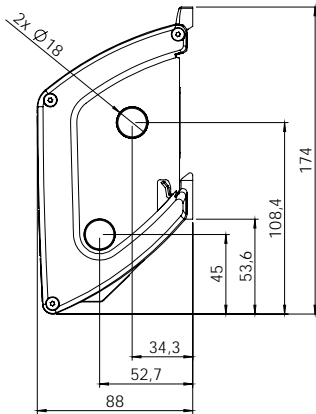
in buses with reinforced wall structure and comes with the necessary hardware to make installation easy.



### Features

- Designed to heat buses, coaches and marine applications
- Suitable for vehicles with water/glycol based heating systems
- High output
- Light and compact
- Quiet and draft-free heating
- Maintenance free
- Twin pipe for optimized heat output
- Shaped to fit reinforced wall structure

# Convector UC-9



Dimensions in mm

## Technical Data

Heat output	2091 Btu/hr (0.61 kW) $Q_{60}$	3467 Btu/hr (1 kW) $Q_{100}$ [1]
Piping	Copper Ø 0.7" (18 mm) + aluminium with hose connections	
Weight	Copper 2.6 kg/m, aluminium 2.34 kg/m	
Maximum length	197" (5 m)	
Color	Silver anodized aluminium	
	Please contact your MCC representative for more details	

[1] The  $Q_x$  value stands for the power in kW emitted from a unit length (1 m) of the convector at a temperature difference between coolant inlet and room air equal to the subscript (x) .

## Convector P-200

# Efficient bus heating

MCC convector P-200 offers efficient heating and can be integrated with the Whisper 200 family. The P-200 is a twin pipe design made of copper or aluminum that carries

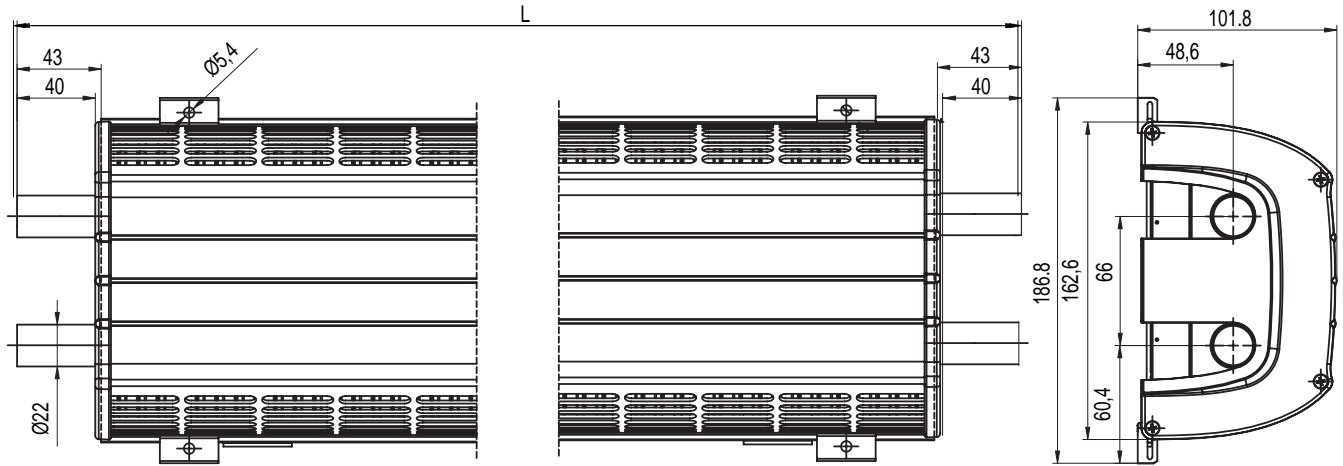
glycol based coolant through the convector. Coil producing up to as much as 714W/m of heat.



### Features

- Suitable for heating buses, coaches where highly efficient heating is required
- Designed for vehicles with water/glycol based heating systems
- High output
- Quiet and draft-free heating
- Maintenance free
- Fully compatible with Whisper 200 heaters

# Convector P-200



Dimensions in mm

## Technical Data

Heat output	2436 Btu/hr (0.71 kW) $Q_{60}^*$	4060 Btu/hr (1.2 kW) $Q_{100}^*$
Piping	Copper or aluminum $\varnothing 0.8''$ (22 mm)	
Weight	Copper 27 lbs/ft (3.71 kg/m) , aluminium 24 lbs/ft (3.34 kg/m)	
Maximum lengths	197'' (5 m)	
Color	Silver anodized aluminium	
	Please contact your MCC representative for more details	

\* The  $Q_x$  value stands for the power in kW emitted from a unit length (1 m) of the convector at a temperature difference between coolant inlet and room air equal to the subscript (x) .



## Power Convector **PC-500**

# Even temperature distribution, small footprint, numerous layout options and easy to install

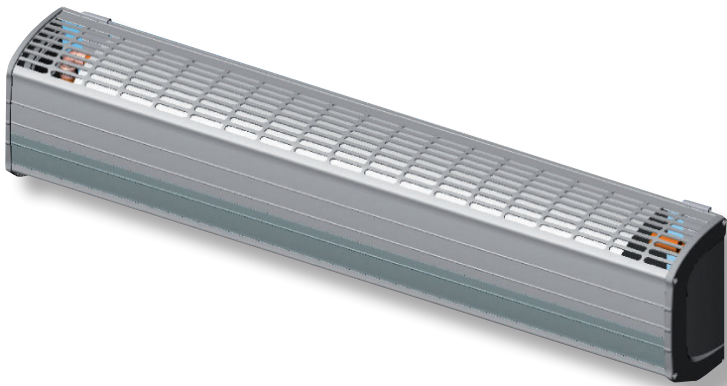
PC-500 (Power Convector) is a patented “crossover” product featuring the benefits of a normal convector and that of a fan assisted heating unit.

The PC-500 has three operating modes:

**Normal convector mode**, (Free-Flow) warm air rises naturally (convection) from the unit.

**Fan half-speed mode**, (Forced-Air) draws the air from the top of the unit through the fins and out to the floor. Once on the floor the warm air mixes and rises to the top.

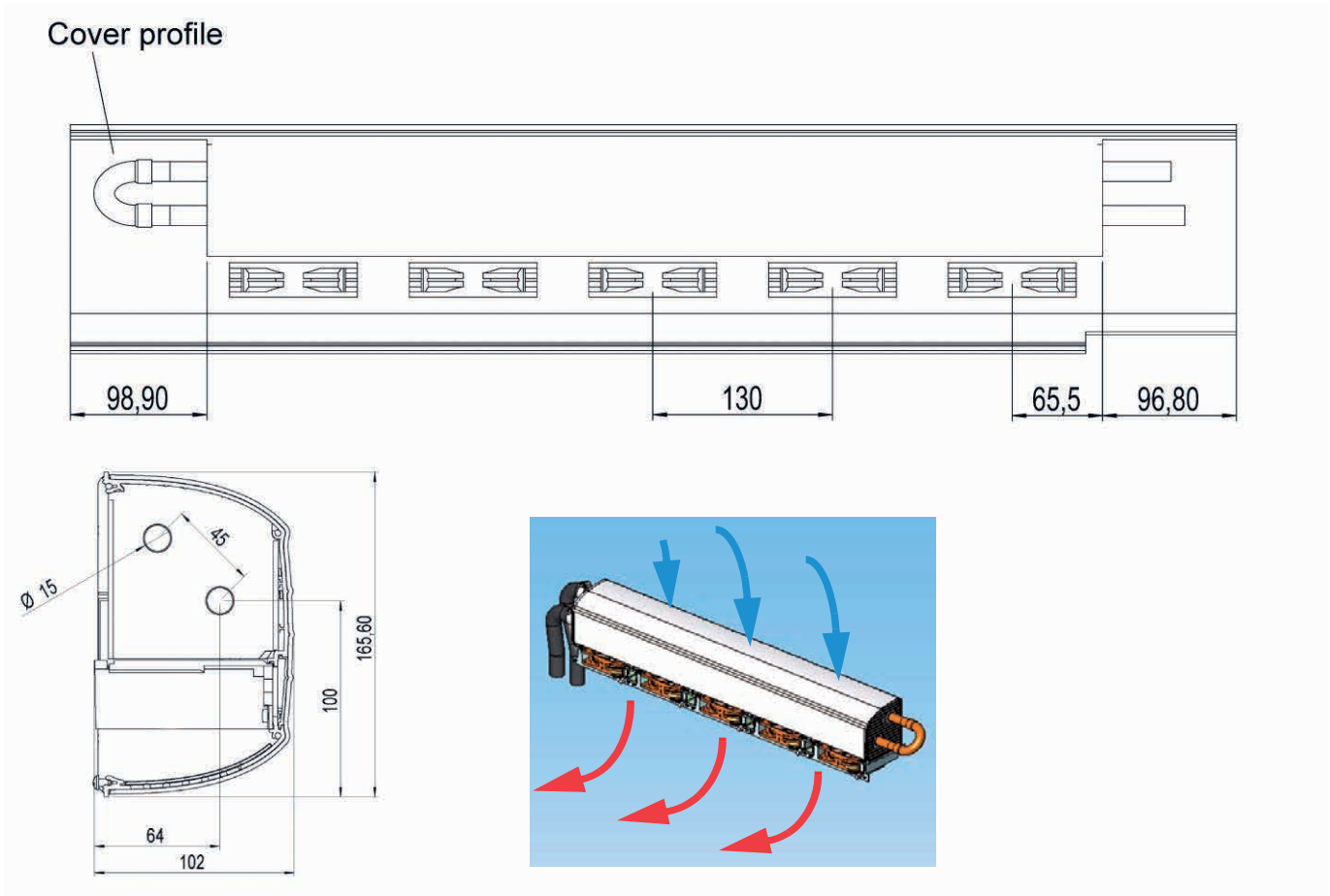
**Fan full-speed mode**, (Forced-Air) gives instant heating results by taking maximum heat from the PC 500 and distributing this air all over the floor.



## Features

- Ideal for buses, coaches and other vehicles
- Designed to work in any climate region
- Can be ordered with one fan (10"/250 mm unit) up to 15 fans (236"/6 m unit)
- Available both 12V and 24V versions
- Covers can be easily removed for maintenance
- Max number of PC-500 in series 3 units connection
- Multiple fans can be mounted according to customer's heating specifications

# Power Convector **PC-500**



Note: Dimensions in mm only.

## Technical Data

	Fan Mode – One meter section, 5 fans	Radiant Mode – One meter section
Heat output	10236 Btu/hr (3kW) $Q_{60}$ <sup>[1]</sup>	1587 Btu/hr (0.46 kW) $Q_{60}$ <sup>[1]</sup>
	16378 Btu/hr (4.8 kW) $Q_{100}$ <sup>[1]</sup>	2423 Btu/hr (0.71 kW) $Q_{100}$ <sup>[1]</sup>
Piping <sup>[2]</sup>	Ø 0.59" (15 mm)	Ø 0.59" (15 mm)
Weight Copper	9.5 lbs (4.3 kg)	8 lbs (3.7 kg)
Weight Aluminium	8.5 lbs (3.9 kg)	7 lbs (3.3 kg)
Maximum length	197" (5 m)	197" (5 m)
Color	Silver anodized aluminium	Silver anodized aluminium
Please contact your MCC representative for more details		

[1] The Qx value stands for the power in kW emitted from a unit length (1m) of the convector at a temperature difference between coolant inlet and room air equal to the subscript (x).

[2] Custom piping may be available

# Notes



# VIII. Heaters

## Heater **Whisper UW-9**

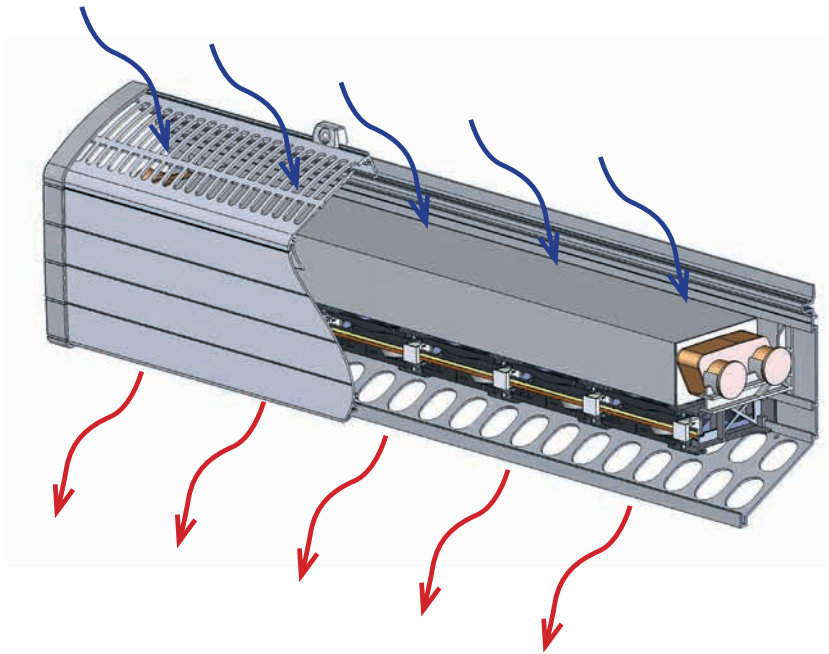
# Very compact heater

Having the same profile as the UC-9 convector, MCC heater whisper UW-9 is the ideal wall mounted heater when extra heat output is required.

As a part of the UC-9 family, the UW-9 heater is compact, it is also highly customizable suitable for motor coaches

and transit buses. The unit consists of heat exchanger with configurable water connections, two speed fans.

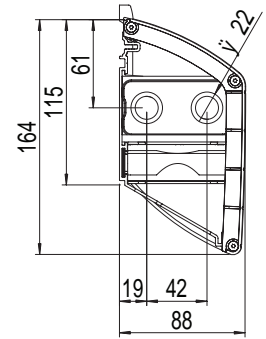
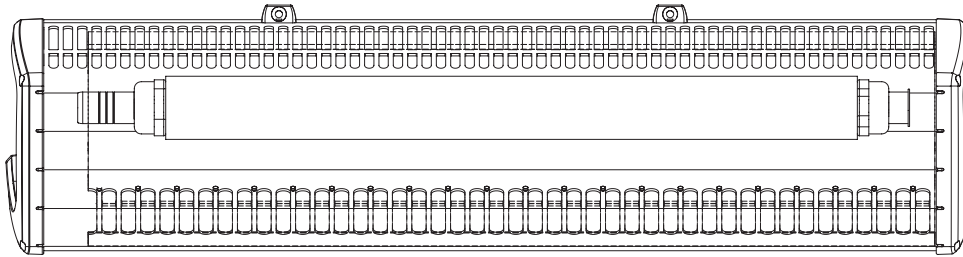
The UC-9 can be also be used in as a standalone heating unit or in combination with other heaters and convectors. An electrostatic or mesh filter can also be added as an option.



### Features

- Smooth air distribution
- Rugged design
- Suitable for sloping floors
- Flexible design (3-18 fans)
- Two speed long life fans
- Lightweight

## Dimensions



Dimensions in mm

## Technical Data

Heat	15013 Btu/hr (4.4 kW) $Q_{80}$	18767 Btu/hr (5.5 kW) $Q_{100}$
Air flow @ 28V (6 fans)	61 CFM (182 m <sup>3</sup> /h)	
Coolant connection	Copper Ø 0.9 (22 mm)	
Voltage	12 or 24V	
Height	6.5" (165 mm)	
Lengths	10-79" (250-2000 mm)	
Cover sections	Anodized aluminum	

\* The  $Q_x$  value stands for the temperature difference between the water inlet temp and the air temp in the room where the heat exchanger is. For instance water inlet temp +80°C and air temp +20°C is known as  $Q_{60}$ .

## Heater **Whisper 3C, 7C and 12C**

# High performance heating system

The Whisper 3C, 7C and 12C heaters are units designed for high output.

Whisper 3C available only in 24V, 7C and 12C are available in 12V and 24V versions. Thanks to its modular

design, piping can be mounted on either left or right side for easy installation. 3C, 7C and 12C are electro-magnetic interference conformance (EMC) approved according to 72/245/EG including revision 2005/83/EG.



Whisper 3C

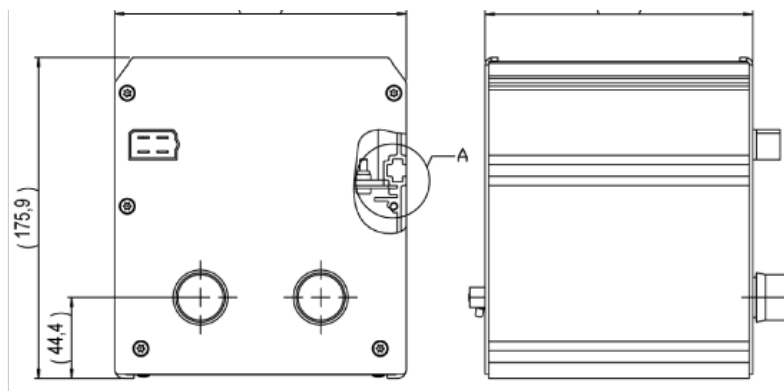


Whisper 7C & 12C

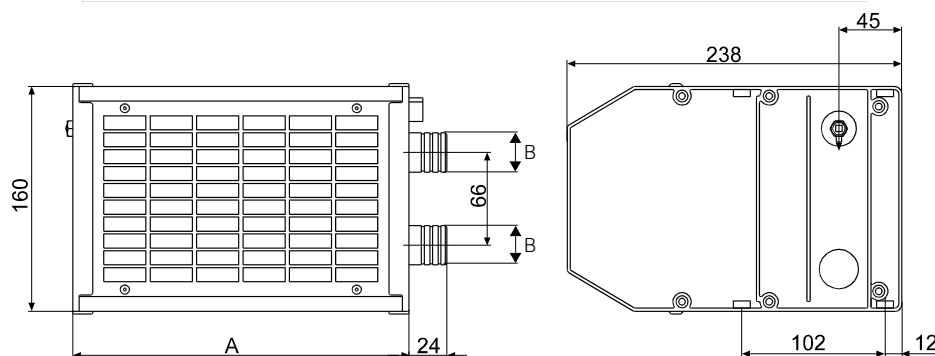
### Features

- Design for buses, off-road and marine applications
- High performance
- Rugged design
- Piping can be mounted either left or right side
- Can be mounted in horizontal or vertical position

Whisper 3C



Whisper 7C &amp; 12C



## Technical Data

	<b>3C</b>	<b>7C</b>	<b>12C</b>
Heat @ 24V	10577 Btu/hr (3.1 kW) $Q_{80}$ <sup>[1]</sup>	24567 Btu (7 kW) $Q_{80}$ <sup>[1]</sup>	39240 Btu (11.5 kW) $Q_{80}$ <sup>[1]</sup>
Heat @ 12V	N/A	21496 Btu (6 kW) $Q_{80}$ <sup>[1]</sup>	35827 Btu (10.5 kW) $Q_{80}$ <sup>[1]</sup>
Air flow @ 24 V	102 CFM (175 m <sup>3</sup> /h)	212 CFM (360 m <sup>3</sup> /h)	309 CFM (525 m <sup>3</sup> /h)
Air flow @ 12 V	N/A	182.5 CFM (310 m <sup>3</sup> /h)	256 CFM (435 m <sup>3</sup> /h)
Max current @ 24 V (A)	2.6 Amp	4.3	6.2
Max current @ 12 V (A)	N/A	8.3	11.7
Hose connection	22/28 mm	22/28 mm	22/28 mm
Weight	6 lbs (2.6 kg)	11.2 lbs (5.1 kg)	14.5 lbs (6.6 kg)
Depth	6.3" (160 mm)	9.3" (238 mm)	9.3" (238 mm)
Height	6.9" (175 mm)	6.3" (160 mm)	6.3" (160 mm)
Length	5.7" (147 mm)	9.4" (239 mm)	14" (356 mm)
Electrical connection	4 pin AMP 180901-0 connector		
Heat exchanger	Copper fins with brass and plates		
Casing	Natural anodised aluminium sections		
Standard colour	Natural aluminium		
Accessories	Different types of hoses, brackets etc, see product sheet		

[1] The  $Q_x$  value stands for the temperature difference between the water inlet temp and the air temp in the room where the heat exchanger is. For instance water inlet temp +80°C and air temp +20°C is known as  $Q_{60}$ .

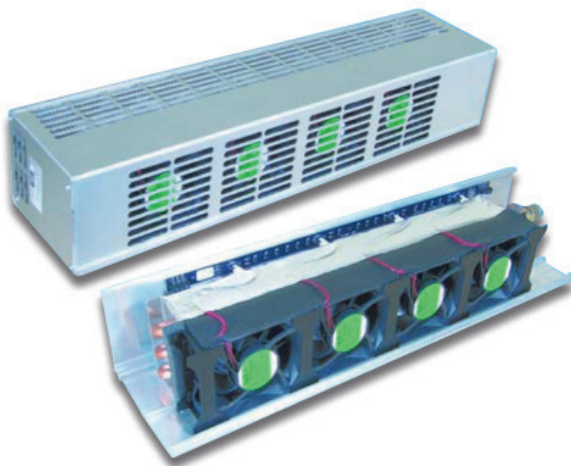


## Heater **Whisper K-200**

# Economical Compact Heater

MCC Whisper K-200 compact heating unit is a part of the Whisper 200 family, its compact size means that it can be mounted anywhere. The whisper K-200 consists of a heat exchanger and four brushless fans (12VDC or 24VDC) with

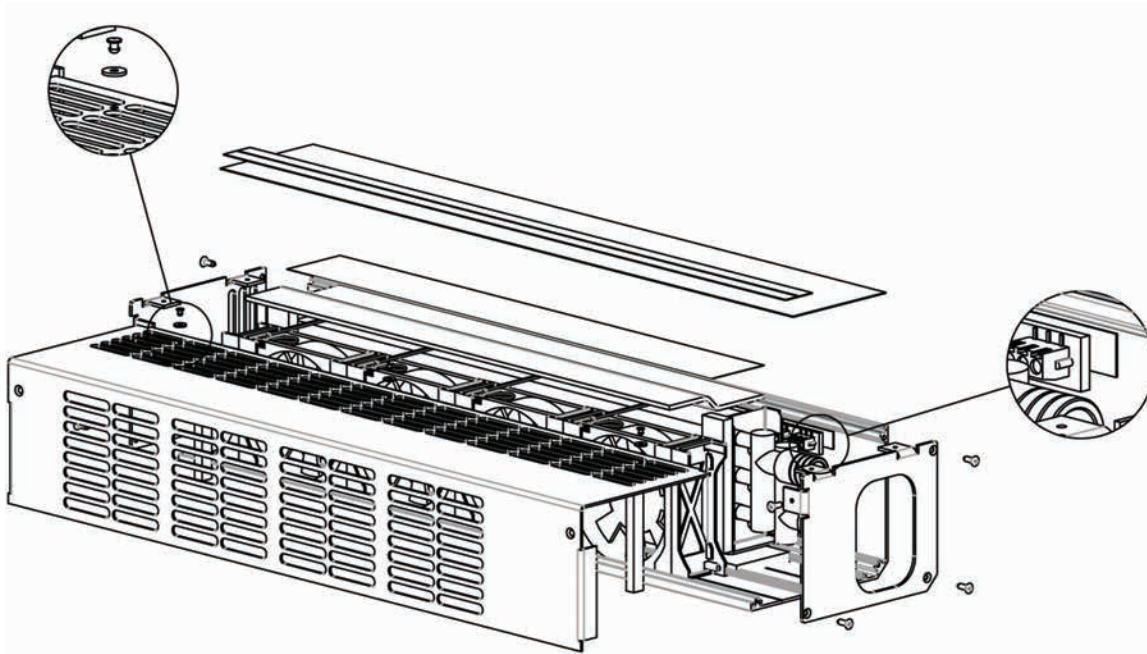
long life bearings for quiet operation. All components are mounted in a rugged anodized aluminum case with integrated mounting bracket for simple installation.



### Features

- Heater system for interior heating in buses with water/ glycol based heating systems
- Piping can be mounted either left or right side
- Smooth air distribution
- Compact and light weight design
- Long life brushless fans

## Dimensions



Dimensions in mm

## Technical Data

Operating voltage/Maximum operating voltage	24/28 VDC	
Power consumption	0.8A/19W	
K 200 meets the requirements according to:	Low Voltage Directive 73/23/EEC EMC Directive 89/336/EEC CE Marking Directive 93/68/EEC	
Standard connection	Direct to circuit board	Black=Ground Red=High speed Blue=Low speed
Heat <sup>[1]</sup>	8190 Btu/hr (2.4 kW) $Q_{60}$	13649 Btu/hr (4.0 kW) $Q_{100}$ AMP plug P/N 1-350346-0
Air flow	103 CFM (175 m <sup>3</sup> /h)	
Coolant connections	Connections to K200 are with Ø 0.9" (22 mm) hoses.	

[1] The  $Q_x$  value stands for the temperature difference between the water inlet temp and the air temp in the room where the heat exchanger is. For instance water inlet temp +80°C and air temp +20°C is known as  $Q_{60}$ .

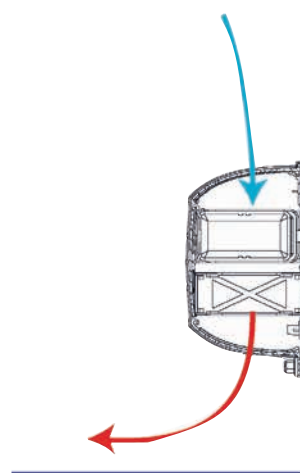
## Heater **Whisper 200/2-3-5 fans**

# High performance with unique flexibility

The Whisper 200 family is a highly customizable wall mounted heating unit designed for motor coaches and buses. It consists of a coolant type heat exchanger with various fan configurations in 24V or 12V. The Whisper 200 can be customized in different configurations, with two to five fans and

front or rear water connections. It can be used as stand alone heating source or in combination with convectors.

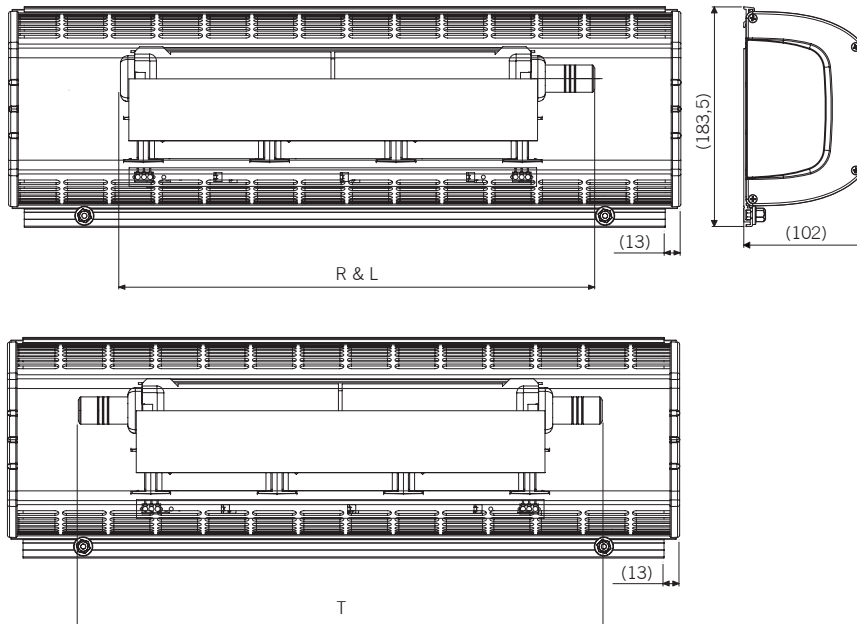
The Whisper 200 is EMC approved according to directive 72/245/EEG including rev 2006/28/EG.



### Features

- Heater blower system for buses with water/glycol based heating systems
- Smooth air distribution
- Whisper quiet operation
- Many configurations possible thanks to flexible design
- Long life two speed fans
- Low weight

## Dimensions



Dimensions in mm

Variant	2 Fans	3 Fans	5 Fans
Left or Right Connection (R&L)	10.2" (260 mm)	15.1" (383 mm)	23.3" (591 mm)
Through water Connection (T)	11.8" (300 mm)	17" (423 mm)	25" (631 mm)

## Technical Data

	2 Fans	3 Fans	5 Fans
Heat	6824 Btu/hr (2 kW) $Q_{80}$	9554 Btu/hr (2.8 kW) $Q_{80}$	16037 Btu/hr (4.7 kW) $Q_{80}$
	8530 Btu/hr (2.5 kW) $Q_{100}$	11942.5 Btu/hr (3.5 kW) $Q_{100}$	20131 Btu/hr (5.9 kW) $Q_{100}$
Air flow	153 CFM (260 m <sup>3</sup> /h) $\emptyset$	92 CFM (156 m <sup>3</sup> /h)	153 CFM (260 m <sup>3</sup> /h)
Heat exchanger water connection	$\emptyset$ 0.9" (22 mm)	$\emptyset$ 0.9" (22 mm)	$\emptyset$ 0.9" (22 mm)
Voltage	12 or 24V	12 or 24V	12 or 24V
Depth	4" (102 mm)	4" (102 mm)	4" (102 mm)
Height	7.2" (183.5 mm)	7.2" (183.5 mm)	7.2" (183.5 mm)
Length	According to request, see Whisper 200 product configuration		
Cover sections	Anodized aluminum		

\* The  $Q_x$  value stands for the temperature difference between the water inlet temp and the air temp in the room where the heat exchanger is. For instance water inlet temp +80°C and air temp +20°C is known as  $Q_{60}$ .

## Electric DC Voltage Heater

# PTC heating element with MCC electronic temperature stabilization and safety control

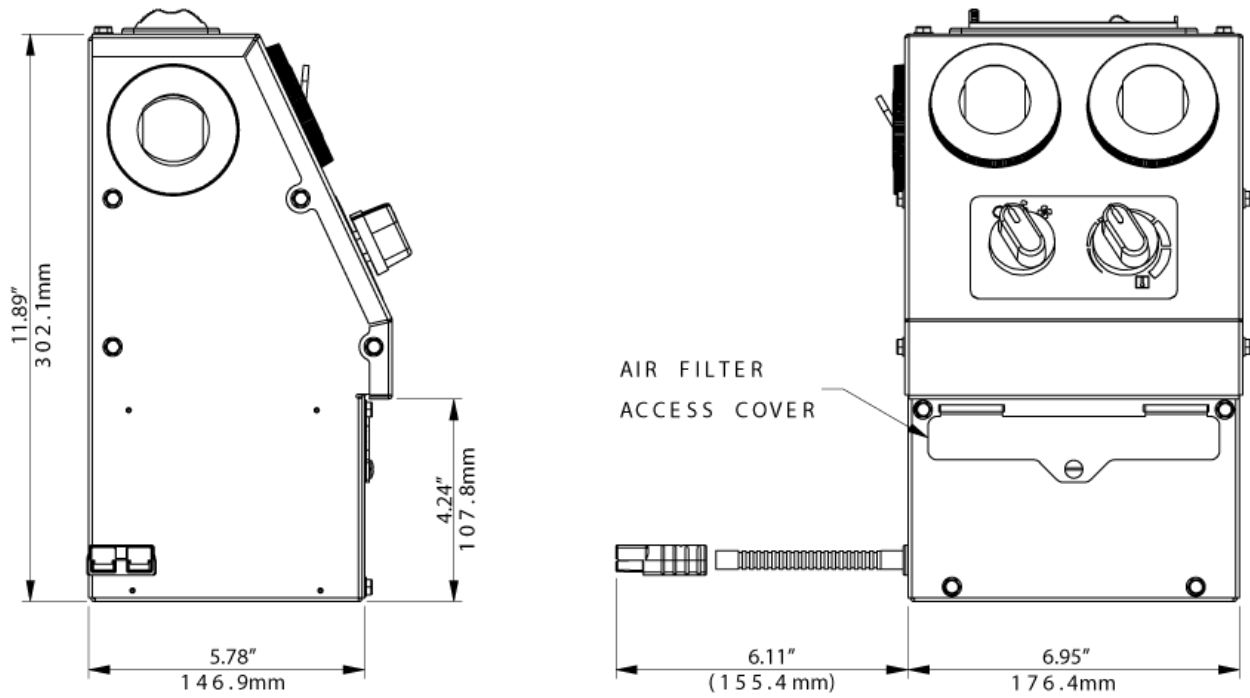
This newly designed mini electric heater with fully integrated controls can be used where space is at a premium. Small and economical, but powerful for its size, it is perfect for electrically powered compact cabins, forklifts, mini

construction equipment, or as an aftermarket replacement. Simple and easy to instal, all that is needed is an electrical connection and a power supply. The heater casing is made of durable powder coated metal to withstand rigors of daily use.



### Features

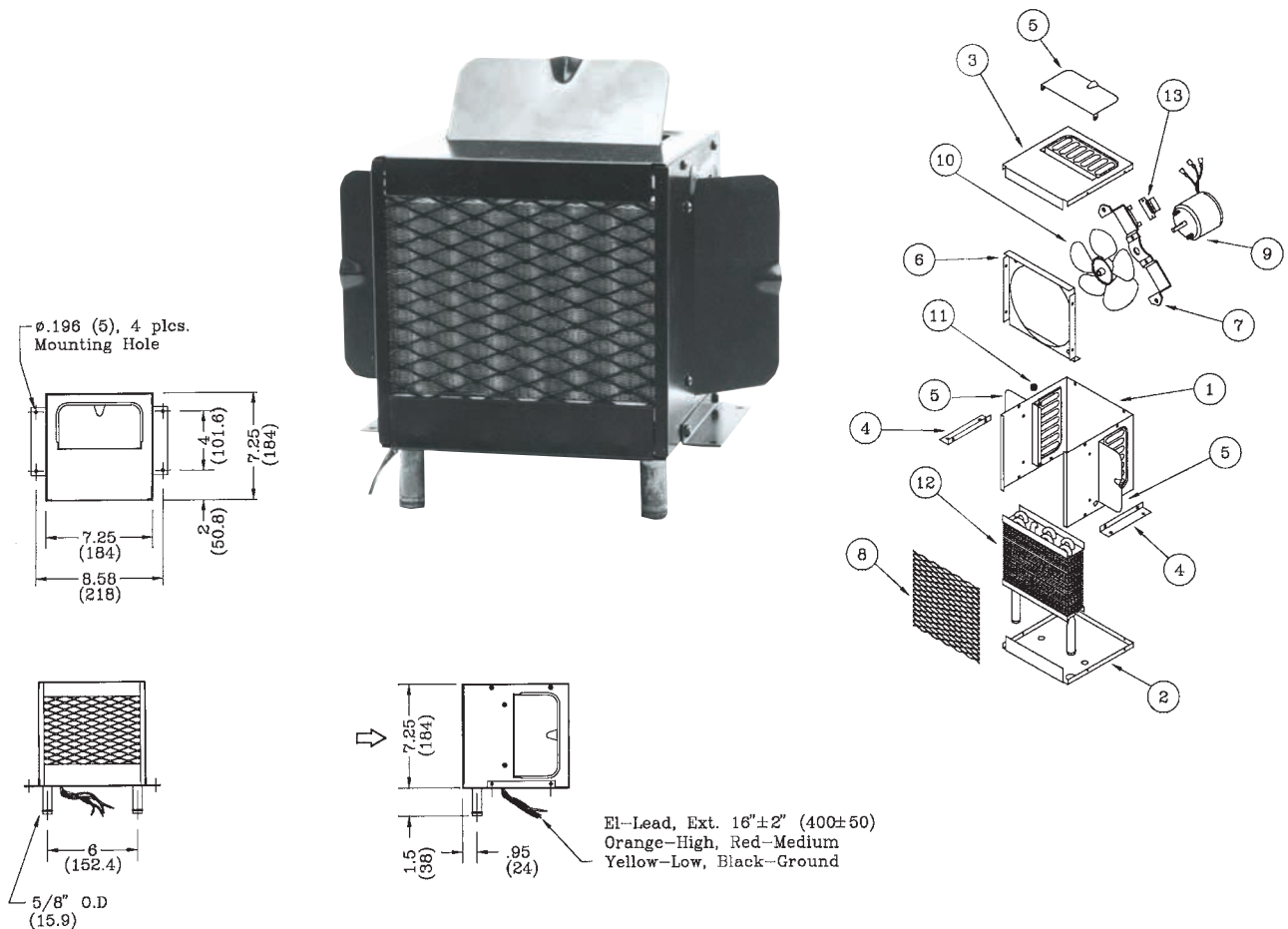
- Compact design with low weight
- High efficiency and quiet operation
- Integrated speed and temperature control
- Four direction airflow louvers
- Flexible mounting for bottom or side
- No maintenance other than filter cleaning
- Easy access and reusable filter
- Industry leading power management
- MCC optimized electronic controller
- CAN (J1939) capability



### Technical Data

Airflow	~175 CFM (297 m <sup>3</sup> /h)
Heating Capacity	5500 Btu/hr (1600 Watts)
Noise (SPL)	60 dba at maximum speed setting
Maximum discharge temperature	60° C (140° F)
Maximum surface temperature	60° C (140° F)
Voltage	36/48/80 VDC
Amperage	~ 45/36/20 Amps
Connector	Anderson Power 2-W SB 50 (BLUE)

# Fan Heater Model 201



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-0103	Heater 12V	1	24-0135	Casing	8	24-0172	Coil Protector
12-0102	Heater 24V	2	24-0136	Cover	9	25-0105	Motor 12V
		3	24-0137	Cover		25-0107	Motor 24V
		4	24-0133	Mounting Bracket	10	25-0023	Fan
		5	23-0009	Door (3 Pcs.)	11	28-0014	Grommet
		6	24-0138	Venturi	12	22-0042	Heater Coil
		7	24-0113	Motor Bracket	13	25-0095	Resistor

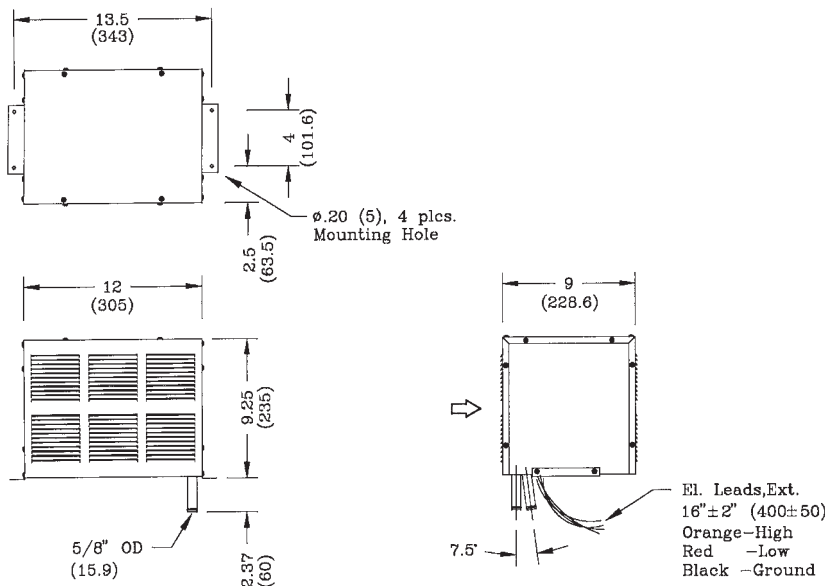
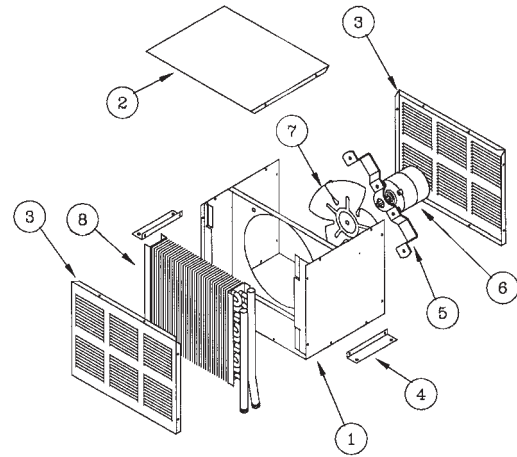
### Specifications

Heating -13500 Btu/hr (3960 W)  
 Air Flow -185 CFM (315 m<sup>3</sup>/h)  
 Current -5.8 Amps/12V  
           -2.9 Amps/24V  
 Weight -7.5 lbs. (3.4 kg)  
 3-Speed operated motor.

### Features

The compact design of the 201 is ideal for dash or under seat mounting. Air is delivered to sides of unit and can be controlled by air doors.

# Fan Heater Model 209



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-0903	Heater 12V	1	24-0353	Casing
12-0904	Heater 24V	2	24-0354	Cover
		3	24-0355	Grill
		4	24-0133	Mounting Bracket
		5	24-0223	Motor Bracket
		6	25-0344	Motor 12V
			25-0107	Motor 24V
		7	25-0121	Fan C.W. (8")
		8	22-0029	Heater Coil

**Specifications**

Heating	- 32000 Btu/hr (9380 W)
Air Flow	- 350 CFM (595 m <sup>3</sup> /h)
Current	- 12 Amps/12V - 6 Amps/24V
Weight	- 25.5 lbs. (11.5 kg)

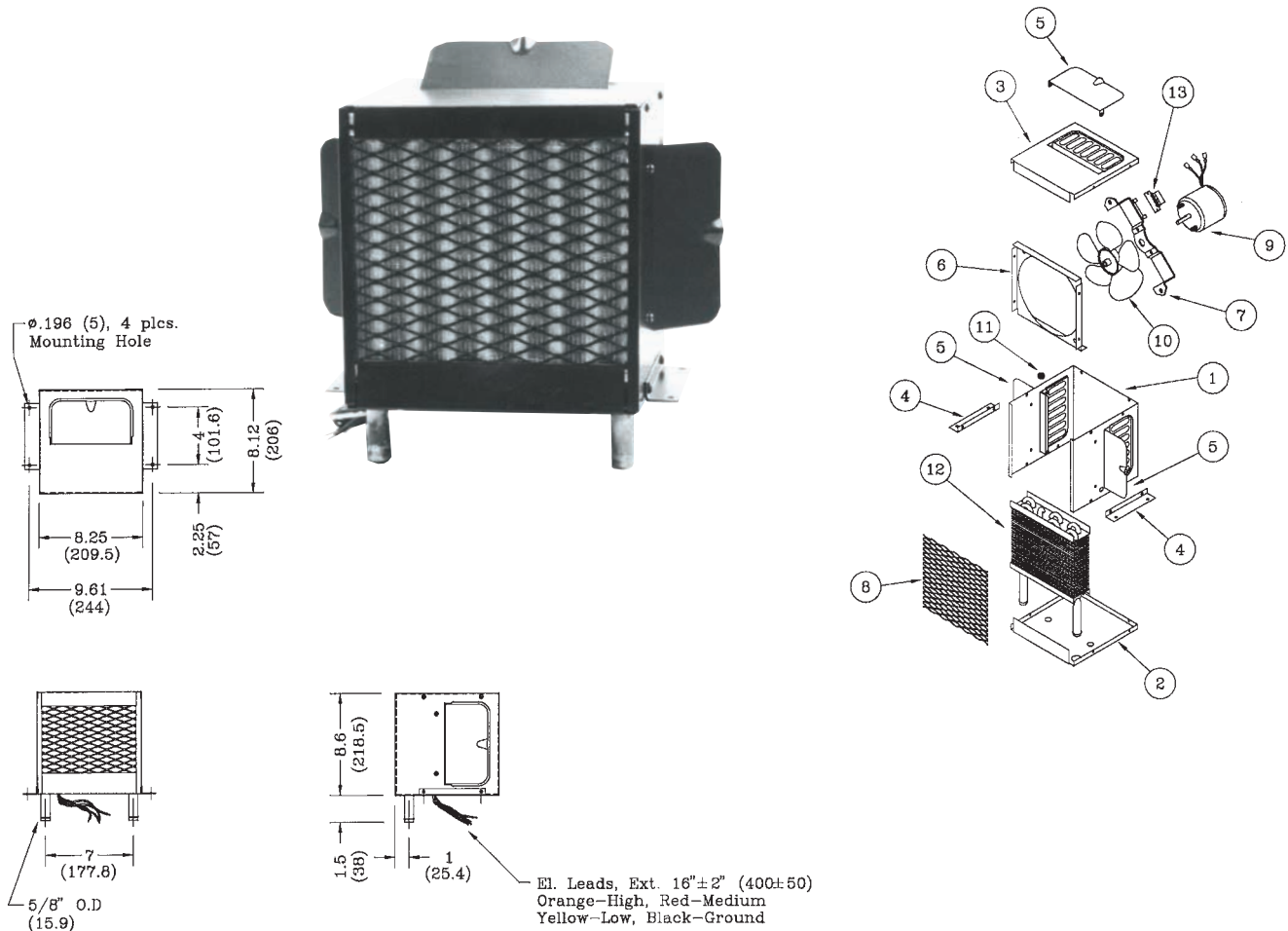
2-Speed motor.

## Features

High capacity design can be used as auxiliary heater for bus, or as stand alone cab heater.



# Fan Heater Model 211



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-1103	Heater 12V	1	24-0140	Casing	9	25-0105	Motor 12V
12-1104	Heater 24V	2	24-0142	Cover		25-0107	Motor 24V
		3	24-0143	Cover	10	25-0023	Fan
		4	24-0133	Mounting Bracket	11	28-0014	Grommet
		5	23-0009	Door (3 Pcs.)	12	22-0023	Heater Coil
		6	24-0141	Venturi	13	25-0095	Resistor
		7	24-0113	Motor Bracket			
		8	24-0171	Coil Protector			

**Specifications**

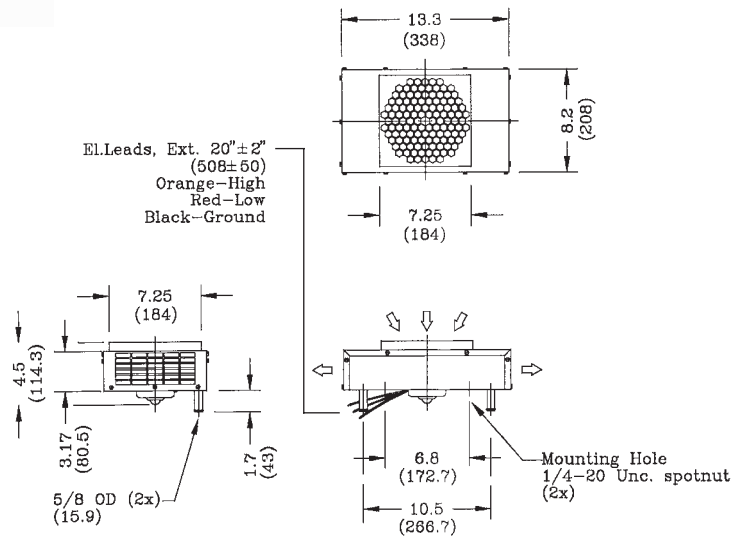
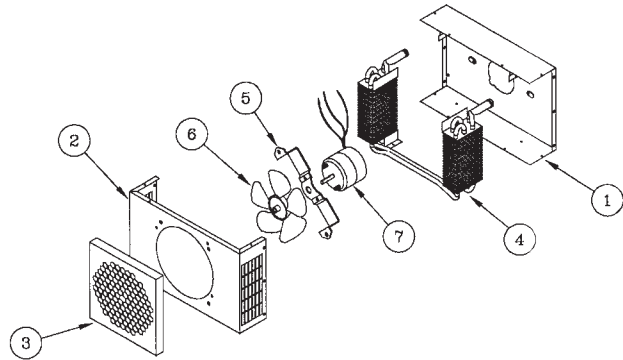
Heating	-21000 Btu/hr (6150 W)
Air Flow	-265 CFM (450 m <sup>3</sup> /h)
Current	-5.8 Amps/12V
	-2.9 Amps/24V
Weight	-9 lbs. (4 kg)

3-Speed motor.

## Features

Similar design as our popular 201. The 211 offers a higher quality heater with controllable air doors.

# Fan Heater Model 213



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
12-1301	1	24-1120	Casing
12-1302	2	24-1121	Cover
	3	25-1122	Fan Guard
	4	22-0196	Heater Coil
	5	24-0110	Motor Bracket
	6	25-0023	Fan
	7	25-0105	Motor 12V
		25-0107	Motor 24V

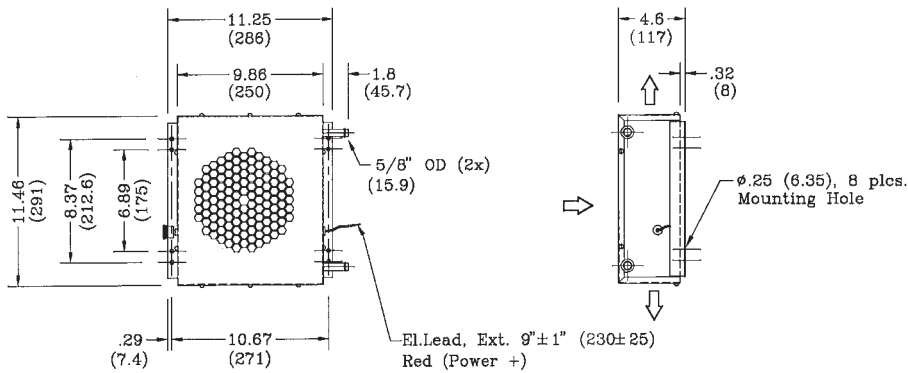
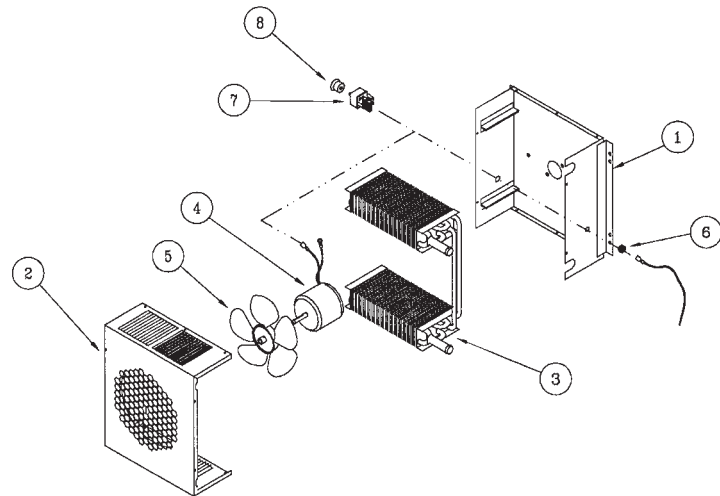
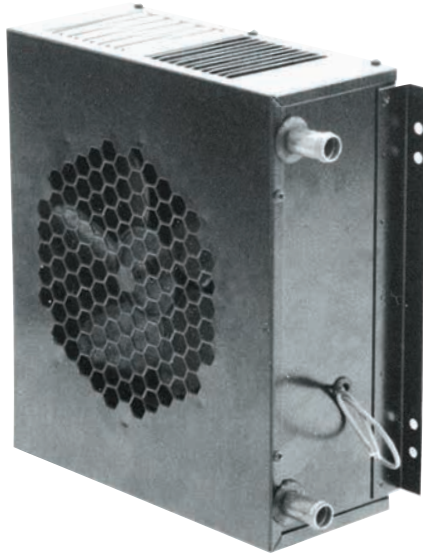
### Specifications

Heating	-12500 Btu/hr (3660 W)
Air Flow	-150 CFM (255 m <sup>3</sup> /h)
Current	- 5.8 Amps/12V - 2.9 Amps/24V
Weight	- 7 lbs. (3.2 kg)
2-Speed motor.	

### Features

Slim design allows for mounting in tight spots. Can be wall mounted with heater connectors exiting the back of the unit.

# Fan Heater Model 214



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
12-1411	1	24-0042	Casing
12-1412	2	24-0043	Cover
	3	22-0073	Heater Coil
	4	25-0039	Motor 12V
		25-0043	Motor 24V
	5	25-0015	Fan
	6	28-0014	Grommet
	7	25-0028	Switch
	8	25-0067	Knob

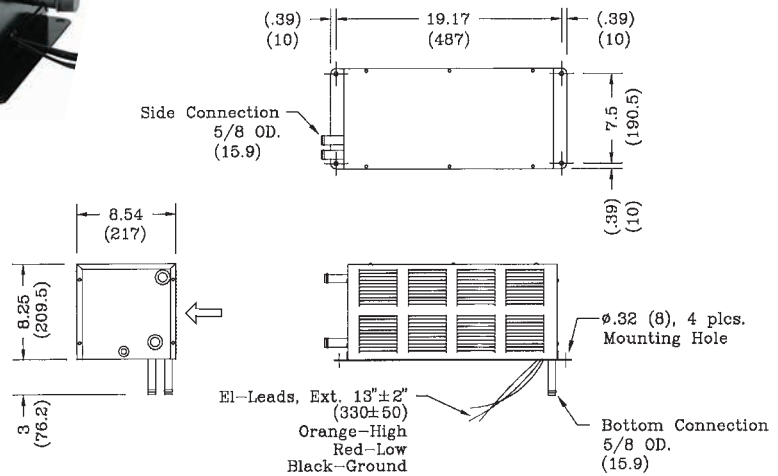
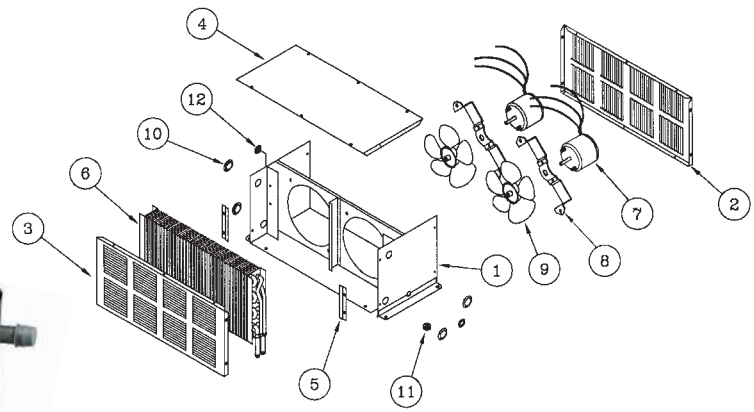
  

Specifications	
Heating	-18500 Btu/hr (5420 W)
Air Flow	-175 CFM (300 m <sup>3</sup> /h)
Current	-4.4 Amps/12V
	-2.2 Amps/24
Weight	-9 lbs. (4 kg)
3-Speed motor and internally grounded.	

## Features

With a larger capacity than the 213, the 214 offers flexible mounting solutions for wall mount situations. Fittings exit the side of the 214.

# Fan Heater Model 216



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description	No.	Part No.	Description
12-1601	Heater 12V -R.H.C.	1	24-0130	Casing	7	25-0105	Motor 12V
12-1602	Heater 24V -R.H.C.	2	24-0131	Grill (Inlet)		25-0107	Motor 24V
12-1621	Heater 12V -B.C.	3	24-0132	Front (Outlet)	8	24-0110	Motor Bracket
12-1622	Heater 24V -B.C.	4	24-0105	Cover	9	25-0023	Fan
		5	24-0146	Coil Support	10	28-0010	Snap-in Plug
			24-0162	Coil Support (B.C.)	11	28-0004	Grommet
			24-0163	Coil Support (B.C.)	12	28-0011	Snap-in Plug
		6	22-0038	Heater Coil			
			22-0039	Heater Coil (B.C.)			

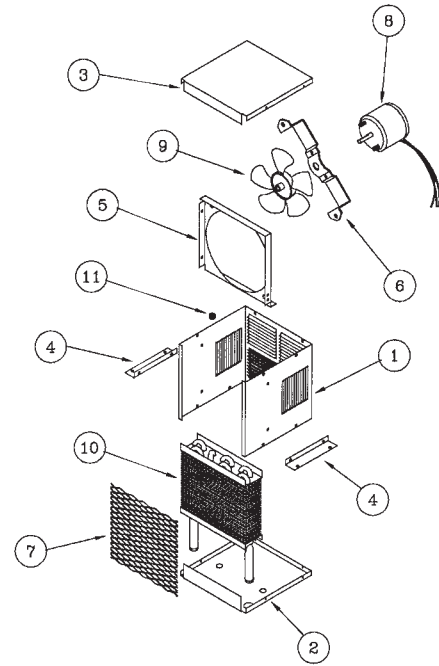
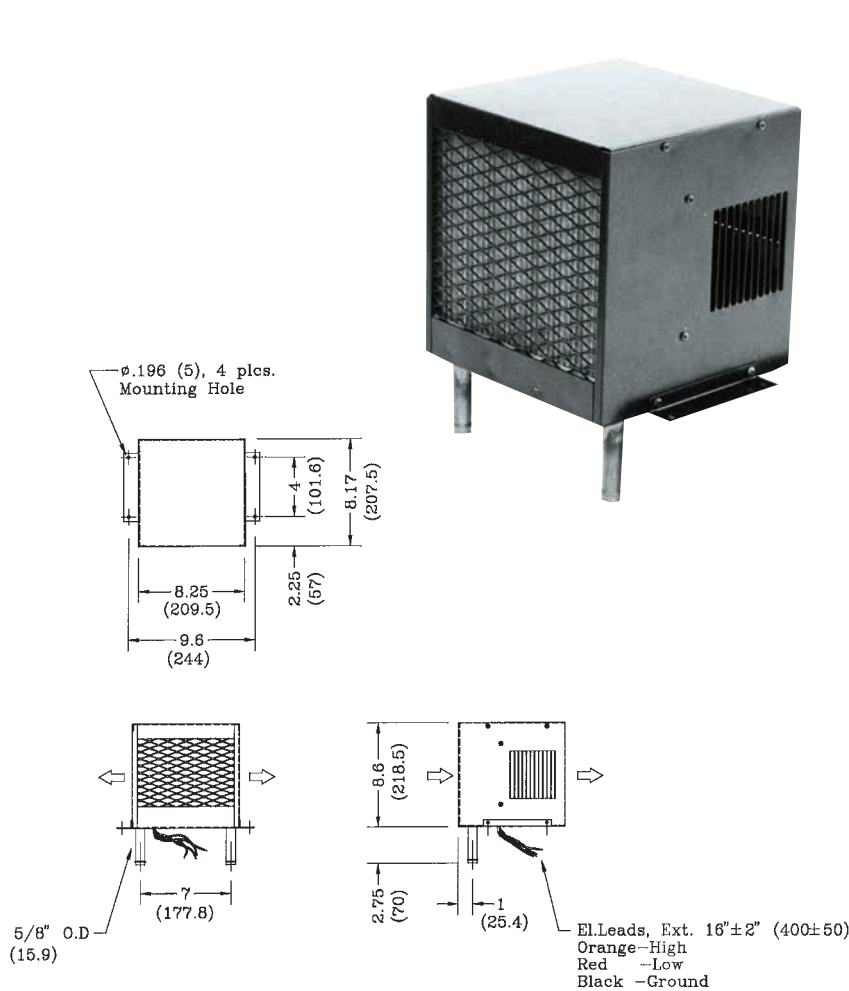
### Specifications

Heating	-42000 Btu/hr (12300 W)
Air Flow	-500 CFM (850 m <sup>3</sup> /h)
Current	-11.6 Amps/12V -5.8 Amps/24V
Weight	-18.5 lbs. (8.4 kg)
2-Speed motor.	

### Features

High capacity heating solution for buses, fire trucks and truck bodies. The 216 delivers maximum performance for large capacity heating requirements.

# Fan Heater Model 222



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-2251	Heater 12V	1	24-0167	Casing
12-2252	Heater 24V	2	24-0142	Cover
		3	24-0161	Cover
		4	24-0133	Mounting Bracket
		5	24-0141	Venturi
		6	24-0110	Motor Bracket
		7	24-0171	Coil Protector
		8	25-0105	Motor 12V
			25-0107	Motor 24V
		9	25-0023	Fan
		10	22-0033	Heater Coil
		11	28-0014	Grommet

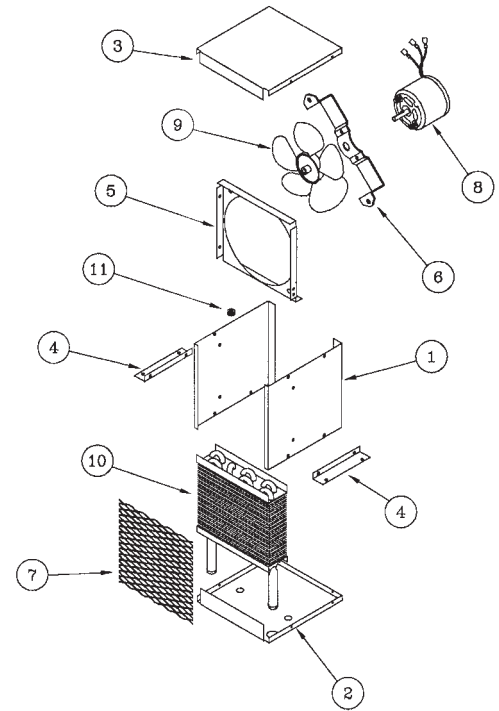
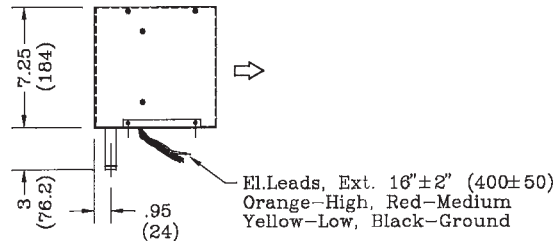
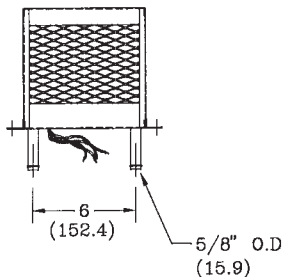
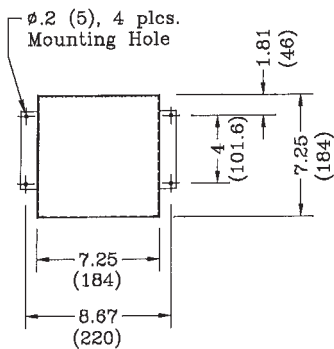
### Specifications

Heating	-21000 Btu/hr (6150 W)
Air Flow	-265 CFM (450 m <sup>3</sup> /h)
Current	-5.8 Amps/12V -2.9 Amps/24V
Weight	-9 lbs. (4 kg)
2-Speed motor.	

## Features

The compact design of the 222 is ideal for dash or under seat mounting.

# Fan Heater Model 226



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-2611	Heater 12V	1	24-0173	Side Plate
		2	24-0136	Cover
		3	24-0160	Cover
		4	24-0133	Mounting Bracket
		5	24-0138	Venturi
		6	24-0110	Motor Bracket
		7	24-0172	Coil Protector
		8	25-0105	Motor 12V
		9	25-0023	Fan
		10	22-0052	Heater Coil
		11	28-0014	Grommet

### Specifications

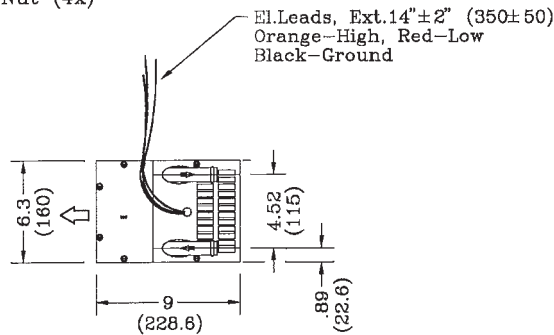
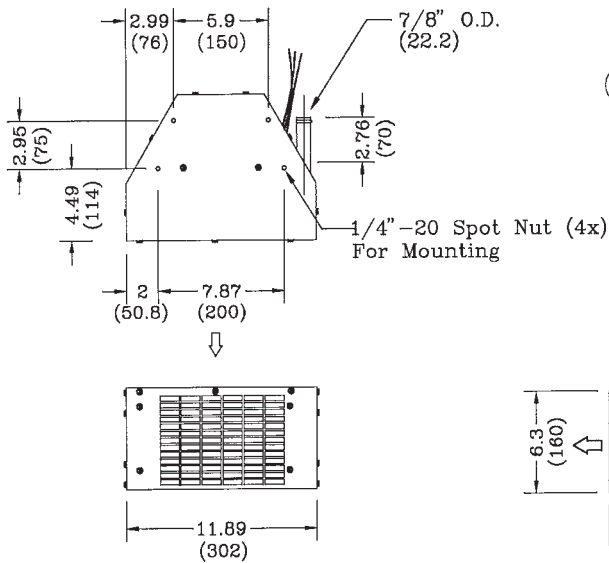
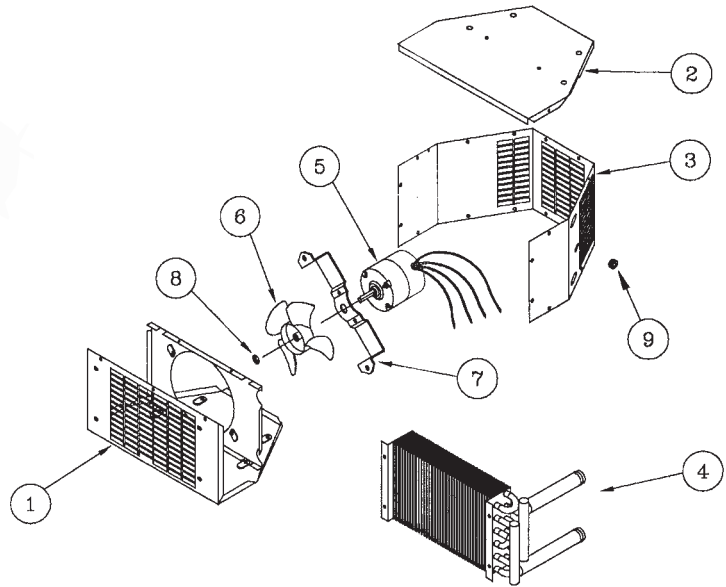
Heating	-13500 Btu/hr (3960 W)
Air Flow	-185 CFM (315 m <sup>3</sup> /h)
Current	-5.8 Amps
Weight	-4.5 lbs. (2 kg)
2-Speed motor.	

## Features

The 226 was designed to offer flexible mounting and deliver air directly out front of the heater.



# Fan Heater Model 238



## Part Descriptions: Specifications

Part No.	Description
12-3811	Heater 12V
12-3812	Heater 24V

### Specifications

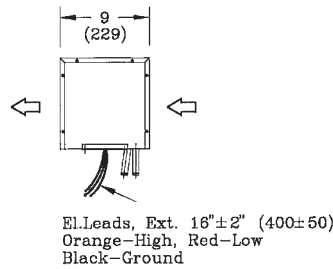
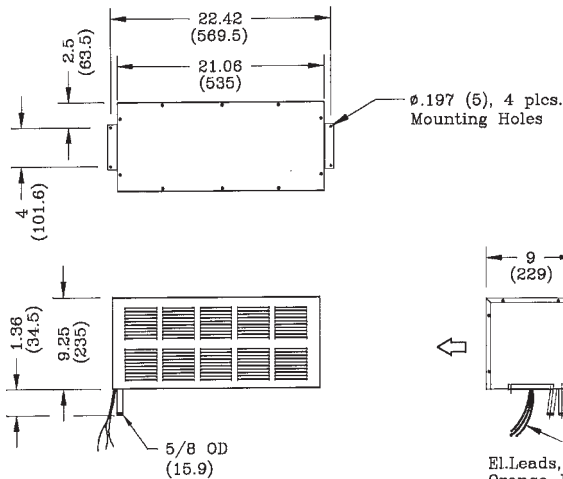
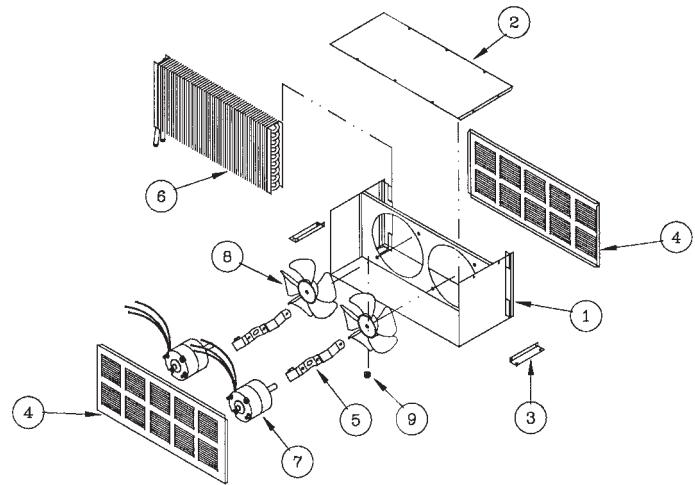
Heating	-22500 Btu/hr (6600 W)
Air Flow	-250 CFM (425 m <sup>3</sup> /h)
Current	-4 Amps/12V -2 Amps/24V
Weight	-11.5 lbs. (5.2 kg)
2-Speed motor.	

No.	Part No.	Description
1	24-0147	Casing
2	24-0148	Top Cover
3	24-0149	Side Cover
4	22-0110	Heater Coil
5	25-0105	Motor 12V
	25-0107	Motor 24V
6	25-0041	Fan
7	25-0110	Motor Bracket
8	29-0039	Retaining Ring
9	28-0014	Grommet

## Features

The 238 is ideal for underseat mounting. Air is disbursed to the front of the unit.

# Fan Heater Model 239



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-3903	Heater 12V	1	24-0356	Casing
12-3904	Heater 24V	2	24-0357	Cover
		3	24-0133	Mounting Bracket
		4	24-0358	Grill
		5	24-0223	Motor Bracket
		6	22-0030	Heater Coil
		7	25-0344	Motor 12V
			25-0107	Motor 24V
		8	25-0121	Fan (8" C.W.)
		9	28-0004	Grommet

### Specifications

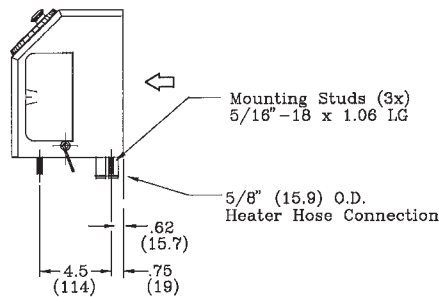
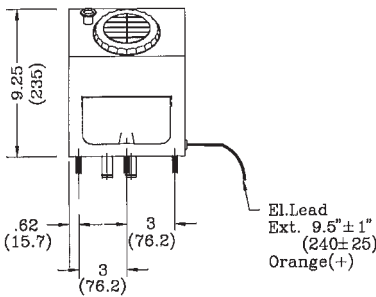
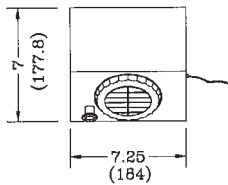
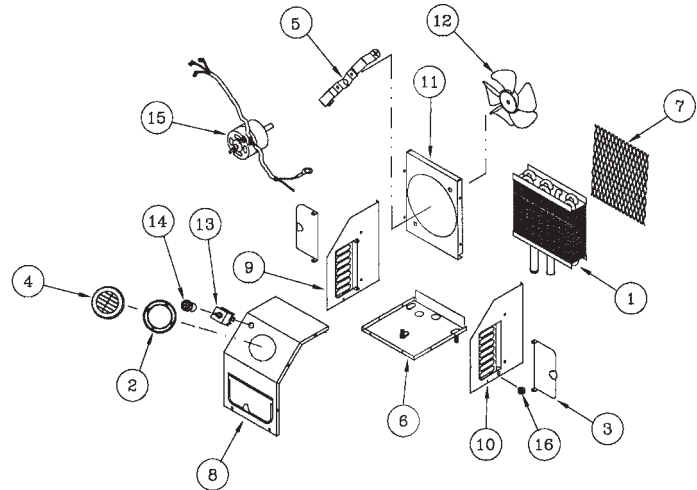
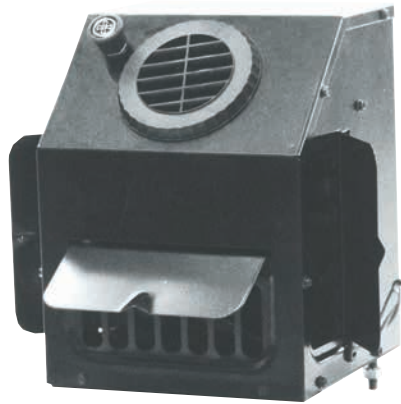
Heating	- 64000 Btu/hr (18760 W)
Air Flow	- 800 CFM (1360 m <sup>3</sup> /h)
Current	- 13 Amps/12V
	- 6.5 Amps/24V
Weight	- 25 lbs. (11.3 kg)
2-Speed motor.	

### Features

The 239 is our largest capacity fan heater - ideal for buses and other large capacity requirements.



# Fan Heater Model 245



## Part Descriptions: Specifications

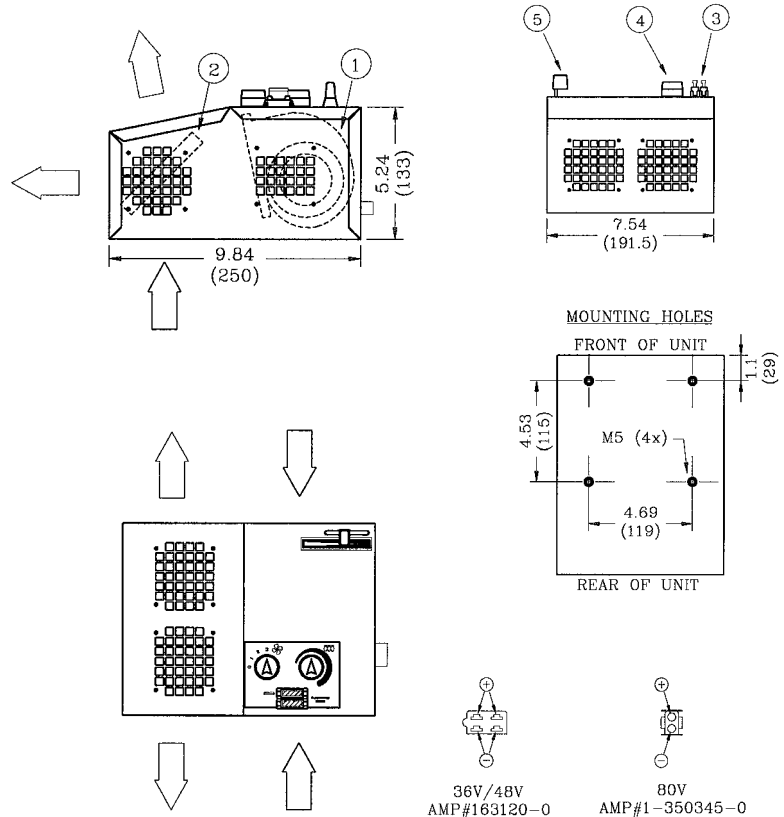
Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-4503	Heater 12V	1	22-0140	Heater Coil	10	24-0893	Side (R)
12-4504	Heater 24V	2	23-0048	Adapter	11	24-0894	Venturi
		3	23-0009	Door	12	25-0023	Fan (6.6" C.C.W.)
		4	23-0045	Louver	13	25-0029	Switch
		5	24-0110	Motor Bracket	14	25-0067	Knob
		6	24-0175	Base	15	25-0105	Motor 12V
		7	24-0890	Coil Protector		25-0107	Motor 24V
		8	24-0891	Cover	16	28-0014	Grommet
		9	24-0892	Side (L)			

**Specifications**  
 Heating -20000 Btu/hr (5860 W)  
 Air Flow -265 CFM (450 m<sup>3</sup>/h)  
 Current -5.8 Amps/12V  
 -2.9 Amps/24V  
 Weight -8.5 lbs. (3.8 kg)  
 2-Speed motor.  
 Heater is internally grounded.

## Features

The 245 offers the ability to control fan speed with a control on the box. Ideal for auxiliary heaters or small cab applications.

# Fan Heater Model 290E (Europe only)



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
12-9080		Heater 36V		1	15-0290	Blower 24V
12-9048		Heater 48V		2	25-1171	Heater Element 80V
12-9036		Heater 80V		2	25-1170	Heater Element 48V
				2	25-1169	Heater Element 36V
				3	25-1172	Fuse 30/A 80V At 80V
				3	25-1173	Fuse 20/A/80V
				3	25-1174	Fuse 20A/32V At 36V
				4	25-1175	Knob
				5	26-0712	Lever
				6	25-1181	Resistor 36V (3.3Ω)
				6	25-1184	Resistor 48V (6.8Ω)
				6	25-1182	Resistor 80V (15Ω)
				7	25-1185	Resistor 36V (2.2Ω)
				7	25-1183	Resistor 48V (4.7Ω)
				7	25-1179	Resistor 80V (10Ω)
				8	25-1180	Thermostat
				9	25-1178	Relay 24V

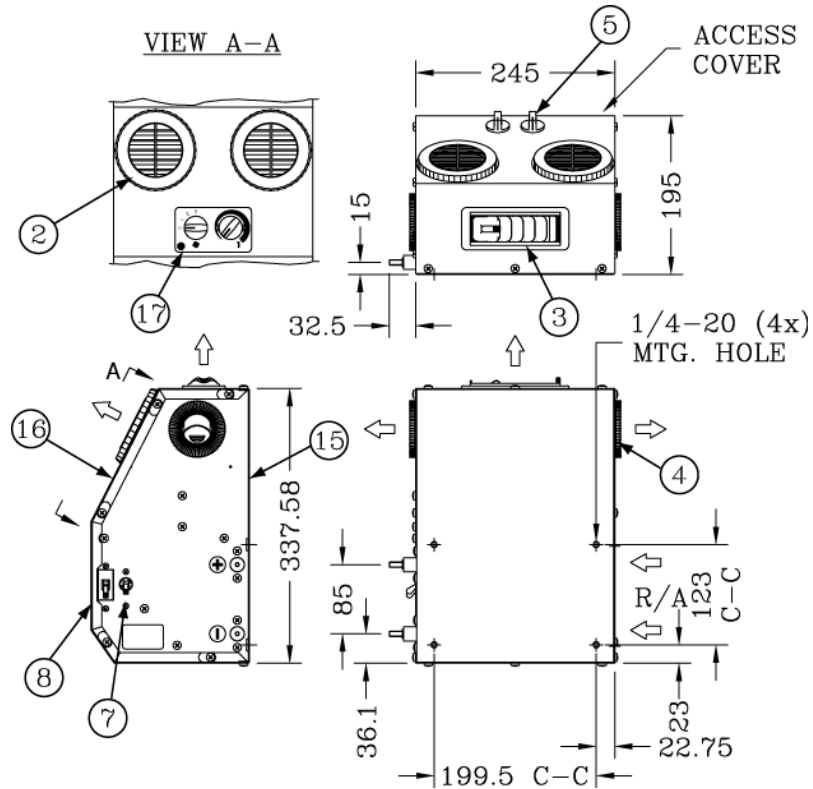
  

Specifications	
Heating	36V - 1000 Btu/hr (292.87W) 48V - 1600 Btu/hr (468.59W) 80V - 2000 Btu/hr (585.74W)
Air Flow	82.4 CFM (140 m <sup>3</sup> /h)
Current	36V - 28A 48V - 33A 80V - 25A
Weight	8.8 lbs. (4kg)

Items 6 through 9 are not shown.	
Part	MCC P/N
Casing	11.058.00.001
Cover (80V)	11.058.00.002
Cover (36/48V)	11.058.00.009
Decal	20.400.00.244

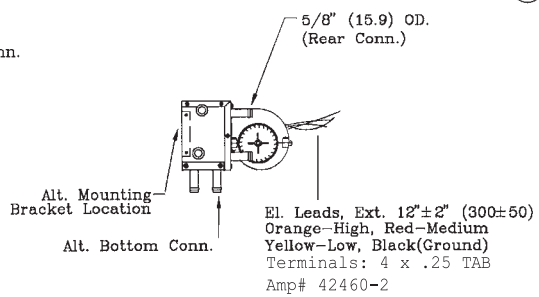
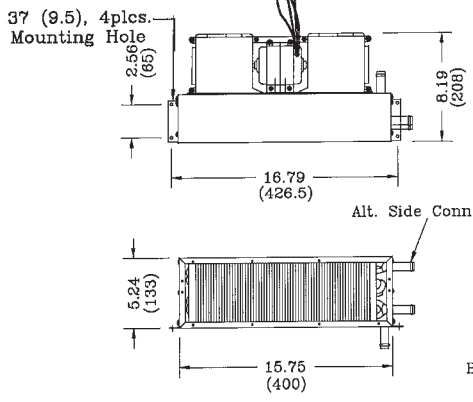
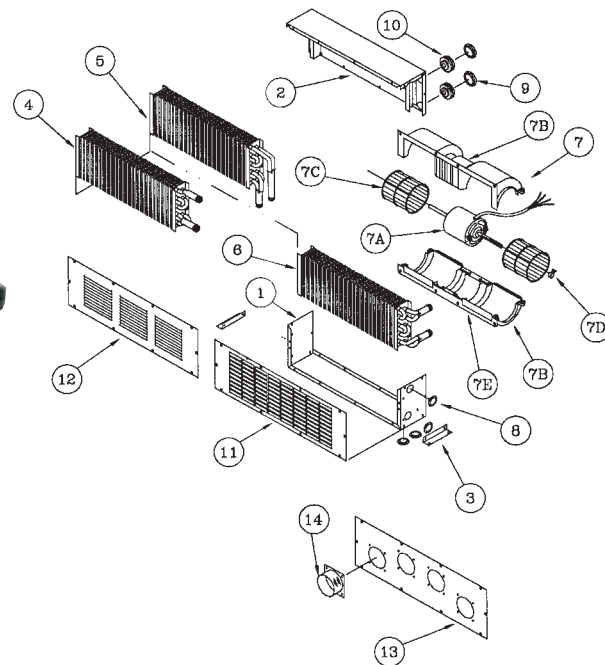
# Fan Heater **Model 290N** (North America only)



## Part Descriptions: Specifications

Specifications	No.	Part No.	Description	No.	Part No.	Description	
Heating		3	23-0145	Louver	11	25-1204	Contactors
		4	23-0171	Louver	12	25-1373	Resistor 10Ω (12-9038)
Air flow		5	25-0435	Knob	13	25-1760	Resistor 4Ω (12-9050)
		6	25-1160	Heater Element 48V	14	25-1761	Resistor 2.5Ω (12-9038/12-9050)
Current		6	25-1169	Heater Element 36V	15	24-4796	Casing Stainless Steel
Weight		7	25-1372	Circuit Breaker 8A/80V	16	24-4797	Cover Stainless Steel
		8	25-1481	Circuit Breaker 50A/80V	17	28-0722	Overlay
		8	25-2459	Circuit Breaker 60A/80V			Items 1,6,10 to 14 are not shown

# Blower Heater Model 202



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
12-0203		1	Heater 12V - Rear Conn.	7D	25-0022	Clip
12-0213		2	Heater 12V - Side Conn.	7E	25-0020	Motor Tape
12-0204		3	Heater 24V - Rear Conn.	8	28-0010	Snap-in Plug
12-0214		4	Heater 24V - Side Conn.	9	28-0013	Snap-in Plug
12-0293		5	Heater 12V - Bottom Conn.	10	28-0005	Grommet (Rear Conn.)
		6	Heater Coil (Rear Conn.)	11	24-0060	Grill
		7	Blower Assy. 12V	12	24-0045	Grill
		7A	Blower Assy. 24V	13	24-0066	Front (4 x 2\"/>

### Specifications

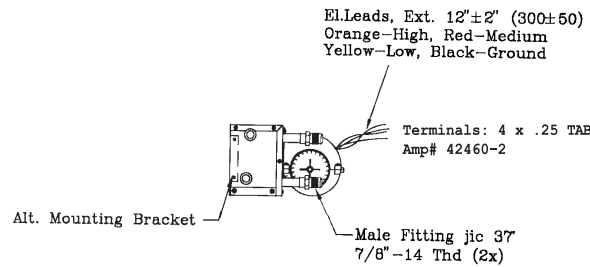
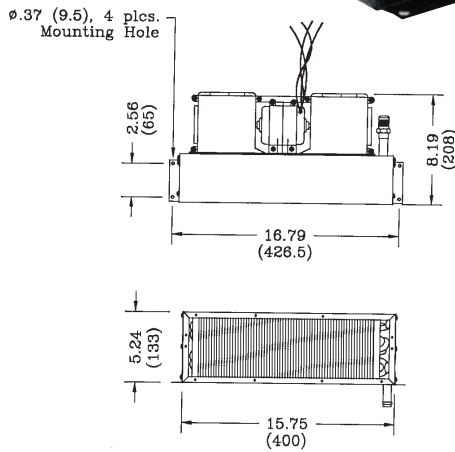
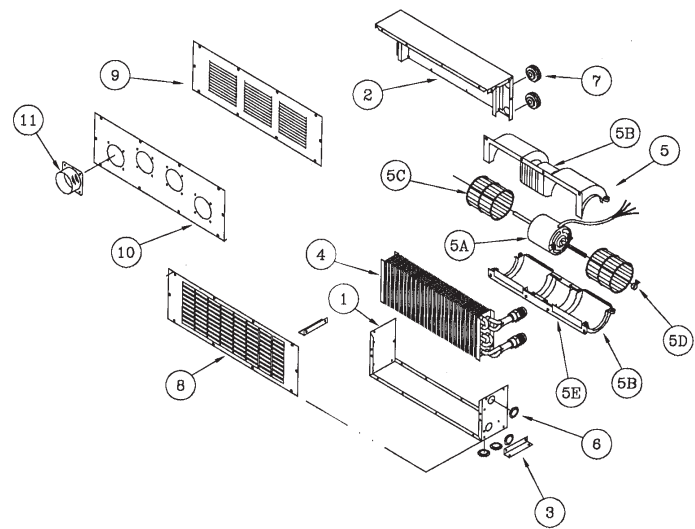
Heating	- 24700 Btu/hr (7240 W)
Air Flow	- 295 CFM (500 m <sup>3</sup> /h)
Current	- 12 Amps/12V - 6 Amps/24V
Weight	- 9 lbs. (4 kg)
3-Speed motor.	

### Features

The 202 offers flexible installation options to fit a wide range of applications. Can be ducted for defrost capabilities. Also available with an oil coil.

**Items 11-14 are optional and have to be ordered separately.**

# Blower Heater Model 202 Oil



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
12-0253		1	24-0009 Casing	5D	25-0022	Clip
12-0254		2	24-0008 Cover	5E	25-0020	Motor Tape
		3	24-0012 Mounting Bracket	6	28-0010	Snap-in Plug
		4	22-0282 Heater Coil (Oil)	7	28-0005	Grommet
		5	15-0503 Blower Assy. 12V	8	24-0060	Grill
			15-0504 Blower Assy. 24V	9	24-0045	Grill
		5A	25-0070 Motor 12V	10	24-0066	Front (4 x 2" HA)
			25-0075 Motor 24V		24-0067	Front (4 x 2 1/2" HA)
		5B	25-0017 Blower Housing	11	23-0110	Hose Adapter 2"
		5C	25-0021 Blower Wheel		23-0125	Hose Adapter 2 1/2"

### Specifications

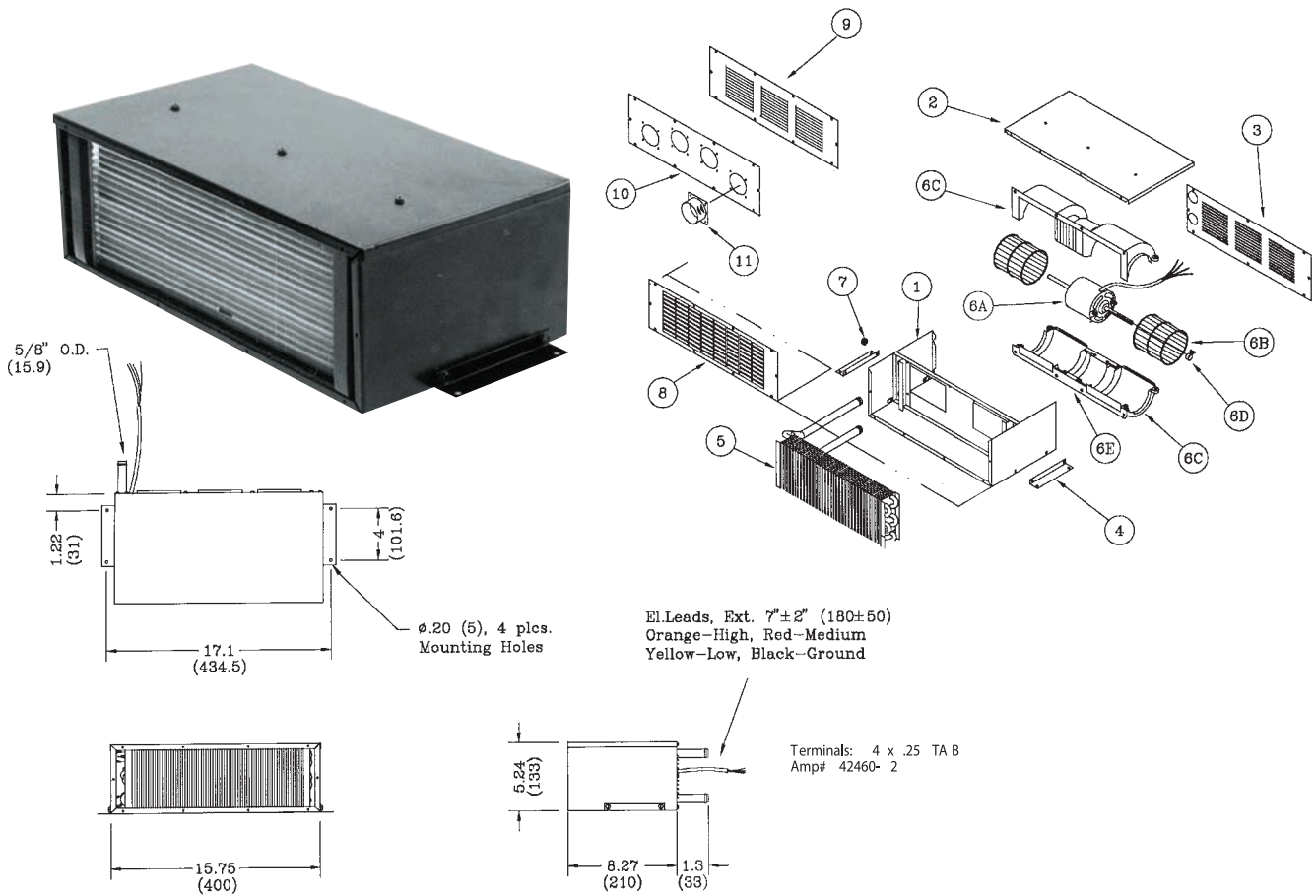
Heating - 14500 Btu/hr (4250 W)  
 Air Flow - 295 CFM (500 m3/h)  
 Current - 12 Amps/12V  
 - 6 Amps/24V  
 Weight - 9 lbs. (4 kg)  
 3-Speed motor.

**Items 8-11 are optional and have to be ordered separately.**

## Features

The 202 offers flexible installation options to fit a wide range of applications. Can be ducted for defrost capabilities.

# Blower Heater Model 205



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
12-0503	1	24-0225	Casing	7	28-0014	Grommet
12-0504	2	24-0226	Cover	8	24-0060	Grill
	3	24-0199	Grill	9	24-0045	Grill
	4	24-0133	Mounting Bracket	10	24-0066	Front (4 x 2" HA)
	5	22-0060	Heater Coil		24-0067	Front (4 x 2 1/2" HA)
	6	15-0503	Blower Assy. 12V	11	23-0110	Hose Adapter 2"
		15-0504	Blower Assy. 24V		23-0125	Hose Adapter 2 1/2"
	6A	25-0070	Motor 12V			
		25-0075	Motor 24V			
	6B	25-0021	Blower Wheel			
	6C	25-0017	Blower Housing			
	6D	25-0022	Clip			
	6E	25-0020	Motor Tape			

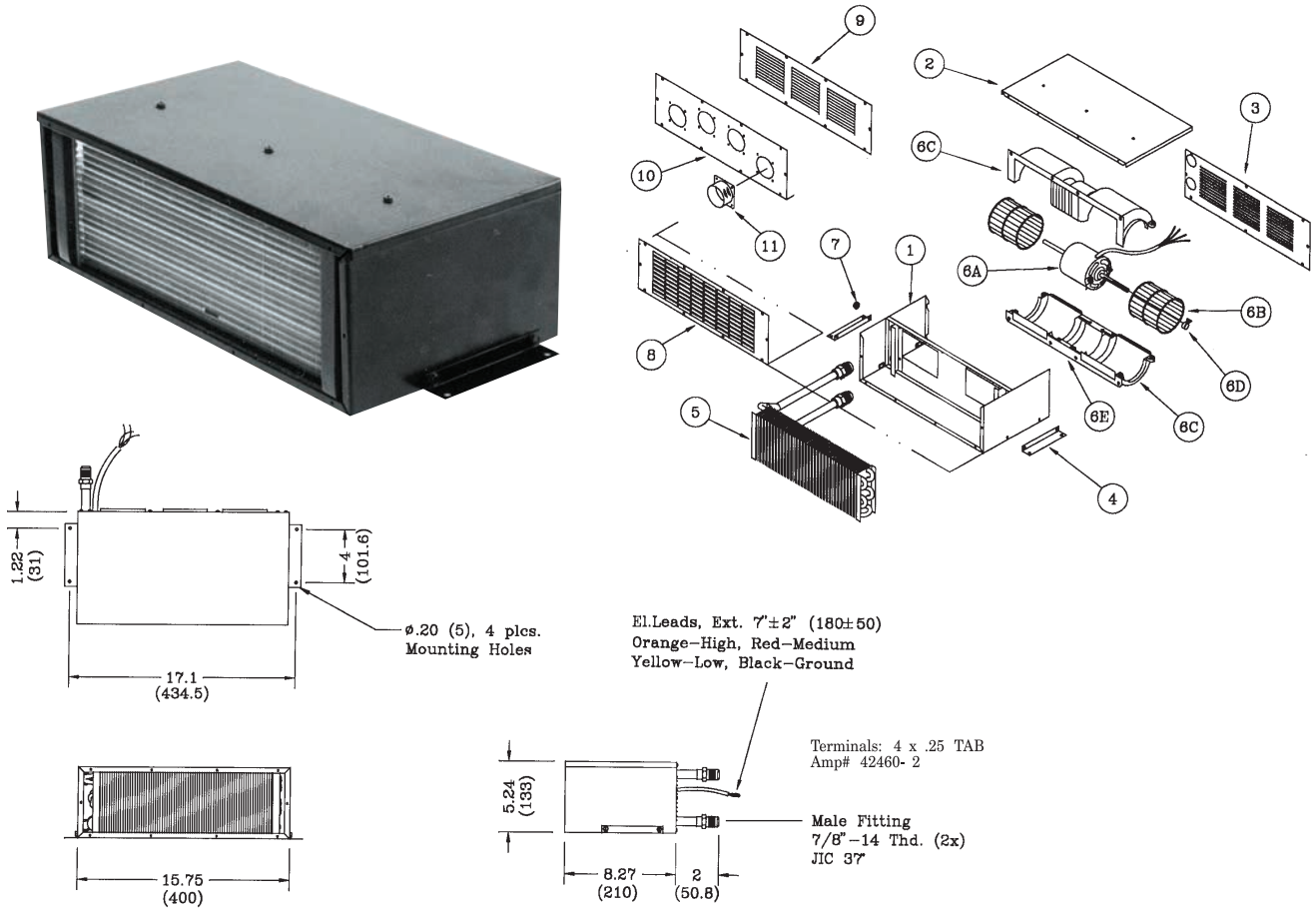
Items 8-11 are optional and have to be ordered separately.

## Features

A more heavy duty option than the 202. The 205 offers the same installation flexibility. Also available with an oil coil.



# Blower Heater Model 205 Oil



## Part Descriptions: Specifications

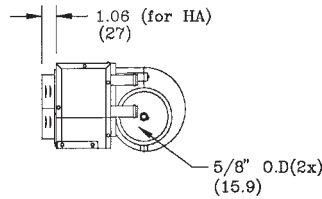
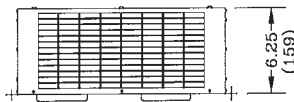
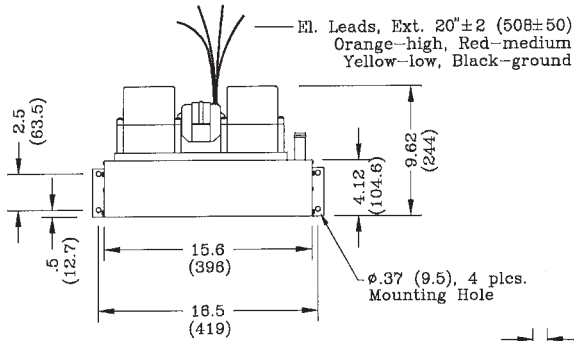
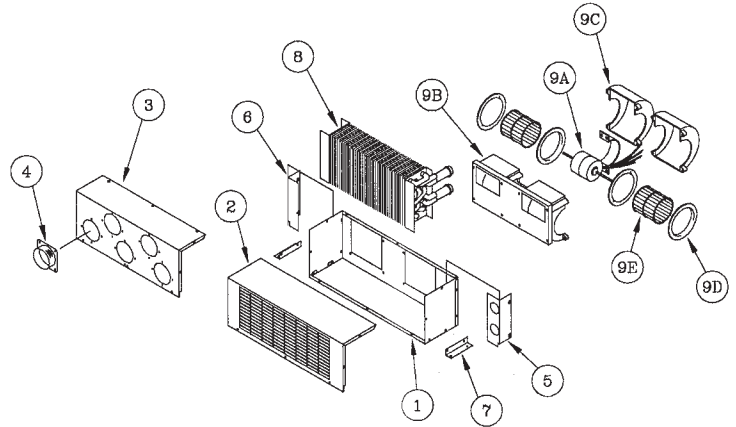
Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-0553		12-0553	Heater 12V	7	28-0014	Grommet	
12-0554		12-0554	Heater 24V	8	24-0060	Grill	
		1	24-0225	Casing	9	24-0045	Grill
		2	24-0226	Cover	10	24-0066	Front (4 x 2" HA)
		3	24-0199	Grill		24-0067	Front (4 x 2 1/2" HA)
		4	24-0133	Mounting Bracket	11	23-0110	Hose Adapter 2"
		5	22-0283	Heater Coil		23-0125	Hose Adapter 2 1/2'
		6	15-0503	Blower Assy. 12V			
		6A	15-0504	Blower Assy. 24V			
		6A	25-0070	Motor 12V			
			25-0075	Motor 24V			
		6B	25-0021	Blower Wheel			
		6C	25-0017	Blower Housing			
		6D	25-0022	Clip			
		6E	25-0020	Motor Tape			

**Items 8-11 are optional and have to be ordered separately.**

## Features

A more heavy duty option than the 202. The 205 offers the same installation flexibility.

# Blower Heater Model 212



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
12-1203	1	24-0055	Casing	9	15-1513	Blower Assy. 12V
12-1204	2	24-0056	Cover		15-1514	Blower Assy. 24V
12-1223	3	24-1011	Cover (5 HA's)	9A	25-0053	Motor 12V, 3-Speed
12-1224	4	23-0125	Hose Adapter 2 1/2"		25-0076	Motor 24V, 3-Speed
	5	24-0057	Coil Bracket	9B	25-0048	Blower Housing
	6	24-0058	Coil Bracket	9C	25-0348	Housing Top
	7	24-0012	Mounting Bracket	9D	25-0060	Venturi
	8	22-0090	Heater Coil	9E	25-0200	Blower Wheel
					25-0022	Clip (B.W.)

### Specifications

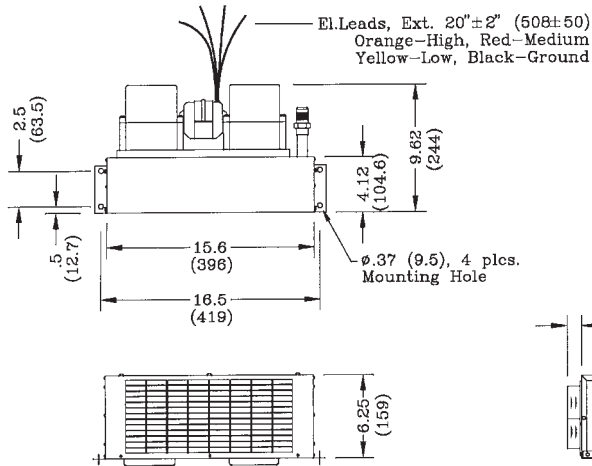
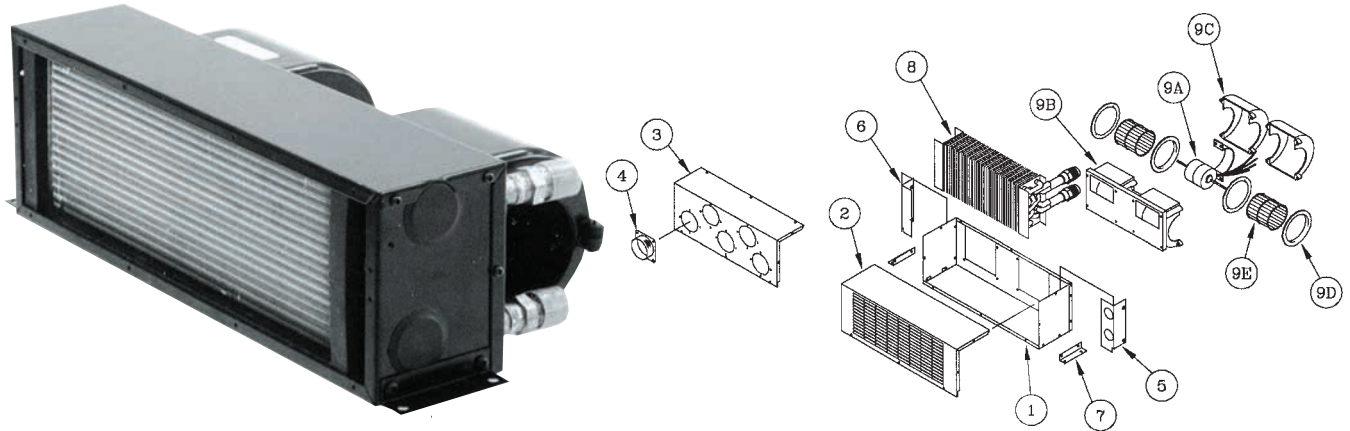
Heating	-36000 Btu/hr (10550 W)
Air Flow	-400 CFM (680 m <sup>3</sup> /h)
Current	-14 Amps/12V
	-8 Amps/24V
Weight	-12 lbs. (5.5 kg)
3-Speed motor.	

### Features

A higher capacity heater than the 202 and 205, the 212 equipped with hose adapters offers installation flexibility for defrosting and cab ducting requirements.



# Blower Heater Model 212 Oil



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-1251	Heater 12V (w.24-0056)	1	24-0055	Casing	9	15-1513	Blower Assy. 12V
12-1252	Heater 24V (w.24-0056)	2	24-0056	Cover		15-1514	Blower Assy. 24V
12-1255	Heater 12V (w.24-1011) &	3	24-1011	Cover (5 HA's)	9A	25-0053	Motor 12V, 3-Speed
12-1256	Heater 24V (23-0125) (5x)	4	23-0125	Hose Adapter 2 1/2"		25-0076	Motor 24V, 3-Speed
		5	24-0057	Coil Bracket	9B	25-0048	Blower Housing
		6	24-0058	Coil Bracket	9C	25-0348	Housing Top
		7	24-0012	Mounting Bracket	9D	25-0060	Venturi
		8	22-0284	Heater Coil (Oil)	9E	25-0200	Blower Wheel
						25-0022	Clip (B.W.)

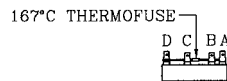
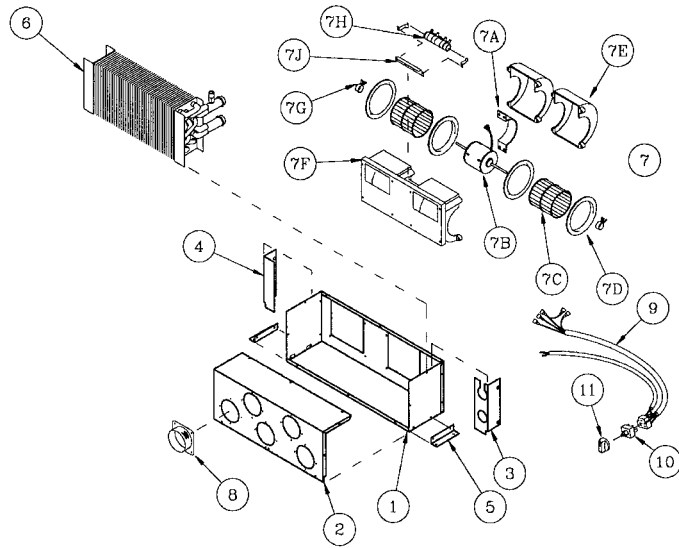
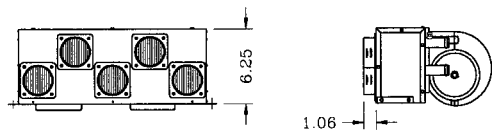
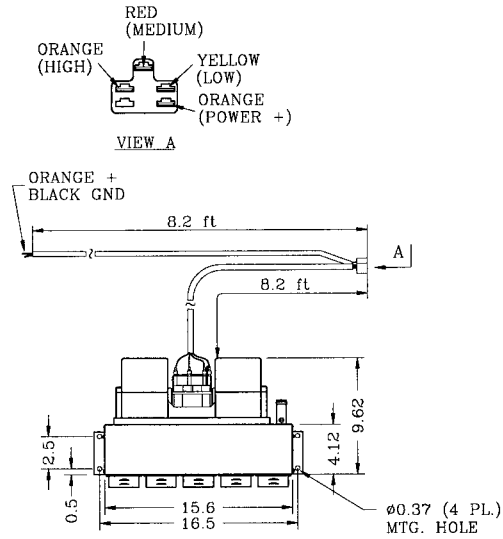
### Specifications

Heating	-36000 Btu/hr (10550 W)
Air Flow	-400 CFM (680 m <sup>3</sup> /h)
Current	-14 Amps/12V -8 Amps/24V
Weight	-12 lbs. (5.5 kg)
3-Speed motor.	

### Features

A higher capacity heater than the 202 and 205, the 212 offers installation flexibility for defrosting and cab ducting requirements.

# Blower Heater Model 212 Marine



**DETAIL OF RESISTOR**

- A - TO MOTOR (ORANGE)
- B - LOW SPEED
- C - MED. SPEED
- D - HIGH SPEED

**Important! Motor is of a non-explosion proof design. The heater must be installed in areas where flammable liquids and vapors are not present.**

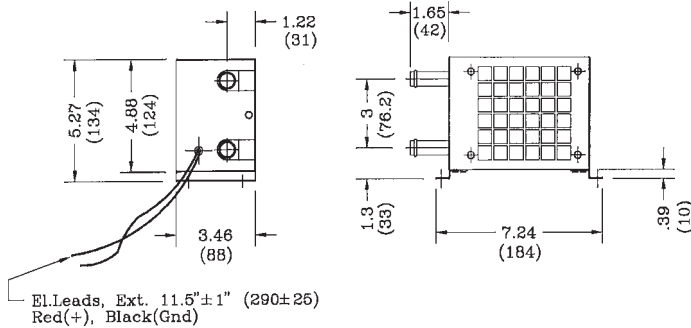
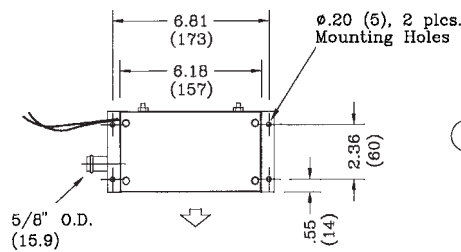
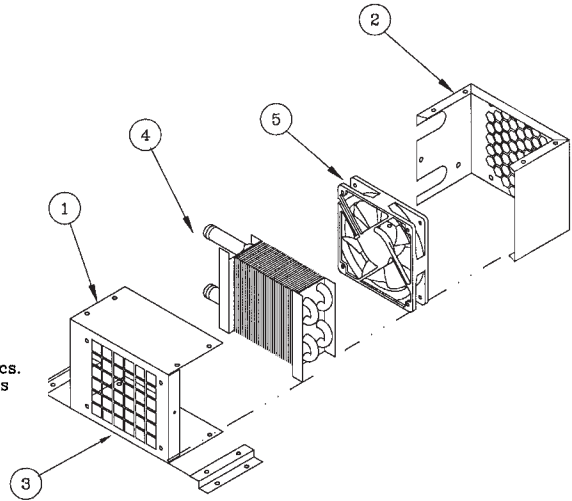
## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
12-1239	Heater 12V	1	24-3937	Casing	7D	25-0060	Venturi
		2	24-3938	Cover	7E	25-0348	Housing Top
		3	24-3939	Coil Bracket	7F	25-0048	Blower Housing
		4	24-3940	Coil Bracket	7G	28-0022	Clip
		5	24-3945	Mounting Bracket	7H	25-0601	Resistor 12V w/Bkt
		6	22-0520	Heater Coil	7J	29-0130	Resistor Bracket
		7	15-1561	Blower Assy. 12V	8	23-0125	Hose Adapter 2 1/2"
		7A	25-0861	Motor Mount	9	25-1126	Wiring Harness
		7B	25-0655	Motor 12V	10	25-0044	Switch 25 Amp
		7C	25-0200	Blower Wheel	11	25-0067	Knob

## Features

This powerful version of the popular #212 family of heaters is specifically designed for the corrosive ocean environment. Coil is made of copper with stainless steel (SS) end plates. Hardware and casing are made of SS as well. Engineering plastics are used for hose adapters and blower. Details of the blower can be found in the blower section. Hose adapters make the heater suitable for ducting to windshields etc. Switch for 3 speed operation, wiring harness and knob are included.

# Low Amp Heater Model 234



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
12-3421	1	24-1105	Heater 12V
12-3422	2	24-1106	Heater 24V
	3	24-1107	Casing (Front)
	4	24-0041	Casing (Rear)
	5	25-0172	Mounting Bracket
		25-0244	Heater Coil
			Fan 12V
			Fan 24V

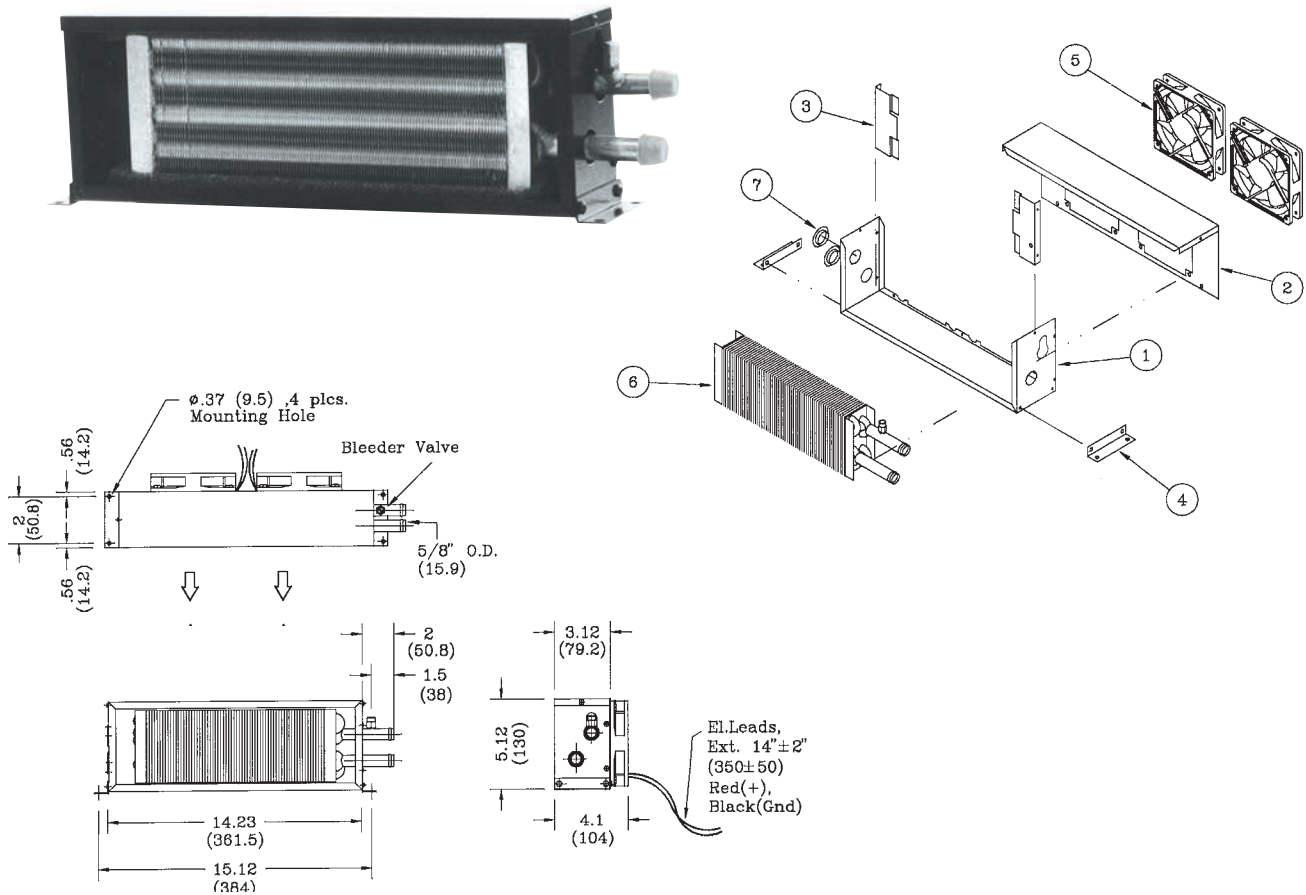
### Specifications

- Heating - 32000 Btu/hr (9380 W)
- Air Flow - 350 CFM (595 m<sup>3</sup>/h)
- Current - 12 Amps/12V
- 6 Amps/24V
- Weight - 25.5 lbs. (11.5 kg)
- 2-Speed motor.

### Features

The low amp current of the 234HD allows for mounting in applications such as motor homes, where an auxiliary heater is required.

# Low Amp Heater Model 236



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-3601	Heater 12V	1	24-0369	Casing
12-3602	Heater 24V	2	24-0370	Cover
		3	24-0380	Coil Bracket
		4	24-0012	Mounting Bracket
		5	25-0172	Fan 12V
			25-0244	Fan 24V
		6	22-0083	Heater Coil
		7	28-0010	Snap-in Plug

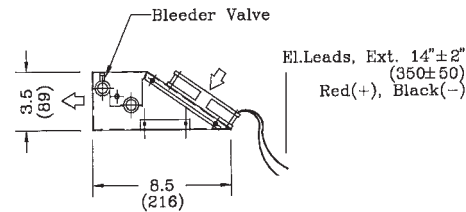
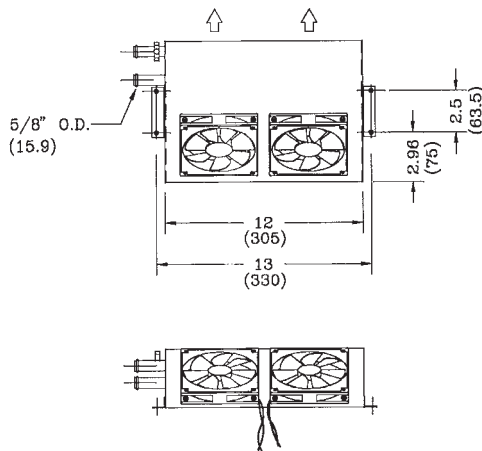
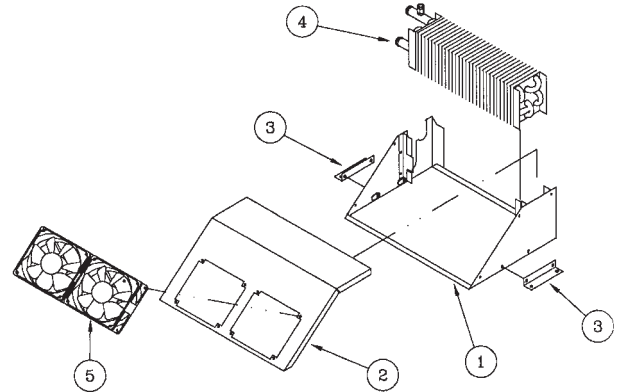
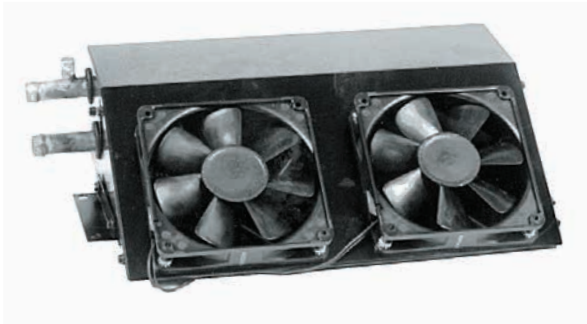
### Specifications

Heating	-8700 Btu/hr (2550 W)
Air Flow	-130 CFM (220 m <sup>3</sup> /h)
Current	-0.7 Amps/12V
	-0.35 Amps/24V
Weight	-5 lbs. (2.3 kg)
1-Speed motor.	

### Features

A larger capacity heater than the 234HD, the 236 offers the capacity to handle larger low amp heater requirements.

# Low Amp Heater Model 247



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-4701	Heater 12V	1	24-1114	Casing
12-4702	Heater 24V	2	24-1115	Cover
		3	24-0012	Mounting Bracket
		4	22-0171	Heater Coil
		5	25-0172	Fan 12V
			25-0144	Fan 24V

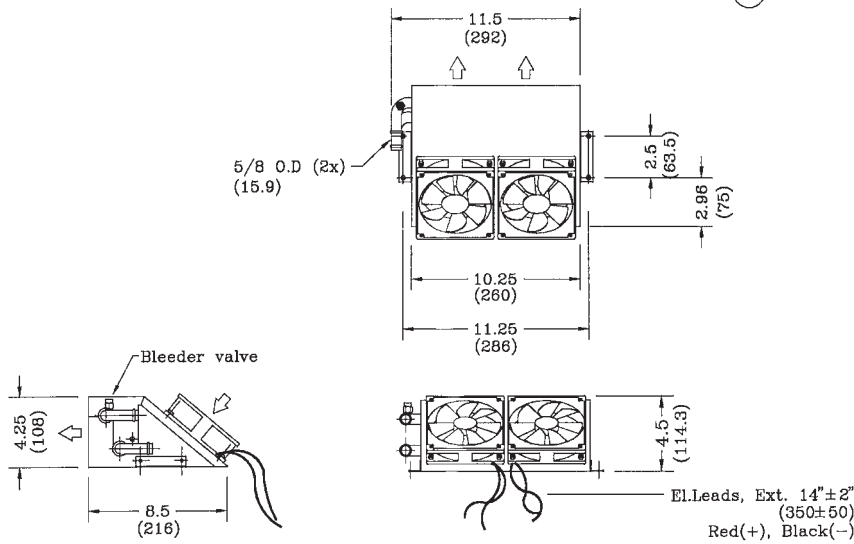
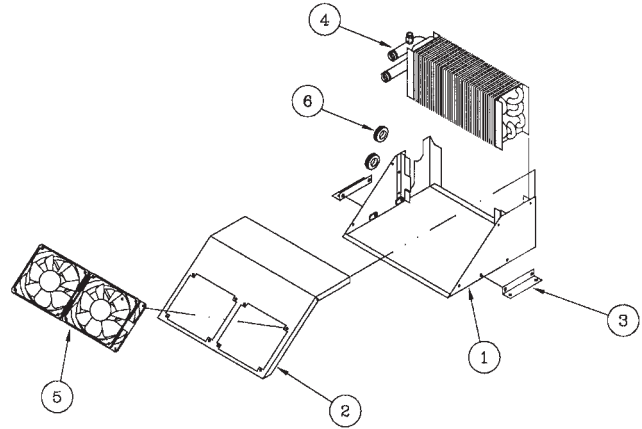
### Specifications

Heating	-8700 Btu/hr (2550 W)
Air Flow	-130 CFM (220 m <sup>3</sup> /h)
Current	-0.70 Amps/12V -0.35 Amps/24V
Weight	-6.1 lbs. (2.8 kg)
1-Speed motor.	

## Features

The 247 is another option for low amp heater requirements.

# Low Amp Heater Model 249



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description
12-4901	Heater 12V	1	24-1189	Casing
		2	24-1190	Cover
		3	24-0012	Mounting Bracket
		4	22-0203	Heater Coil
		5	25-0447	Fan 12V
		6	28-0009	Grommet
<b>Specifications</b>				
Heating	-10000 Btu/hr (2930 W)			
Air Flow	-160 CFM (270 m <sup>3</sup> /h)			
Current	- 1.0 Amps/12V			
Weight	-7.5 lbs. (3.4 kg)			
1-Speed motor.				

## Features

The 249 offers similar mounting and installation to the 247, in a larger capacity package.

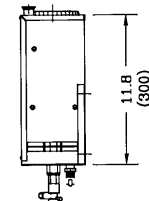
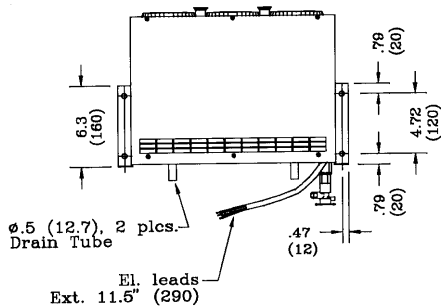
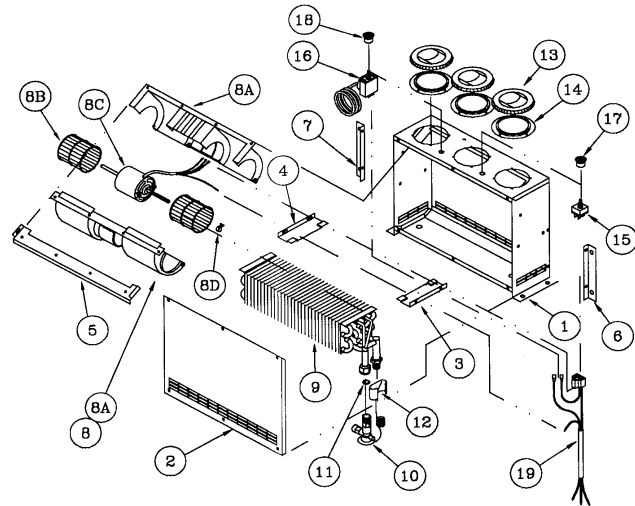
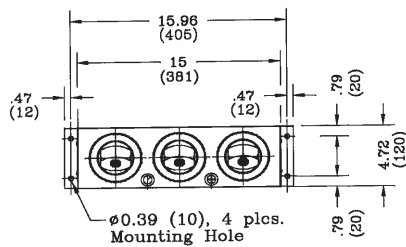
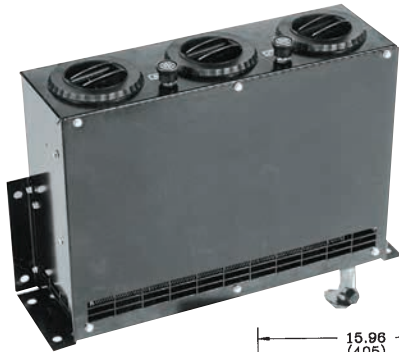
## Notes



# IX. Compact AC



# Air Conditioner Model 301



5/8" - 18 Male (OR #6)  
7/8" - 14 Male (OR #10)  
Refr. Hose Connection

**El. Connection**  
Orange - Power (+)  
Black - Ground (-)  
White - To pressure switch/compressor  
Blue - To condenser/relay (if fan condenser)

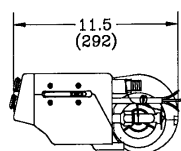
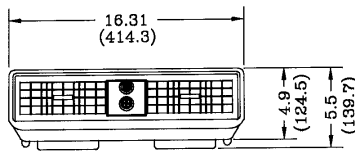
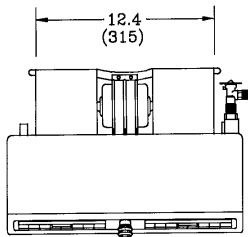
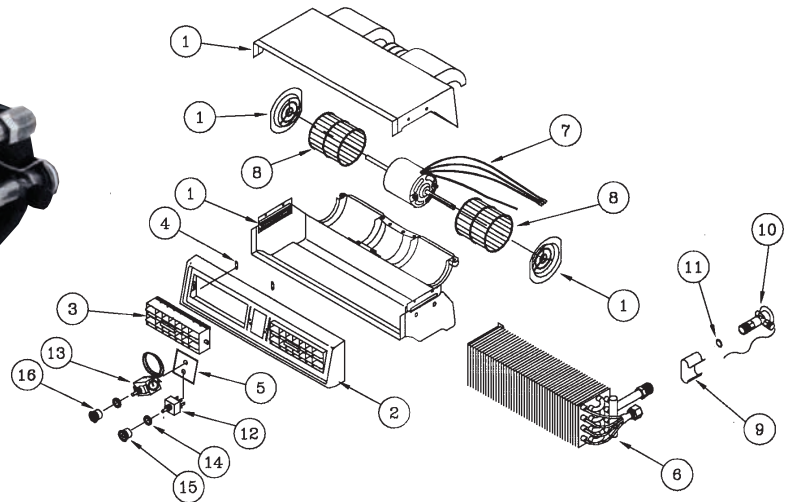
## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
13-0121		Air Conditioner 12V		1	24-1584	Casing
13-0122		Air Conditioner 24V		2	24-1585	Cover
				3	24-1586	Coil Bracket (R)
				4	24-1587	Coil Bracket (L)
				5	24-1588	Blower Support
				6	24-1941	Mounting Bracket (R)
				7	24-1942	Mounting Bracket (L)
				8	15-0503	Blower 12V
					15-0504	Blower 24V
				8A	25-0017	Blower Housing
				8B	25-0021	Blower Wheel
				8C	25-0070	Motor 12V
					25-0076	Motor 24V
				8D	25-0022	Clip
				9	21-0276	Evaporator Coil
				10	26-0162	Expansion Valve
				11	27-0602	O-Ring #8
				12	26-0006	Bulb Clamp
				13	23-0005	Louver
				14	23-0048	Adapter
				15	25-0029	Blower Switch
				16	25-0045	Thermostat
				17	25-0067	Knob
				18	25-0068	Knob
				19	25-0586	Wiring Harness

## Features

The 301 is a compact air conditioner that is ideal for small cabs. It can be wall mounted or used as a stand alone floor mount.

# Air Conditioner **Model 302**



El. leads, Ext.16±2  
(400±50)  
White -from Thermostat  
Orange -Power  
Black-Ground

0.5 (12.7) OD, 2 plcs.  
Drain Tube

## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
13-0221		1	28-0001	Case	9	26-0006	Bulb Clamp
13-0222		2	28-0002	Bezel	10	26-0162	Expansion Valve
		3	23-0011	Louver	11	27-0602	O-Ring #8
		4	23-0028	Louver Strip	12	25-0029	Switch
		5	25-0032	Switch Plate	13	25-0030	Thermostat
		6	21-0003	Evaporator Coil	14	25-0059	Nut Cover
		7	25-0677	Motor 12V	15	25-0067	Knob
			25-0678	Motor 24V	16	25-0068	Knob
		8	25-0021	Blower Wheel	17	25-0679	Wiring Harness (Not Shown)

### Specifications

Cooling	-17950 Btu/hr (5260 W)
Air Flow	-250 CFM (425 m³/h)
Current	-11 Amps/13.5V -5.5 Amps/27V
Weight	-9 lbs. (4 kg)

3-Speed motor.

## Features

The 302 is a compact unit that can be ducted to deliver air flow where desired. Ideal for dash or compartment mounting.

# Air Conditioner **Model 355**



## Part Descriptions: Specifications

Part No.		Specifications	
13-5521	Air Conditioner 12V	Cooling	-20000 Btu/hr (5860 W)
13-5522	Air Conditioner 24V	Air Flow	-275 CFM (468 m <sup>3</sup> /h)
		Current	-12 Amps/13.5V -6 Amps/27V
		Weight	-31 lbs. (14 kg)

Made of 18GA (1.25mm) Cold Rolled Steel and finished in grey epoxy powder coat.

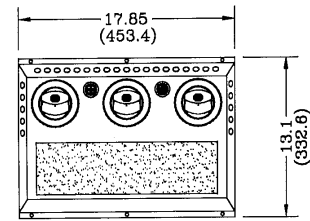
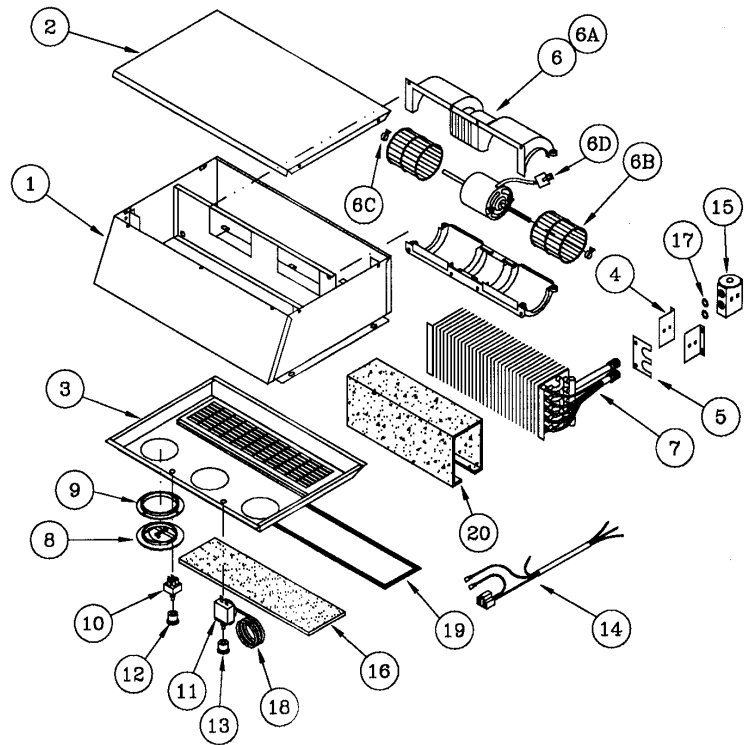
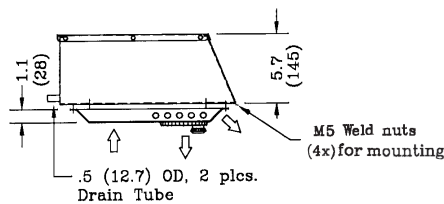
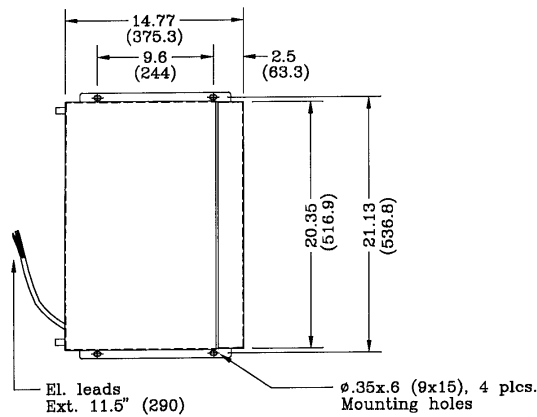
## Features

The 355 is a low profile roof mount air conditioner.

## Dimension Profiles

### El. Connection

- Orange—Power(+)
- Black—Ground(-)
- White—To pressure switch/  
compressor
- Blue—To condenser/relay  
(if fan condenser)

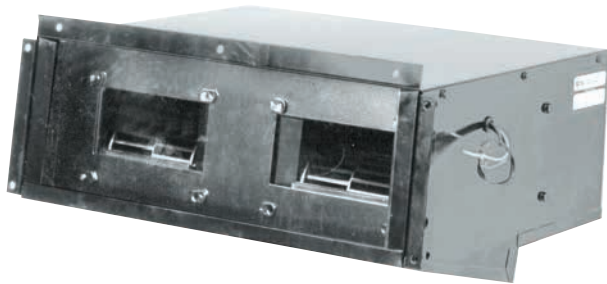


View A

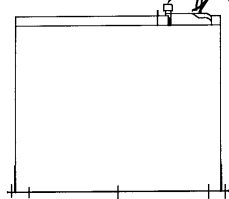
## Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2177	Casing Assy.	6C	25-0643	Motor 12V	13	25-0068	Knob (Temp.)
2	24-2296	Cover Assy.		25-0644	Motor 24V	14	25-0672	Wiring Harness
3	24-2437	Air Plenum	6D	25-0022	Clip	15	26-0190	Block Valve
4	24-2439	Support Bracket	7	21-0399	Evaporator Coil	16	26-0431	Air Filter
5	24-2440	Cover Plate	8	23-0005	Louver	17	27-0602	O-Ring #8
6	15-0533	Blower 12V	9	23-0048	Adapter	18	28-0031	PVC Hose
	15-0534	Blower 24V	10	25-0044	Blower Switch	19	28-0166	Hook Tape
6A	25-0017	Blower Housing	11	25-0045	Thermostat	20	28-0230	Reticulated Foam
6B	25-0021	Blower Wheel	12	25-0067	Knob(Fan)			

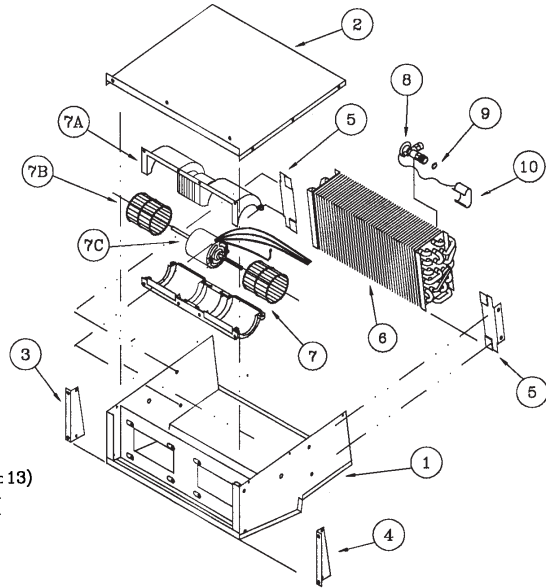
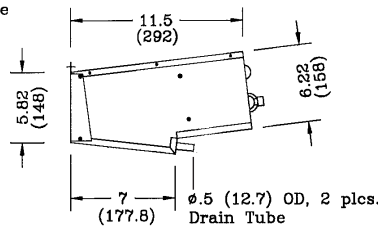
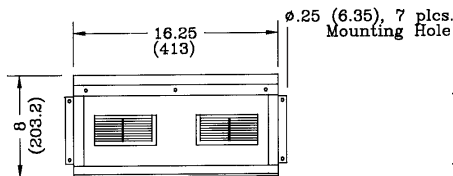
# Air Conditioner Model 311



5/8-18 Male (OR #6)  
7/8-14 Male (OR #10)  
Refr. Hose Connections



EL Leads, Ext. 5"±.5" (127±13)  
Orange-High, Red-Medium  
Yellow-Low, Black-Ground



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
13-1153		1	24-0267	Casing	7A	25-0017	Blower Housing
13-1154		2	24-0270	Cover	7B	25-0021	Blower Wheel
		3	24-0192	Mounting Bracket (L)	7C	25-0070	Motor 12V
		4	24-0193	Mounting Bracket (R)		25-0075	Motor 24V
		5	24-0194	Coil Bracket	8	26-0162	Expansion Valve
		6	21-0045	Evaporator Coil	9	27-0602	O-Ring #8
		7	15-0503	Blower Assy. 12V	10	26-0006	Bulb Clamp
			15-0504	Blower Assy. 24V			

### Specifications

Cooling -21800 Btu/hr (6390 W)  
Air Flow -325 CFM (552 m<sup>3</sup>/h)  
Current -11.6 Amps/13.5V  
-5.8 Amps/27V  
Weight -17 lbs. (7.7 kg)

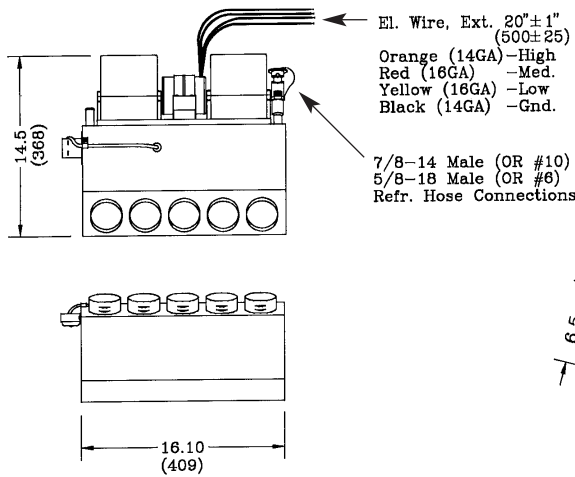
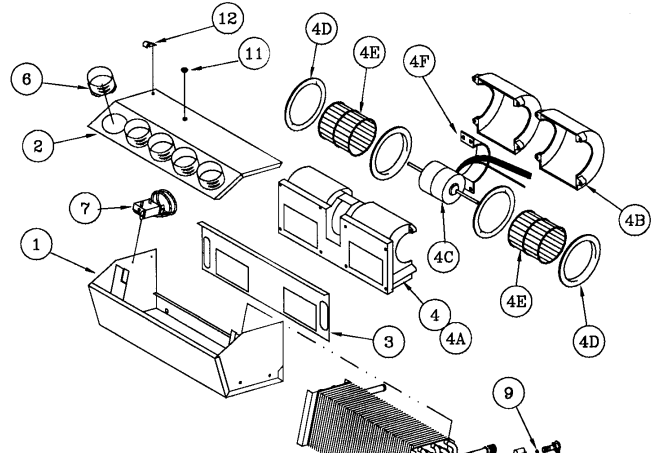
3-Speed motor.

Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat. Louvers have to be ordered separately.

### Features

The 311 is ideal for ambulance requirements.

# Heater-Air Conditioner **Model 306**



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
13-0651		Heater-AC 12V				
13-0652		Heater-AC 24V				
<b>Specifications</b>						
Heating		-33000 Btu/hr (9675 W)				
Cooling		-22500 Btu/hr (6685 W)				
Air Flow		-400 CFM (680 m <sup>3</sup> /h)				
Current		-14 Amps/13.5V				
		-7 Amps/27V				
Weight		-19 lbs. (8.6 kg)				
	1	24-0035	Casing	4E	25-0200	Blower Wheel
	2	24-0404	Cover	4F	25-0271	Motor Mount
	3	24-0497	Blower Plate	5	21-0005	Combo Coil
	4	15-1513	Blower 12V	6	23-0038	Hose Adapter 2 1/2"
		15-1514	Blower 24V	7	25-0069	Thermostat
	4A	25-0048	Blower Housing	8	26-0162	Expansion Valve
	4B	25-0348	Housing Top	9	27-0602	O-Ring #8
	4C	25-0053	Motor 12V	10	26-0006	Bulb Clamp
		25-0076	Motor 24V	11	28-0021	Snap-in Plug
	4D	25-0060	Venturi	12	29-0139	Half Clamp 5/16"

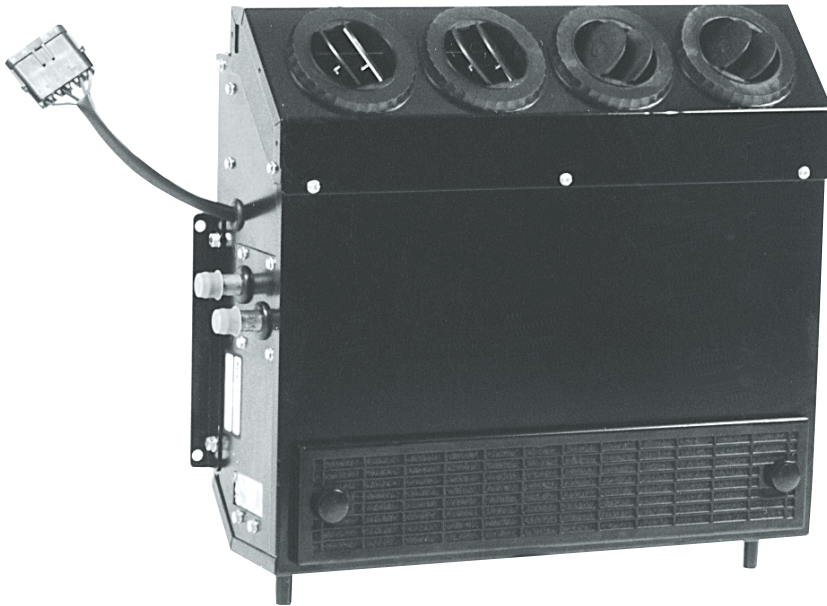
Casing made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.

## Features

The 306 is ideal for under seat or dash mounting. It's high performance capacity can handle most cab requirements. It can also be used in limousine applications.



# Heater-Air Conditioner **Model 310**



## Part Descriptions: Specifications

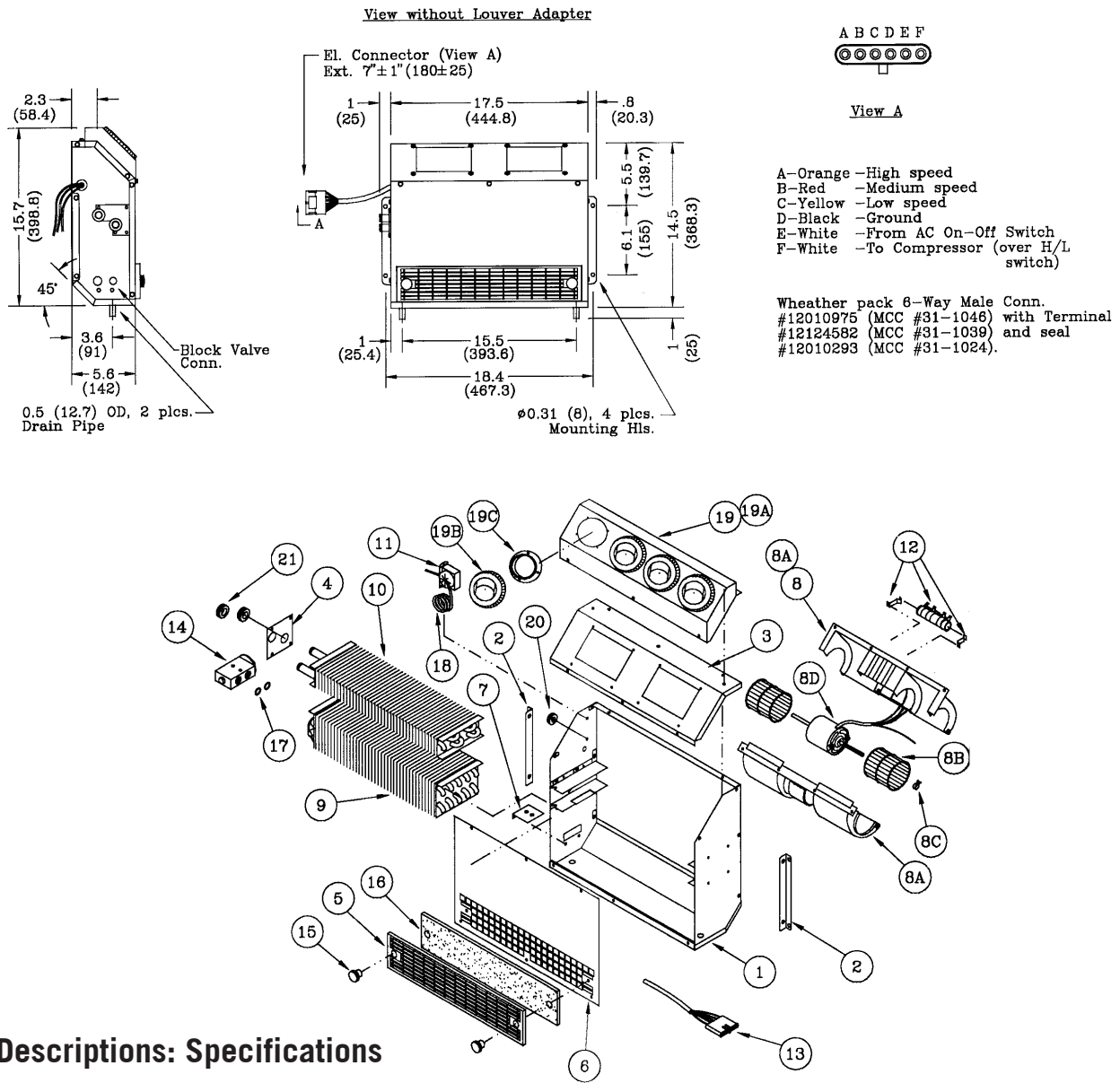
Part No.		Specifications		
13-1003	Heater-AC 12V	Heating	-25500 Btu/hr (7480 W)	Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.
13-1004	Heater-AC 24V	Cooling	-19775 Btu/hr (5800 W)	
13-1023	Air Conditioner 12V	Air Flow	-300 CFM (510 m <sup>3</sup> /h)	
13-1024	Air Conditioner 24V	Current	-12 Amps/13V	
13-1090	Plenum Assy. Incl.19A, 19B, 19C	Weight	-6 Amps/27V -27.3 lbs. (12.4 kg)	

## Features

The 310 is a compact unit that can be used as a free blowing or ducting unit to direct air around the cab. A remote mount control panel is required for this system.



### Dimension Profiles

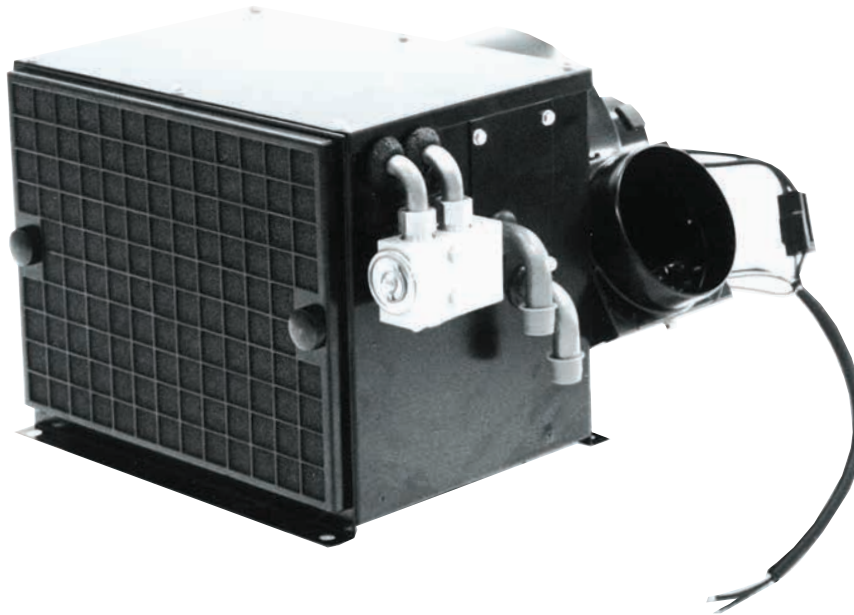


### Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2124	Casing	8B	25-0021	Blower Wheel	15	26-0263	Knurled Knob
2	24-2125	Mounting Bracket	8C	25-0022	Clip	16	26-0399	Air Filter
3	24-2126	Blower Plate	8D	25-0228	Motor 12V	17	27-0602	O-Ring
4	24-2166	Cover Plate		25-0298	Motor 24V	18	28-0031	PVC Hose
5	24-2167	Grill	9	21-0364	Evaporator	<b>19</b>	<b>13-1090</b>	<b>Plenum Assy.</b>
6	24-2168	Front Cover	10	22-0319	Heater Coil			<b>Inc. 19A, B, C.</b>
7	24-2211	Expansion Valve Bkt.	11	25-0069	Thermostat	<b>19A</b>	<b>24-2396</b>	<b>Plenum</b>
8	15-0551	Blower 12V	12	25-0601	Resistor 12V	<b>19B</b>	<b>23-0005</b>	<b>Louver</b>
	15-0552	Blower 24V		25-0602	Resistor 24V	<b>19C</b>	<b>23-0048</b>	<b>Adapter</b>
8A	25-0017	Blower Housing	13	25-0664	Wiring Harness	20	28-0004	Grommet
			14	26-0190	Block Valve	21	28-0009	Grommet



# Heater-Air Conditioner **Model 316**



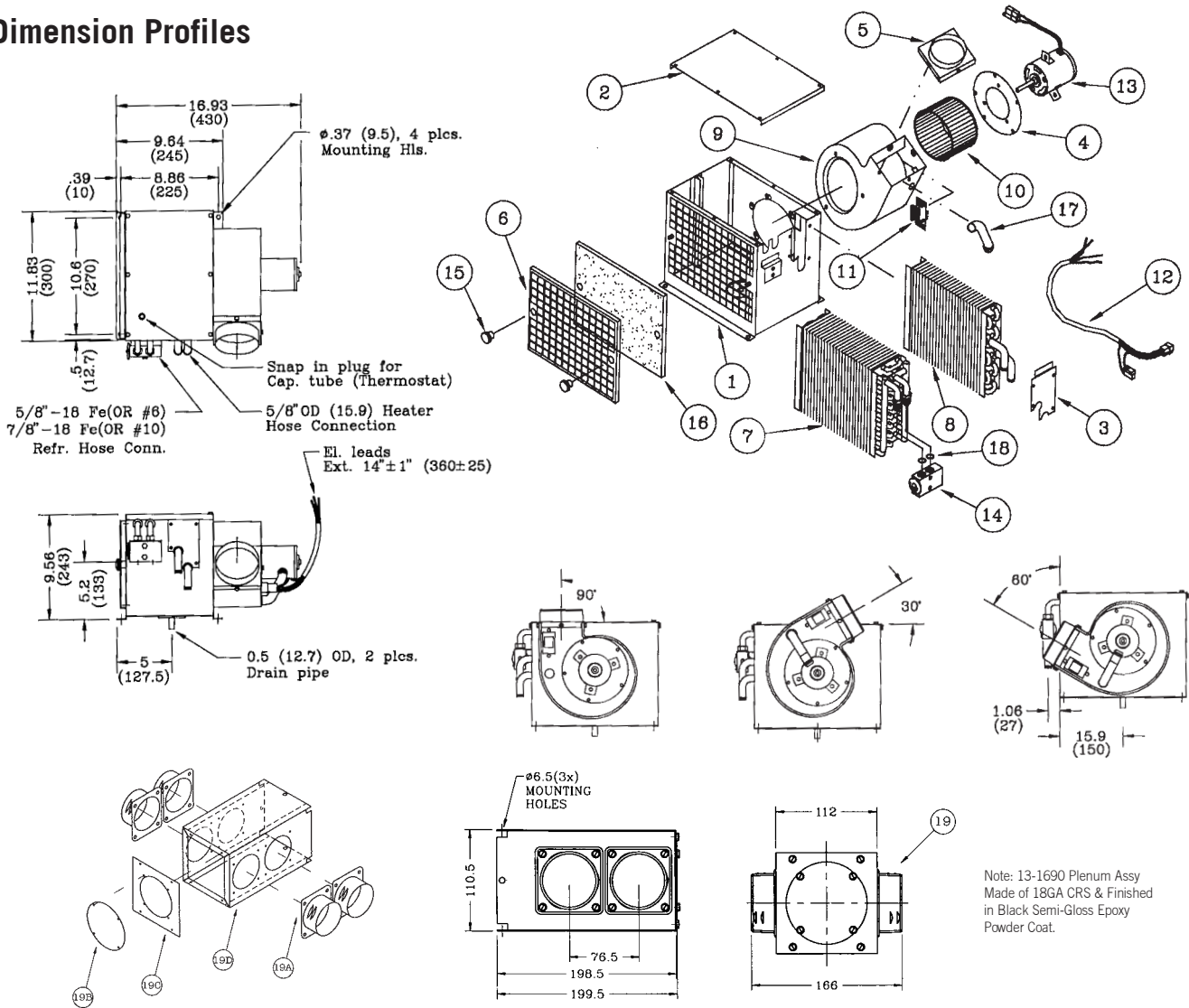
## Part Descriptions: Specifications

Part No.		Specifications		
13-1601	Heater-AC 12V	Heating	-32500 Btu/hr (9525 W)	The unit is supplied w/o heater valve and de-icing thermostat, which have to be installed if needed.
13-1602	Heater-AC 24V	Cooling	-26500 Btu/hr (7770 W)	
13-1690	Plenum Assy. Inc. 19A -19D	Air Flow	-350 CFM (595 m <sup>3</sup> /h)	
		Current	-24 Amps/12V -12 Amps/24V	
		Weight	-26 lbs. (11.8kg)	

## Features

The 316 is designed for behind the seat installations or for sleeper bunks. It is also designed to duct air around the cab. The blower can be rotated as shown in dimension profiles.

**Dimension Profiles**



**Part Descriptions: Specifications**

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2425	Casing	10	25-0098	Blower Wheel	16	26-0430	Air Filter
2	24-2426	Cover	11	25-0136	Resistor 12V	17	27-0105	Vent Tube
3	24-2427	Cover Plate		25-0552	Resistor 24V	18	27-0602	O-Ring #8
4	24-2431	Motor Plate	12	25-0538	Wiring Harness	<b>19*</b>	<b>13-1690</b>	<b>Plenum Assy</b>
5	24-2432	Hose Adapter	13	25-0675	Motor 12V	<b>19A</b>	<b>23-0125</b>	<b>Hose Adapters 2.5"</b>
6	24-2501	Filter Grill		25-0676	Motor 24V	<b>19B</b>	<b>23-0006</b>	<b>Cover Plate</b>
7	21-0395	Evaporator Coil	14	26-0190	Block Valve	<b>19C</b>	<b>24-3317</b>	<b>Covers</b>
8	22-0339	Heater Coil	15	26-0263	Knurled Knob	<b>19D</b>	<b>24-3316</b>	<b>Plenum</b>
9	25-0668	Blower Housing						

**Item 19 is optional and has to be ordered seperately.**

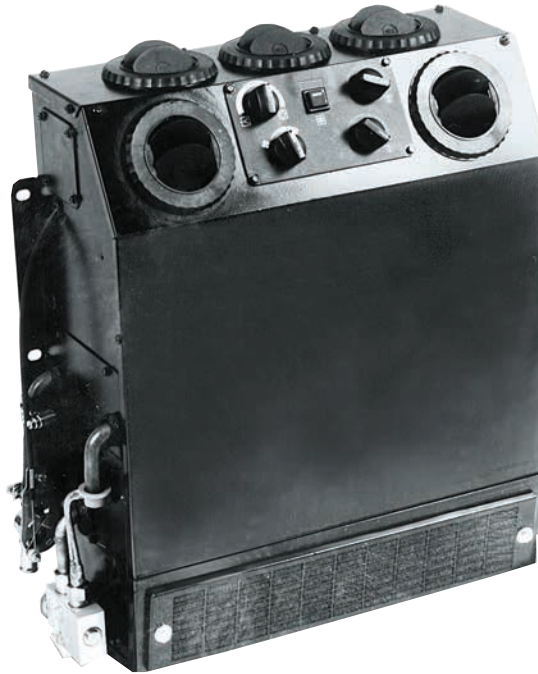
**Features**

The 316 is designed for behind the seat installations or for sleeper bunks. It is also designed to duct air around the cab. The blower can be rotated as shown in dimension profiles.

# Heater-Air Conditioner **Model 320**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



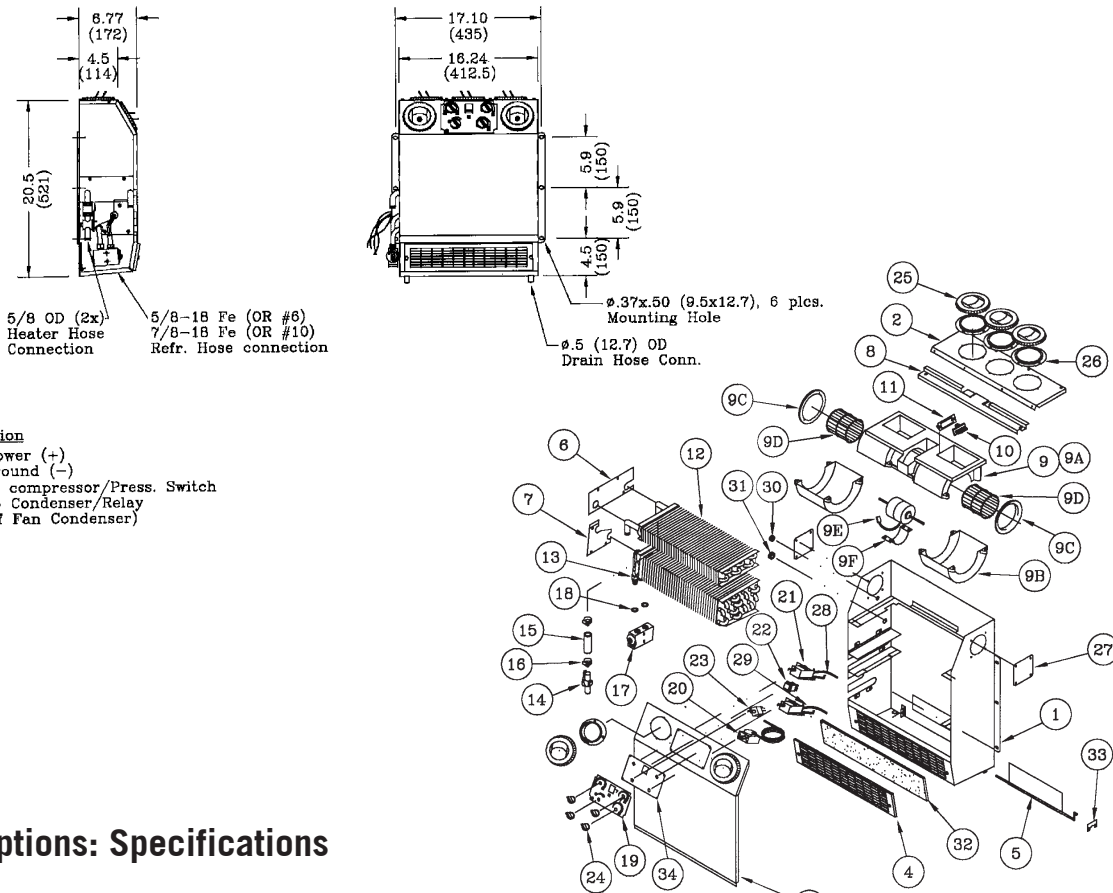
## Part Descriptions: Specifications

Part No.		Specifications		
13-2021	Heater-AC 12V	Heating	-28000 Btu/hr (8200 W)	Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.
13-2022	Heater-AC 24V	Cooling	-21000 Btu/hr (6150 W)	
13-2051	Air Conditioner 12V	Air Flow-	380 CFM (646 m <sup>3</sup> /h)	
13-2052	Air Conditioner 24V	Current	-18 Amps/13.5V -9 Amps/27V	
		Weight	-40 lbs. (18 kg)	
		3-Speed blower.		

## Features

The 320 is a universal wall mounted unit that can handle the requirements of most off-road cabs. An outside filter kit and damper door can be added for outside air.

## Dimension Profiles



5/8 OD (2x) Heater Hose Connection  
 5/8-18 Fe (OR #6) 7/8-18 Fe (OR #10) Refr. Hose connection

### El. connection

Orange - Power (+)  
 Black - Ground (-)  
 White - To compressor/Press. Switch  
 Blue - To Condenser/Relay (if Fan Condenser)

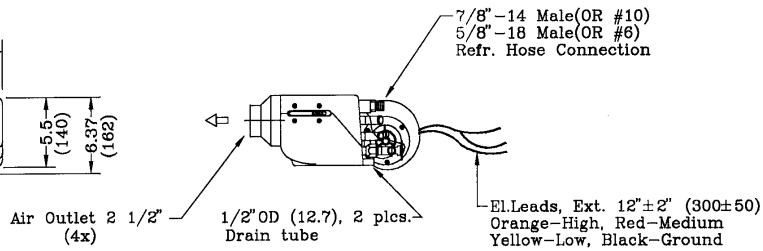
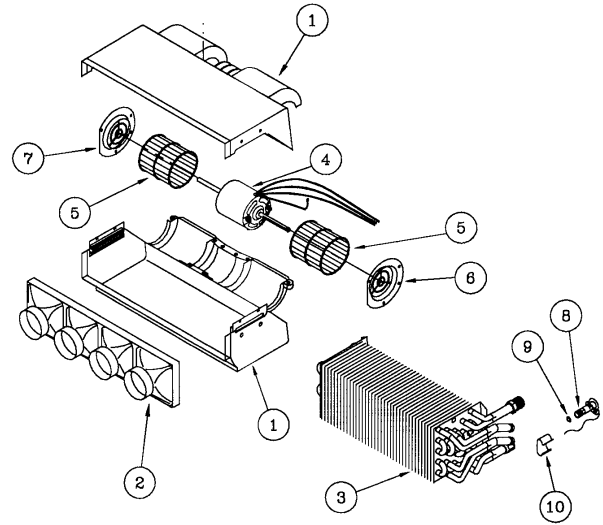
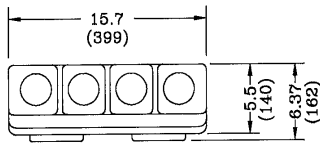
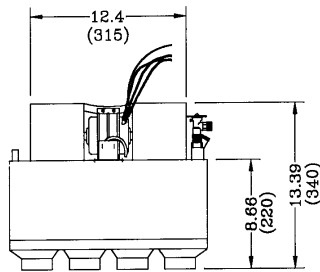
## Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-1182	Casing	9E	25-0665	Motor 12V	22	25-0631	Switch Push 12V
2	24-1183	Top Cover		25-0650	Motor 24V		25-0632	Switch Push 24V
3	24-1184	Front Cover	9F	25-0271	Motor Mount	23	25-0044	Blower Switch
4	24-1185	Filter Holder	10	25-0120	Resistor 12V	24	25-0435	Knob
5	24-1186	Flapper		25-0139	Resistor 24V	25	23-0005	Louver
6	24-1230	H.C. Cover Plate	11	24-0836	Mounting Plate	26	23-0048	Adapter
7	24-1243	E.C. Cover Plate	12	22-0207	Heater Coil	27	24-0320	Cover Plate
8	24-1187	Blower Bracket	13	21-0212	Evaporator Coil	28	26-0242	Bowden Cable
9	15-1503	Blower 12V	14	26-0025	Heater Valve	29	26-0243	Bowden Cable
	15-1502	Blower 24V	15	27-0225	Heater Hose 5/8"	30	28-0014	Grommet
9A	25-0048	Blower Housing	16	27-0059	Gear Clamp	31	28-0004	Grommet
9B	25-0348	Blower Housing Top	17	26-0190	Block Valve	32	26-0258	Filter
9C	25-0060	Venturi	18	27-0602	O-Ring #8	33	24-1188	Flapper Holder
9D	25-0200	Blower Wheel	19	28-0110	Overlay	34	24-1128	Control Plate
			20	25-0045	Thermostat	35	25-0436	Wiring Harness (Not Shown)
			21	26-0095	Rotary Control			

## Features

The 320 is a universal wall mounted unit that can handle the requirements of most off-road cabs. An outside filter kit and damper door can be added for outside air.

# Heater-Air Conditioner Model 309



## Part Descriptions: Specifications

Part No.		No.	Part No.	Description	No.	Part No.	Description
13-0953	Heater-AC 12V	1	28-0016	Case	6	28-0019	Venturi (R)
13-0954	Heater-AC 24V	2	28-0006	Bezel	7	28-0020	Venturi (L)
		3	21-0012	Combo Coil	8	26-0162	Expansion Valve
		4	25-0070	Motor 12V	9	27-0602	O-Ring #8
		5	25-0076	Motor 24V	10	26-0006	Bulb Clamp
			25-0021	Blower Wheel			

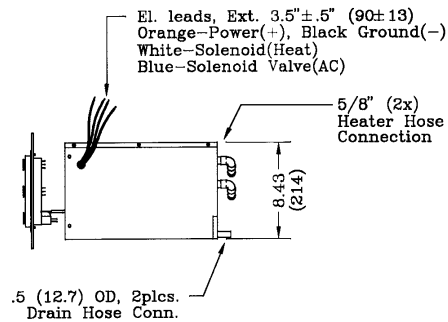
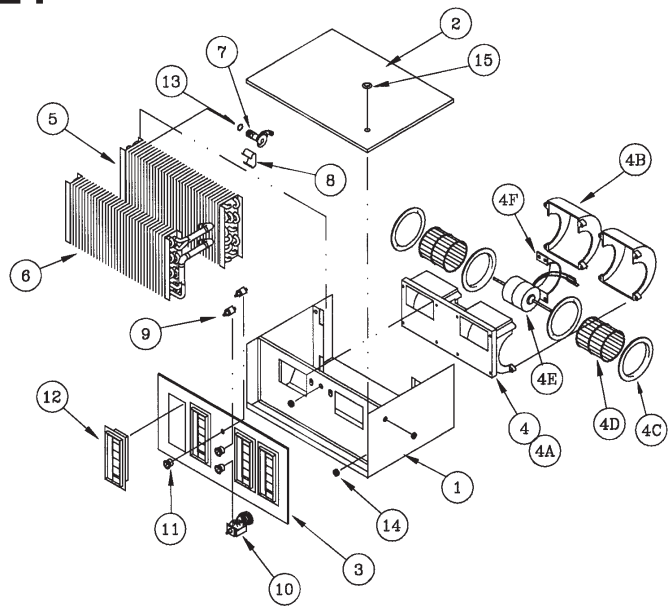
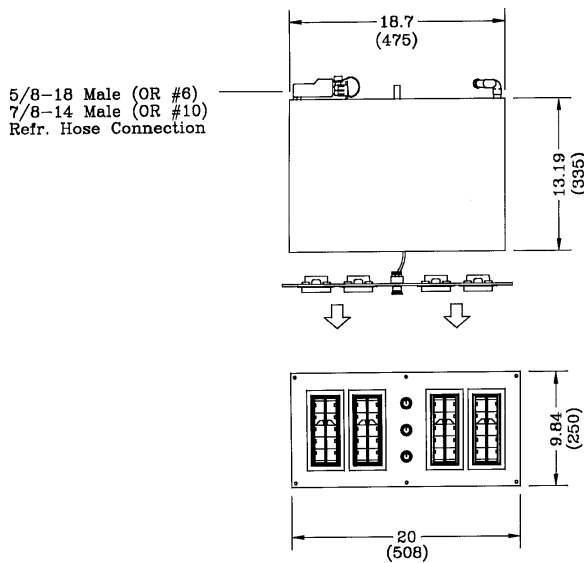
### Specifications

Heating -20200 Btu/hr (5920 W)  
 Cooling -15100 Btu/hr (4425 W)  
 Air Flow -310 CFM (530 m<sup>3</sup>/h)  
 Current -11 Amps/13.5V  
 -5.5 Amps/27V  
 Weight -10.5 lbs. (4.8 kg)  
 3-Speed motor.  
 Casing made of ABS.

## Features

The 309 is a compact unit that can be ducted to deliver air flow where desired. Ideal for dash or compartment mounting.

# Heater-Air Conditioner **Model 321**



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
13-2155	Heater-AC 12V	1	24-0539	Casing	6	22-0130	Heater Coil
		2	24-0274	Cover	7	26-0162	Expansion Valve
		3	24-0275	Front	8	26-0006	Bulb Clamp
		4	15-1513	Blower 12V	9	25-0029	Switch
		4A	25-0048	Blower Housing	10	25-0045	Thermostat
		4B	25-0348	Housing Top	11	25-0072	Knob
		4C	25-0060	Venturi	12	23-0055	Louver
		4D	25-0200	Blower Wheel	13	27-0602	O-Ring #8
		4E	25-0053	Motor 12V	14	28-0004	Grommet
		4F	25-0271	Motor Mount	15	28-0021	Snap-in Plug
		5	21-0046	Evaporator Coil			

### Specifications

Heating	-40000 Btu/hr (11720 W)
Cooling	-27300 Btu/hr (8000 W)
Air Flow	-450 CFM (765 m <sup>3</sup> /h)
Current	-17 Amps/12V
Weight	-31 lbs. (14 kg)

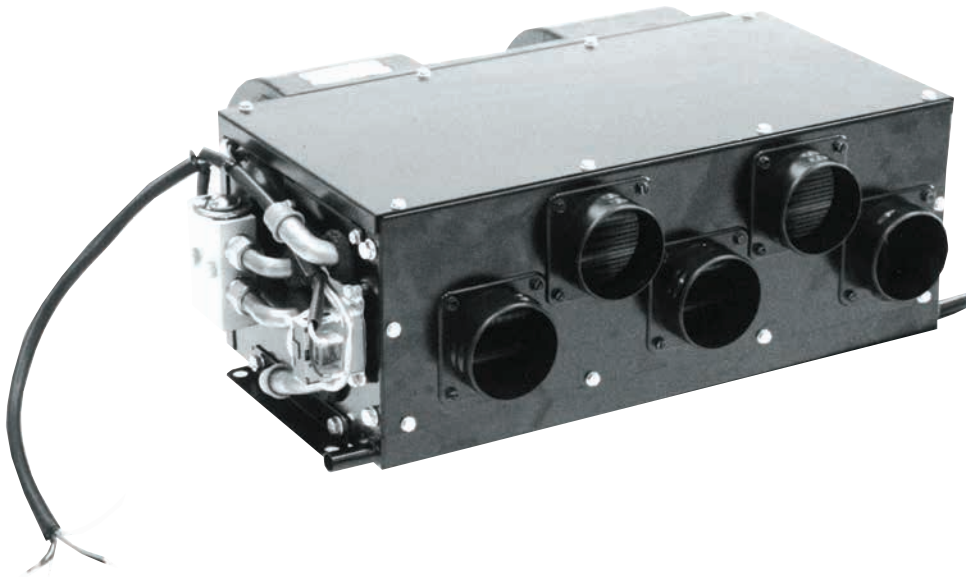
Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.

### Features

The 321 was designed for ambulance installation. It can be used for any deck mounting application. The high capacity of the 321 makes this unit ideal for ambulance and large cabs.



# Heater-Air Conditioner **Model 325**



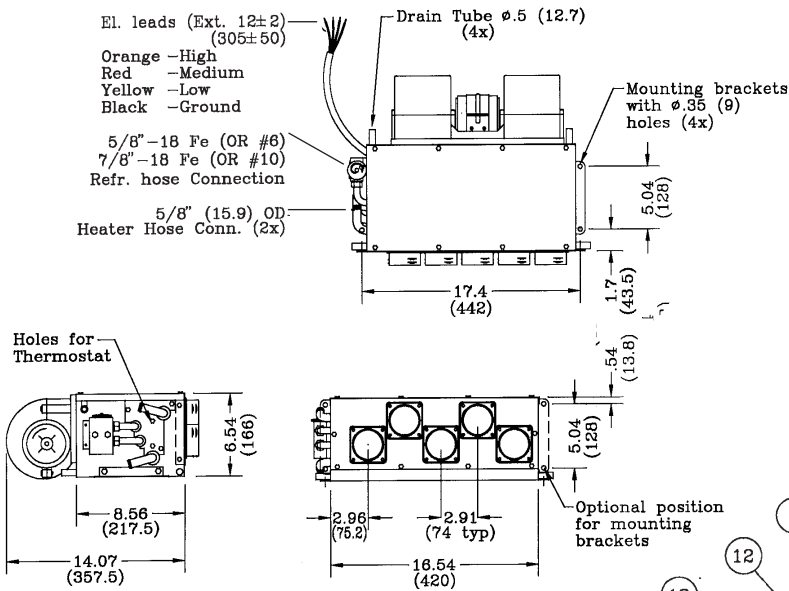
## Part Descriptions: Specifications

Part No.		Specifications		
13-2503	Heater-AC 12V	Heating	-36000 Btu/hr(10500 W)	Permanent magnet motor with ball bearings. Casing made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss powder coat.
13-2504	Heater-AC 24V	Cooling	-28500 Btu/hr (8350 W)	
		Air Flow	-450 CFM (765 m <sup>3</sup> /h)	
		Current	-16 Amps/13.5V -8 Amps/27V	
		Weight	-19 lbs. (8.6 kg)	

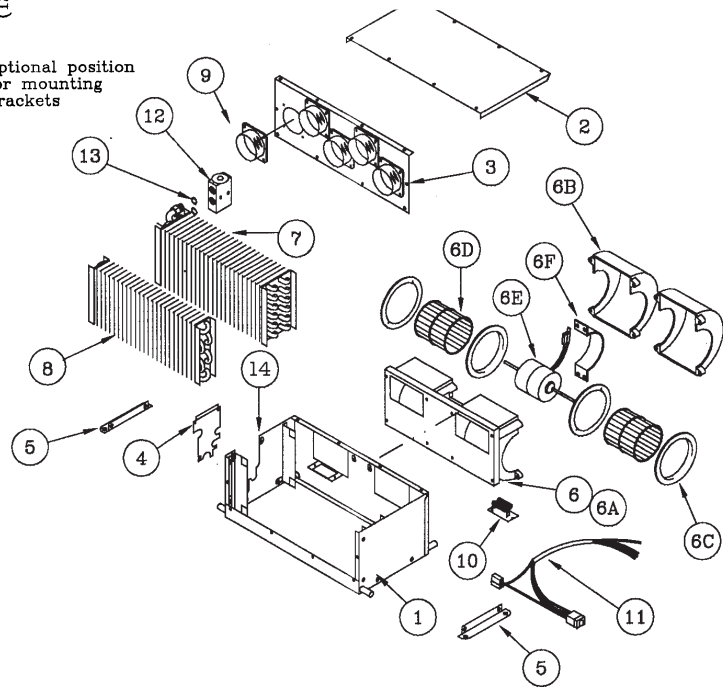
## Features

The 325 is a universal unit that fits all ducting requirements.

### Dimension Profiles



**Note:**  
 This Unit is supplied w/o Heater Valve and De-icing Thermostat which have to be installed if needed.



### Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-0027	Casing	6B	25-0348	Housing Top	9	23-0125	Hose Adapter 2.5"
2	24-0028	Cover	6C	25-0060	Venturi	10	25-0136	Resistor 12V
3	24-0013	Cover	6D	25-0200	Blower Wheel		25-0552	Resistor 24V
4	24-0017	Coil Cover (H)	6E	25-0645	Motor 12V	11	25-0671	Wiring Harness
5	24-0033	Mounting Bracket		25-0650	Motor 24V	12	26-0190	Block Valve
6	15-1501	Blower 12V	6F	25-0271	Motor Mount	13	27-0602	O-Ring #8
	15-1502	Blower 24V	7	21-0091	Evaporator Coil	14	25-0069	Thermostat
6A	25-0048	Blower Housing	8	22-0348	Heater Coil			

### Features

The 325 is a universal unit that fits all ducting requirements.



# Heater-Air Conditioner **Model 330**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



## Part Descriptions: Specifications

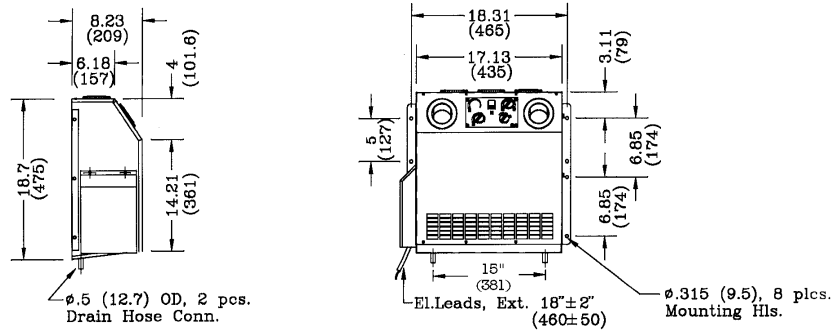
Part No.		Specifications	
13-3061	Heater-AC 12V	Heating	-42200 Btu/hr(12370 W)
13-3062	Heater-AC 24V	Cooling	-28500 Btu/hr (8350 W)
13-3063	Air Conditioner 12V	Air Flow	-450 CFM (765 m <sup>3</sup> /h)
13-3064	Air Conditioner 24V	Current	-22 Amps/13.5V
13-3067	Heater 12V		-11 Amps/27V
		Weight	-38 lbs. (17.2 kg)

Permanent magnet motor with long life brushes.  
3-Speed blower.  
Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.  
Items 31-35 are optional and have to be ordered separately

## Features

Although similar in design and function, the 330 is a larger capacity unit than the 320. It is ideal for street sweepers and large off-road cabs. Outside air can be achieved by adding a filter kit.

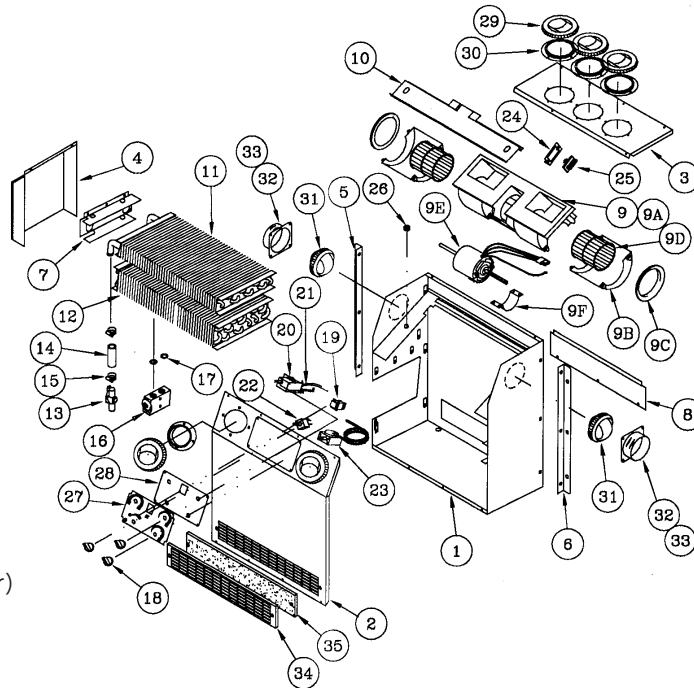
## Dimension Profiles



**Note:**

5/8-18 Male (OR #6)  
 7/8-14 Male (OR #10)  
 Refr. Hose Conn.  
 5/8" OD Heater Hose Conn.  
 All behind protection cover.

Electrical Connections  
 Orange - Power (+)  
 Black - Ground (-)  
 White - To Compressor/Pressure Switch  
 Blue - To Condensor/Relay (if fan condensor)



## Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-1157	Casing	9F	24-0271	Motor Mount	23	25-0045	Thermostat
2	24-1158	Front Cover	10	24-1160	Blower Mount	24	24-0836	Resistor Bracket
3	24-1159	Top Cover	11	22-0078	Heater Coil	25	25-0120	Resistor 12V
4	24-0205	Protection Cover	12	21-0063	Evaporator Coil		25-0139	Resistor 24V
5	24-0290	Mounting Bracket (L)	13	26-0025	Heater Valve	26	28-0014	Grommet
6	24-0279	Mounting Bracket (R)	14	27-0225	Heater Hose 5/8"	27	28-0110	Overlay
7	24-0242	Coil Bracket	15	27-0059	Gear Clamp	28	24-1128	Control Plate
8	24-0291	Fresh Air Cover	16	26-0190	Block Valve	29	23-0005	Louver
9	15-1503	Blower 12V	17	27-0602	O-Ring #8	30*	23-0048	Adapter
	15-1502	Blower 24V	18	25-0435	Knob	31*	23-0087	Ball Louver
9A	25-0048	Blower Housing	19	25-0631	Switch Push 12V	32*	23-0110	Hose Adapter 2"
9B	25-0348	Blower Housing Top		25-0632	Switch Push 24V	33*	23-0125	Hose Adapter 2.5"
9C	25-0060	Venturi	20	26-0095	Rotary Control	34*	24-2018	Grill
9D	25-0200	Blower Wheel	21	26-0320	Bowden Cable	35*	26-0425	Air Filter
9E	25-0665	Motor 12V	22	25-0044	Blower Switch	36	25-0436	Wiring Harness (Not Shown)
	25-0650	Motor 24V						

# Heater-Air Conditioner **Model 344**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



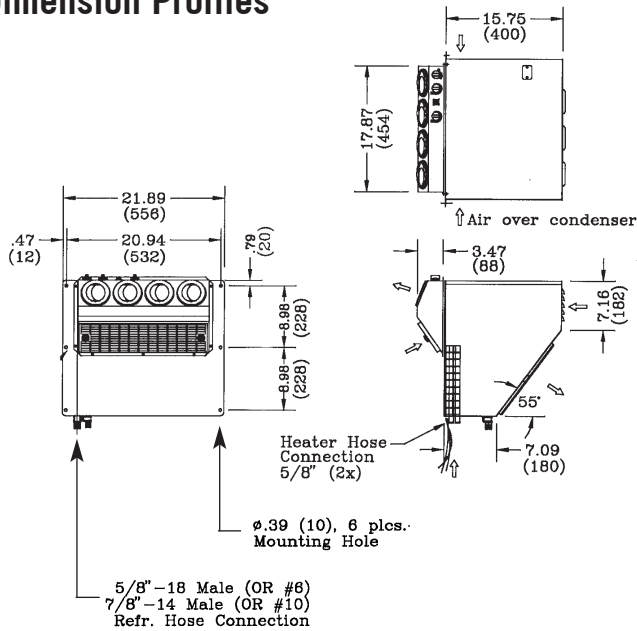
## Part Descriptions: Specifications

Part No.		Specifications		
13-4401	Heater-AC 12V	Heating	-34000 Btu/hr (9960 W)	Casing made of 16GA (1.5mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.
13-4402	Heater-AC 24V	Cooling	-17000 Btu/hr (4980 W)	
		Air Flow	-265 CFM (450 m <sup>3</sup> /h)	
		Current	-33.4 Amps/3.5V	
			-16.7 Amps/27V	
		Weight	-77 lbs. (35 kg)	

## Features

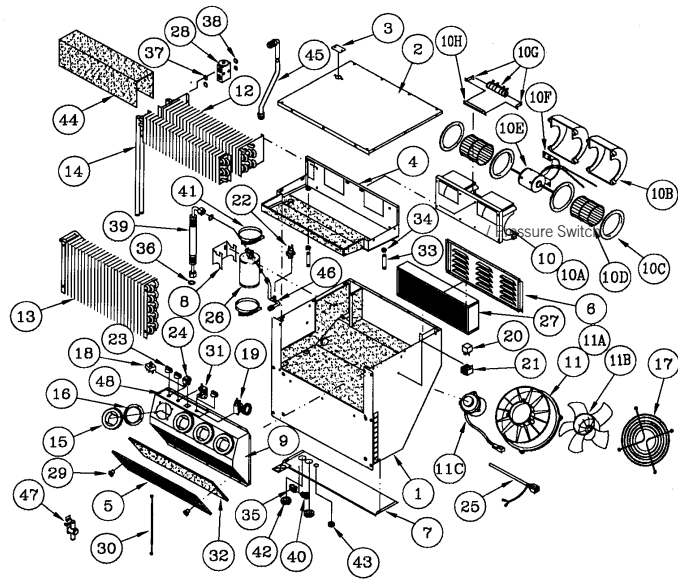
The 344 is a unit that has the condenser mounted in the same compartment as the heater-air conditioner. This unit is mounted on the side of any cab and blows air into a louver console. Outside air is standard.

**Dimension Profiles**



**El.Connection**

Orange - Power (+)  
 Black - Ground (-)  
 White - To Compressor  
 Wiring Harness Ext. 3.5" ± .5"



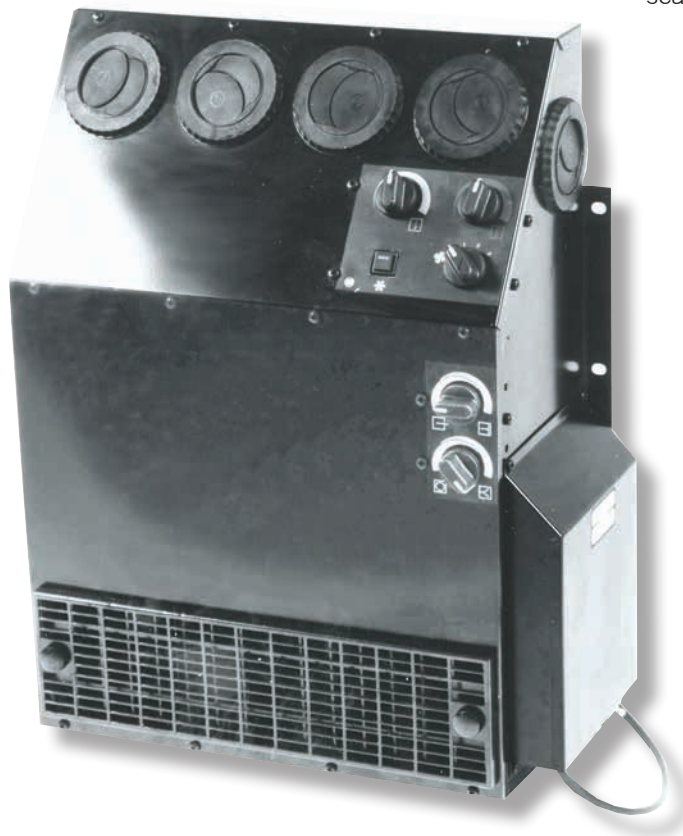
**Part Descriptions: Specifications**

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2229	Casing Assy.	11	15-7512	Fan Assy. 24V	27	26-0041	Air Filter
2	24-2230	Cover Assy.	11A	25-0577	Venturi	28	26-0190	Block Valve
3	24-1919	Sight Glass Cover	11B	25-0579	Fan	29	26-0263	Knurled Knob
4	24-2231	Drain Pan Assy.	11C	25-0621	Motor 12V	30	26-0347	Bowden Cable
5	24-1921	Recirc. Grill		25-0622	Motor 24V	31	26-0350	Rotary Control
6	24-1922	Filter Cover	12	21-0318	Evaporator Coil	32	26-0374	Air Filter (Recirc.)
7	24-1923	Bottom Plate	13	21-0319	Condenser Coil	33	27-0030	Drain Hose
8	24-1924	R/D Bracket	14	22-0292	Heater Coil	34	27-0091	Drain Hose Clamp
9	24-2010	Plenum	15	23-0005	Louver	35	27-0502	Clamp
10	15-1561	Blower 12V	16	23-0048	Adapter	36	27-0601	O-Ring #6
	15-1562	Blower 24V	17	23-0148	Finger Guard	37	27-0602	O-Ring #8
10A	25-0048	Blower Housing	18	25-0044	Blower Switch	38	27-0603	O-Ring #10
10B	25-0348	Blower Top	19	25-0045	Thermostat	39	27-1107	Refr. Hose Assy. #6
10C	25-0060	Venturi	20	25-0251	Relay 12V	40	27-1108	P-Clamp #8
10D	25-0200	Blower Wheel		25-0219	Relay 24V	41	27-1121	Gear Clamp
10E	25-0655	Motor 12V	21	25-0221	Socket/Relay	42	28-0005	Grommet
	25-0660	Motor 24V	22	25-0343	Pressure Switch	43	28-0045	Grommet
10F	25-0271	Motor Mount	23	25-0435	Knob	44	28-0210	Reticulated Foam
10G	25-0601	Resistor 12V	24	25-0631	Switch Push 12V	45	34-0164	Copper Tube Assy.
	25-0602	Resistor 24V		25-0632	Switch Push 24V	46	34-0167	Copper Tube Assy.
10H	29-0130	Resistor Bracket	25	25-1015	Wiring Harness	47	26-0025	Heater Valve
11	15-7511	Fan Assy. 12V	26	26-0018	Drier Receiver	48	28-0191	Overlay

# Heater-Air Conditioner **Model 345**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



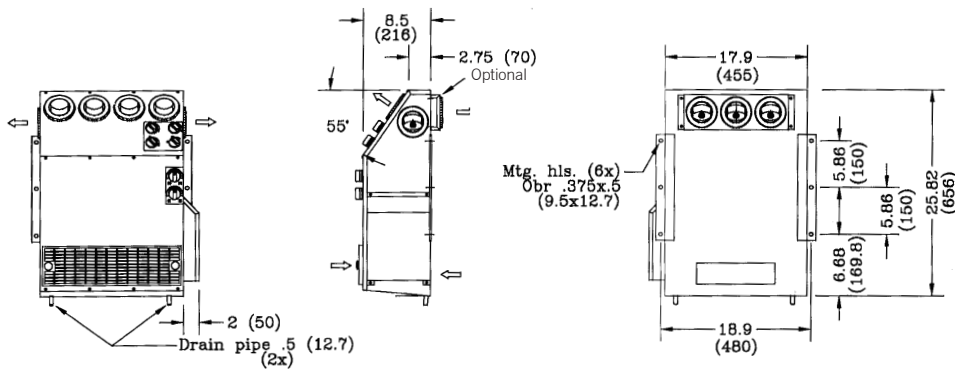
## Part Descriptions: Specifications

Part No.		Specifications		
13-4503	Heater-AC 12V	Heating	-46000 Btu/hr(13480 W)	Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss "texture" epoxy powdercoat. <b>13-4595 Rear Outlet Flapper Kit includes 1 piece 26-0350, 25-0581, 26-0421 and 26-0079 with hardware. Kit is optional and has to be ordered separately</b>
13-4504	Heater-AC 24V	Cooling	-33000 Btu/hr (9670 W)	
13-4590	Air Plenum Assy.	Air Flow	-450 CFM (765 m <sup>3</sup> /h)	
13-4595	Rear Outlet Flapper Kit	Current	-22 Amps/13.5V -11 Amps/27V	
		Weight	-48 lbs. (22 kg)	

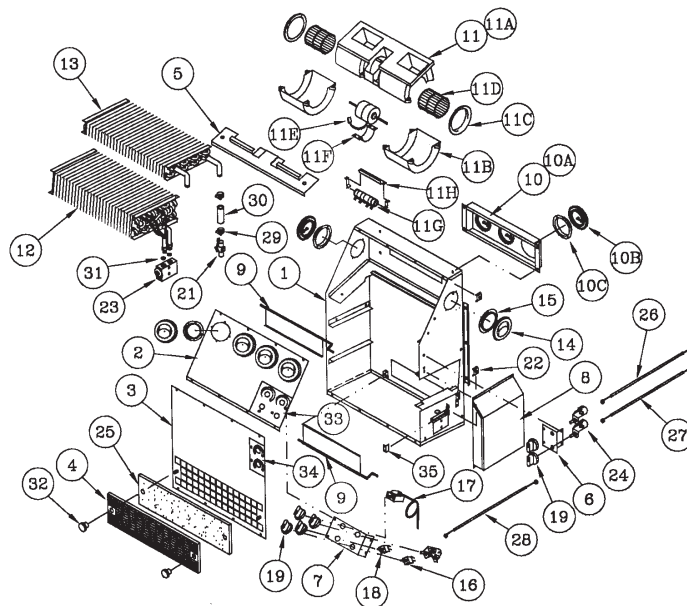
## Features

The 345 is an excellent choice for armored cars and large cabs. Its many options include outside air, rear air damper control, and side air louvers.

### Dimension Profiles



**El. Connection**  
 Orange - Power (+)  
 Black - Ground (-)  
 White - To Compressor/Press. Switch  
 Blue - To Condenser/Relay (if Fan Condenser)



### Part Descriptions: Specifications

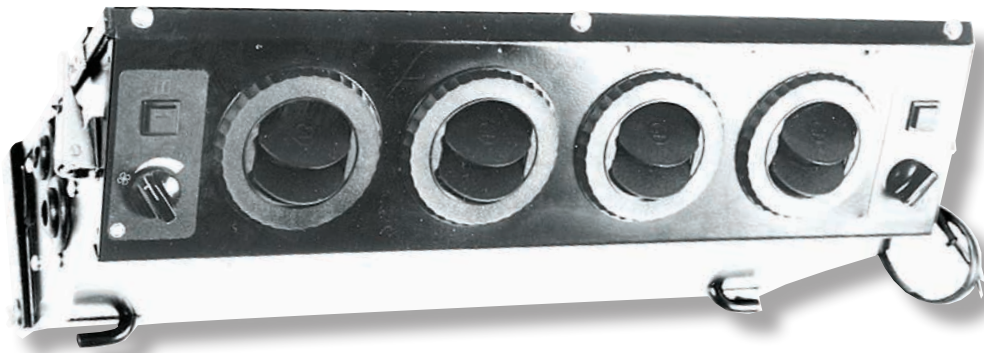
No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2235	Casing	11C	25-0060	Venturi	21	26-0025	Heater Valve
2	24-2236	Face Cover	11D	25-0200	Blower Wheel	22	26-0079	Cable Clamp
3	24-2237	Front Cover	11E	25-0228	Motor 12V	23	26-0190	Block Valve
4	24-2238	Grill		25-0298	Motor 24V	24	26-0350	Rotary Control
5	24-2239	Blower Support	11F	25-0271	Motor Mount	25	26-0400	Air Filter
6	24-2240	Control Bracket	11G	25-0601	Resistor 12V	26	26-0421	Bowden Cable (R/A-Option)
7	24-2241	Control Bracket		25-0602	Resistor 24V			
8	24-2242	Protection Cover	11H	29-0130	Resistor Bracket	27	26-0422	Bowden Cable (F/A)
9	24-2243	Flapper Door	12	21-0362	Evaporator Coil	28	26-0423	Bowden Cable (Heat)
10	13-4590	Air Plenum Assy.	13	22-0318	Heater Coil	29	27-0059	Gear Clamp
10A	24-2447	Plenum	14	23-0005	Louver	30	27-0225	Heater Hose
10B	23-0005	Louver	15	23-0048	Adapter	31	27-0602	O-Ring #8
10C	23-0048	Adapter	16	25-0044	Blower Switch	32	26-0263	Knurled Knob
11	15-1551	Blower 12V	17	25-0118	Thermostat Assy.	33	28-0212	Overlay
	15-1552	Blower 24V	18	25-0307	Switch	34	28-0213	Overlay
11A	25-0048	Blower Housing	19	25-0581	Knob	35	24-2274	Mounting Bracket
11B	25-0348	Housing Top	20	25-0669	Wiring Harness (Not Shown)			



# Heater-Air Conditioner **Model 346**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



## Part Descriptions: Specifications

Part No.		Specifications	
13-4603	Heater-AC 12V	Heating	- 17500 Btu/hr (5130 W)
13-4604	Heater-AC 24V	Cooling	- 17300 Btu/hr (5070 W) -AC
13-4623	Air Conditioner 12V	only	
13-4624	Air Conditioner 24V		- 14250 Btu/hr (4180 W) - Heater-AC
		Air Flow	- 250 CFM (425 m <sup>3</sup> /h)
		Current	- 12 Amps/13.5 V
			- 6 Amps/27V
		Weight	- 33 lbs. (15 kg)

3-Speed motor.  
Made of 18GA (1.25mm) Cold Rolled Steel finished in black textured epoxy.

\* Only for Heat/AC version.

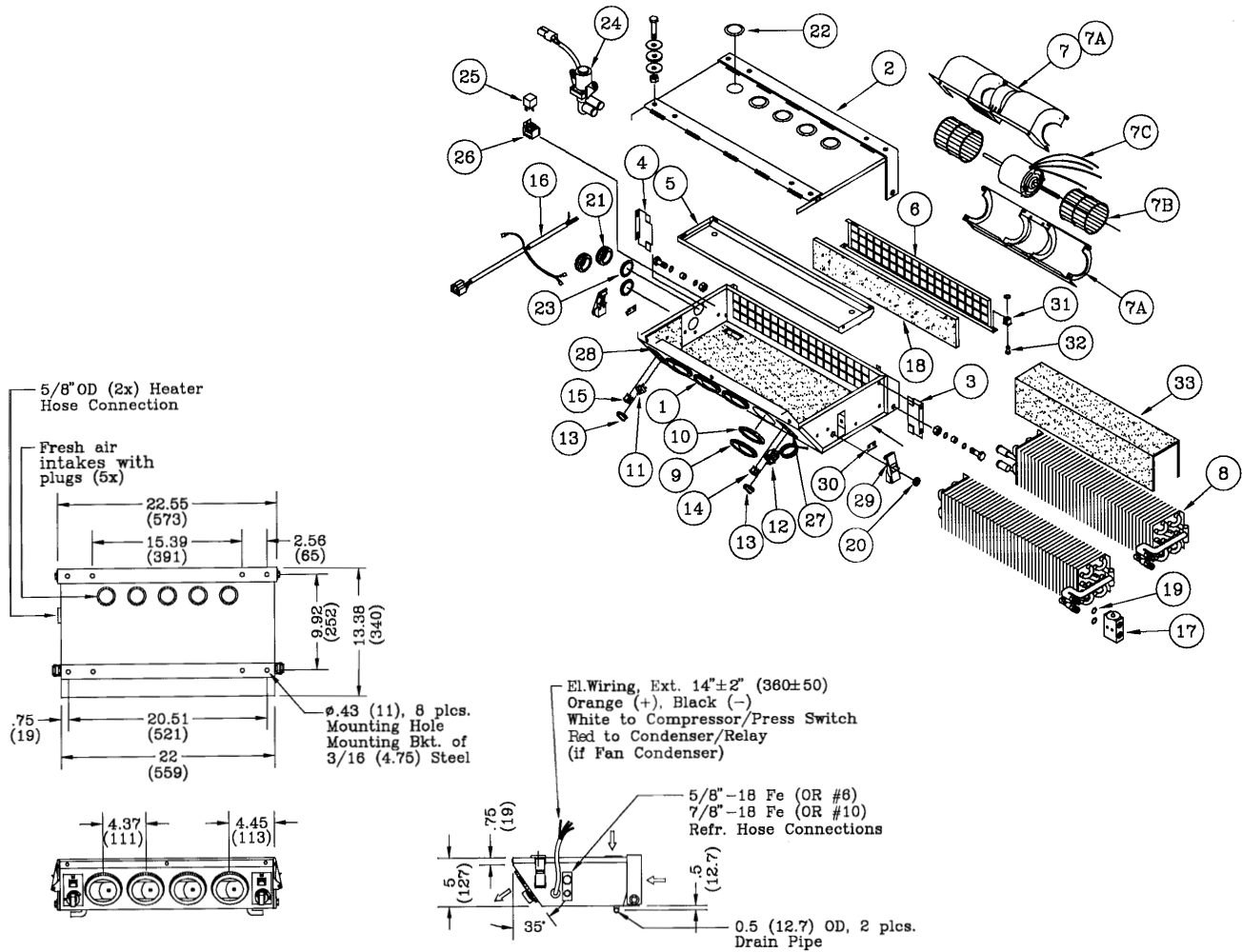
\*\* Only for AC version

## Features

The 346 is a compact overhead with a heater option. Its compact design makes it an excellent choice for many off-road cabs.

The convenient swing-down unit makes for easy service.

### Dimension Profiles



### Part Descriptions: Specifications

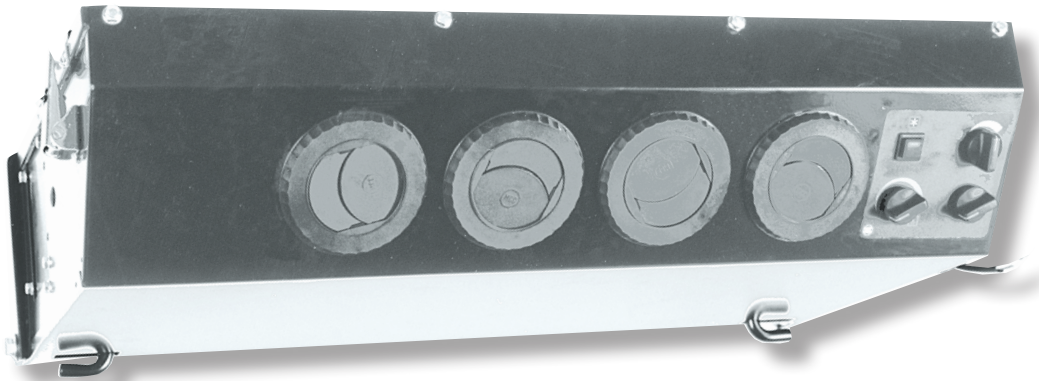
No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-1991	Casing Assy.	10	23-0048	Adapter	22	28-0012	Snap-in Plug
2	24-1992	Cover Assy.	11	25-0029	Blower Switch	23	28-0013**	Snap-in Plug
3	24-1979	Coil Bracket	12	25-0118	Thermostat	24	26-0348	Solenoid Valve 12V
4	24-1980	Coil Bracket	13	25-0435	Knob	26-0194	Solenoid Valve 24V	
5	24-1981	Drain Pan	14	25-0631	Switch Push 12V(AC)	25	25-0251	Relay 12V
6	24-1982	Filter Holder		25-0632	Switch Push 24V(AC)	25-0219	Relay 24V	
7	15-0533	Blower 12V	15	25-0633*	Switch Push 12V (Heat)	26	25-0221	Socket Relay
	15-0534	Blower 24V		25-0634*	Switch Push 24V (Heat)	27	28-0173	Overlay
7A	25-0017	Blower Housing	16	25-0636**	Wiring Harness	28	28-0174	Overlay
7B	25-0021	Blower Wheel		25-0637*	Wiring Harness	29	29-0221	Latch
7C	25-0643	Motor 12V	17	26-0190	Block Valve	30	29-0222	Latch Hook
	25-0644	Motor 24V	18	26-0375	Air Filter	31	29-0075	Receptacle
8	21-0315**	Evaporator Coil	19	27-0602	O-Ring #8	32	29-0076	Stud, Oval Slotted
	0315**	Combo Coil (HE)	20	28-0004	Grommet		29-0077	Retainer
9	21-0314*	Louver	21	28-0005*	Grommet	33	28-0185	Reticulated Foam
	23-0005							



# Heater-Air Conditioner **Model 347**

Note:

Switch is not as depicted in photo, has been changed to sealed rocker switch.



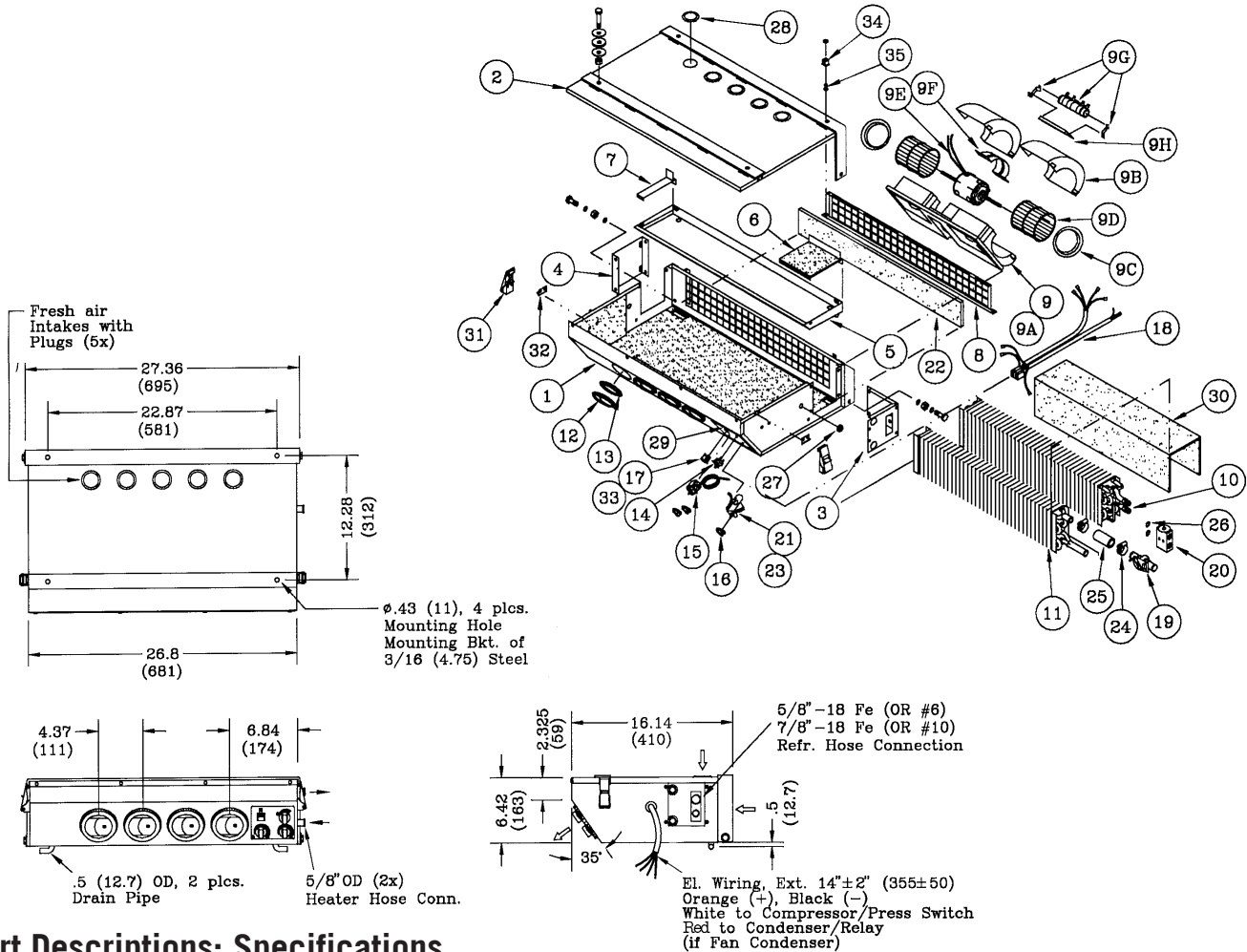
## Part Descriptions: Specifications

Part No.		Specifications		
13-4703	Heater-AC 12V	Heating	-40000 Btu/hr (11720 W)	3-Speed motor. Made of 18GA (1.25mm) Cold Rolled Steel and finished in black textured epoxy powder coat.
13-4704	Heater-AC 24V	Cooling	-21000 Btu/hr (6150 W)	
13-4723	Air Conditioner 12V	Air Flow	-450 CFM (765 m <sup>3</sup> /h)	* Only for Heat/AC version. Heater and Evaporator Coil can be changed to have opposite connections.
13-4724	Air Conditioner 24V	Current	-23 Amps/13.5V	
13-4795	Heater Conv. Kit	Weight	-11.5 Amps/27V -49 lbs. (22.2 kg)	

## Features

The 347 is a larger capacity version of the 346. The coils can be flipped to either side of the unit to accommodate different installations. Outside air is available. This high capacity unit will handle most off-road cabs.

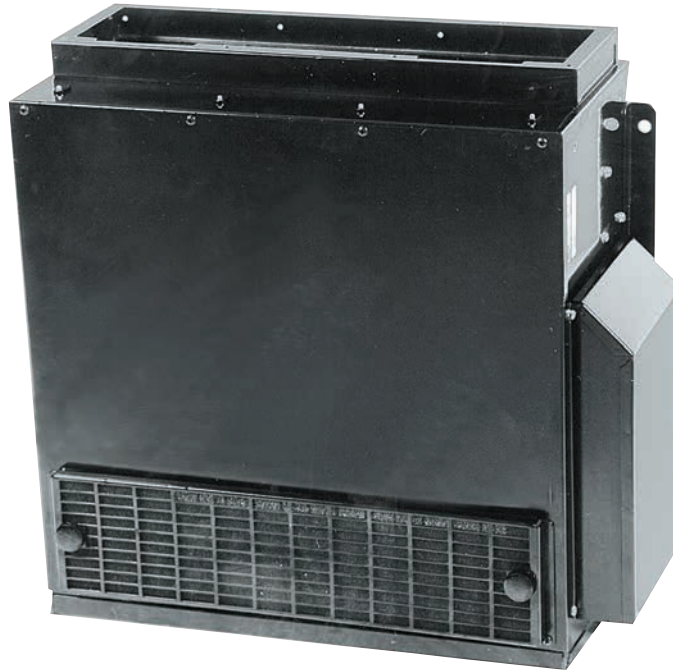
### Dimension Profiles



### Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2215	Casing Assy.	9F	25-0271	Motor Mount	21	26-0350*	Rotary Control
2	24-2216	Cover Assy.	9G	25-0601	Resistor 12V	22	26-0376	Air Filter
3	24-1956	Coil Bracket		25-0602	Resistor 24V	23	26-0377*	Bowden Cable
4	24-1957	Coil Bracket	9H	29-0130	Resistor Bracket	24	27-0059*	Gear Clamp
5	24-1958	Drain Pan	10	21-0313	Evaporator Coil	25	27-0225*	Heater Hose
6	24-2228	Coil Support Assy.	11	22-0290*	Heater Coil	26	27-0602	5/8" (HD)
7	24-1960	Coil Support	12	23-0005	Louver	27	28-0004	O-Ring #8
8	24-1961	Filter Holder	13	23-0048	Adapter	28	28-0012	Grommet
9	15-1561	Blower 12V	14	25-0044	Blower Switch	29	28-0172	Snap-in Plug
	15-1562	Blower 24V	15	25-0118	Thermostat	30	28-0187	Overlay
9A	25-0048	Blower Housing	16	25-0435	Knob		28-0189*	Reticulated Foam
9B	25-0348	Housing Top	17	25-0631	Switch Push 12V	31	29-0221	Reticulated Foam
9C	25-0060	Venturi		25-0632	Switch Push 24V	32	29-0222	Latch
9D	25-0200	Blower Wheel	18	25-0638	Wiring Harness	33	29-0075	Latch Hook
9E	25-0655	Motor 12V	19	26-0025*	Heater Valve	34	29-0076	Receptacle
	25-0660	Motor 24V	20	26-0190	Block Valve		29-0077	Stud, Oval Slotted Retainer

# Heater-Air Conditioner **Model 353**



## Part Descriptions: Specifications

Part No.		Specifications	
13-5303	Heater-AC 12V	Heating	-46000 Btu/hr (13480 W)
13-5304	Heater-AC 24Vt	Cooling	-34000 Btu/hr (9970 W)
		Air Flow	-450 CFM (765 m <sup>3</sup> /h)
		Current	-10.2 Amps/27V
			-20.4 Amps/13.5V
		Weight	-44 lbs. (22 kg)

Made of 18GA (1.25mm) Cold Rolled Steel and finished in black epoxy powder coat. Dim. marked (\*) are inlet and outlet openings. **Items 18 to 28 are optional and have to be ordered separately.**

## Features

The 353 was designed for log loader applications in Western North America. It is available in many different hose adapter options. It also has a 32" cover option for cab wall mount applications.

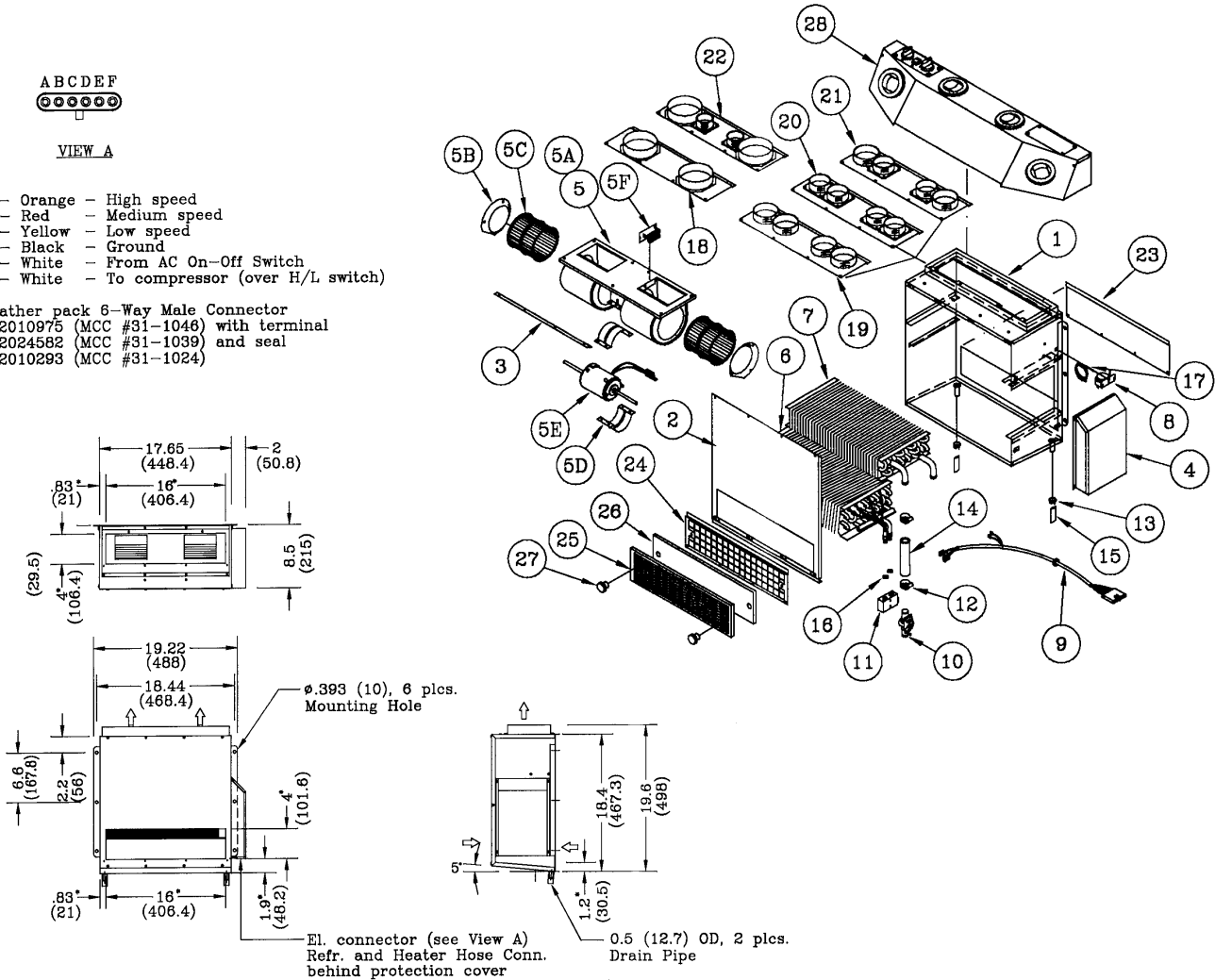
## Dimension Profiles



VIEW A

- A - Orange - High speed
- B - Red - Medium speed
- C - Yellow - Low speed
- D - Black - Ground
- E - White - From AC On-Off Switch
- F - White - To compressor (over H/L switch)

Weather pack 6-Way Male Connector  
 #12010975 (MCC #31-1046) with terminal  
 #12024582 (MCC #31-1039) and seal  
 #12010293 (MCC #31-1024)



## Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2204	Casing	6	21-0337	Evaporator Coil	18	23-0160	HA Plate (2x4")
2	24-2205	Cover	7	22-0299	Heater Coil	19	23-0161	HA Plate (4x3")
3	24-2206	Blower Mount	8	25-0069	Thermostat	20	23-0162	HA Plate (4x2 1/2")
4	24-2207	Protection Cover	9	25-0661	Wiring Harness	21	23-0165	HA Plate (2x3"/2x2 1/2")
5	15-2033	Blower 12V	10	26-0025	Heater Control Valve	22	23-0167	1/2")
	15-2034	Blower 24V	11	26-0190	Block Valve	23	24-1436	HA Plate (2x4"/2x2")
5A	25-0159	Blower Housing	12	27-0059	Gear Clamp	24	24-2212	Cover Plate
5B	25-0164	Venturi	13	27-0091	Drain Hose Clamp	25	24-1524	Grill Support
5C	25-0047	Blower Wheel	14	27-0225	Heater Hose	26	26-0412	Grill
5D	24-0234	Motor Mount	15	27-0421	Drain Valve	27	26-0263	Air Filter
5E	25-0265	Motor 12V	16	27-0602	O-Ring #8	28	13-5391	Knurled Knob
	25-0270	Motor 24V	17	28-0031	PVC Hose		13-5392	Plenum 12V
5F	25-0136	Resistor 12V						Plenum 24V
	25-0552	Resistor 24V						

# Heater-Air Conditioner **Model 360**



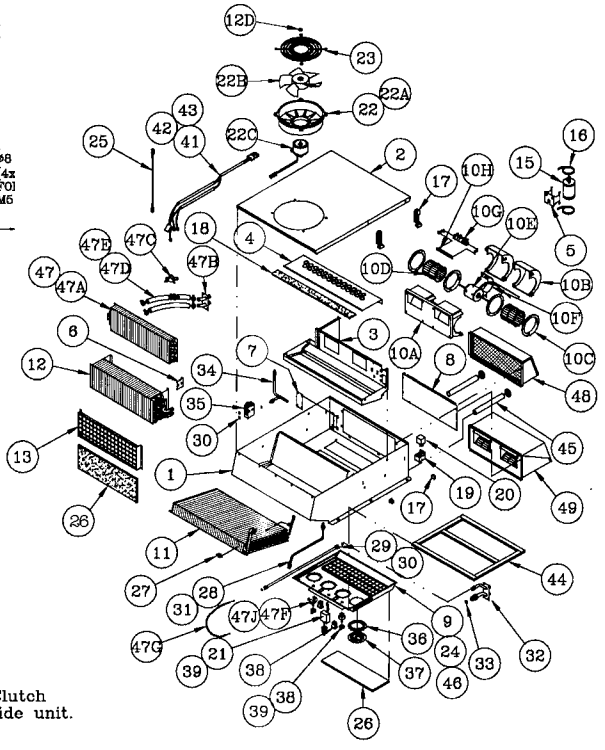
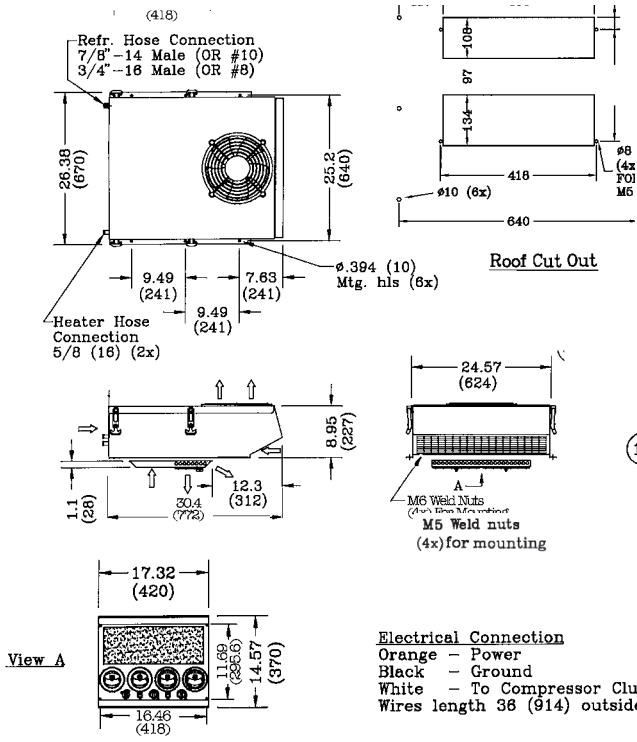
## Part Descriptions: Specifications

Part No.		Specifications		
13-6023	Air Conditioner 12V	Heating	-46000 Btu/hr (13500 W)	Made of 14 (1.5mm) and 16 (1.5mm) GA Cold Rolled Steel and finished in grey semi-gloss epoxy powder coat. <b>Items 47 to 49 are optional and have to be ordered separately.</b>
13-6024	Air Conditioner 24V	Cooling	-27000 Btu/hr (7900 W)	
13-6095	Heater Conv. Kit	Air Flow	-400 CFM (680 m <sup>3</sup> /h)	
		Current	-40 Amps/12V -20 Amps/24V	
		Weight	-77 lbs. (35 kg)	

## Features

The 360 was designed to offer a variety of installation options. It can be set up with an outside air or positive fan presswinger. It is also available with heat. A water and corrosion resistant condenser ensures years of service. Four nylon latches allow easy service access.

### Dimension Profiles

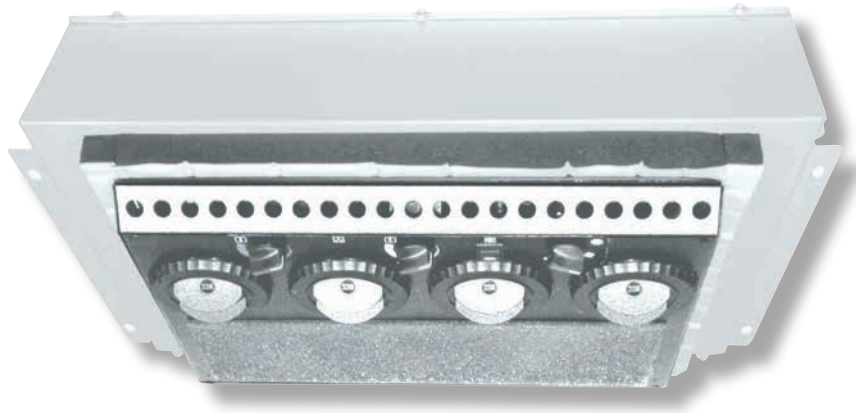


### Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2219	Casing Assy.	17	29-0236	Draw Latch Assy.	37	23-0005	Louver
2	24-2208	Cover Assy.	18	28-0242	Foam	38	25-0044	Blower Switch
3	24-2221	Drain Plate	19	25-0221	Socket Relay	39	25-0435	Knob
4	24-2270	Coil Support	20	25-0251	Relay 12V	40	25-0631	Switch Push 12V
5	24-2429	R.D. Bracket	21	25-0219	Relay 24V	41	25-0632	Switch Push 24V
6	24-2428	Bracket	22	25-0118	Thermostat	42	25-0693	Wiring Harness
7	24-2505	Plate	22	15-7501	Fan Assy. 12V	43	25-0689	Fuse 40A/12V (Blower)
8	24-2226	Cover Plate		15-7502	Fan Assy. 24V		25-0686	Fuse 20A/24V (Blower)
9	24-2430	Air Plenum	22A	25-0577	Venturi	44	25-0688	Fuse 30A/12V (Fan)
10	15-1561	Blower 12V	22B	25-0579	Fan	45	25-0685	Fuse 15A/24V (Fan)
	15-1562	Blower 24V	22C	25-0591	Motor 12V		28-0225	Gasket
10A	25-0048	Blower Housing		25-0592	Motor 24V		27-0030	Drain Hose
10B	25-0348	Housing Top	22D	29-0167	"C" Clip		27-0091	Drain Hose Clip
10C	25-0060	Venturi	23	23-0148	Finger Guard	46	28-0248	Overlay
10D	25-0200	Blower Wheel	24	28-0221	EPDM Seal	47	13-6095	Heater Conv. Kit
10E	25-0655	Motor 12V	25	29-0235	Cable Assy.	47A	22-0301	Heater Coil
	25-0660	Motor 24V	26	28-0244	Air Filter	47B	34-0267	Copper Tube Assy.
10F	25-0130	Motor Mount	27	25-0343	Pressure Switch	47C	26-0074	Heater Valve
10G	25-0601	Resistor 12V	28	34-0397	Copper Tube 3/8"	47D	27-0225	Heater Hose 5/8"
	25-0602	Resistor 24V	29	34-0398	Copper Tube 1/2"	47E	27-0059	Gear Clamp
10H	29-0130	Resistor Bracket	30	27-0602	O-Ring #8	47F	26-0345	Rotary Control
11	21-0341	Condenser Coil	31	27-0601	O-Ring #6	47G	26-0441	Bowden Cable
12	21-0339	Evaporator Coil	32	34-0261	Copper Tube Assy.	47J	25-0435	Knob
13	24-2433	Filter Support	33	27-0603	O-Ring #10	48	16-0200	Filter Unit
14	28-0243	Reticulated Foam	34	34-0364	Copper Tube 3/8"	49	16-0303	Filter Kit 12V
15	26-0018	Receiver Drier	35	26-0190	Block Valve		16-0304	Filter Kit 24V
16	27-1121	Gear Clamp 4"	36	23-0048	Adapter			



# Heater-Air Conditioner **Model 369**



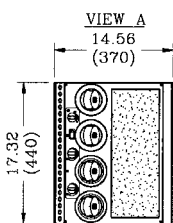
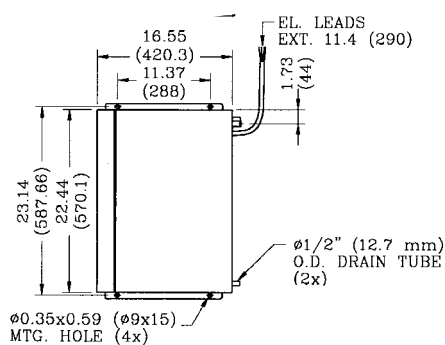
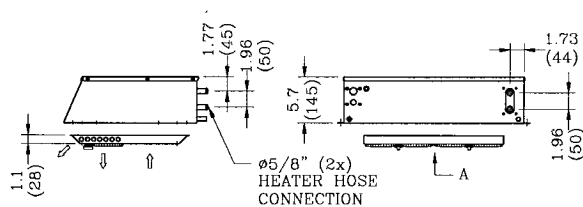
## Part Descriptions: Specifications

Part No.		Specifications		
13-6903	Combo Unit 12V	Heating	-28000 Btu/hr (8200 W)	Casing made of 18GA (1.25mm) Cold Rolled Steel and finished in grey epoxy powder coat.
13-6904	Combo Unit 24V	Cooling	-20000 Btu/hr (5860 W)	
		Air Flow	-275 CFM (468 m <sup>3</sup> /h)	
		Current	-12 Amps/12V -6 Amps/24V	
		Weight	-30.9 lbs. (14 kg)	

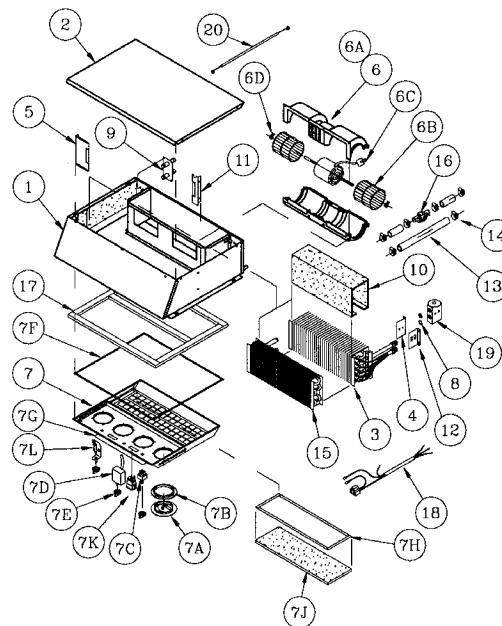
## Features

The 369 is a low profile roof mount heater-air conditioner.

## Dimension Profiles



**EL. CONNECTIONS**  
 ORANGE -POWER (+)  
 BLACK -GROUND (-)  
 WHITE -TO PRESSURE SWITCH/COMPRESSOR  
 BLUE -TO CONDENSER/RELAY (IF FAN COND.)



## Part Descriptions: Specifications

No.	Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
1	24-2842	Casing Assembly	7b	23-0048	Adapter	11	24-2722	Coil Support Bracket
2	24-2843	Cover Assembly	7c	25-0044	Blower Switch	12	24-2719	Valve Mtg. Bracket (R)
3	21-0399	Evaporator Coil	7d	25-0118	Thermostat	13	27-0225	Heater Hose (2x70mm&180mm)
4	24-2718	Valve mtg. brkt (L)	7e	25-0435	Knob	14	27-0059	Gear Clamp
5	24-2721	Coil Support (Long)	7f	28-0161	EPDM Seal (10mm)	15	22-0376	Heater Coil
6	15-0533	Blower 12V	7g	28-0248	Overlay	16	26-0025	Heater Valve
6	15-0534	Blower 24V	7h	28-0166	Hook Tape	17	28-0225	Gasket
6a	25-0017	Blower Housing	7j	28-0244	Air Filter	18	25-0737	Wiring Harness
6b	25-0021	Blower Wheel	7k	25-1106	Rocker Switch (G) 24V	19	26-0190	Block Valve
6c	25-0644	Motor 24V	7k	25-1105	Rocker Switch (G) 12V	20	26-0590	Bowden Cable
6c	25-0643	Motor 12V	7L	26-0350	Rotary Control w/nut			
6d	25-0022	Clip	8	27-0602	O-Ring #8			
7	26-0584	Air Plenum Assy. 24V	9	34-0560	Copper Tube Assy.			
7	26-0583	Air Plenum Assy. 12V	10	28-0230	Reticulated Foam			
7a	23-0005	Louver						

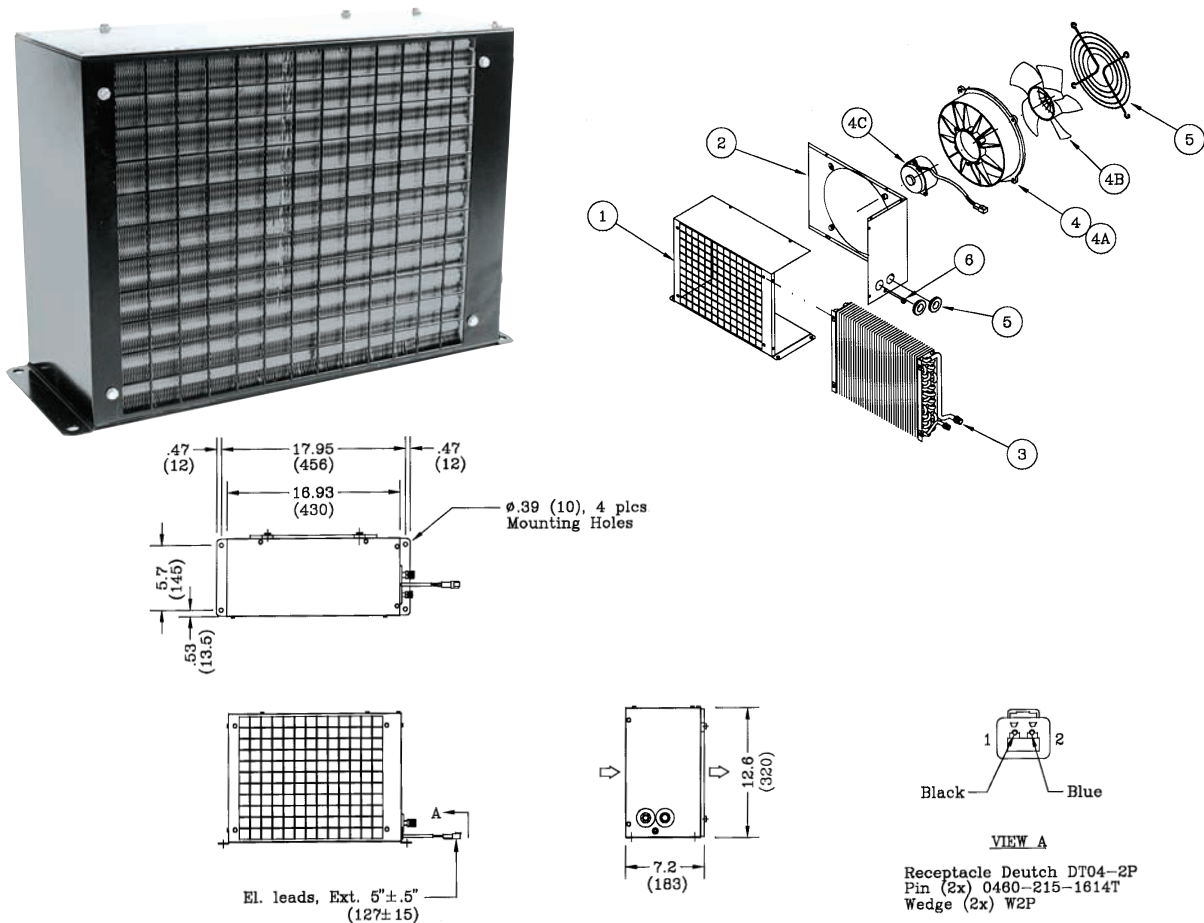


## Notes



# X. Compact Condensers

# Electric Condenser **Model 402**



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
14-0201	1	24-1591	Casing	4B	25-0579	Fan
14-0202	2	24-1592	Cover	4C	25-0621	Motor Assy. 12V
<b>Specifications</b>	3	21-0278	Condenser Coil		25-0622	Motor Assy. 24V
Capacity	4	15-7511	Fan Assy. 12V	5	28-0005	Grommet
	4A	15-7512	Fan Assy. 24V	6	28-0014	Grommet
		25-0577	Venturi	7	23-0148	Finger Guard

Capacity -to support a cooling capacity of 26500 Btu/hr (7770 W)

Air Flow -1025 CFM (1735 m<sup>3</sup>/h)

Current -21.2 Amps/13.5V  
-10.6 Amps/27V

Weight -24 lbs. (11 kg)

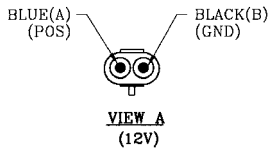
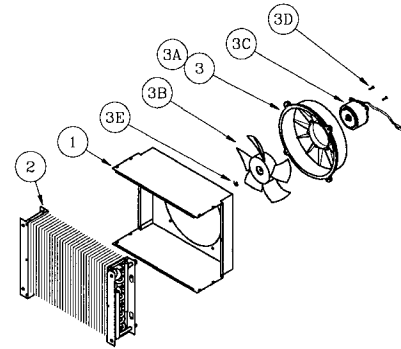
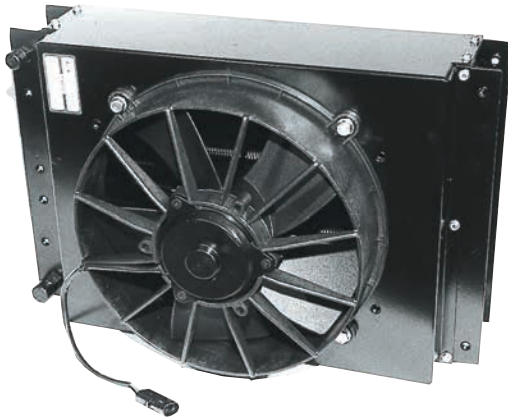
Casing made of 14/18GA (2/1.25mm) Cold Rolled Steel finished in black semi-gloss epoxy powder coat.

### Features

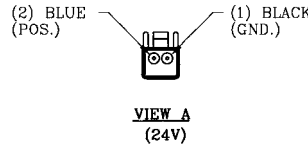
The 402 is an excellent light duty application condenser. It provides the option of deck or roof mounting.

Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and/or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

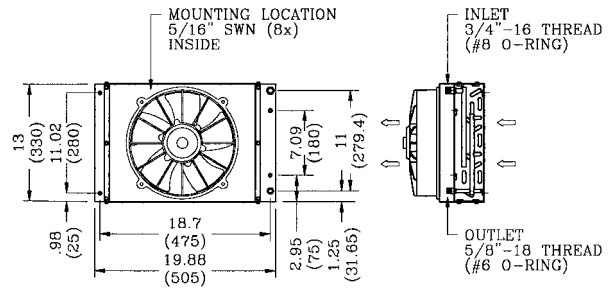
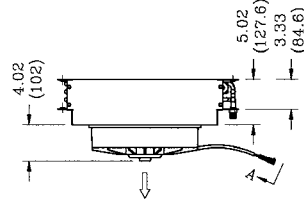
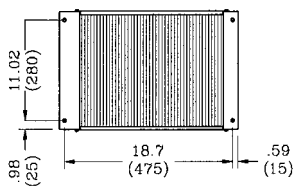
# Electric Condenser Model 403



**Electrical Connections**  
 2-way male weather pack connector, packard #12010973 (MCC #31-1068) with male terminal #12124582-L (2x) (MCC #31-1039) and seal #12010293 (2X) (MCC #31-1024)



**Electrical Connections**  
 2-way deutsch plug DT06 - 2S (MCC #31-1123) with #W2S wedge (MCC #31-1124) and 2 contacts 14/16Ga #0462-209-1614 (MCC #31-1125)



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description			
14-0301	Condenser 12V	1	24-2514	Casing	25-0778	Motor 24V			
14-0302	Condenser 24V	2	21-0412	Condenser Coil	3C	25-0591	Motor 12V		
<b>Specifications</b>	Capacity	-To support a cooling capacity of 29700 Btu/hr (8700 W)	3	15-7604	Fan Assembly 24V	3D	29-0166	#10-32 Hex. Socket	
		Airflow	-1150 CFM (1950 m <sup>3</sup> /h)	3	15-7601	Fan assembly 12V	3E	29-0197	"C" Clip
		Current	-19.2 Amps (at 13.5V)	3A	25-0577	Venturi			
			-9 amps (at 27V)	3B	25-0728	Fan			
Weight	-28.7 lbs (13kg)								

Capacity  
 Airflow  
 Current  
 Weight

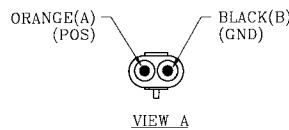
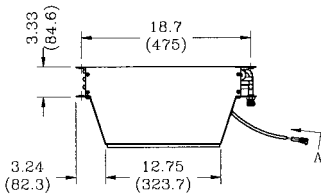
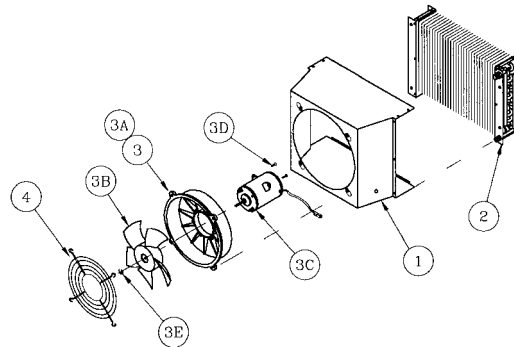
Electrical condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and /or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

Note: Casing made of 16GA satin coat steel, endplates made of 14GA satin coat steel and both finished in black semi gloss epoxy powder coat.

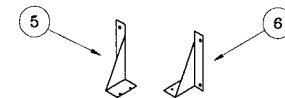
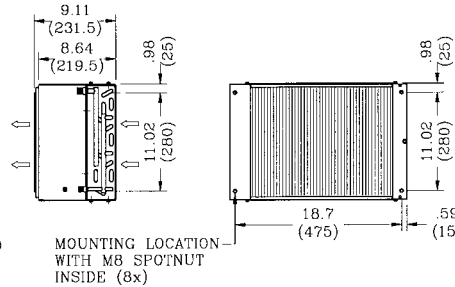
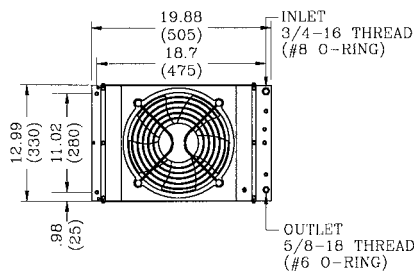
## Features

The 403 is a compact high performance condenser.

# Electric Condenser **Model 405**



**Electrical Connections:**  
 2-way male weather pack connector, packard #12010973 (MCC #31-1068) with male terminal #12124582-L)(2x) (MCC #31-1039) and seal #12010293 (2x) (MCC #31-1024)



## Part Descriptions: Specifications

Part No.	Description
14-0513	Condenser 12V
14-0514	Condenser 24V

Specifications	
Capacity	-to support a cooling capacity of 29650 Btu/hr (8700 W)
Air Flow	-1150 CFM (1950 m <sup>3</sup> /h)
Current	-17 Amps (1.35V)
Weight	-8.5 Amps at (27V) -28.5 lbs. (13 kg)

No.	Part No.	Description
1	24-2892	Casing
2	21-0412	Condenser Coil
3	15-7551	Fan Assy. 12V
3A	15-7552	Fan Assy. 24V
	25-0577	Venturi
3B	25-0579	Fan

No.	Part No.	Description
3C	25-0745	Motor 12V
	25-0746	Motor 24V
3D	29-0166	#10 -32 HEX. Socket CTR.Sunk
3E	29-0167	"C" clip
4	23-0148	Finger Guard
5	24-3639	Bracket, Left (Opt.)
6	24-3640	Bracket, Right (Opt.)

**Items 5 and 6 have to be ordered separately.**

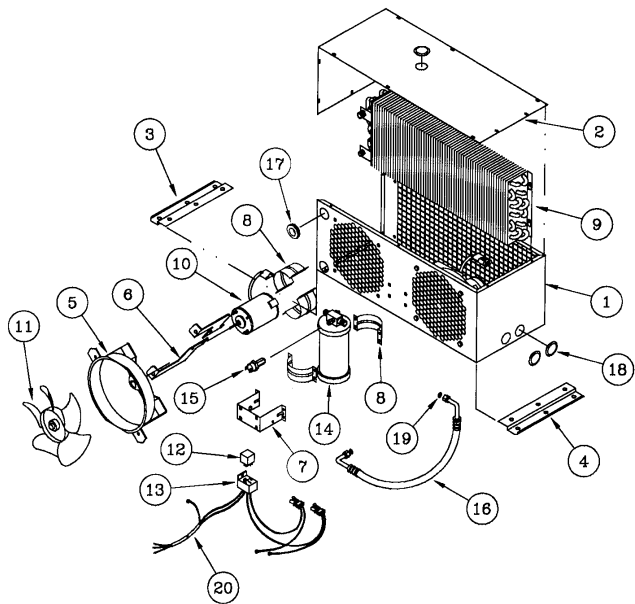
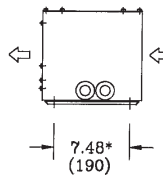
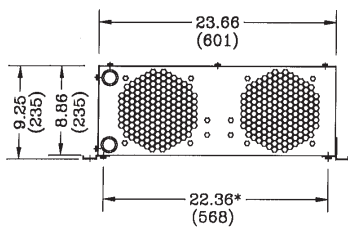
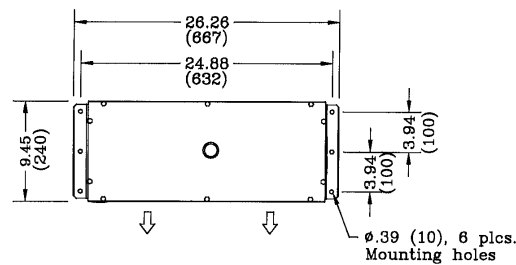
Casing made of 16GA (1.5mm) Satin Coat Steel. Endplates made of 14GA (2mm) Satin Coat Steel. Both are finished in black semi-gloss epoxy powder coat.

Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and /or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

## Features

The 405 is a compact, high capacity unit. Its compact design allows for wall or flush mounting applications in engine compartments. A motor with longer life than in the 403 is used in this condenser which makes it slightly deeper.

# Electric Condenser Model 406



**Note**  
El. Wiring and Refr. Hose to be connected inside casing

**Wiring**  
Orange(+), Black(-)  
Blue (from On-Off AC)

**Refrigerant**  
Inlet-3/4"-18 Male (# 8 O-Ring)  
Outlet-5/8"-18 Male (#6 O-Ring)

(\*) - Dimensions of Mounting Hole (M8 Thd)

## Part Descriptions: Specifications

Part No.		No.	Part No.	Description	No.	Part No.	Description
14-0611	Condenser 12V	1	24-0145	Casing	11	25-0108	Fan
14-0612	Condenser 24V	2	24-0159	Cover	12	25-0251	Relay 12V
<b>Specifications</b>		3	24-1993	Mounting Bracket (L)	25-0219	Relay 24V	
Capacity	-to support a cooling capacity of 23600 Btu/hr (6925 W)	4	24-1998	Mounting Bracket (R)	13	25-0221	Socket, Relay
Air Flow	-950 CFM (560 m <sup>3</sup> /h)	5	25-0309	Venturi Assy.	14	26-0220	Receiver Drier
Current	-14 Amps/13.5V	6	25-0434	Motor Support	15	25-0343	Pressure Switch
	-7 Amps /27V	7	24-0343	Receiver Drier Bracket	16	27-0288	Refr. Hose Assy. #6
Weight	-30 lbs. (13.6 kg)	8	24-0234	Mount	17	28-0005	Grommet
		9	21-0122	Condenser Coil	18	28-0013	Snap-in Plug
		10	25-0470	Motor 12V	19	27-0601	O-Ring #6
			25-0490	Motor 24V	20	25-0451	Wiring Harness

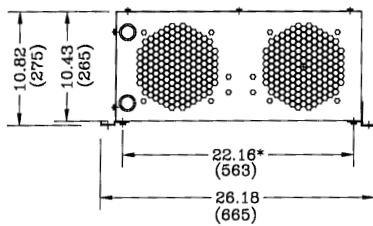
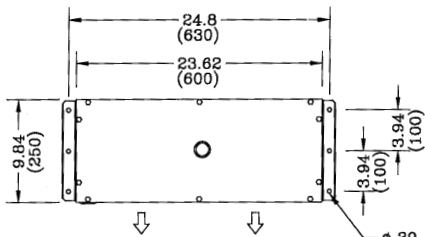
Casing made of 16GA (1.5mm) and mounting brackets of 14GA (2mm) Cold Rolled Steel finished in black semi-gloss epoxy powder coat.

Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and /or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

## Features

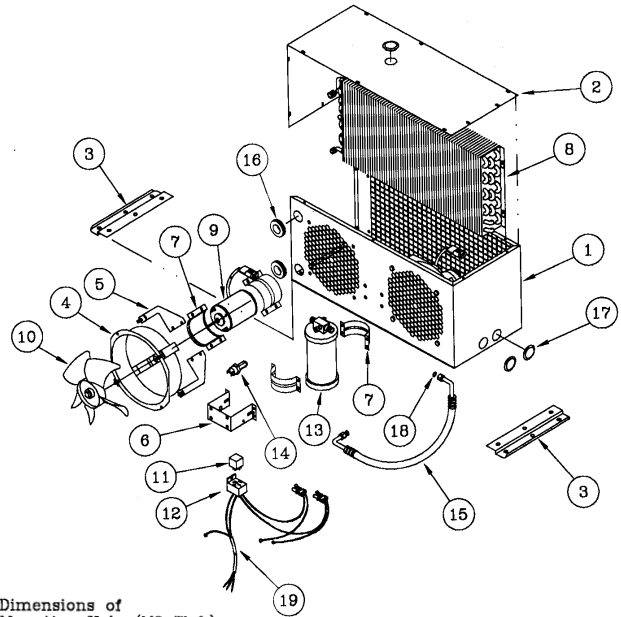
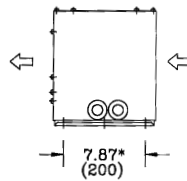
The 406 is a deck or roof mount condenser that has the receiver/drier mounted internally. The hose can exit either side of the 406. Condenser must be mounted as shown in picture.

# Electric Condenser **Model 407**



∅.39 (10), 6 pls. Mounting Holes

(\*) - Dimensions of Mounting Hole (M8 Thd.)



**Note**  
El. Wiring and Refr. Hose to be connected inside casing

**Wiring**  
Orange(+), Black(-)  
Blue (from On-Off AC)

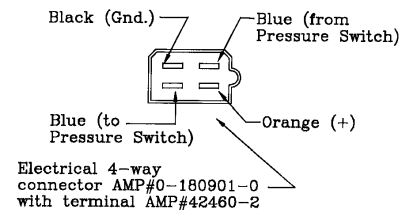
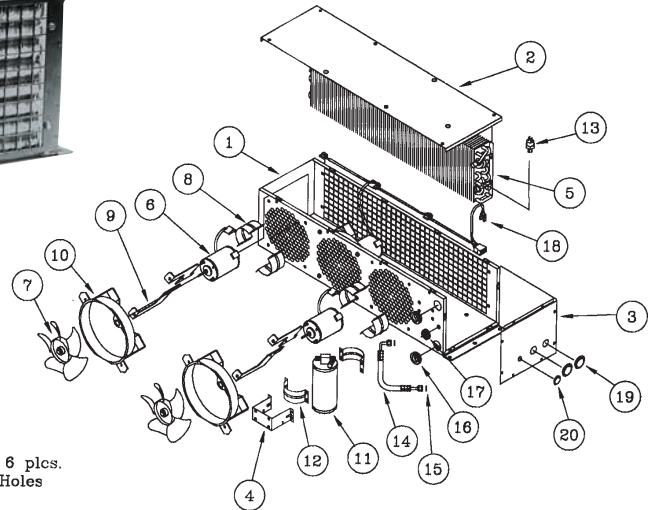
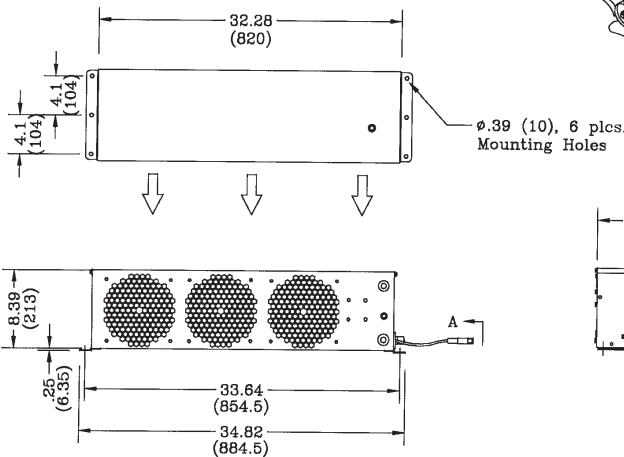
**Refrigerant**  
Inlet-3/4"-16 Male (# 8 O-Ring)  
Outlet-5/8"-18 Male (#6 O-Ring)

## Features

The 407 is a larger capacity version of the 406. With the receiver/drier mounted internally, installation time is minimized. Condenser must be mounted as shown in picture.



# Electric Condenser **Model 408**



View A

## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
14-0851	Condenser 12V	1	24-0964	Casing	11	26-0219	Receiver Drier
14-0852	Condenser 24V	2	24-0965	Cover	12	25-0297	Mount
<b>Specifications</b>		3	24-0966	Side Cover	13	25-0308	Pressure Switch
Capacity	-to support a cooling capacity of 29000 Btu/hr (8500 W)	4	24-0967	Receiver Drier Bracket	14	27-0373	Refrigerant Hose #6
Air Flow	-1050 CFM (1785 m <sup>3</sup> /h)	5	21-0166	Condenser Coil	15	27-0601	O-Ring #6
Current	-20 Amps/13.5V	6	25-0185	Motor 12V	16	28-0005	Grommet
	-10 Amps/27V	7	25-0190	Motor 24V	17	28-0004	Grommet
Weight	-47 lbs. (21.3 kg)	8	25-0108	Fan C.C.W.	18	25-0450	Wiring Harness
Casing made of 16GA (1.5mm) and mounting bracket of 14GA (2mm) Cold Rolled Steel finished in black semi-gloss epoxy powder coat.		9	24-0234	Motor Mount	19	28-0013	Snap-in Plug
		10	25-0434	Motor Support	20	28-0011	Snap-in Plug
			25-0309	Venturi Assy.			

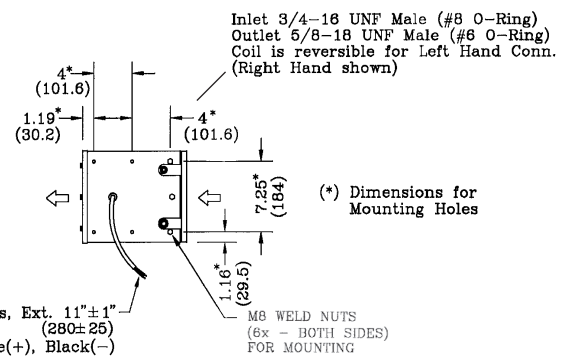
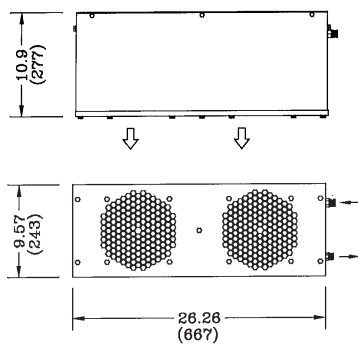
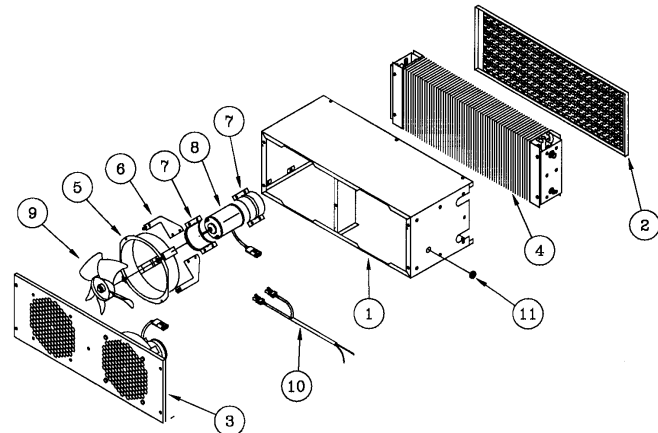
Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and /or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

## Features

The 408 was designed for large capacity requirements in the forestry, construction and mining industries. Its three fan design ensures high capacity performance in the most demanding conditions. Receiver/drier mounted internally. Condenser must be mounted as shown in picture.



# Electric Condenser **Model 409**



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description
14-0901	1	24-1967	Casing	7	24-0234	Motor Mount
14-0902	2	24-1966	Grill	8	25-0181	Fan
	3	24-1968	Cover	9	25-0470	Motor 12V
	4	21-0309	Condenser Coil		25-0490	Motor 24V
	5	25-0388	Venturi	10	25-0635	Wiring Harness
	6	25-0434	Motor Support	11	28-0045	Grommet

### Specifications

Capacity -to support a cooling capacity of 28500 Btu/hr (8350 W)

Air Flow -1100 CFM (1870 m<sup>3</sup>/h)

Current -14 Amps/13.5V  
-7 Amps/27V

Weight -46 lbs. (21 kg)

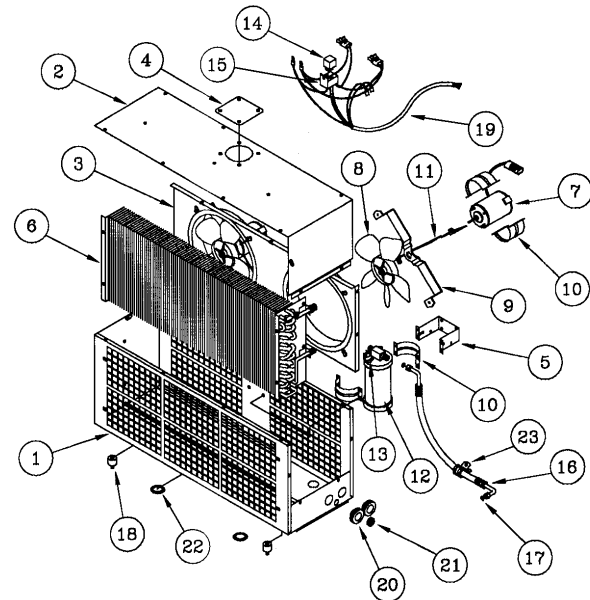
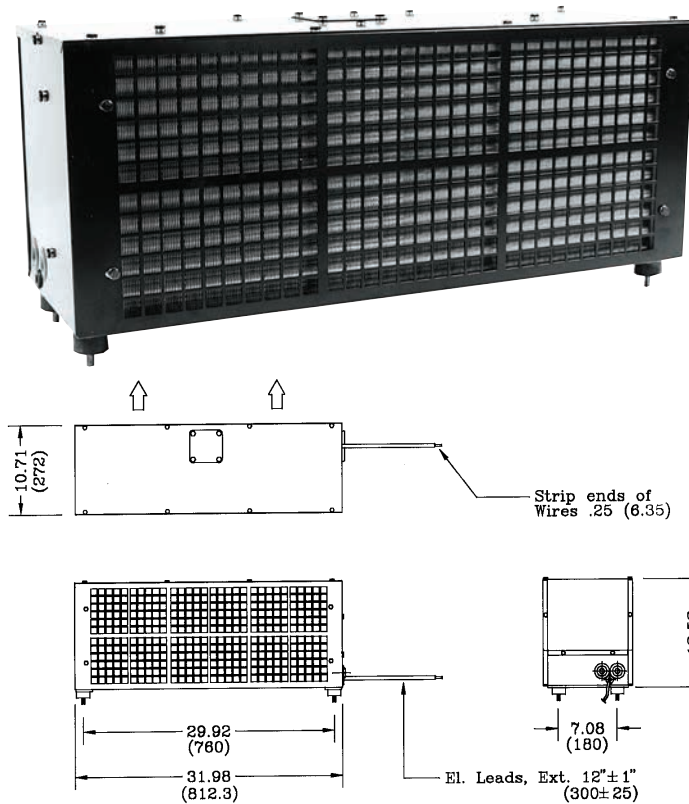
Casing made of 16GA (1.5mm) Cold Rolled Steel finished in black semi-gloss epoxy powder coat.

Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and/or when additional heat overload the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

### Features

The 409 is a universal mount electric condenser. It does not have the receiver/drier mounted internally. This allows for many different installation options. Condenser can be mounted vertically or horizontally.

# Electric Condenser **Model 410**



## Part Descriptions: Specifications

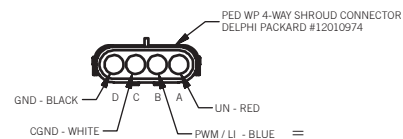
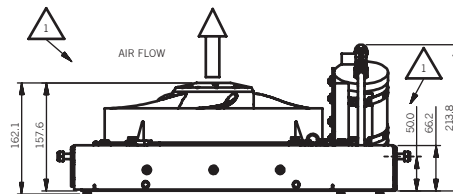
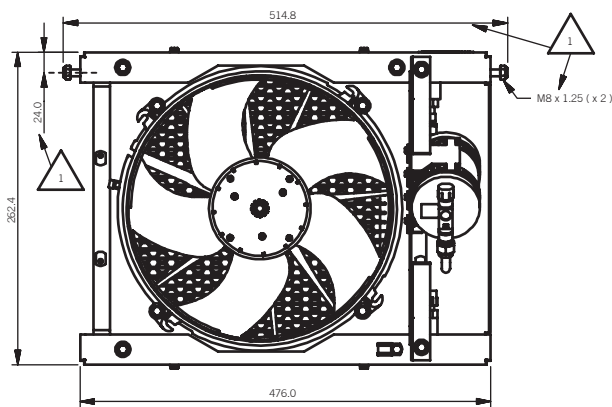
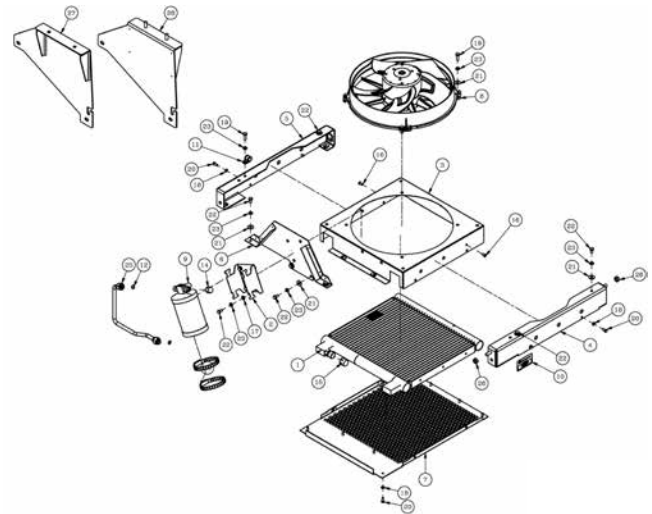
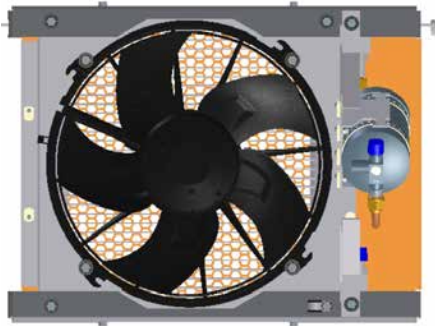
Part No.	No.	Part No.	Description	No.	Part No.	Description
14-1001		14-1001	Condenser 12V	13	25-0308	Pressure Switch
14-1002		14-1002	Condenser 24V	14	25-0251	Relay 12V
<b>Specifications</b>						
Capacity	-to support a cooling capacity of 41600 Btu/hr(12200 W)		15	25-0219	Relay 24V	
Air Flow	-1900 CFM (3230 m <sup>3</sup> /h)		16	25-0221	Socket	
Current	-24 Amps/13.5V		17	27-0379	Refrigerant Hose #6	
	-12 Amps/27V		18	27-0601	O-Ring #6	
Weight	-65 lbs. (29.5 kg)		19	28-0057	Vibration Mount	
Casing made of 16GA (1.5mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.			20	25-0394	Wiring Harness	
			21	28-0045	Grommet	
			22	28-0005	Grommet	
			23	28-0013	Plastic Plug	
				27-0012	Hose Clamp #6	
			1	24-0925	Casing	
			2	24-0926	Cover	
			3	24-0927	Fan Mounting Plate	
			4	24-0928	Cover Plate	
			5	24-0929	Receiver Drier Bracket	
			6	21-0188	Condenser Coil	
			7	25-0470	Motor 12V (B.B.)	
				25-0229	Motor 24V (B.B.)	
			8	25-0302	Fan	
			9	24-0963	Motor Bracket	
			10	24-0234	Motor Mount	
			11	24-0962	Motor Support	
			12	26-0219	Receiver Drier	

Electric condensers are used when radiator mounted types cannot be installed. The reasons being insufficient air flow and /or when additional heat load over the engine cannot be tolerated. Condensing capacity will remain constant and will not be dependent on engine RPM.

## Features

The 410 was designed for high capacity off-road applications. Its large design has flexible hose routing options. The receiver/drier is mounted internally. Condenser must be mounted as shown in picture.

# Electric Condenser **Model 443**



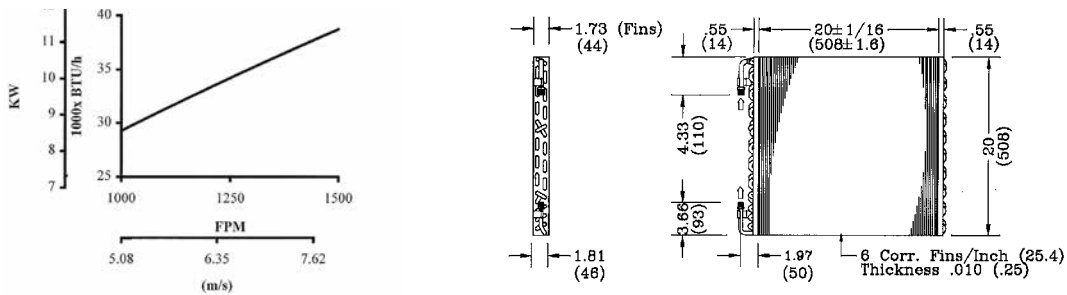
## Part Descriptions: Specifications

Part no.	No.	Part No.	Description	No.	Part No.	Description	
14-4302	Condenser 24V	1	21-1855	CONDENSER	11	27-0082	P-Clamp #08
		2	24-12022	Receiver Bracket	12	27-0601	O-Ring #6
		3	24-12040	Condenser Casing	13	27-1211	Gear Clamp 3"
		4	24-12041	Condenser Supp. Back	14	28-0345	Plastic Cap #6
		5	24-12042	Condenser Supporter	15	28-0348	Plastic Cap #8
		6	24-12043	Receiver Support	16	29-0315	Pop Rivet 3/16"x.44"
		7	24-12044	Condenser Cover	17	29-0500	Washer M6 SS
		8	25-3089	Fan EBМ 24V	18	29-0514	Washer M5 SS
		9	26-0018	Receiver Drier	19	29-0520	Bolt M6x20 SS
		10	26-1916	MCC Label for 14-4302	20	29-0626	Bolt M5x12 SS
					21	29-0555	Washer M6 S.S.
					22	29-0753	Bolt M6x12 SS
					23	29-1252	Lock Washer M6
					24	31-1164	Conduit 3/8" L=300mm
					25	34-4810	Copper Tube 3/8"
					26	29-1455	M8 LOCKNUT w/NYLON IN
Specifications							
Heating	23.000	Btu/hr					
Air flow	1000	CFM					
Current	2.0	AMPS					
Weight	10.7KG						
	(13.8KG with mounting brackets and mtg. fastners)						

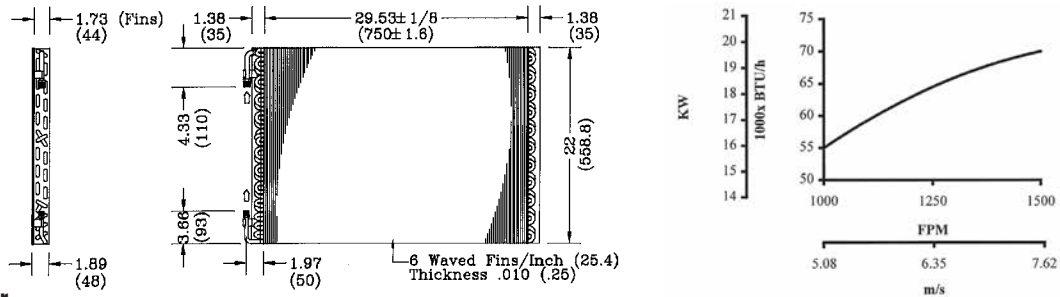
# Condensers Radiator Mount

MCC's heavy duty radiator mounted condensers are the least expensive alternative compared to forced air types. They are manufactured in-house using 0.008-0.010" (0.20mm-0.25mm) thick aluminum fins and copper tubes. With endplates made of 16GA (1.5mm) Satin Coat Steel. Waved or corrugated fins are available, as indicated on the drawings. In addition to the heavy fin thickness, the edges are rippled, increasing the strength further. Low fin density makes cleaning easier and provides less pressure drop. Please keep in mind that the MCC condensers are developed for off-road environments. Condensers are painted black. In and outlet tubes are reinforced with metal brackets where required. All coils are pressure tested to a minimum of 300 psi (2.1 MPa) .

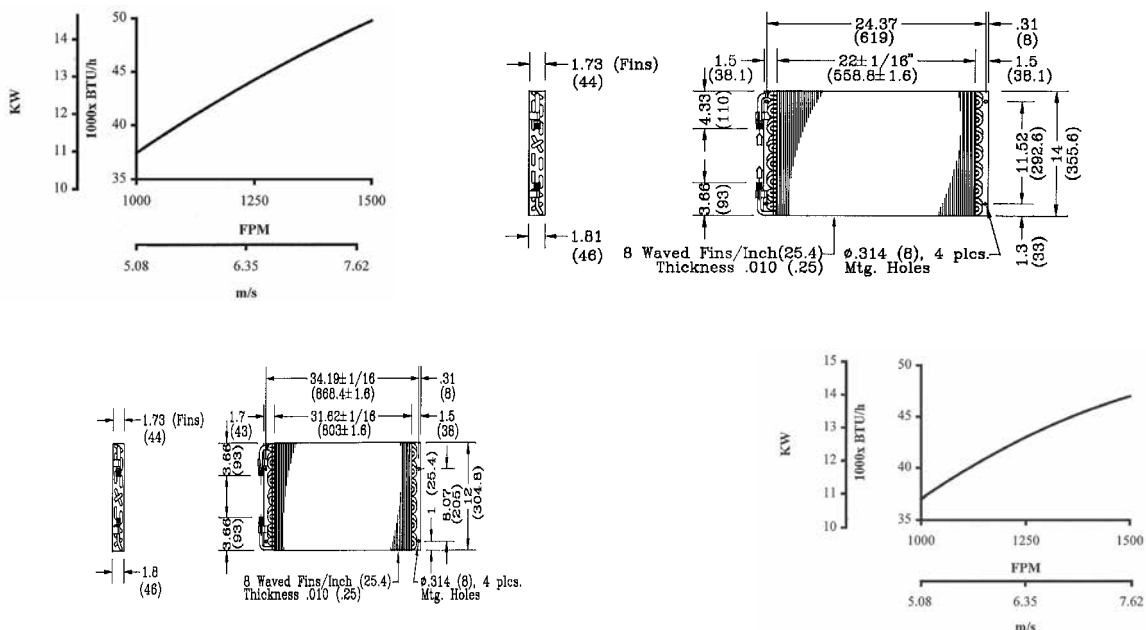
## 21-0089 Condenser



## 21-0176 Condenser



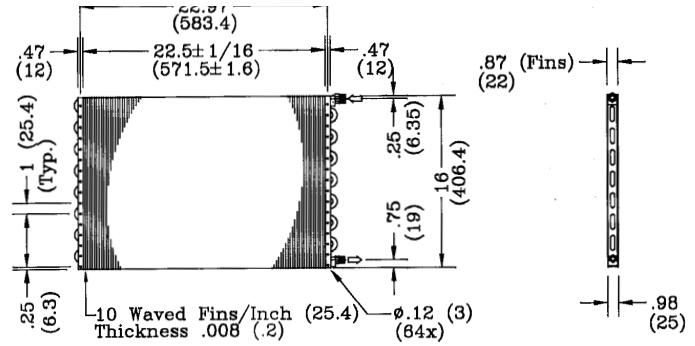
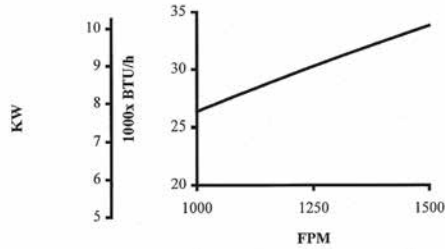
## 21-0320 Condenser



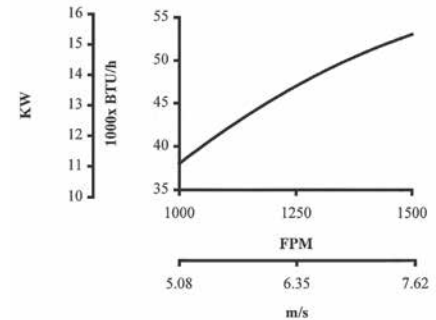
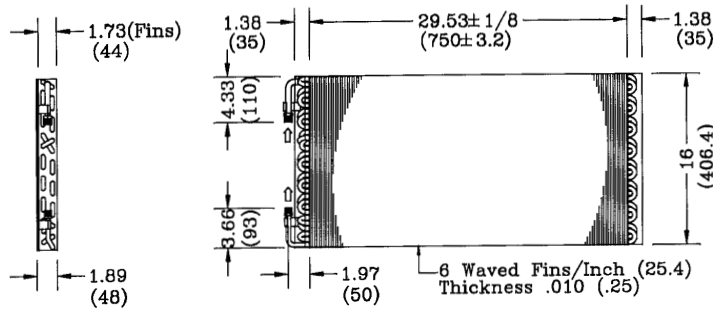
Note: Capacity based on 100°F (38°C) air temp. and 140°F (60°C) condensing temp.  
 Inlet -3/4-16 UNF Male (O-Ring #8) Outlet -5/8-18 UNF Male (O-Ring #6)

# Condensors Radiator Mount

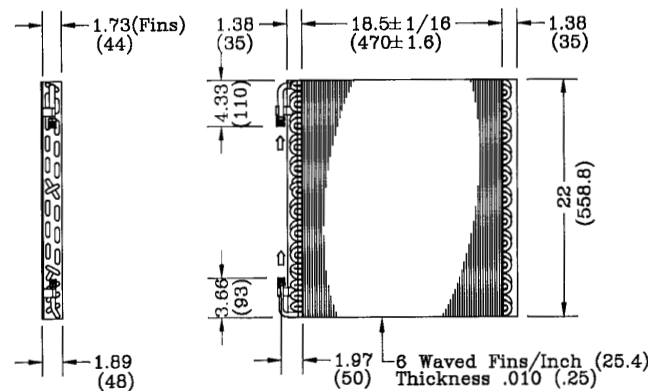
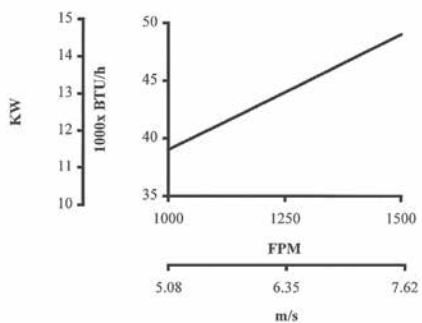
## 21-0020 Condenser



## 21-0322 Condenser



## 21-0324 Condenser



Note: Capacity based on 100°F (38°C) air temp. and 140°F (60°C) condensing temp.  
 Inlet -3/4-16 UNF Male (O-Ring #8) Outlet -5/8-18 UNF Male (O-Ring #6)

# Notes

## Notes



# XI. Compressors



## Compressor Valeo **TM-08**

# Compact and adaptable for Off Road equipment

The TM series compressors were designed to cover a wide range of applications, ideal for any customer requiring adaptation flexibility. The TM compressors incorporate the latest design improvements to better meet the needs of today's Heavy Duty systems.

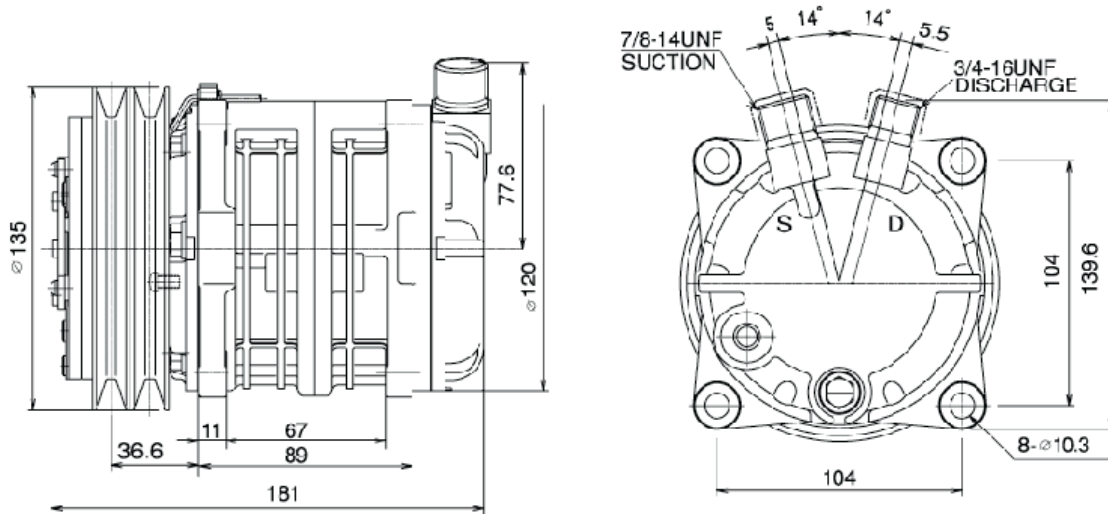
The TM family boasts extends to:

- The drive end, through a wide range of interchangeable pulley profiles (A, B and PKP), pitch diameters and bi-directional clutch plates
- The refrigerant connections end, through a range of back caps or a wide range of fittings that are pad-mounted to the back cap



### Features

- High efficiency and performance
- Lightweight and compact compressor
- Many adaptations with a large choice of clutches and fittings
- High reliability
- Low vibrations and noise
- Suitable for heavy duty applications



### Technical Data

Rotation	CW / CCW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	5 in <sup>3</sup> (82 cm <sup>3</sup> )
Number of pistons	6
Refrigerant	R134a
Pulleys <sup>[1]</sup>	125-2AG 135-1AG 135-2AG 137-1bg 119 (4PK / 6PK / 8PK)
Mounting	EAR
Unloading steps	N/A
Oil charge	ZXL 100PG PAG OIL 5.3 oz (150 cm <sup>3</sup> )
Weight (without clutch)	9 lbs (4.1 kg)

[1] Outside diameters

## Compressor Valeo TM-13

# Heavy duty for Truck and Off Road equipment

The TM series compressors were designed to cover a wide range of applications, ideal for any customer requiring adaptation flexibility. The TM compressors incorporate the latest design improvements to better meet the needs of today's heavy duty systems.

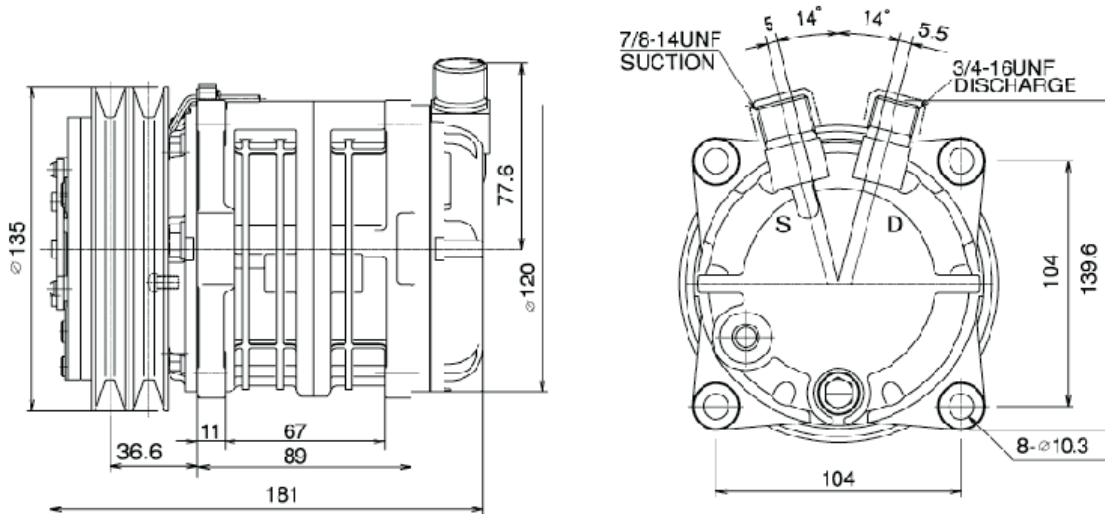
The TM family boasts extends to:

- The drive end, through a wide range of interchangeable pulley profiles (A, B and PKP), pitch diameters and bi-directional clutch plates
- The refrigerant connections end through a range of back caps or a wide range of fittings that are pad-mounted to the back cap
- Two alternative mounting provisions: Ear or Direct



### Features

- Adaptable heavy duty compressors
- High efficiency and performance
- Lightweight and compact
- High reliability
- Low vibrations and noise



### Technical Data

Rotation	CW / CCW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	8 in <sup>3</sup> (131 cm <sup>3</sup> )
Number of pistons	6
Refrigerant	R134a
Pulleys <sup>[1]</sup>	135-1AG 135-2AG 137-1bg 119 (4PK / 6PK / 8PK)
Mounting	Ear or Direct
Unloading steps	N/A
Oil charge	ZXL 100PG PAG OIL 5.3 oz (150 cm <sup>3</sup> )
Weight (without clutch)	10 lbs (4.4 kg)

[1] Outside diameters

## Compressor Valeo **TM-15**

# Heavy duty for Truck, Bus and Off Road equipment

The TM series compressors were designed to cover a wide range of applications, ideal for any customer requiring adaptation flexibility. The TM compressors incorporate the latest design improvements to better meet the needs of today's Heavy Duty systems.

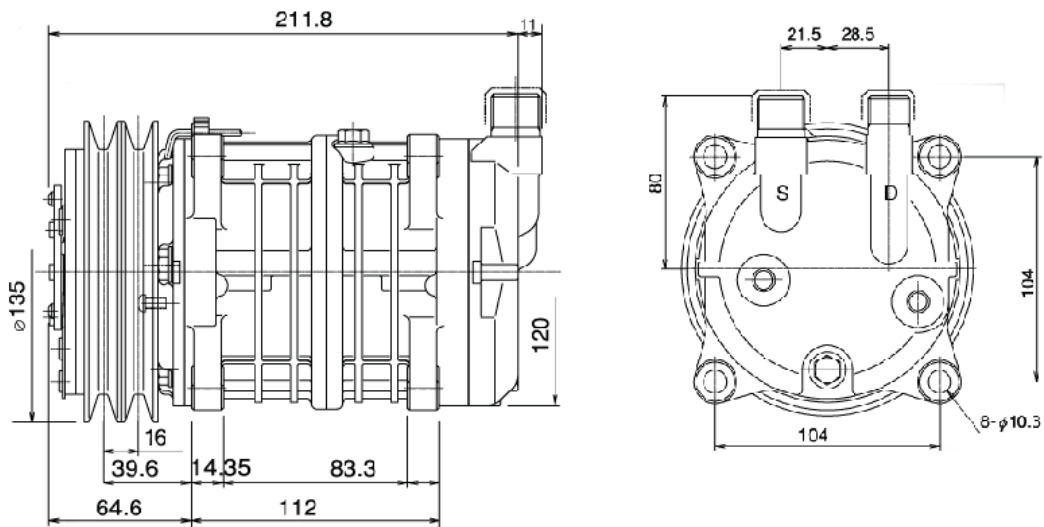
The TM family boasts extends to:

- The drive end, through a wide range of interchangeable pulley profiles (A, B and PKP), pitch diameters and bi-directional clutch plates
- The refrigerant connections end through a range of back caps or a wide range of fittings that are pad-mounted to the back cap
- Two alternative mounting provisions: Ear or Direct



### Features

- Adaptable heavy duty compressors
- High efficiency and performance
- Lightweight and compact
- High reliability
- Low vibrations and noise



## Technical Data

Rotation	CW / CCW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	9 in <sup>3</sup> (147 cm <sup>3</sup> )
Number of pistons	12 (6 x 2)
Refrigerant	R134a
Pulleys <sup>[1]</sup>	135-1AG 135-2AG 137-1bg 119 (4PK / 6PK / 8PK)
Mounting	Ear or Direct
Unloading steps	N/A
Oil charge	ZXL 100PG PAG OIL 5.3 oz (150 cm <sup>3</sup> )
Weight (without clutch)	10 lbs (4.4 kg)

[1] Outside diameters

## Compressor Valeo **TM-16**

# Provides the largest cubic displacement in its class

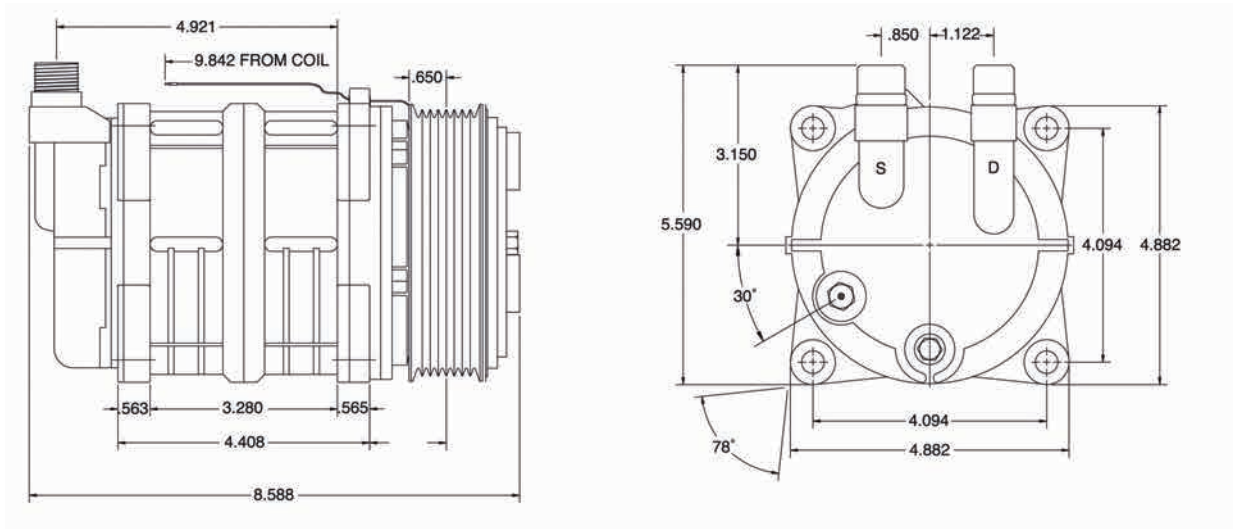
At 10 in<sup>3</sup> (164 cm<sup>3</sup>) displacement, the TM-16 compressor has the largest displacement in the light transit segment today.

Its capacity at idle is virtually unmatched in the marketplace and has a proven track record of superior durability.



### Features

- Six cylinder, balanced swash plate design offers low pulsation noise, quiet and smooth operation, less vibration and lower horsepower requirements
- Ball and shoe design promotes lubrication for better compressor durability
- Lip shaft seal assures excellent sealing integrity and extends compressor life
- Needle bearings ensure high durability for long life and high-speed operation
- Coated steel swash plate provides additional protection during liquid slugging, and high load conditions



Note: Dimensions in mm only.

### Technical Data

Rotation	CW or CCW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	10 in <sup>3</sup> (164 cm <sup>3</sup> )
Number of pistons	6
Refrigerant	R134a
Pulleys	2A/6PK/8PK/10PK
Mounting	Ear or direct
Unloading steps	N/A
Oil charge	ZXL 6.6 fl.oz (180 cm <sup>3</sup> )
Weight (with clutch)	15.7 lbs (7.1 kg)

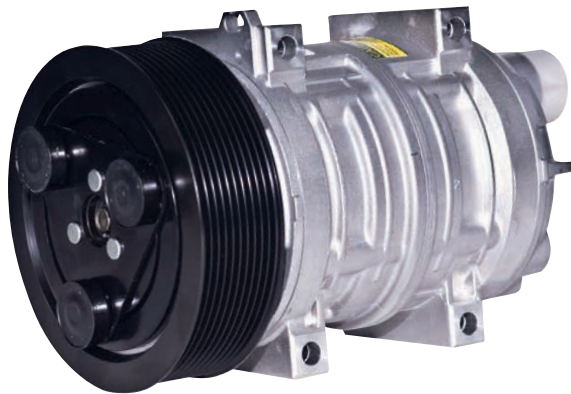


## Compressor Valeo TM-21

# Provides the largest cubic displacement in its class

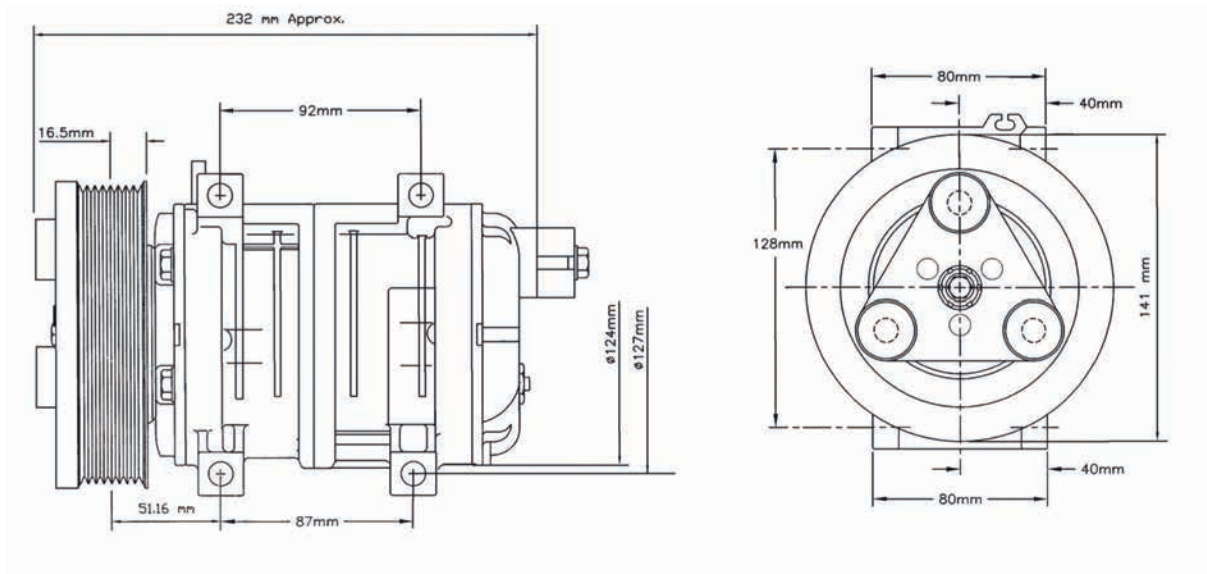
At 13.1 in<sup>3</sup> (215 cm<sup>3</sup>) displacement, the TM-21 compressor has the largest displacement in the light transit segment today.

Its capacity at idle is virtually unmatched in the marketplace and it has a proven track record of superior durability.



### Features

- Ten cylinder axial configuration
- The positive pressure gear-driven lubrication system provides superior lubrication to cylinder walls, pistons, bearings, and shaft seals
- Lip shaft seal assures excellent sealing integrity and extends compressor life
- Needle bearings insure high durability for long life and high-speed operation
- Coated steel wash plate provides additional protection during liquid slugging, and high load conditions
- Pulleys available are Type A or Poly-V



### Technical Data

Rotation	CW or CCW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	13.1 in <sup>3</sup> (215 cm <sup>3</sup> )
Number of pistons	10
Refrigerant	R134a
Pulleys	2A/6PK/8PK/10PK
Mounting	Direct
Unloading steps	N/A
Oil charge	ZXL 6.6 fl.oz (180 cm <sup>3</sup> )
Weight (with clutch)	17.9 lbs (8.1 kg)

## Compressor Valeo **TM-31**

# Provides the largest cubic displacement in its class

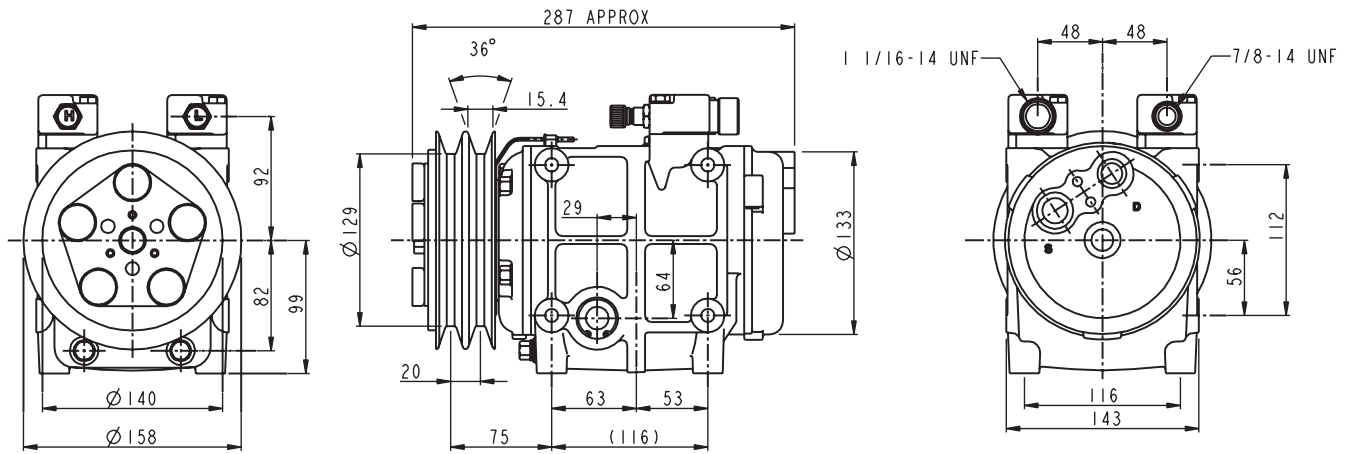
At 19.1 in<sup>3</sup> (313 cm<sup>3</sup>) displacement, the TM-31 compressor has the largest displacement in the light transit segment today. Its capacity at idle is virtually unmatched in

the marketplace and has a proven track record of superior durability.



### Features

- Ten cylinder axial configuration
- The positive pressure gear driven lubrication system provides superior lubrication to cylinder walls, pistons, bearings, and shaft seals
- Lip shaft seal assures excellent sealing integrity and extends compressor life
- Needle bearings ensure high durability for long life and high-speed operation
- Coated steel swash plate provides additional protection during liquid slugging, and high load condition
- Pulleys available are Type A, Type B or Poly-V
- Standard oil sight glass provides ease of maintenance



### Technical Data

Rotation	CW
Max speed	700 – 5000 rpm
Clutch coil	12 or 24 VDC
Displacement	132.2 in <sup>3</sup> (313 cm <sup>3</sup> )
Number of pistons	10
Refrigerant	R134a
Pulleys	2A/1B/2B/6PK/8PK
Mounting	Direct
Unloading steps	N/A
Oil charge	ZXL 16.9 fl.oz (500 cm <sup>3</sup> )
Weight (with clutch)	34 lbs (15.5 kg)

## Compressor Valeo **TM-55**

# Heavy duty for Transit and Coach application

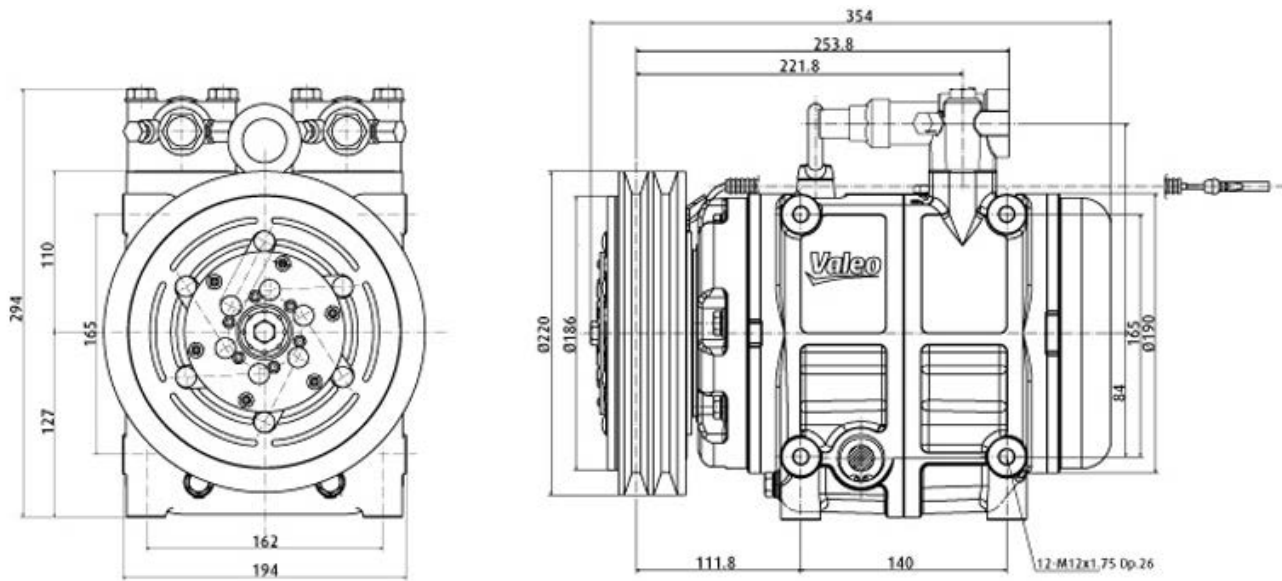
The TM-55 compressor is a heavy duty bus compressor whose design is an extension of the highly reputable smaller TM series compressor family. A lightweight aluminum casting encasing a durable swash-plate mechanism with the minimum of moving

parts and a force-feed lubrication system providing an exceptional cooling performance for buses and coaches along with less cost; reduced noise and vibration compared to reciprocating compressors.



### Features

- Best efficiency, reliability and durability
- High cooling capacity
- Lightweight and compact
- Excellent performance cost ratio
- Balanced 14 cylinders design
- perfect compatibility and premium quality product
- Valeo warranty and competitive pricing



## Technical Data

Rotation	CW
Max speed	600 - 4000 rpm
Clutch coil	12 or 24 VDC
Displacement	132.2 in <sup>3</sup> (313 cm <sup>3</sup> )
Number of pistons	14
Refrigerant	R134a
Pulleys <sup>[1]</sup>	220-2BW+260-2AW 220-2BW+250-2AW 220-2BW 196-8PK
Mounting	Direct
Unloading steps	N/A
Oil charge	ZXL 100PG PAG OIL 53 oz (1500 cm <sup>3</sup> ) - force-feed
Weight (without clutch)	40 lbs (18.1 kg)

[1] Outside diameters

## Compressor **05G**

# The only compressor you'll ever need!



The Mobile Climate Control 05G bus air conditioning compressor is a perfect example of Mobile Climate Control's leadership in advanced compressor design.

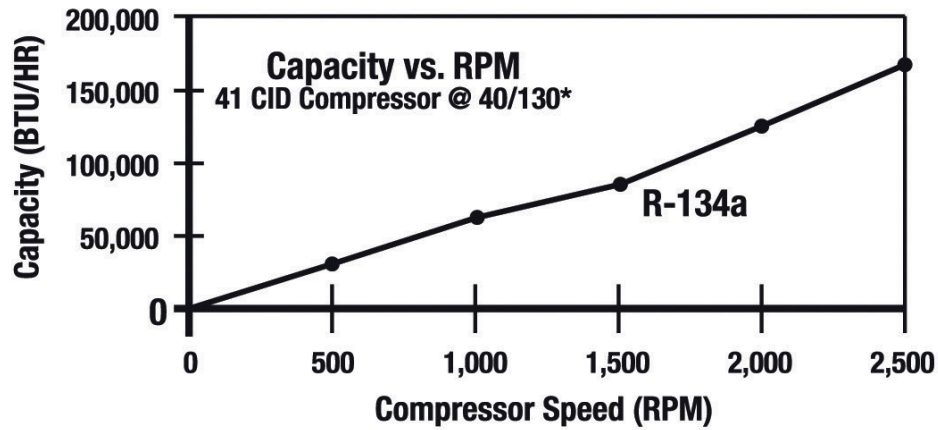
Proven in more than 50000 air conditioning installations, it's recognized as the industry standard for superior performance and exceptional reliability.

In fact, the 05G is virtually indestructible. It features time proven, heavy-duty construction for extended life, and the highest reliability in the transport air conditioning industry. And, the 05G's exclusive 6-cylinder design features uncommonly smooth, balanced operation.

No other manufacturer of air conditioning compressors has the experience backed by the advanced R&D, engineering, and technological leadership of Mobile Climate Control.

### Features

- High capacity, efficiency at lower speeds. Cooling capacities are equal to or better than any competitive model, with operating speeds at least 30% lower
- Superior efficiency significantly reduces horsepower drain on the bus engine, reduces maintenance, extends life – and saves fuel
- Exclusive, balanced six-cylinder design
- Balanced crankshaft design minimizes torque pulsations for smoother operation, less wear on the bus engine and transmission
- Extended maintenance, lower operating costs. Lower operating speeds, lower vibration, and less wear mean less maintenance and considerable savings on parts and labor over the life of the bus
- Low oil-circulation rate. Less than 1%. Ensures superb operating efficiency
- Large-capacity oil pump. Self-priming, reversible design provides dependable oil flow under cold or flooded start-up conditions, and more than ample pressure even when operating at low rpm
- Housing-mounted clutch and large clutch bearing provide longer life
- Exclusive compressor unloading. Saves fuel, increases efficiency, virtually eliminates coil freezing, and produces uniform temperature distribution for greater passenger comfort
- Industry-leading warranty. MCC's warranty provides the most extensive parts and labor coverage in bus air conditioning.
- Certified for use with R134a refrigerant



\* 40°F (4°C) Saturated Suction Temperature/  
130°F (54°C) Saturated Condensing Temperature.

### Technical Data

Rotation	CW or CCW
Max speed	400 – 2200
Clutch coil	12 or 24 VDC
Displacement	41 in <sup>3</sup> (671 cm <sup>3</sup> )
Number of pistons	6
Refrigerant	R134a
Pulleys	2A-2B/Various
Unloading steps	3 steps (100% – 66% - 33%)
Oil charge	POE 5.8 pints (2.6 l)
Dimensions (L x W x H)	17.6" (447 mm) x 17.2" (436.9 mm) x 16.1" (408 mm)
Weight	137 lbs (62 kg) (with clutch)

Specifications are subject to change without notice.



## Compressor **05K**

# A new dimension in proven performance



A product of MCC's leadership in advanced compressor design, the 05K compressor brings you the next generation for bus model of superior performance and exceptional reliability, from MCC.

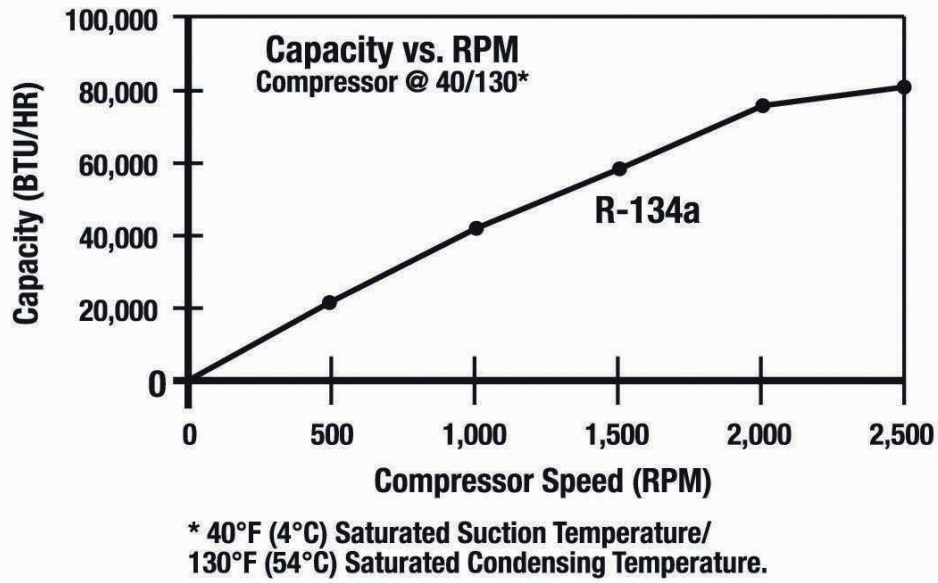
Engineered to withstand punishing conditions, the 05K is

virtually indestructible. Based on the 05G, the industry standard for high reliability, the 05K features time-proven, heavy-duty construction. And its exclusive four-cylinder design ensures exceptionally smooth, balanced operation.

No other manufacturer of air conditioning compressors has the experience backed by the advanced R&D, engineering, and technological leadership of Mobile Climate Control.

### Features

- High capacity, efficiency at lower speeds. Superior efficiency significantly reduces horsepower drain on the bus engine, reduces maintenance, extends life and saves fuel
- Exclusive, balanced four-cylinder design
- Extended maintenance, lower operating costs. Lower operating speeds, lower vibration, and less wear mean less maintenance and considerable savings on parts and labor over the life of the bus
- Large-capacity oil pump. Self-priming, reversible design provides dependable oil flow under cold or flooded start-up conditions
- Housing-mounted clutch and large clutch bearing provide longer life
- Low oil-circulation rate. Less than 1%. Ensures superb operating efficiency
- Exclusive compressor unloading. Saves fuel, increases efficiency, virtually eliminates coil freezing, and produces uniform temperature distribution for greater passenger comfort
- Industry-leading warranty. MCC's warranty provides the most extensive parts-and-labor coverage in bus air conditioning
- Certified for use with R-134a refrigerant



### Technical Data

Rotation	CW or CCW
Max speed	400 – 2200
Clutch coil	12 or 24 VDC
Displacement	24.4 in <sup>3</sup> (400 cm <sup>3</sup> )
Number of pistons	4
Refrigerant	R134a
Pulleys	2A-2B/Variou
Unloading steps	2 steps (100% – 50%)
Oil charge	POE 5.5 pints (2.6 L)
Dimensions (L x W x H)	17.6" (447 mm) x 17.2" (436.9 mm) x 16.1" (408 mm)
Weight	137 lbs (62 kg)

## Compressor Sanden SD-7

# Combines durability and versatility

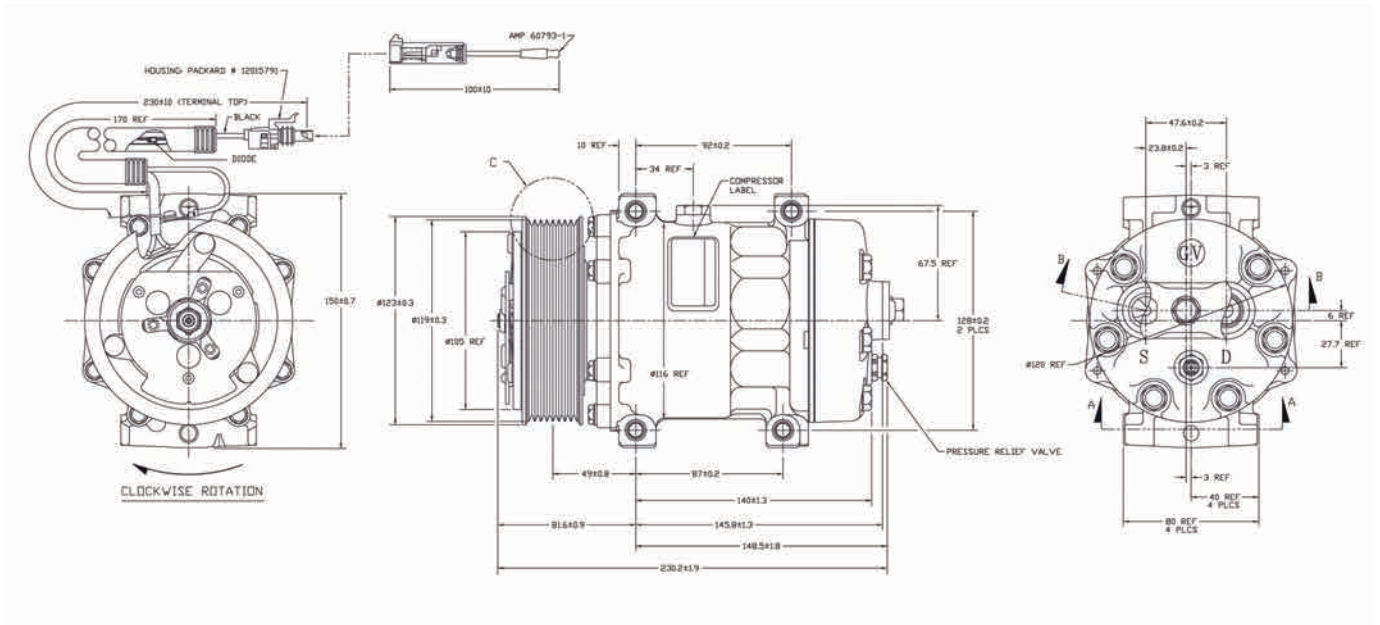
At 9.5 in<sup>3</sup> (155 cm<sup>3</sup>) displacement the SD-7 series of compressors combine durability and versatility that enable them to service a wide range of mobile air conditioning ap-

plications, from passenger cars to buses and trucks to off-highway bulldozers.



### Features

- Equipped with an all-new environmental intrusion package to prevent dust and other invasive materials from collecting on the clutch armature and from potential penetration to the clutch bearing and compressor shaft seal behind the clutch coil
- 7-cylinder design offers low pulsation, less vibration and lower horsepower requirements
- Exclusive crankcase design promotes superior lubrication for increased durability
- Shaft dual lip seal for greater leak prevention and extends compressor life
- Sanden pulley is machined from a single steel forging providing durability in high vibrating diesel applications
- Mounting ears are a continuous 14.3 mm for added strength



### Technical Data

Rotation	CW
Max speed	700 – 6000 rpm
Clutch coil	12 or 24 VDC
Displacement	9.5 in <sup>3</sup> (155 cm <sup>3</sup> )
Number of pistons	5
Refrigerant	R134a
Pulleys	2A/6PK/8PK/10PK
Mounting	Ear or direct
Unloading steps	N/A
Oil charge	PAG 6.8 fl.oz (200 cm <sup>3</sup> )
Weight (with clutch)	16.8 lbs (7.6 kg)

## Compressor **Bock<sup>1</sup> FKX40 and FKX50 Bus Air Conditioning**

# World class performance, compact and robust design

The product of extensive experience in the transport refrigeration and air conditioning market, the Bock FKX40 and FKX50 open drive compressor models offer world class performance and durability. The four cylinder FKX40 and 6

cylinder FKX50 are available in a variety of displacement levels and can be sized to meet a wide range of application levels. The Bock Compressors offer many valued features sought after in the transport air conditioning market.



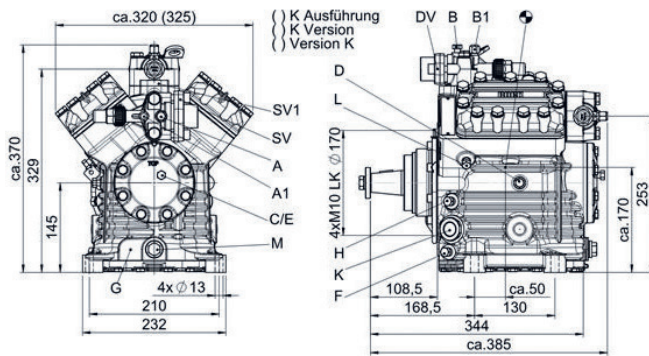
FKX40



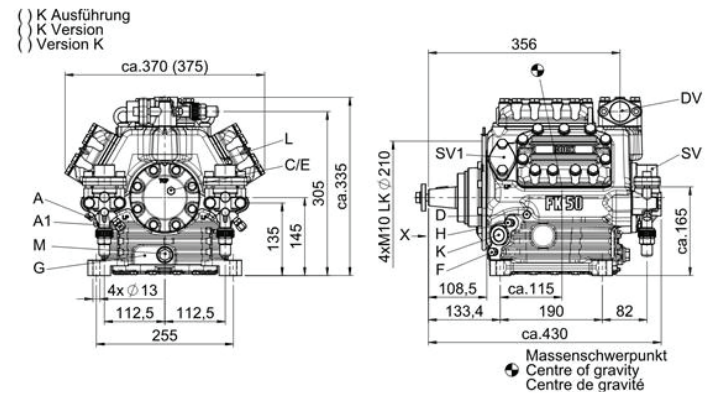
FKX50

### Features

- High efficiency and reliable operation
- Lightweight and compact aluminum design
- Robust lubrication and valve design
- Forced-feed lubrication
- Proven shaft seal designed for long life and ease of service
- Optimized for R134a, R407C
- Special K-valve plate system
- Practical drain through a feely accessible flexible tube (no dismantling of the clutch necessary)



FKX40



FKX50

### Technical Data

	Bock <sup>1</sup> FKX40	Bock <sup>1</sup> FKX50
Rotation	CW/CCW	CW/CCW
Max speed	3500 rpm	3500 rpm
Clutch coil	24 VDC	24 VDC
Displacement	39.7 in <sup>3</sup> (650 cm <sup>3</sup> )	50.7 in <sup>3</sup> (830 cm <sup>3</sup> )
Number of cylinders	4	6
Refrigeran	R134a, R407C	R134a, R407C
Pulleys	2-SPB, 2 – 5 V	2-SPB, 2 – 5 V
Oil charge	67.6 oz (2000 cm <sup>3</sup> )	67.6 oz (2000 cm <sup>3</sup> )
Dimensions (L x W x H)	15.2" (386.08 mm) x 12.8" (325.12 mm) x 14.6" (370.84 mm)	16.9" (429.26 mm) x 14.8" (375.92 mm) x 13.2" (335.28 mm)
Weight (without clutch)	73 lbs (33 kg)	93 lbs (42 kg)

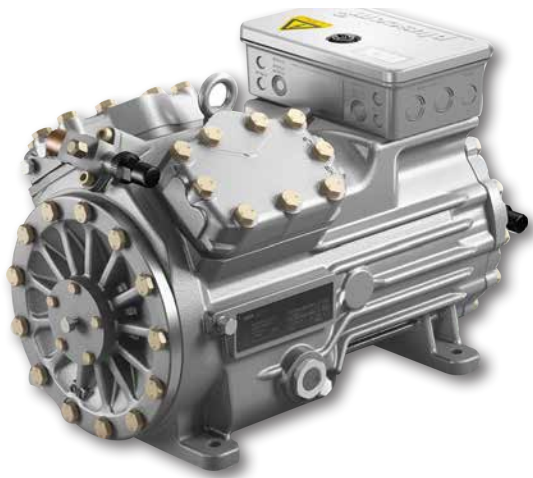
<sup>1)</sup> Bock Compressors are now part of the Global GEA Companies

## Compressor **Semi-hermetic HG**

# Powerful lightweight semi-hermetic compressors for mobile application

The product of extensive experience in the transport refrigeration and air conditioning market, the Bock HG34 is a V-4 semi-hermetic compressor that offers world class performance and durability. It is available in three displacement levels. The HG34 is designed to operate at a variable speed across a wide range of frequency driven by a suction gas-cooled 3-phase induction motor on a

common shaft. Along with an optional unloader on one cylinder bank, the compressors offers the most versatile and most energy saving method of capacity control in the industry. The Bock Compressors offer many valued features sought after in the transport air conditioning market.

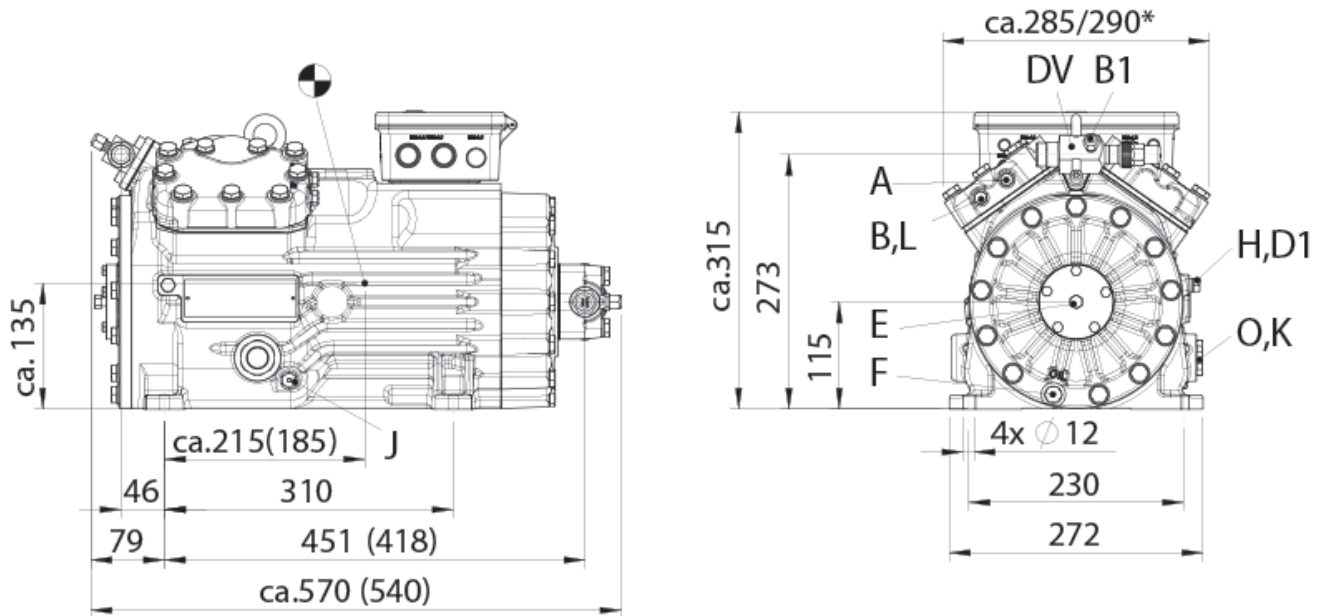


HG34

### Features

- High efficiency and reliable operation
- Compact and lightweight aluminum design
- Robust lubrication system and bearing
- Extremely low noise and vibration
- Optimized for R134a, R-407C
- Special K-valve plate optimized for air conditioning applications





## Technical Data

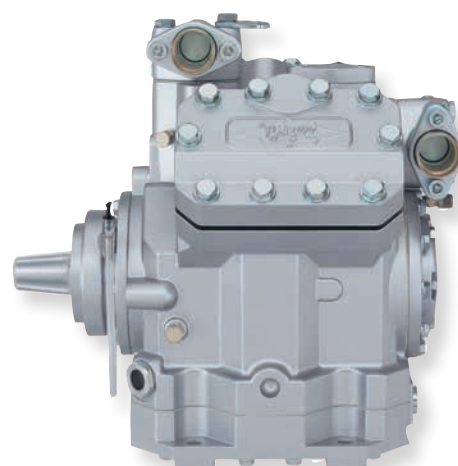
	Semi-hermetic HG	
Compressor type	Reciprocating, 4-cylinder, V-arrangement	
Swept volume	255 - 315 - 380 cm <sup>3</sup> (15.6 - 19.2 - 23.2 in <sup>3</sup> )	
Speed (frequency) range	(N <sub>s</sub> ) 900 - 3600 min <sup>-1</sup> (15 - 60 Hz)	
Sense of rotation	Bi-directional (insensitive to phase sequence)	
Motor type	3-phase induction, 2-pole	
Motor voltage	400 - 3 - 50 (480 - 3 - 60)	Other voltages available
Refrigerant	R134a, R407C	
Lubrication	Forced, bi-directional gerotor pump	
Oil type and charge	POE, 1300 cm <sup>3</sup> (44 oz)	
Dimensions (L x W x H)	570 x 290 x 315 mm (22.4 x 11.4 x 12.4 in)	
Weight (without clutch)	59 kg (130 lbs)	



## Compressor **Bitzer 4NFCY and 6NFCY Bus Air Conditioning** **Providing a lightweight and flexible** **engine mounted solution**

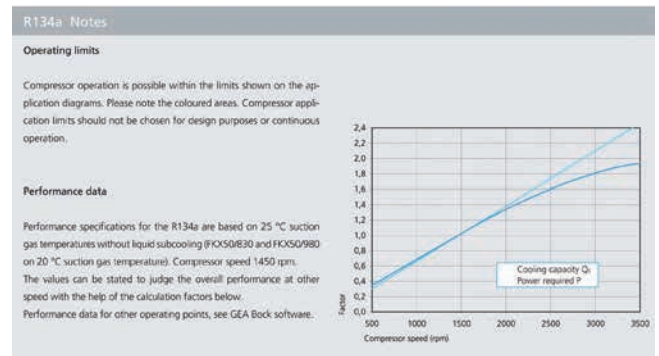
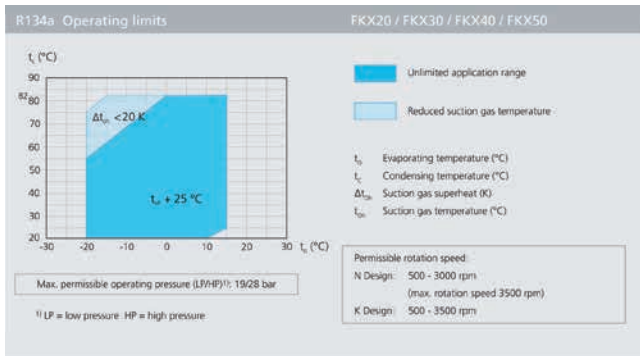
Bitzer is the world's leading bus A/C compressor manufacturer with over 70,000 units produced per year in 4 factories: USA, Brazil, Germany, and China. The four cylinder 4NFCY and six cylinder 6NFCY compressor models are

transit duty compressors designed specifically meet the demands of this harsh application. Each compressor can be configured to meet a wide variety of capacity and system applications to assure optimum performance.



### Features

- High efficiency and smooth operation
- Lightweight and compact aluminum design
- Wide Speed Range 500 – 3500 RPM continuous
- Forced-feed lubrication
- Optimized for R134a
- Patented shaft seal with secondary oil barrier for trouble free operation



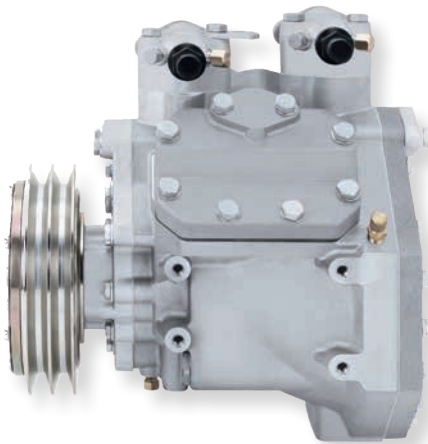
**Technical Data**

	4NFCY	6NFCY
Rotation	CW	CW
Swept volume	39 in <sup>3</sup> (647 cm <sup>3</sup> )	59 in <sup>3</sup> (970 cm <sup>3</sup> )
Max speed	500 – 3500 rpm	500 – 3500 rpm
Clutch coil	24 VC	24 VC
Displacement (1750/3000 RPM)	2395/4110 CFM (68/116 m <sup>3</sup> /hr)	3600/6165 CFM (102/175 m <sup>3</sup> /hr)
Number of cylinders	4	6
Refrigerant	R134a	R134a
Pulleys	2-5 V, 2-SPB	2-5 V, 2-SPB
Oil charge	88 fl. oz (2602.5 cm <sup>3</sup> )	88 oz (2602.5 cm <sup>3</sup> )
Dimensions (W x H x D)	12.09" (307 mm) x	14.45" (367 mm) x
	14.84" (377 mm) x	13.43" (341 mm) x
	15.83" (402 mm)	17.56" (446 mm)
Weight (without clutch)	73 lbs (33 kg)	88.0 lbs (40 kg)

## Compressor **Bitzer F-400 Bus Air Conditioning** **Providing a lightweight and flexible** **engine mounted solution**

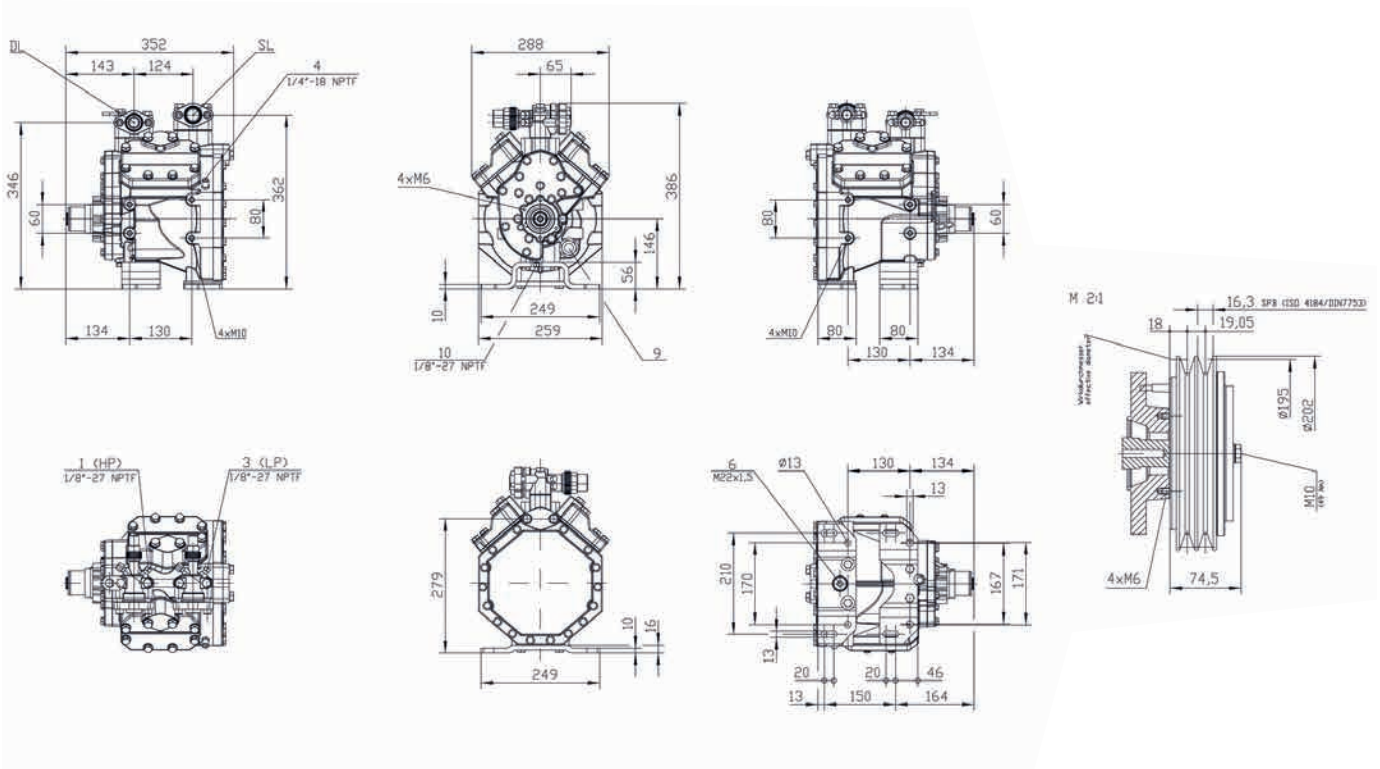
With the extensive experience gained from the Bitzer 4UFC and 4NFC compressor series over many successful years of service, an alternative lightweight and compact compressor has been developed for small and medium capacity bus air conditioning systems. The F-400Y compressor series offers the perfect balance of low weight, high efficiency, reliability, and durability – all in a very compact package.

With its extremely compact design, the F-400(Y) is ideally suited to front engine applications which typically have had to settle for single or dual automotive style compressors. This coupled with its extended speed range of up to 4500 RPM, allows superior capacity performance even at engine idle.



### Features

- Very compact design
- Lightest weight in its class – only 51 lbs (23 kg)
- Widest speed range – 4500 RPM
- Certified for use with R134a
- Housing mounted clutch
- 3 mounting positions for better mounting flexibility



## Technical Data

Rotation	CW or CCW
Swept volume	24 in <sup>3</sup> (400 cm <sup>3</sup> )
Max speed	500 – 4500 rpm continuous
Clutch coil	12 or 24 VDC
Displacement (1450/3000 RPM)	1230/2540 CFM (35/72 m <sup>3</sup> /hr)
Number of pistons	4
Refrigerant	R134a
Pulleys	2-SPB
Oil charge	35.2 fl.oz (1000 cm <sup>3</sup> )
Dimensions (W x D x H)	11.34" (288 mm) x 13.86" (352 mm) x 15.20" (386 mm)
Weight (without clutch)	51 lbs (23 kg)

## Compressor **MasterFlux Sierra (xx) – 0434 and 0982**

# Excellence in high-efficiency refrigeration and air conditioning

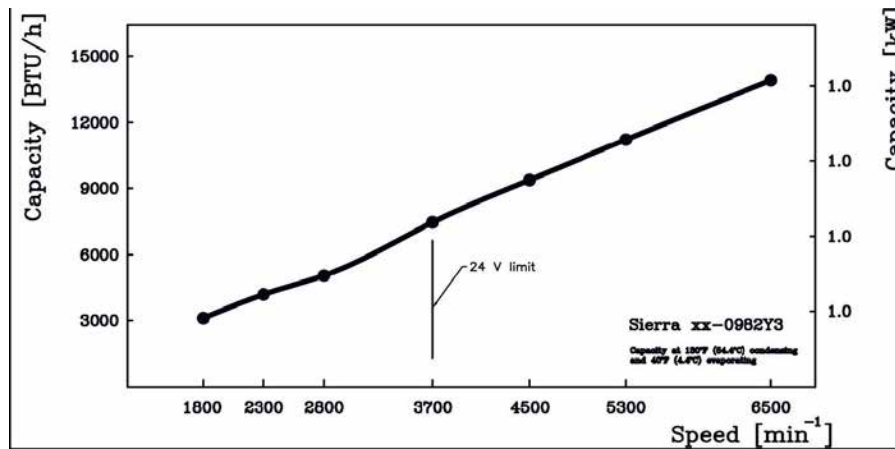
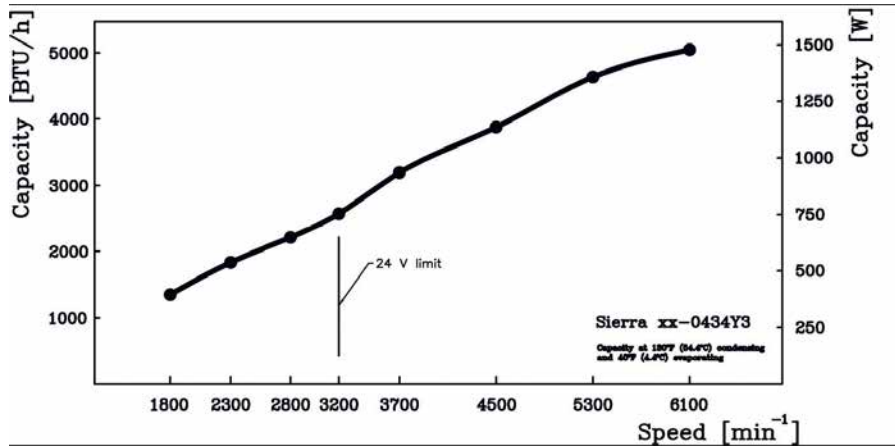
The MasterFlux Sierra hermetic compressor models offer world class performance and durability. The rotating piston construction is a proven long-life design that has a wide

range for optimum energy utilization, making it one of the most energy-conserving compressors in the industry



### Features

- High efficiency permanent magnet motor and rotating piston compressor
- State of the art PVE lubricant for increased service life
- Wide range of capacity control (variable speed)
- Integrated suction accumulator
- Leak free hermetic construction
- Optimized for R134a



Technical Data

	Sierra (xx) – 0434	Sierra (xx) - 0982
Construction	Hermetic – rotating piston	Hermetic – rotating piston
Swept volume	0.434 in <sup>3</sup> (7.1 cm <sup>3</sup> )	0.434 in <sup>3</sup> (7.1 cm <sup>3</sup> )
Refrigerant	R134a	R134a
Capacity control	Variable speed: (1800 to 3200 min <sup>-1</sup> ) – 24 V (1800 to 6100 min <sup>-1</sup> ) – 48 V	Variable speed: (1800 to 4300 min <sup>-1</sup> ) – 24 V (1800 to 6500 min <sup>-1</sup> ) – 48 V
Oil Charge	PVE - 9.8 fl.oz (290 cm <sup>3</sup> )	PVE - 9.8 fl.oz (290 cm <sup>3</sup> )
Dimensions (L x W x H) (without rubber mounts)	7.1" (180 mm) x 7.7" (195 mm) x 6.5" (165 mm)	6.1" (155 mm) x 8.7" (220 mm) x 7.4" (188 mm)
Weight (without drive)	10.5 lbs (4.8 kg)	14.1 lbs (6.4 kg)
Motor	3-phase permanent magnet	3-phase permanent magnet
Voltage (supply to drive)	12/24/48 VDC	24/48 VDC
Sensitivity to phase sequence	Yes	Yes

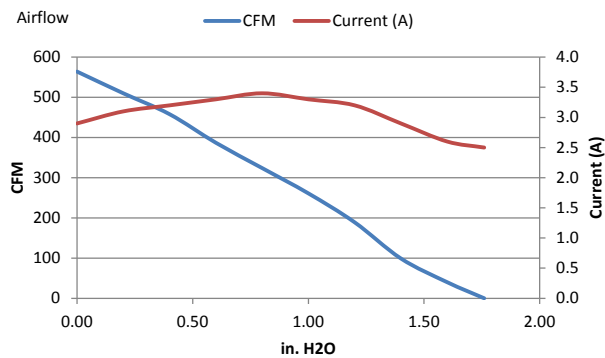
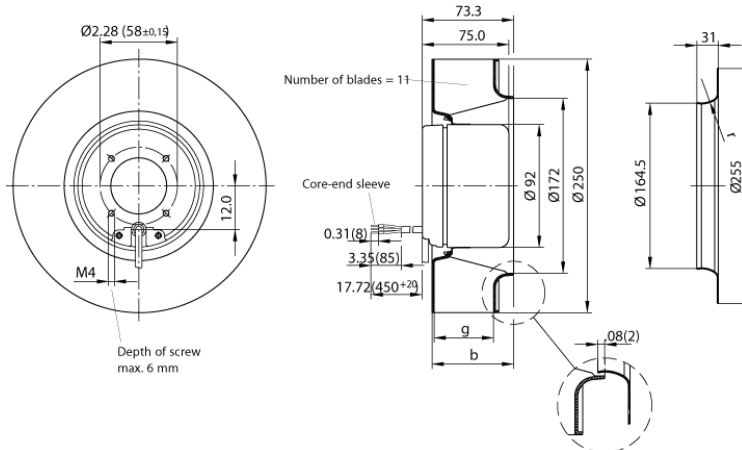
## Notes



# XII. Blowers



# Blower **Model 290** Brushless



## Part Descriptions: Specifications

### Part No.

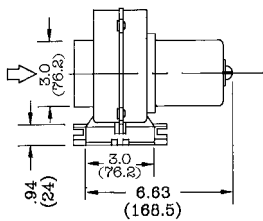
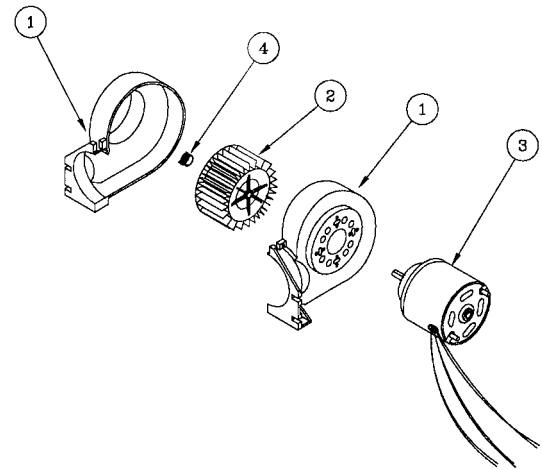
12-9038 Blower 12V

### Features

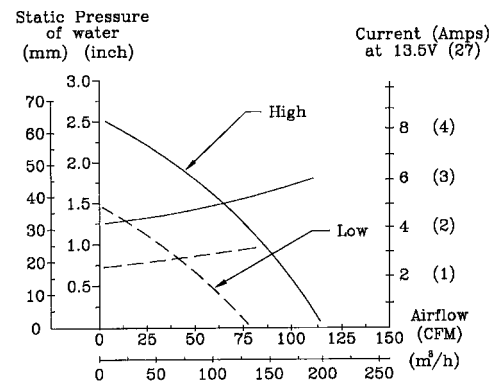
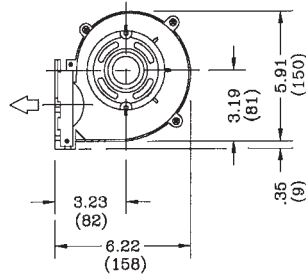
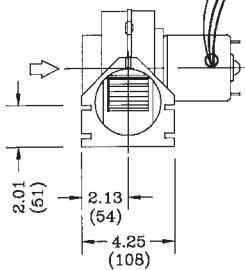
- Impeller completely made of injection molded GF PA 66 plastic
- 0-10 VDC and PWM control input
- Reverse polarity and locked-rotor protection
- Long life and maintenance free ball bearings
- Wire configuration

12V	Red
PWM/LIN	Yellow
Tach output	White
GND	Blue

# Blower Model 503



EL. leads, Ext. 20"±2" (500±50)  
 Orange -High speed  
 Red -Low speed  
 Black -Ground



## Part Descriptions: Specifications

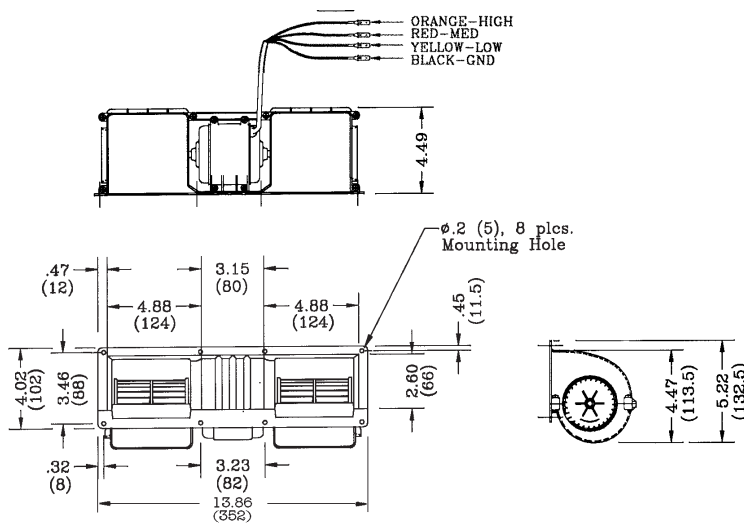
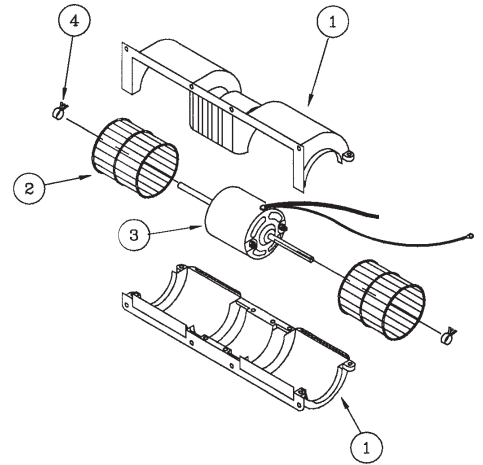
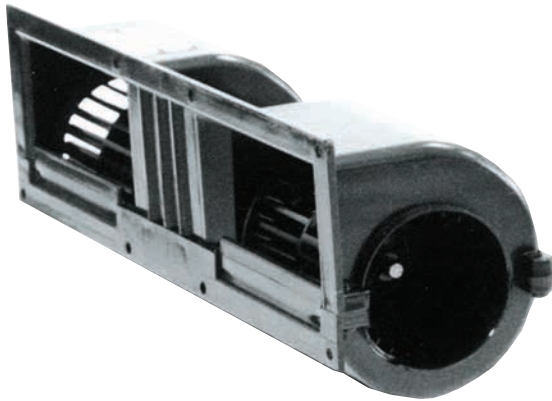
Part No.	Description	No.	Part No.	Description
15-0311	Blower 12V	1	25-0033	Blower Housing
15-0312	Blower 24V	2	25-0291	Blower Wheel (C.C.W.)
Blower Housing and Blower Wheel made of ABS plastic.		3	25-0344	Motor 12V
			25-0107	Motor 24V
		4	25-0022	Clip

2-Speed wire wound motor.  
 Weight -2.4 lbs. (1.1 kg)

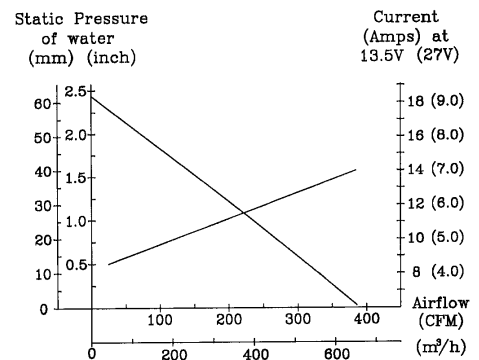
## Features

The 503 is an excellent defrost booster blower. It can also be used to bring outside air into the cab.

# Blower Model 505



ALL WIRES : 16GA (60°) 300 MM Long  
TERMINALS 4x .25 Tab Terminal Amp # 42460-2



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
15-0503 Blower 12V	1	25-0017	25-0017
15-0504 Blower 24V	2	25-0021	25-0021
	3	25-0070	25-0070
		25-0075	25-0075
	4	25-0022	25-0022

### Specifications

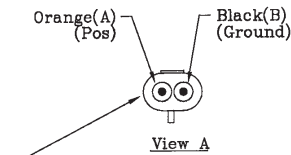
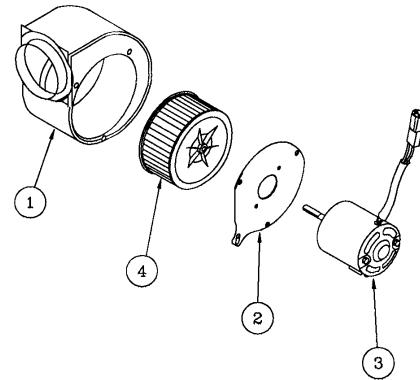
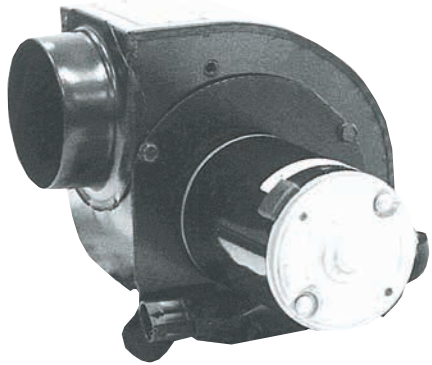
Blower Housing and Blower Wheel made of ABS Plastic.

3-Speed wire wound motor.  
Weight -4 lbs. (1.8 kg)

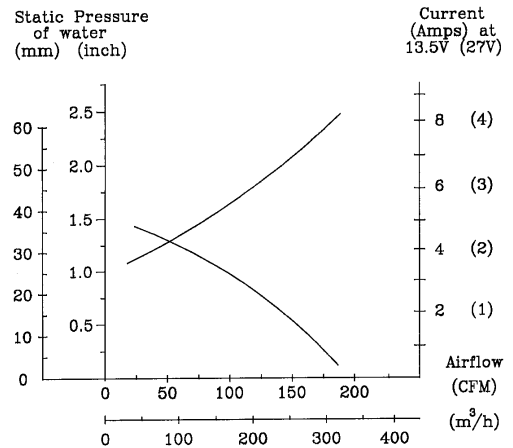
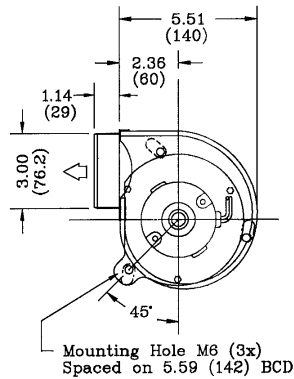
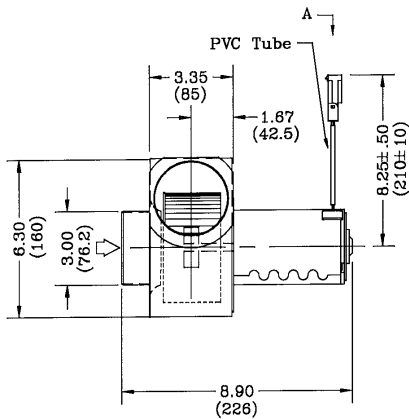
### Features

The 505 is a compact high performance blower which is ideal for extra air flow to the window areas of the cab.

# Blower Model 506



2-Way Weather Pack Male Connector Packard #120010973 with Male Terminal #12124582-1(2x) and Seal #12010293(2x)



## Part Descriptions: Specifications

Part No.	Description
15-0601	Blower 12V
15-0602	Blower 24V

Blower Housing made of 18/20GA (1.25/1mm) Cold Rolled Steel and finished in semi-gloss epoxy powder coat.  
Sealed Motor has long life brushes and ball bearings.  
Blower Wheel made of Talc filled Polypropylene.  
Inlets and Outlets have hose adapters for a 3" airhose.  
Weight -5 lbs. (2.3 kg)

No.	Part No.	Description
1	25-0337	Blower Housing
2	25-0338	Blower Plate
3	25-0470	Motor 12V
	25-0490	Motor 24V
4	25-0140	Blower Wheel

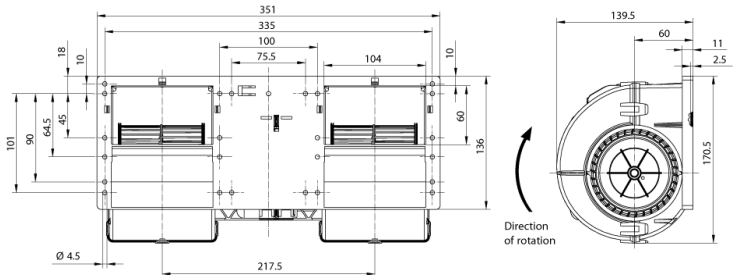
## Features

The 506 is MCC's choice for bringing outside air into the cab. The sealed motor has long life brushes and ball bearings.

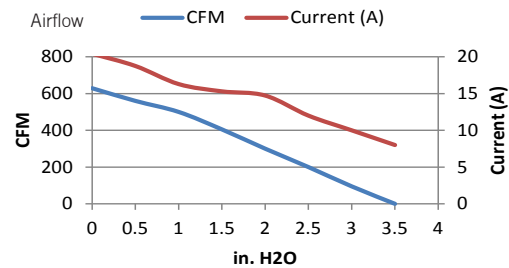
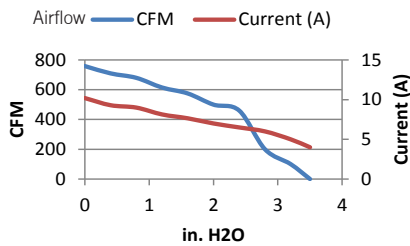
# Blowers **Model 515** Brushless



Airflow 15-1594

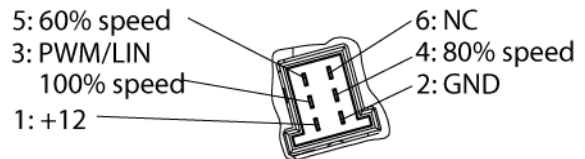


Airflow 15-1579



## Part Descriptions: Specifications

Part No.	Voltage	Weight
15-1579	12V	2.00 lbs (0.91kg)
15-1594	24V	4.40 lbs (2.00kg)

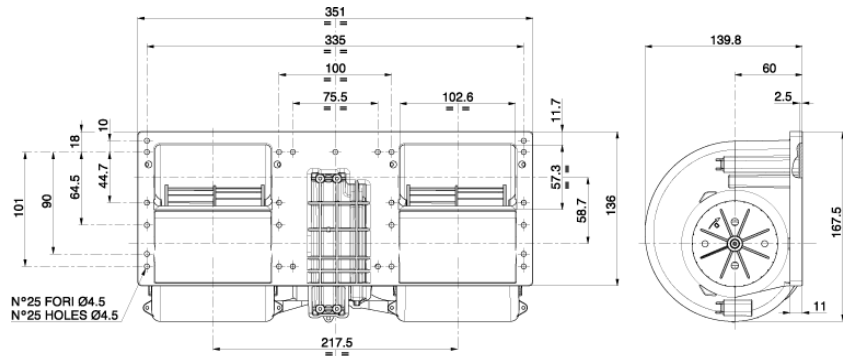


## Features

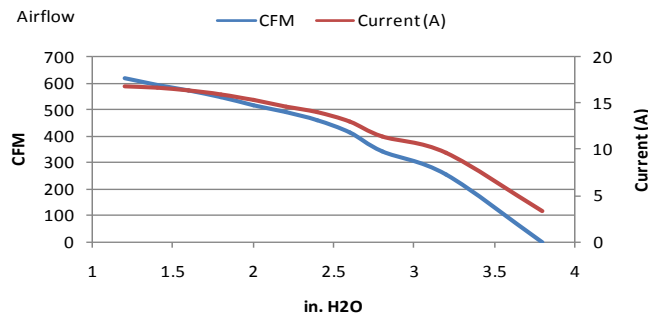
### AMP Junior Power Timer 6 pole plug

- Designed for HVACs in buses and tractor and trucks
- Long life ball bearing design 40000 hours
- Variable speed control (PWM or linear DC control)
- Locked rotor, over temperature, reverse polarity and under voltage protection
- High efficiency and low noise emission
- Integrated electronics
- IP 24 protection
- free blowing, not recommended for non-stop operation at 85°C

# Blower **Model 515** Brushless



Note: Dimensions in mm only.



## Part Descriptions: Specifications

**Part No.**

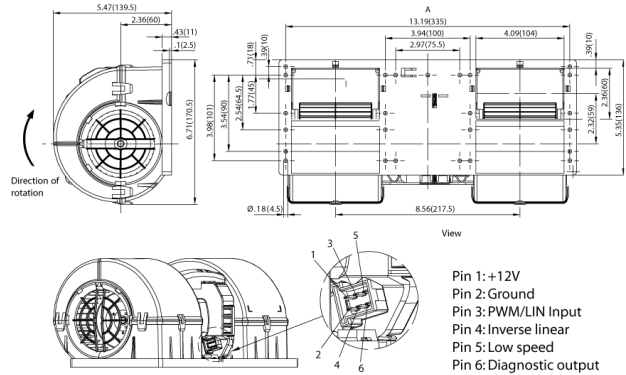
15-15018 Blower 24V

### Features

- Long Life (Brushless motor)
- Waterproof motor (IP 68)
- Maximum current draw: 35 Amps

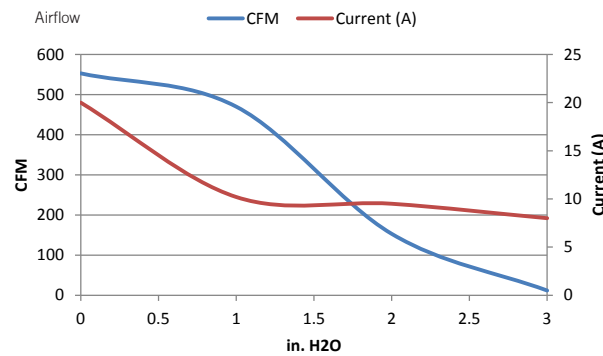
Attention: This blower must be used with a static pressure higher then 30mm H2O (1.2in H2O).

# Blower **Model 515** Brushless



AMP Junior Power Timer 6 pole plug

Note: Dimensions in mm only.



## Part Descriptions: Specifications

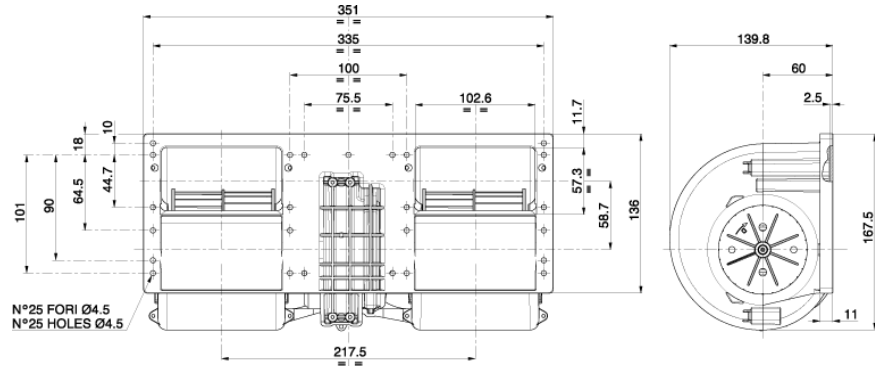
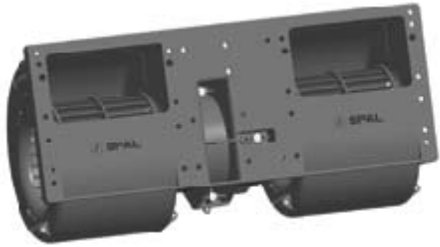
**Part No.** \_\_\_\_\_

15-1585 Blower 12V

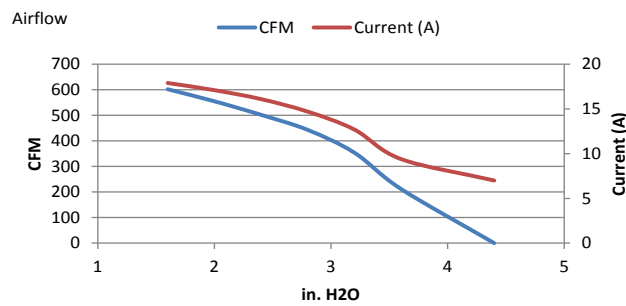
### Features

- Designed for HVACs in buses and coaches
- Coated motor windings
- Long life ball bearing design 40000 hours
- Locked rotor, over temperature, reverse polarity and under voltage protection
- Variable speed control (PWM or linear DC control)
- Dynamically balanced brushless motor for long life
- free blowing, not recommended for non-stop operation at 85°C

# Blower **Model 515** Brushless



Note: Dimensions in mm only.



## Part Descriptions: Specifications

**Part No.**

15-15013 Blower 24V

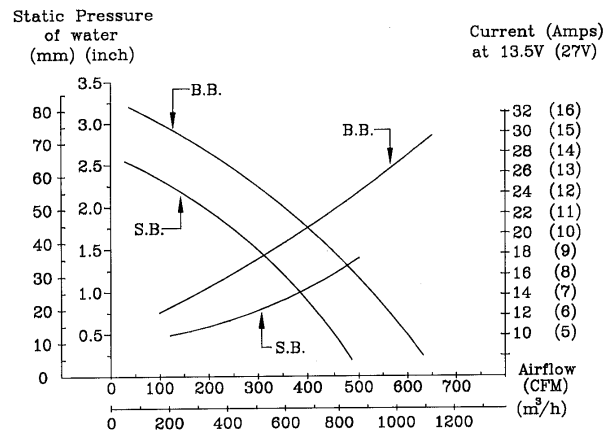
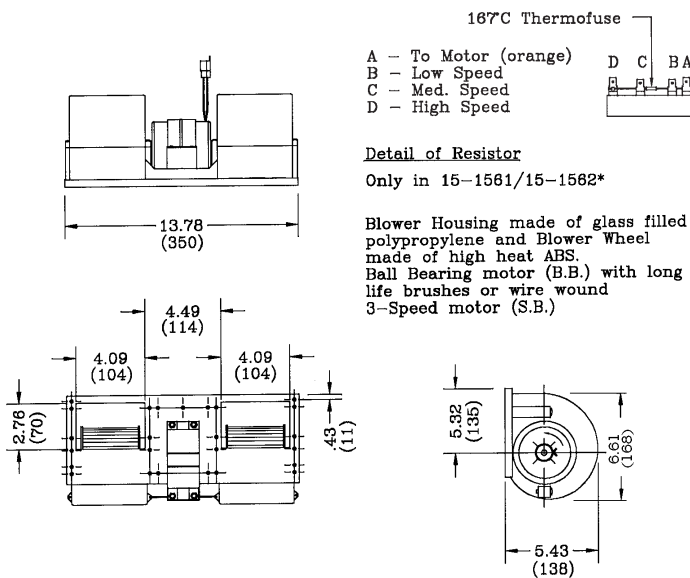
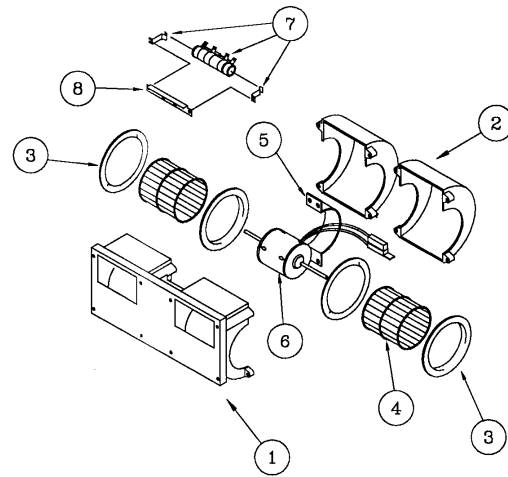
### Features

- Long Life (Brushless motor)
- Waterproof motor (IP 68)
- Maximum current 14A

Attention: This blower must be used with a static pressure higher then 30mm H<sub>2</sub>O (1.2in H<sub>2</sub>O).



# Blowers Model 515



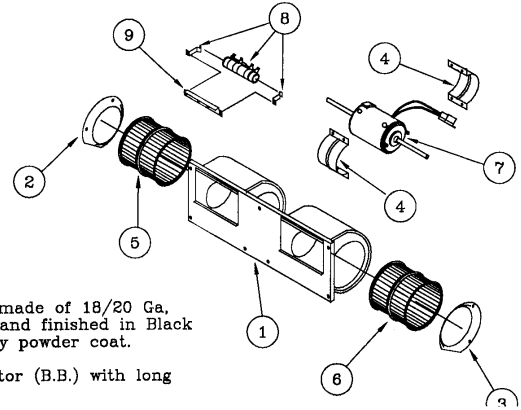
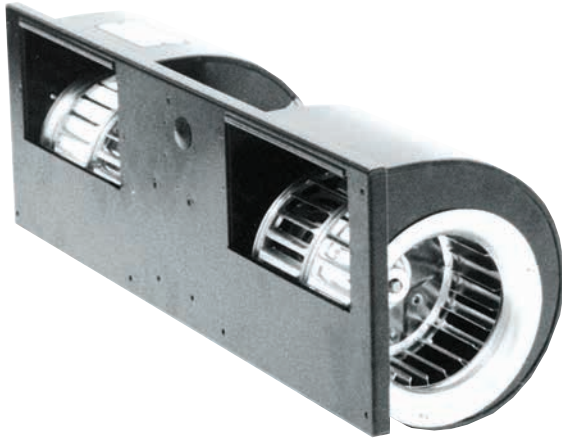
## Part Descriptions: Specifications

Part No.	Description	No.	Part No.	Description	No.	Part No.	Description
15-1501	Blower 12V (1 Sp.)	1	25-0048	Blower Housing	6	25-0053	Motor 12V (3 Sp.)
15-1502	Blower 24V (1 Sp.)	2	25-0348	Blower Housing Top		25-0076	Motor 24V (3 Sp.)
15-1513	Blower 12V (3 Sp.)	3	25-0060	Venturi		25-0645	Motor 12V (B.B.)
15-1514	Blower 24V (3 Sp.)	4	25-0200	Blower Wheel		25-0650	Motor 24V (B.B.)
15-1561	Blower 12V (3 Sp./Resistor)	5	25-0271	Motor Mount		25-0655	Motor 12V (B.B.)
15-1562	Blower 24V (3 Sp./Resistor)					25-0660	Motor 24V (B.B.)
Weight	-4.5 lbs. (2 kg)				7	25-0601	Resistor 12V
						25-0602	Resistor 24V
					8	29-0130	Resistor Bracket

## Features

The 515 is used in the majority of MCC's air conditioning units. It is the right sized package for most off-road blower applications. The glass filled polypropylene design makes the 515 a rugged affordable blower. The blower wheels and motor are balanced as an assembly.

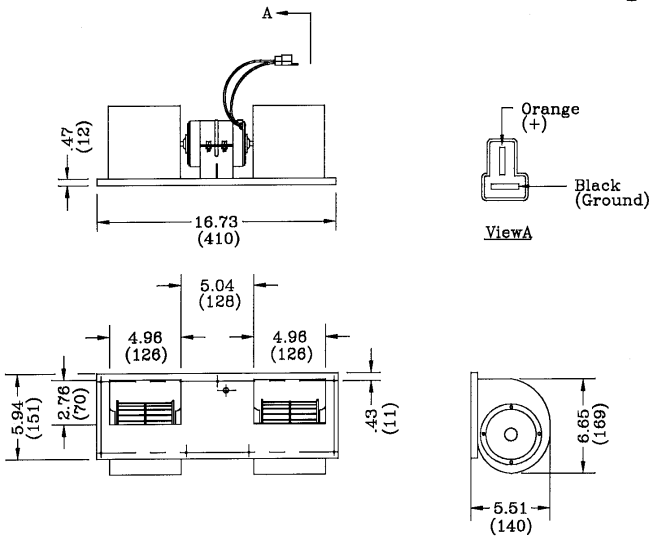
# Blower Model 519 Brushless



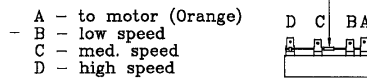
Blower Housing made of 18/20 Ga. (1.25mm/1mm) and finished in Black semi-gloss epoxy powder coat.

Ball Bearing motor (B.B.) with long life brushes.

Blower Wheel made of Aluminium.



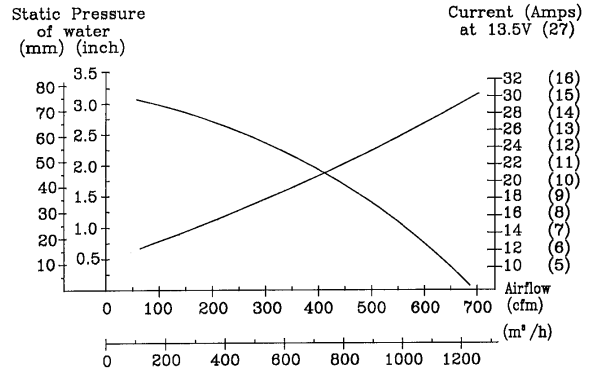
167°C Thermofuse



- A - to motor (Orange)
- B - low speed
- C - med. speed
- D - high speed

Detail of Resistor

Only in 15-1961/15-1962\*



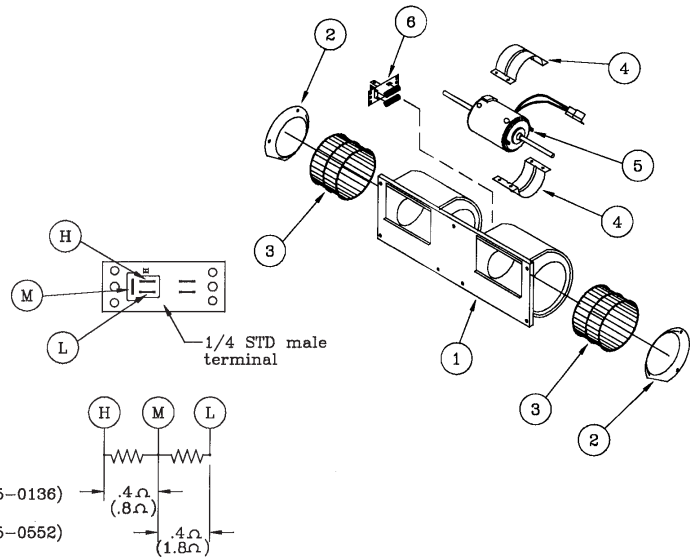
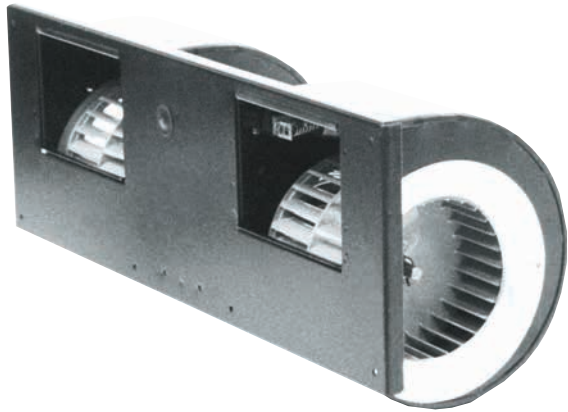
## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
15-1943	Blower 12V	1	25-0240	Blower Housing	6	25-0399	Blower Wheel (C.C.W.)
15-1944	Blower 24V	2	25-0411	Venturi	7	25-0265	Motor 12V
15-1961	Blower 12V (3 Sp.)	3	25-0412	Venturi		25-0270	Motor 24V
15-1962	Blower 24V (3 Sp.)	4	25-0234	Motor Mount	8	25-0601	Resistor 12V
		5	25-0398	Blower Wheel (C.W.)		25-0604	Resistor 24V
Weight	-8.4 lbs. (3.8 kg)				9	29-0130	Resistor Bracket

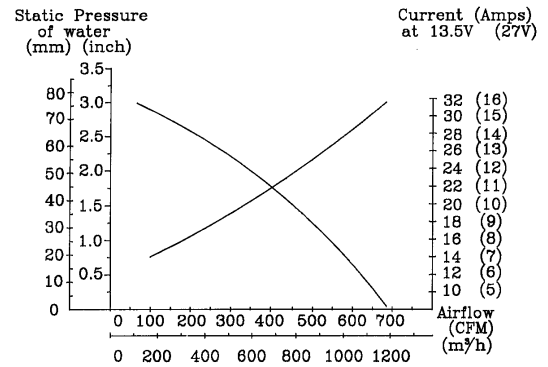
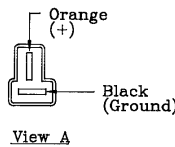
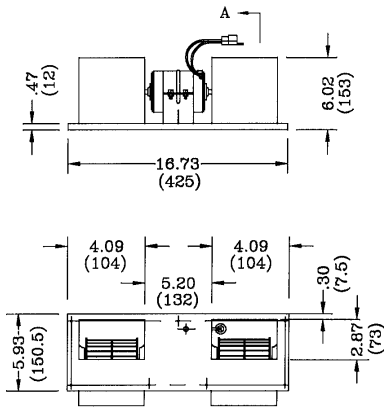
## Features

The 519 is a high performance blower assembly for high volume blower requirements.

# Blower **Model 520** Brushless



**Detail of Resistor**



## Part Descriptions: Specifications

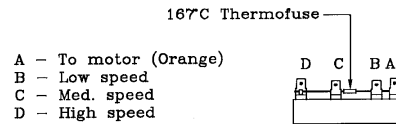
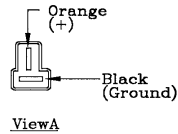
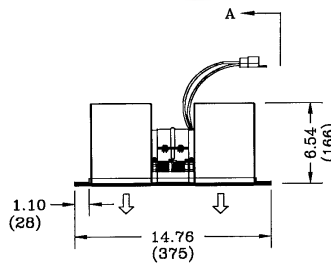
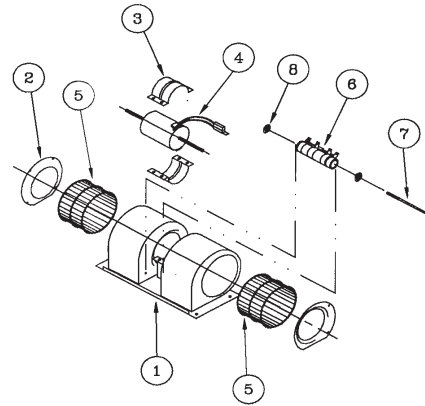
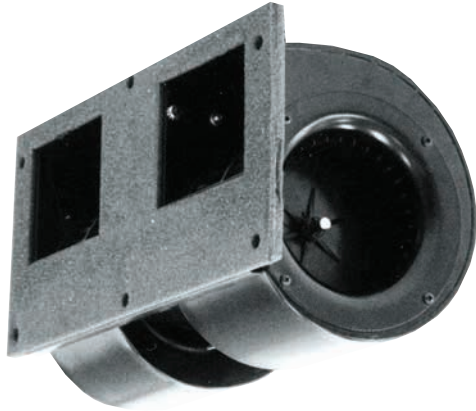
Part No.	No.	Part No.	Description
15-2033	1	25-0159	Blower Housing
15-2034	2	25-0164	Venturi
	3	25-0047	Blower Wheel
	4	24-0234	Motor Mount
	5	25-0265	Motor 12V
		25-0270	Motor 24V
	6	25-0136	Resistor 12V
		25-0552	Resistor 24V

Blower Housing made of Cold Rolled Steel finished in black semi-gloss powder coat.  
 Blower Wheels made of high heat ABS.  
 Motor has ball bearings and long life brushes.  
 Blower has resistor for 3-Speed operation.  
 Weight -8.4 lbs. (3.8 kg)

## Features

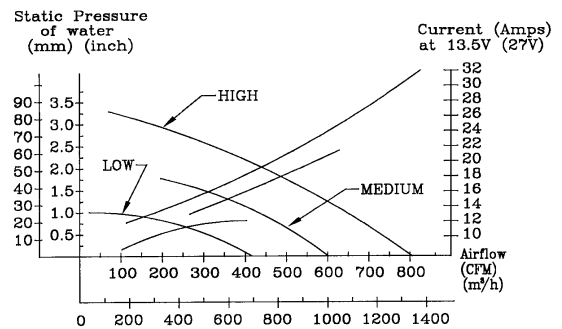
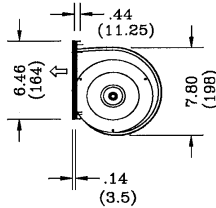
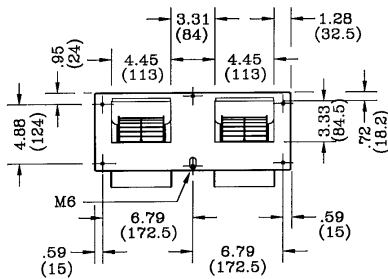
The 520, like the 519, is a high performance blower. Like all of the MCC blowers, the 520 is designed for years of reliable performance in demanding conditions. The blower wheels and motor are balanced as an assembly.

# Blower Model 530 Brushless



A - To motor (Orange)  
 B - Low speed  
 C - Med. speed  
 D - High speed

Detail of Resistor



## Part Descriptions: Specifications

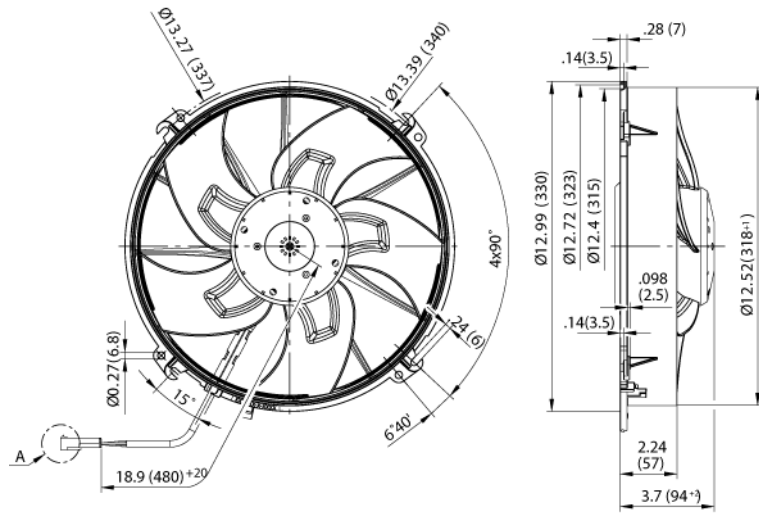
Part No.	No.	Part No.	Description
15-3001	1	25-0386	Blower Housing
15-3002	2	25-0387	Venturi
	3	24-0234	Motor Mount
	4	25-0215	Motor 12V
		25-0250	Motor 24V
	5	25-0300	Blower Wheel
	6	25-0601	Resistor 12V
		25-0604	Resistor 24V
	7	29-0233	Through Bolt
	8	29-0234	Centering Washer

Casing made of 18/20GA (1.25/1mm) Cold Rolled Steel finished in black semi-gloss epoxy powder coat.  
 Blower Wheels made of glass filled black nylon.  
 Blower has resistor for 3-Speed operation.  
 Permanent magnet motor has ball bearings and long-life brushes.  
 Weight -9.2 lbs. (4.2 kg) t

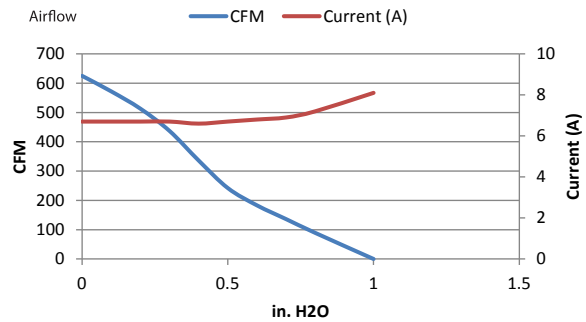
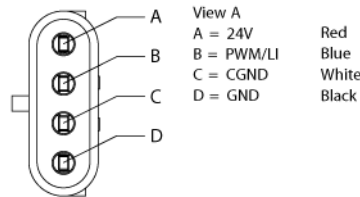
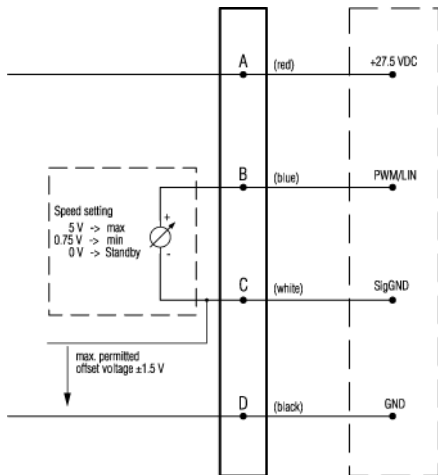
### Features

The 530 is one of MCC's largest capacity blower assemblies. Often used in the toughest air flow requirements involving high static pressure.

# Blower **Model 530** Brushless



Airflow >



## Part Descriptions: Specifications

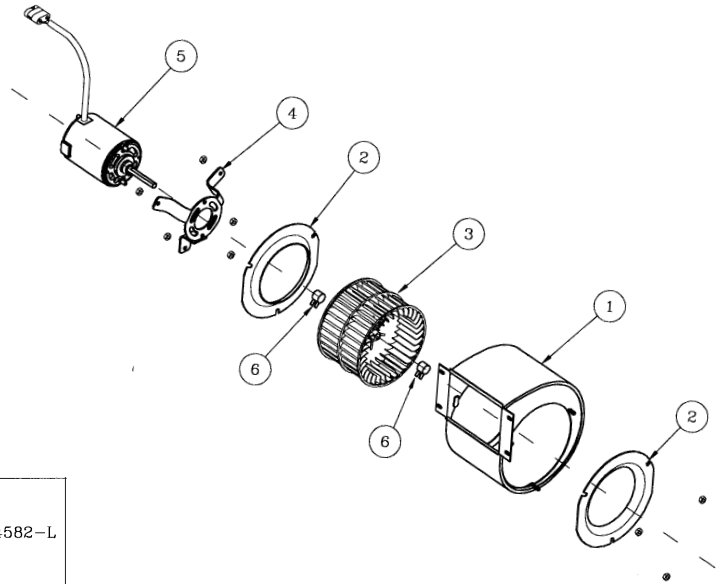
### Part No.

25-3089 Blower 24V

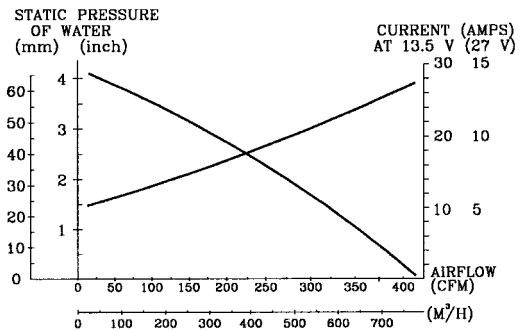
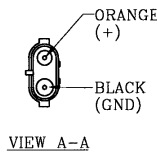
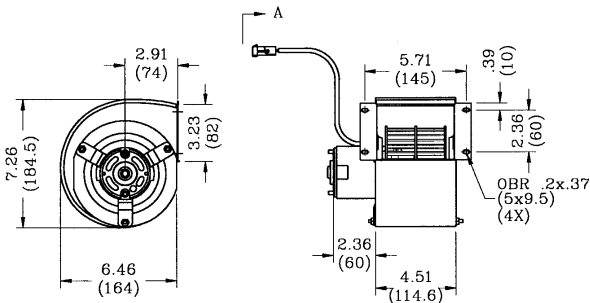
### Features

- Long life ball bearing brushless motor
- Conformally coated electronics with one way ventilation air port
- Variable speed control (PWM or linear DC control)
- Heavy duty construction
- Free blowing not recommended

# Blower Model 561 Brushless



CONNECTOR PACKARD  
 MALE (WP) #12010973  
 MCC #31-1068  
 TERMINAL MALE #12124582-L  
 MCC #31-1039 (2X)  
 SEAL #121010293  
 MCC #31-1024 (2X)  
 EXT. 200±10



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
15-6101	1	25-0760	Blower Housing
15-6102	2	25-0762	Venturi
	3	25-0300	Blower Wheel
	4	25-0790	Motor Bracket
	5	25-0806	Motor 24V
		25-0805	Motor 12V
	6	25-0022	Clip

Blower Housing made of 18 & 22 ga (1.25 and .75 mm) cold rolled steel, finished in black semi-gloss powder coat. Blower Wheels made of glass filled black nylon.

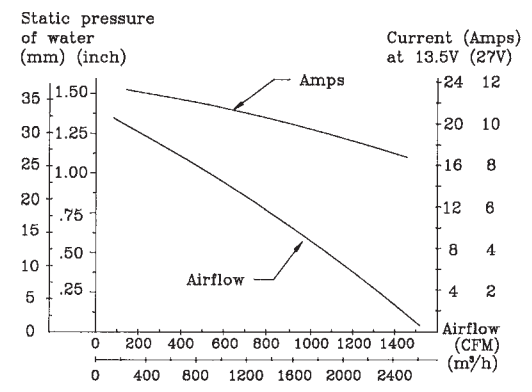
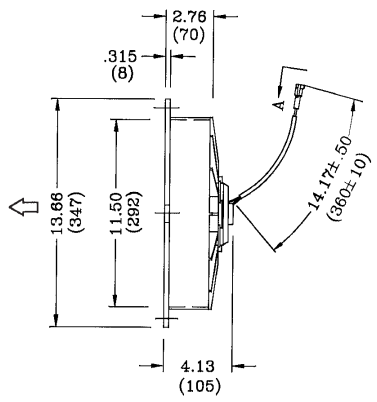
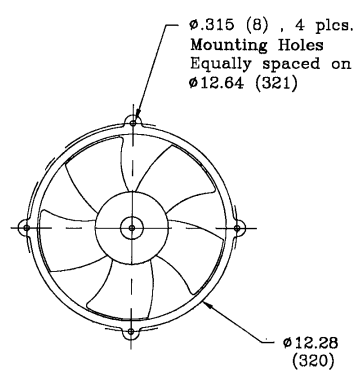
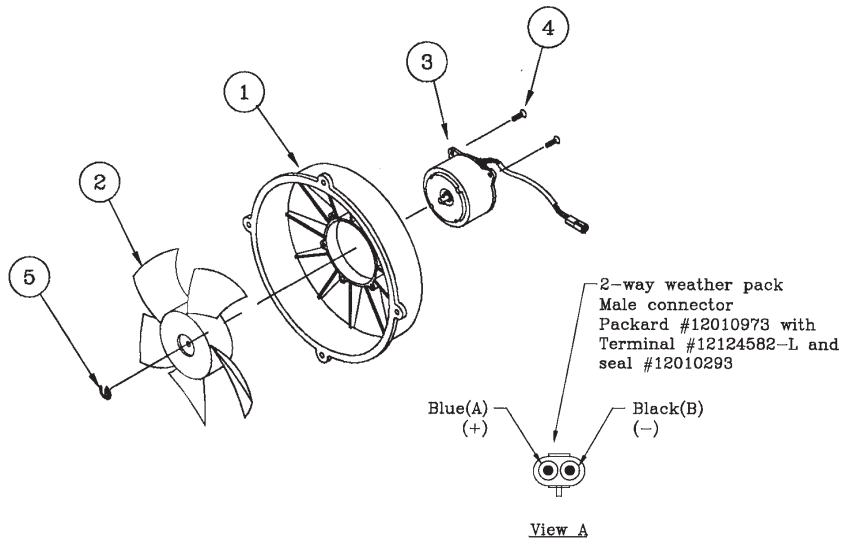
Weight -5.5 lbs. (2.5 kg)

## Features

The 561 is a high performance single squirrel cage blower assembly. It is designed to move air to specific areas in high volume.



# Blower Model 575



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
15-7501	1	25-0577	Venturi
15-7502	2	25-0579	Fan
	3	25-0591	Motor 12V
		25-0592	Motor 24V
	4	29-0166	Screw
	5	29-0167	"C" Clip

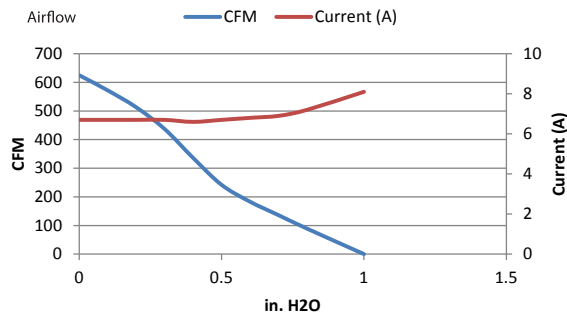
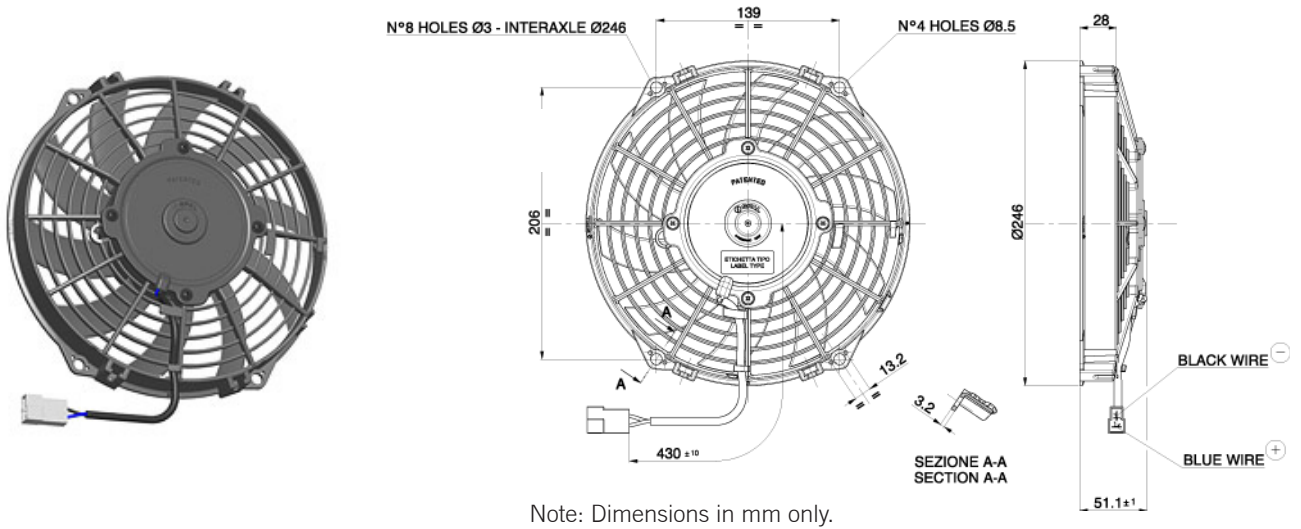
Venture made of 30% G.F. polypropylene and fan made of 30% G.F. nylon.

Weight -5.2 lbs. (2.4 kg)

## Features

The 575 is designed to deliver maximum performance using a single fan assembly. The durable 30% glass filled nylon construction ensures long life.

# Blower **Model 577** Brushed



## Part Descriptions: Specifications

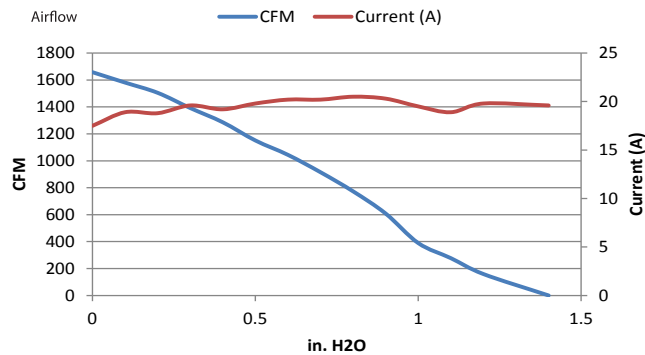
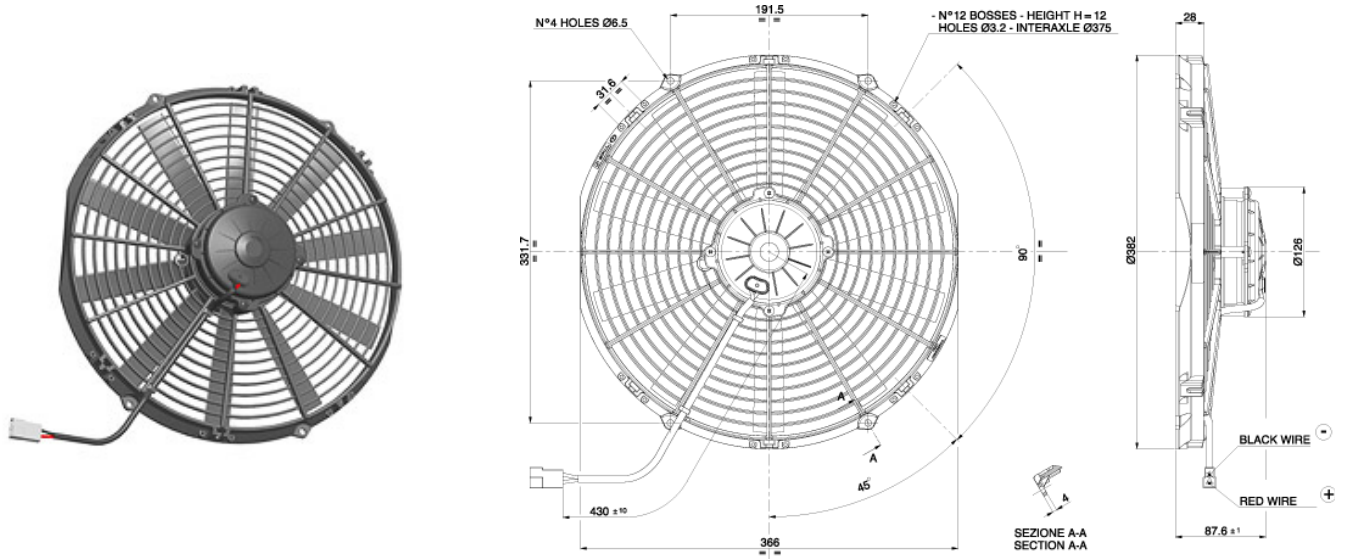
Part No. \_\_\_\_\_  
 15-7705 Blower 12V

### Features

- Long Life
- Low Noise
- Waterproof motor (IP 68)



# Blower **Model 579** Brushed



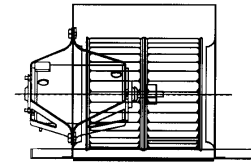
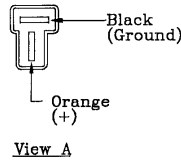
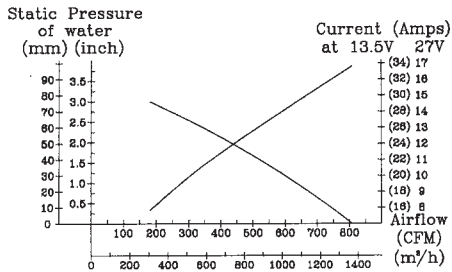
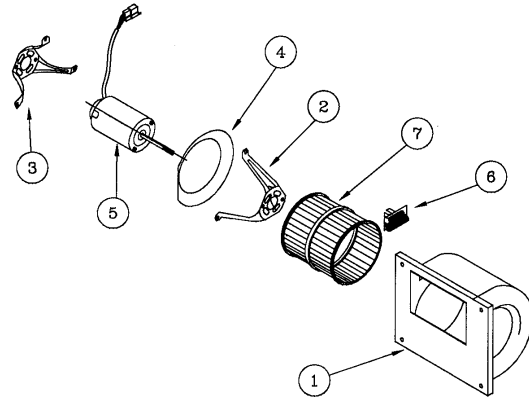
## Part Descriptions: Specifications

**Part No.** \_\_\_\_\_  
 15-7908 Blower 24V

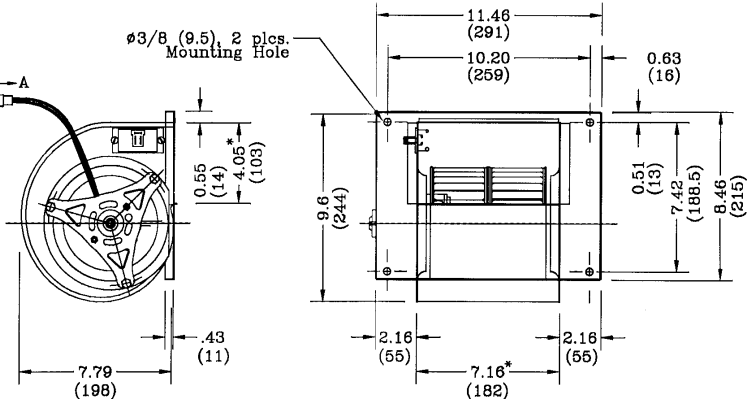
### Features

- Long Life
- Waterproof motor (IP 68)

# Blower Model 582



Electrical connector  
Packard #2984883  
with Terminal #2971982(2x)  
Ext. 5.9"±.375"  
(150±10)



## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
15-8201	1	25-0317	Blower 12V
15-8202	2	25-0320	Blower 24V
	3	25-0319	Motor Mount
	4	25-0318	Venturi
	5	25-0150	Motor 12V
		25-0180	Motor 24V
	6	25-0136	Resistor 12V
		25-0552	Resistor 24V
	7	25-0155	Blower Wheel

Blower housing made of 18/20GA (1.25/1mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.  
Motor has long life brushes and ball bearings.  
Blower Wheel made of aluminum.  
\* Outlet dimensions.  
Weight -8.8 lbs. (4 kg)

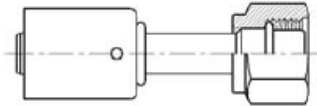
## Features

The 582 is one of MCC's largest capacity blower assemblies. Originally designed for MCC's mass transit division, the 582 is fast becoming a popular off-road blower.

## Notes

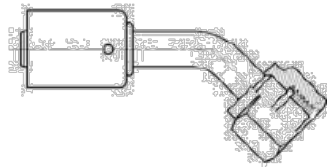


# XII. Fittings



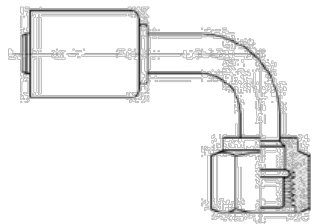
Straight Female O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-2840	27-8272	5/8"-18	6	6	-
27-1266	27-2861	3/4"-16	8	8	-
27-1267	27-3006	7/8"-14	10	10	-
27-1316	NS	1-1/16"-14	12	12	-
27-1315	27-3684	5/8"-18	6	8	-
27-2431	NS	3/4"-16	8	10	-
27-1268	27-3901	7/8"-14	10	12	-
27-1454	NS	3/4"-16	8	6	-



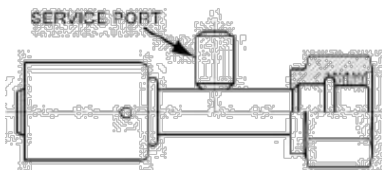
45° Female O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1255	27-2962	5/8"-18	6	6	-
27-1256	27-2862	3/4"-16	8	8	-
27-1257	NS	7/8"-14	10	10	-
27-1314	NS	1-1/16"-14	12	12	-
27-2583	NS	3/4"-16	8	10	-
27-1071	NS	7/8"-14	10	12	-



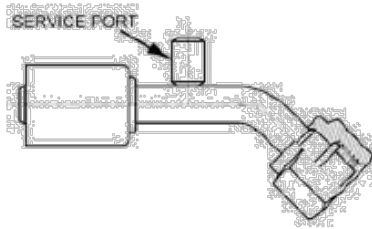
90° Female O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1285	27-2947	5/8"-18	6	6	-
27-1286	27-2172	3/4"-16	8	8	-
27-1287	27-2195	7/8"-14	10	10	-
27-1317	NS	1-1/16"-14	12	12	-
27-2096		5/8"-18	6	8	-
27-2239	NS	3/4"-16	8	10	-
27-1288	NS	7/8"-14	10	12	-
27-2922		3/4"-16	8	6	-
27-3584	NS	1-1/16"-14	12	10	-



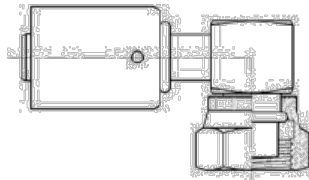
Straight Female O-Ring With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
NS	27-3605	5/8"-18	6	6	1/4" R12
27-1275	27-2964	5/8"-18	6	6	16mm R134a
27-1276	27-2976	3/4"-16	8	8	16mm R134a
27-1277	27-2953	7/8"-14	10	10	13mm R134a
27-2083	27-3900	7/8"-14	10	12	13mm R134a



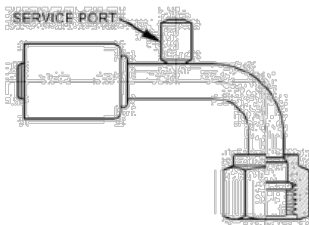
45° Female O-Ring With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
NS	27-2950	5/8"-18	6	6	1/4" R12
27-2102	27-2975	3/4"-16	8	8	16mm R134a
27-2884	27-2911	7/8"-14	10	10	13mm R134a
27-2103	27-2979	7/8"-14	10	12	13mm R134a



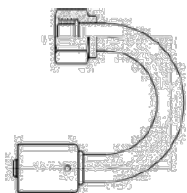
90° Female O-Ring Short Drop

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-2328		3/4"-16	8	8	-
27-2329		7/8"-14	10	10	-
27-4085		7/8"-14	10	12	-



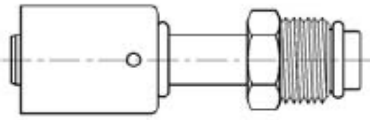
90° Female O-Ring With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1862	27-2946	5/8"-18	6	6	1/4" R12
27-1295	NS	5/8"-18	6	6	16mm R134a
27-1296	27-2912	3/4"-16	8	8	16mm R134a
27-1297	27-2913	7/8"-14	10	10	13mm R134a
27-1109	27-3059	7/8"-14	10	12	13mm R134a



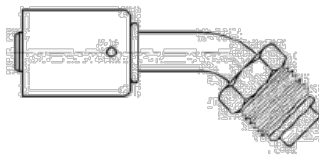
180° Female O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-0479		5/8"-18	6	6	-
27-2053	NS	7/8"-14	10	10	-



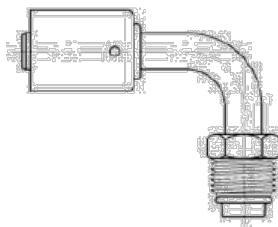
Straight Male O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1365	27-3005	5/8"-18	6	6	-
27-1366	NS	3/4"-18	8	8	-
27-1367	27-2196	7/8-18 "	10	10	-
27-8198	NS	1 1/16-16 "	12	12	-
27-2237	NS	5/8"-18	6	8	-
27-2104	27-8273	7/8-18 "	10	12	-
27-1318		3/4"-18	8	6	-



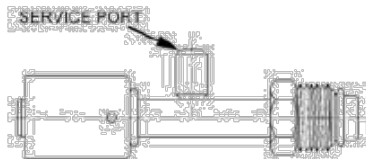
45° Male O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1375	27-2974	5/8"-18	6	6	-
27-1377	27-2914	7/8-18 "	10	10	-
27-3327	NS	5/8"-18	6	8	-



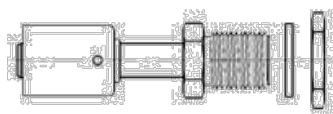
90° Male O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1395	27-2948	5/8"-18	6	6	-
27-2177	NS	3/4"-18	8	8	-
27-1397	27-2915	7/8-18 "	10	10	-
27-8197	NS	1 1/16-16 "	12	12	-
27-3326	NS	5/8"-18	6	8	-
27-1453	27-3060	7/8-18 "	10	12	-
27-2415		7/8-18 "	10	12	13mm R134a



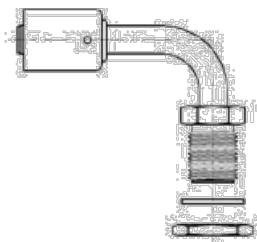
Straight Male O-Ring With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-2099		5/8"-18	6	6	16mm R134a
27-2682		7/8-18 "	10	10	13mm R134a
27-2101		7/8-18 "	10	12	13mm R134a



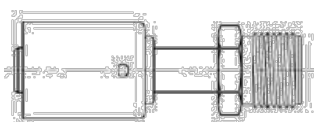
Straight Male Insert O-Ring - Bulkhead

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-0424	27-3057	5/8"-18	6	6	-
27-0425	27-3058	3/4"-16	8	8	-
27-0426	27-3932	7/8"-14	10	10	-



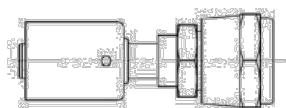
90° Male Insert O-Ring  
- Bulkhead

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-0424	27-3057	5/8"-18	6	6	-
27-0425	27-3058	3/4"-16	8	8	-
27-0426	27-3932	7/8"-14	10	10	-



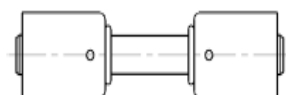
Straight Male Insert O-Ring

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1392	27-3986	5/8"-18	6	6	-
27-1393	NS	3/4"-16	8	8	-
27-1394	27-3987	7/8"-14	10	10	-
27-2047	NS	1-1/16"-14	12	12	-



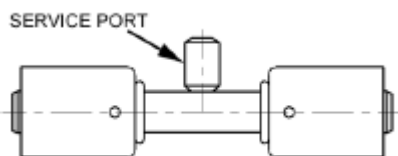
Straight One-Shot Fitting

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
40-62009-00	NS	5/8"-18	6	6	-



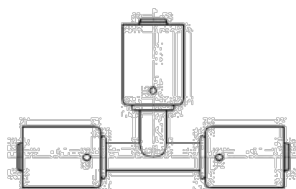
Straight Splicer

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
NS	27-3884	12 x 12	12	12	-



Straight Splicer with  
Switch or Service Port

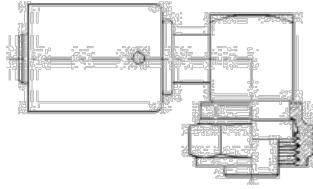
Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-1301	27-2955	6 x 6	6	6	16mm R134a
27-1302	27-2970	8 x 8	8	8	16mm R134a
27-1313	NS	10 x 10	10	10	1/4" R12
27-1303	27-2197	10 x 10	10	10	13mm R134a
27-1304	NS	12 x 12	12	12	13mm R134a



T-Splicer 3 Way Beadlock

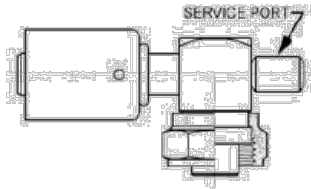
Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-2823	NS	6 x 6 x 6			-
27-2824	NS	10 x 10 x 10			-
NS	27-3885	12 x 12 x 12			-





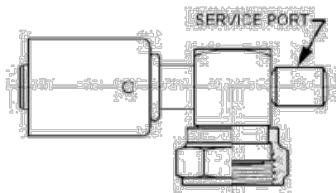
90° Female Tube-O

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-8352	NS	1"-14	FTO	8	-



90° Female Tube-O (FTO)  
With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-8313	NS	1"-14	FTO	8	16mm R134a
27-8314	NS	1"-14	FTO	12	13mm R134a



90° Female Rotalok (FRL)  
With Switch or Service Port

Standard Barrier	Reduced Barrier	THREAD	F	H	PORT
27-8301	NS	1"-14	FRL	8	16mm R134a
27-8302	NS	1"-14	FRL	10	13mm R134a

## Crimp Hose

Part No.	Size	Dimensions				Burst Strength	Crimp OD
		ID		OD			
		Inches	mm	Inches	mm		
27-0020	5/16" 6BH	0.315±0.020	8.0±.05	0.750±0.031	19.1±0.8	2965psi (204 bar)	0.637±.005
27-0021	13/32"8BH	0.420±0.020	10.7±.05	0.906±0.031	23.0±0.8	2490psi (172 bar)	0.790±.005
27-0022	1/2" 10BH	0.510±0.023	13.0±.06	1.000±0.031	25.4±0.8	2320 psi (160 bar)	0.877±.005
27-0023	5/8" 12BH	0.635±0.023	16.1±.06	1.125±0.031	28.6±0.8	2450 psi (169 bar)	1.002±.005

The hose is sold as an assembly including crimped and capped fittings with O-Rings. Hose can also be purchased in bulk per reel. Length varies from 400-650 feet/ reel.



**Polychloroprene Tube:** The tube is made of a refrigerant resistant polychloroprene tube compound. The tube is compatible with a large number of refrigerants including R12, R134a, R22, R500 and R502. The tube is specially formulated to provide good high and low temperature and resist blistering or delamination associated with rapid pressure changes at elevated temperatures.

**Exceeds SAE J2064/J51:** The new BH Dayco Barrier Hose exceeds the stringent requirements for the SAE J2064 specification and exceeds the assembly requirement portion of the specification when crimped with the triple bubble dies using the bead lock style couplings. This combination provides you with an OEM design and quality fitting.

**PAG Lubricant Compatibility:** The Dayco BH Barrier Hose has been tested with all OEM recommended PAG lubricates and has good compatibility with all of them. Fleet testing was done in Australia's outback with PAG lubricants in both new and retro-fitted A/C units. The Dayco BH Barrier Hose is robust designed and field proven.

### Performance: Burst Strength

The SAE J2064 burst requirements have increased to 2000 PSI (13.7 MPa) for discharge and liquid line and 1750 PSI (12 MPa) for suction hose. Dayco has selected high strength textile reinforcement to meet these new demands.

**Crimp Hose**

Part No.	Product Number	Hose Size I.D.		Hose O.D.		Max. Working Pressure		Min. Bend Radius		Min. Burst Pressure		Weight (lbs/foot)
		Inch	mm	Inch	mm	PSI	MPA	Inch	mm	PSI	MPA	
27-8265	4890-06	5/16	7.9	0.56	14.7	500	3.4	1.0	25	2000	13.8	0.09
27-2857	4890-08	13/32	10.3	0.69	17.3	500	3.4	1.5	38	2000	13.8	0.12
27-2956	4890-10	½	12.7	0.75	19.4	500	3.4	2.5	63	2000	13.8	0.13
27-2866	4890-12	5/8	15.9	0.94	23.6	350	2.4	4.0	104	1750	12.1	0.20



**Application:** Recommended for R134a and most refrigerant blends and compressor lubricants in automotive and heavy-duty truck air conditioning systems where significant reduction in permeation and moisture ingress is desired.

**Inner Tube:** Chloroprene

**Barrier:** Nylon

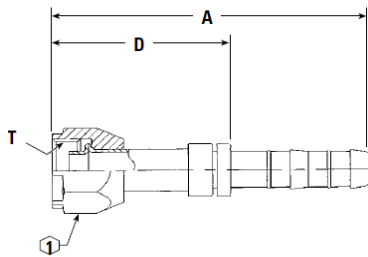
**Reinforcement:** Single-braid polyester

**Cover Compound:** Black chlorobutyl

**Temperature Range:** -40°F to 275°F (-40°C to 135°C)

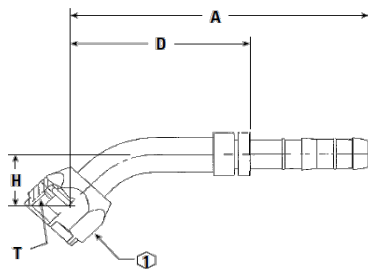
**FlexCLIK FITTING PART NUMBER - KITTED**

**Fitting Assemblies are sold as a Kit.** The FlexCLIK Fitting Kit will include: (1) fitting, (2) FlexCLIK Hose Clamps (Clips) & (1) Cage, all in an MCC pre-printed plastic bag with Bar Code, hose fitting color strip, date code and fitting description (See example below).



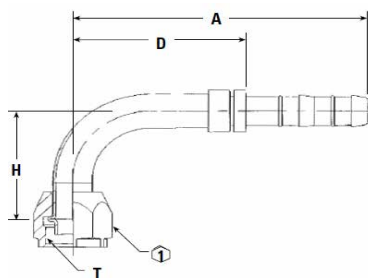
Straight-Female O-Ring  
(Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64074-50	5/8"-18	6	3.14	1.62	-	-	0.75
40-64074-51	5/8"-18	8	3.16	1.62	-	-	0.75
40-64074-52	3/4"-16	8	3.56	2.02	-	-	0.88
40-64074-53	3/4"-16	10	3.57	2.02	-	-	0.88
40-64074-54	7/8"-14	10	3.63	2.08	-	-	1.06
40-64074-55	7/8"-14	12	3.66	2.08	-	-	1.06
40-64074-56	1-1/16"-14	12	4.25	2.67	-	-	1.25
40-64074-57	7/8"-14	8	3.62	2.08	-	-	0.88
40-64074-58	1-1/16"-14	10	4.25	2.62	-	-	1.25
40-64074-59	7/8"-14	16	3.76	2.08	-	-	1.06
40-64074-60	1-1/16"-14	16	4.35	2.67	-	-	1.25



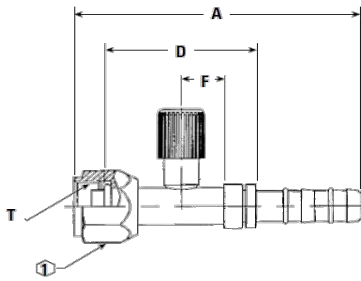
45° Elbow Female  
O-Ring (Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64106-50	1-1/16"-14	12	5.33	3.75	-	1.47	1.25
40-64106-51	5/8"-18	6	3.60	2.08	-	0.67	0.75
40-64106-52	5/8"-18	8	3.62	2.08	-	0.67	0.75
40-64106-53	3/4"-16	8	3.94	2.40	-	0.73	0.88
40-64106-54	3/4"-16	10	3.95	2.40	-	0.73	0.88
40-64106-55	7/8"-14	10	4.37	2.81	-	1.19	1.06
40-64106-56	7/8"-14	12	4.46	2.88	-	1.25	1.06
40-64106-57	1-1/16"-14	16	5.43	3.15	-	1.47	1.25
40-64106-58	7/8"-14	16	4.56	2.66	-	1.25	1.06



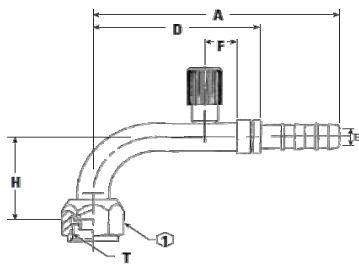
90° Elbow Female  
O-Ring (Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64075-50	5/8"-18	6	3.32	1.79	-	1.38	0.75
40-64075-51	5/8"-18	8	3.33	1.79	-	1.38	0.75
40-64075-52	3/4"-16	8	3.77	2.33	-	1.62	0.88
40-64075-53	3/4"-16	10	3.78	2.23	-	1.62	0.88
40-64075-54	7/8"-14	10	4.22	2.67	-	1.89	1.06
40-64075-55	7/8"-14	12	4.24	2.67	-	1.89	1.06
40-64075-56	1-1/16"-14	12	4.74	3.16	-	2.56	1.25
40-64075-57	3/4"-16	6	3.86	2.33	-	1.62	0.88
40-64075-58	1-1/16"-14	10	4.76	3.31	-	2.56	1.25
40-64075-59	1-1/16"-14	16	4.84	3.16	-	2.56	1.25
40-64075-60	7/8"-14	16	4.4	2.72	-	1.89	1.06



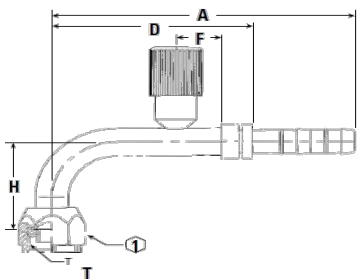
Straight Female O-Ring (Short Pilot) with R134a Low Side Port

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⊕
40-62157-50	7/8"-14	10	4.24	2.25	0.63	-	1.06
40-62157-51	7/8"-14	12	4.27	2.25	0.63	-	1.06
40-62157-52	1-1/16"-14	12	4.58	2.43	0.54	-	1.25
40-62157-53	1-1/16"-14	16	4.68	2.43	0.54	-	1.25



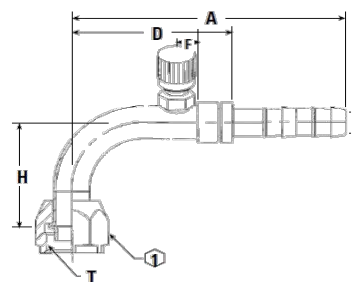
90° Female O-Ring (Short Pilot) with R134a Low Side Port

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⊕
40-62101-50	7/8"-14	10	4.88	3.33	0.63	1.89	1.06
40-62101-51	1-1/16"-14	12	5.1	3.52	0.63	2.56	1.25
40-62101-55	7/8"-14	12	4.83	3.25	0.63	1.89	1.06
40-62101-56	7/8"-14	16	4.93	3.25	0.63	1.89	1.06
40-62101-57	1-1/16"-14	16	5.2	3.52	0.63	2.56	1.25



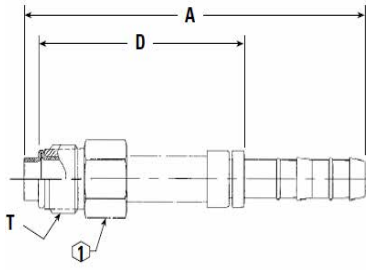
90° Female O-Ring (Short Pilot) With R134a High Side Port

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⊕
40-62103-50	3/4"-16	8	4.61	3.07	0.69	1.62	0.88
40-62103-51	3/4"-16	10	4.53	2.98	0.69	1.62	0.88



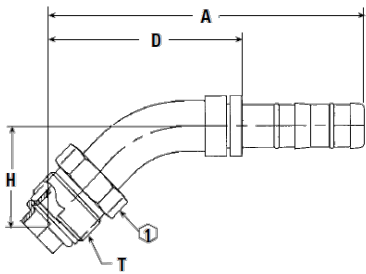
90° Elbow - Female O-Ring (short pilot) with Switch Port (7/16-20 thd)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⊕
40-62103-50	3/4"-16	8	4.61	3.07	0.69	1.62	0.88
40-62103-51	3/4"-16	10	4.53	2.98	0.69	1.62	0.88



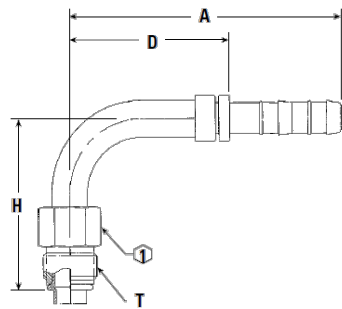
Straight Male O-Ring  
(Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64081-50	5/8"-18	8	3.43	1.7	-	-	0.62
40-64081-51	7/8"-18	12	3.68	1.92	-	-	0.88
40-64081-52	3/4"-18	8	4.37	2.64	-	-	0.75
40-64081-53	5/8"-18	6	3.41	1.7	-	-	0.62
40-64081-54	7/8"-18	10	3.66	1.92	-	-	0.88
40-64081-55	1-1/16"-16	12	3.68	1.92	-	-	1.06
40-64081-56	7/8"-18	16	4.33	2.47	-	-	0.88
40-64081-57	1-1/16"-16	16	4.28	2.47	-	-	1.06



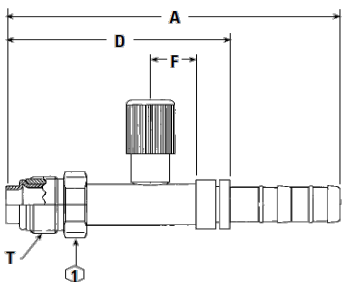
45° Male O-Ring (Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62130-50	3/4"-18	8	4.59	2.83	-	1.2	0.75
40-62130-51	7/8"-18	10	4.65	3.1	-	1.46	0.88
40-62130-52	5/8"-18	8	4.01	2.47	-	0.94	0.62
40-62130-53	7/8"-18	12	4.68	3.1	-	1.47	0.88
40-62130-54	1-1/16"-16	12	4.9	3.32	-	1.53	1.06



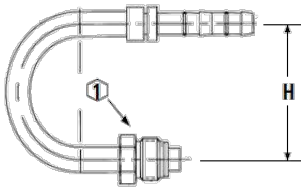
90° Male O-Ring (Short Pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64080-50	7/8"-18	12	4.24	2.67	-	2.45	0.88
40-64080-51	5/8"-18	8	3.34	1.8	-	1.77	0.62
40-64080-52	1-1/16"-16	12	4.22	2.64	-	2.79	1.06
40-64080-53	3/4"-18	10	3.78	2.23	-	2.31	0.75
40-64080-55	7/8"-18	12	4.83	3.25	-	1.89	1.06
40-64080-56	5/8"-18	6	3.33	1.8	-	1.77	0.62
40-64080-57	3/4"-18	8	3.77	2.23	-	2.31	0.75
40-64080-58	7/8"-18	10	4.22	2.67	-	2.453	0.88
40-64080-59	1-1/16"-16	10	4.19	2.64	-	2.79	1.06



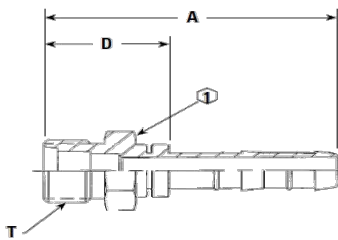
Straight Male O-Ring (short pilot)  
with R134a High Side Port

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64082-50	5/8"-18	6	4.18	2.47	0.63	-	0.62
40-64082-51	3/4"-18	8	4.58	2.85	0.63	-	0.75
40-64082-52	7/8"-18	10	4.34	2.61	0.63	-	0.88



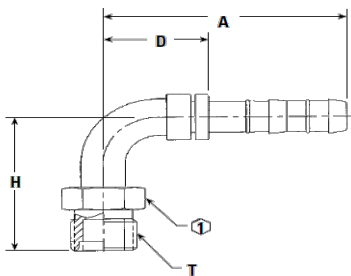
180° Male O-Ring

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62144-50	5/8"-18	6	-	-	-	2.00	0.625
40-62144-51	7/8"-18	10	-	-	-	3.00	0.88



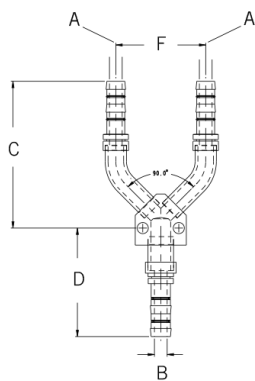
Straight Male Insert O-Ring

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64089-50	5/8"-18	6	3.36	1.83	-	-	0.69
40-64089-51	3/4"-16	8	2.69	1.15	-	-	0.81
40-64089-52	7/8"-14	10	2.9	1.35	-	-	0.94
40-64089-53	7/8"-14	12	4.11	2.5	-	-	0.94
40-64089-54	1-1/16"-14	12	4.29	2.71	-	-	1.125



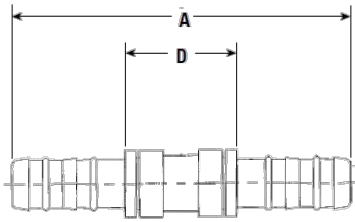
90° Male Insert O-Ring

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62134-50	5/8"-18	8	2.52	0.48	0.98	1.44	0.5
40-62134-51	3/4"-16	10	2.75	0.56	1.2	1.82	0.63



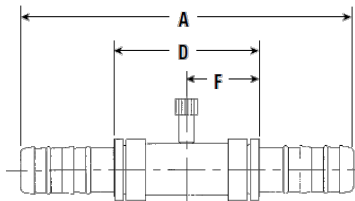
Y Splicer

MCC PN	Description	C Ref	D Ref	F Ref	⬡
40-62127-50	8(A) x 8(A) to 8(B)	4.37	3.24	2.78	-
40-62127-51	10(A) x 10(A to 10(B)	4.30	3.18	2.64	-
40-62127-52	10(A) x 10(A) to 12(B)	4.30	3.11	2.64	-
40-62127-53	12(A) x 12(A) to 12(B)	4.33	3.11	2.64	-
40-62127-54	12(A) x 12(A) to 16(B),	4.33	3.21	2.64	-



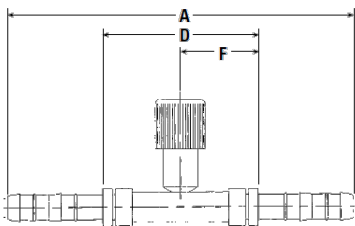
Straight Splicer

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62128-52	-	6	4.63	1.58	-	-	-
40-62128-53	-	8	4.76	1.68	-	-	-
40-62128-54	-	10	5.68	2.58	-	-	-
40-62128-55	-	12	4.72	1.57	-	-	-
40-62128-56	-	16	5.18	1.82	-	-	-



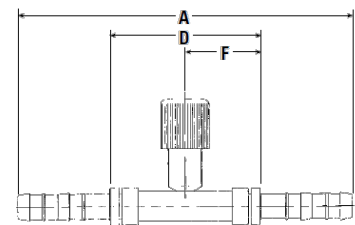
Splicer With Switchport  
7/16"-20 Thread

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62112-50	-	6	5.41	2.36	1.18	-	-
40-62112-51	-	8	5.61	2.52	1.26	-	-
40-62112-52	-	10	5.54	2.44	1.22	-	-
40-62212-53	-	12	5.6	2.44	1.22	-	-
40-62212-54	-	16	6.79	3.44	1.72	-	-



Splicer With R134a  
Low Side Port

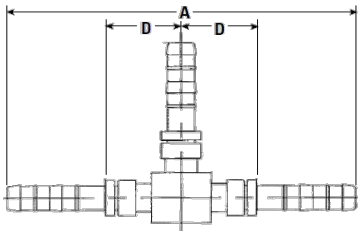
MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64115-50	-	10	5.54	2.44	1.22	-	-
40-64115-51	-	12	5.60	2.44	1.22	-	-
40-64115-52	-	16	6.79	3.44	1.72	-	-



Splicer With High  
Side R134a Port

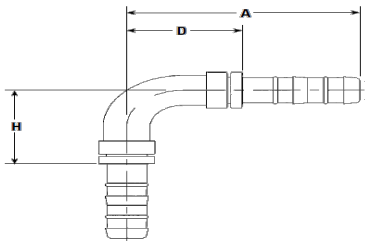
MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64095-51	-	6	5.41	2.36	1.18	-	-
40-64095-52	-	8	5.61	2.52	1.26	-	-
40-64095-50	-	10	5.62	2.52	1.26	-	-





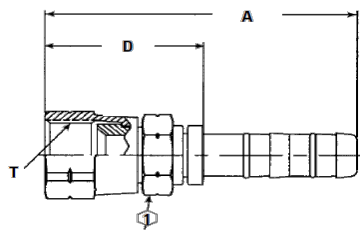
"T" Splicer -  
3 Hose Connector

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62102-50	-	8	5.48	2.40	-	-	-
40-62102-51	-	10	5.62	2.52	-	-	-
40-62102-52	-	12	5.67	2.52	-	-	-



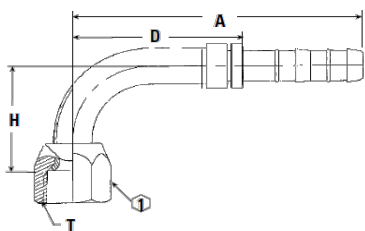
90° Splicer

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62131-50	-	8	2.98	1.43	-	2.98	-
40-62131-51	-	10	3.08	1.53	-	3.08	-
40-62131-52	-	12	3.68	2.11	-	3.68	-



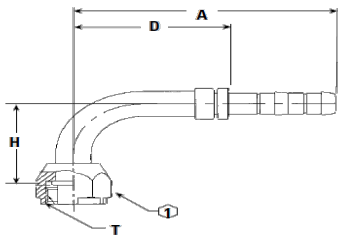
Female SAE 45° Flares

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64084-50	3/4"-18	8	2.96	1.42	-	-	0.69
40-64084-51	5/8"-18	8	3.14	1.62	-	-	0.75
40-64084-52	1-1/16"-16	12	3.20	1.62	-	-	1.25
40-64084-53	3/4"-18	10	3.56	2.02	-	-	0.88
40-64084-54	7/8"-18	10	3.63	2.08	-	-	1.00
40-64084-55	5/8"-18	6	2.88	1.35	-	-	0.56
40-64084-56	7/8"-18	12	3.66	2.08	-	-	1.00



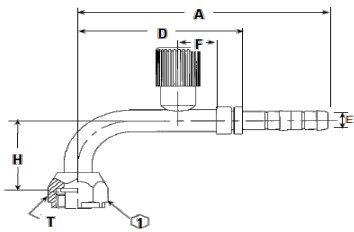
90° Female SAE 45° Flare  
To FlexCLIK Hose

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64073-50	5/8"-18	6	2.51	0.98	-	0.85	0.75
40-64073-51	5/8"-18	8	2.52	0.98	-	0.85	0.75
40-64073-52	3/4"-16"	8	2.74	1.2	-	1.09	0.88
40-64073-53	7/8"-14"	10	3.09	1.54	-	1.19	1.00
40-64073-54	7/8"-14"	12	3.09	1.54	-	1.19	1.00
40-64073-55	1-1/16"-14"	12	3.68	2.11	-	1.80	1.25



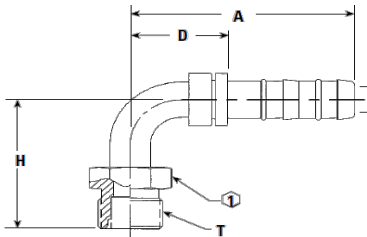
90° Female O-Ring (long pilot) Metric Thread

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	
40-62135-50	M20 x 1.5	10	3.78	2.23	-	1.62	0.94
40-62135-51	M27 x 2	12	4.74	3.16	-	2.56	1.25



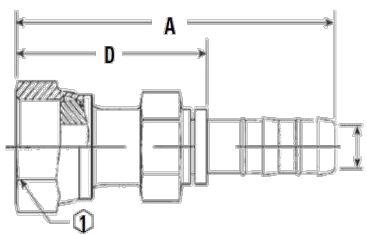
90° Female O-Ring (long pilot) Metric Thread With High-Side Port

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	
40-62135-52	M20 x 1.5	8	4.52	2.98	0.69	1.62	0.94



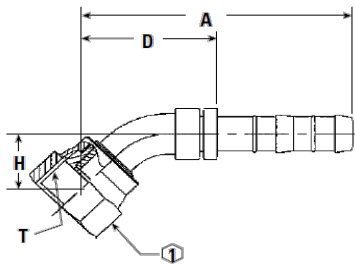
90° Male O-Ring (rigid) Metric Thread

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	
40-62133-50	M20 x 1.5	10	2.75	1.2	-	1.82	0.88



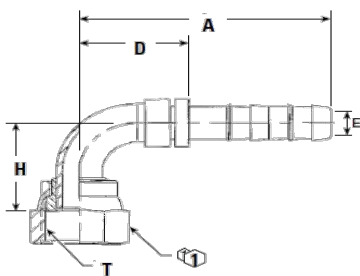
Straight O-Ring Seal Female Swivel

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	
40-62152-50	1-1/16"-16	6	2.95	1.43	-	-	22mm
40-62152-51	1-3/16"-16	8	3.17	1.62	-	-	24mm
40-62152-52	1"-14	10	3.33	1.78	-	-	30mm
40-62152-54	1"-14	12	3.32	1.74	-	-	30mm
40-62152-55	1-3/16"-12	12	3.38	1.80	-	-	36mm



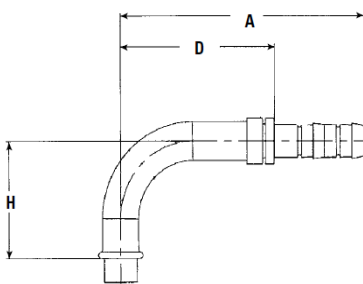
45° O-Ring Seal Female Swivel

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62151-50	11/16"-16	6	2.65	1.12	-	0.44	0.81
40-62151-51	13/16"-16	8	3.02	1.47	-	0.59	0.94
40-62151-52	1"-14	10	3.22	1.67	-	0.7	1.13
40-62151-54	1"-14	8	3.5	1.96	-	0.68	1.18
40-62151-55	1-3/16"-12	12	4.23	2.65	-	0.83	1.42
40-62151-56	1-3/16"-16	10	3.02	1.47	-	0.59	0.94
40-62151-57	1-7/16"-12	16	4.62	2.94	-	0.94	1.61
40-62151-58	1"-14	10	3.76	2.21	-	0.68	1.18



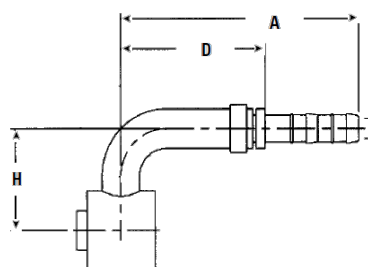
90° O-Ring Seal Female Swivel

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-64094-50	1"-14	10	3.09	1.53	-	1.27	1.12
40-64094-51	11/16"-16	6	2.50	0.98	-	0.91	0.81
40-64094-52	13/16"-16	8	2.74	1.2	-	1.15	0.94
40-64094-53	1-3/16"-12	12	3.36	1.78	-	1.9	1.38
40-64094-54	9/16"-18	6	2.44	0.92	-	0.82	0.69
40-64094-55	1"-14	12	3.11	1.53	-	1.78	1.13
40-64094-56	13/16"-16	6	2.66	1.10	-	1.15	0.94
40-64094-57	1"-14	16	3.3	1.62	-	1.78	1.12
40-64094-58	1"-14	12	3.67	2.10	-	1.54	1.18
40-64094-59	1-7/16"-12	16	3.71	2.04	-	2.22	1.63
40-64094-60	13/16"-16	16	3.46	1.78	-	1.90	1.38
40-64094-61	9/16"-18	10	2.75	1.20	-	1.15	0.94



90° Pilot Connection (long pilot)

MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62132-50	6	8	3.23	1.69	-	1.38	0.75
40-62132-51	10	12	4.25	2.67	-	1.89	1.25

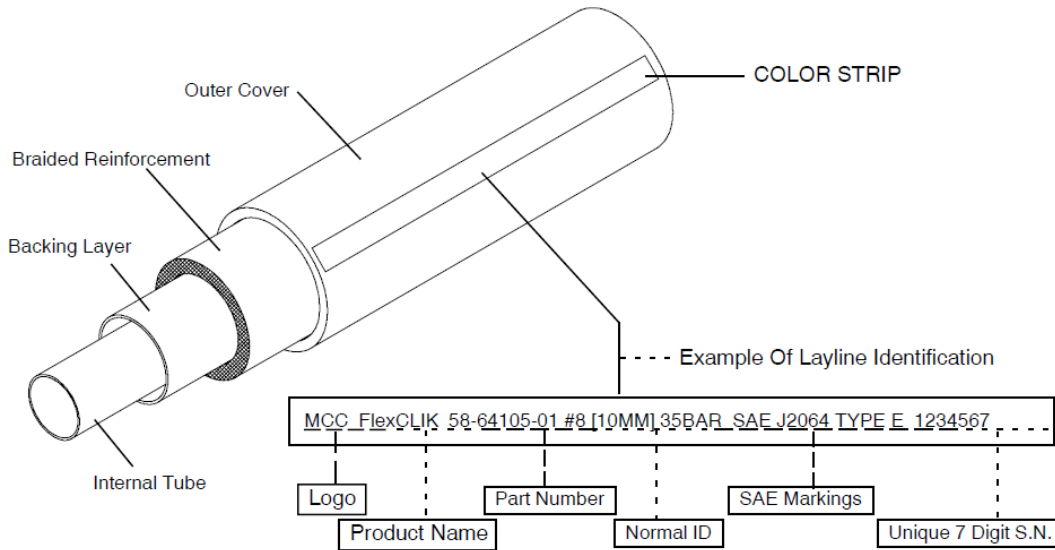


90° GM Block Style

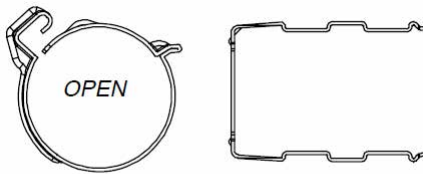
MCC PN	TH'D "T"	Hose	A Ref	D Ref	F Ref	H Ref	⬡
40-62136-50	-	10	3.83	2.28	-	2.31	-
40-62136-51	-	12	3.86	2.28	-	2.38	-

## FlexClik Hose - Clamps - Cages & O-Rings

### FlexCLIK Hose

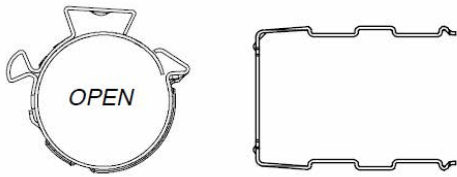


MCC PN	Dash Size	Description
58-64105-90	6	Black, 5/16" 50 Foot (8.1 mm ID x 15.2 mm OD)
58-64105-13	8	Green, 13/32" 50 Foot (10.7 mm ID x 18.2mm OD)
58-64105-24	10	Red, 1/2" 50 Foot (13.2 mm ID x 20.3 mm OD)
58-64105-34	12	Blue, 5/8" 50 Foot (16.3 mm ID x 25.1 mm OD)
58-64105-44	16	Blue, 7/8" 50Foot (16.3 mm ID x 25.1 mm OD)



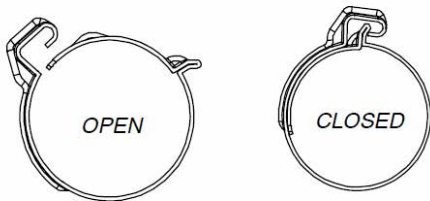
44-64008-50,-51,-52,-53

MCC PN	Dash Size	Description
44-64008-50	6	FlexCLIK Clamp/Cage Kit
44-64008-51	8	FlexCLIK Clamp/Cage Kit
44-64008-52	10	FlexCLIK Clamp/Cage Kit
44-64008-53	12	FlexCLIK Clamp/Cage Kit



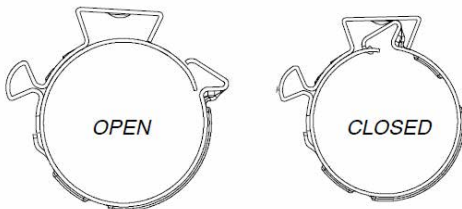
44-64008-54

MCC PN	Dash Size	Description
44-64008-54	16	FlexCLIK Clamp/Cage Kit



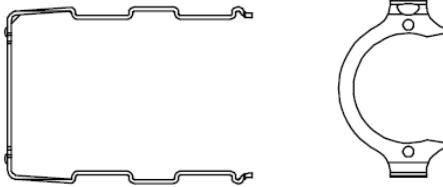
44-64009-00,-01,-02, -03

MCC PN	Dash Size	Description
44-64009-00	6	FlexCLIK Clamp, CLIC 86 N 150
44-64009-01	8	FlexCLIK Clamp, CLIC 86 N 175
44-64009-02	10	FlexCLIK Clamp, CLIC 86 N 200
44-64009-03	12	FlexCLIK Clamp, CLIC 86 N 245

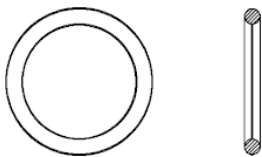


44-64009-04

MCC PN	Dash Size	Description
44-64009-04	16	FlexCLIK Clamp, CLIC E N 285



MCC PN	Dash Size	Description
44-64008-00	6	FlexCLIK Clamp Cage
44-64008-01	8	FlexCLIK Clamp Cage
44-64008-02	10	FlexCLIK Clamp Cage
44-64008-03	12	FlexCLIK Clamp Cage
44-64008-04	16	FlexCLIK Clamp Cage



MCC PN	Dash Size	Description
42-62157-00	4	FlexCLIK O-Ring Nipple, Hose End
42-62157-01	6	FlexCLIK O-Ring Nipple, Hose End
42-62157-02	8	FlexCLIK O-Ring Nipple, Hose End
42-62157-03	10	FlexCLIK O-Ring Nipple, Hose End
42-62157-04	12	FlexCLIK O-Ring Nipple, Hose End
42-62157-05	16	FlexCLIK O-Ring Nipple, Hose End

## FlexCLIK & Quick-CLICK Cross Reference

FlexCLIK KITTED PN	FITTING DESCRIPTION	Quick-CLICK
40-62101-50	90°, #10 FOR X #10 Hose, W/LSA, FlexCLIK	40-62023-01
40-62101-51	90°, #12 FOR X #12 Hose, W/LSA, FlexCLIK	N/A
40-62101-55	90°, #10 FOR X #12 Hose, W/LSA, FlexCLIK	40-62023-00
40-62101-56	90°, #10 FOR X #16 Hose, W/LSA, FlexCLIK	N/A
40-62101-57	90°, #12 FOR X #16 Hose, W/LSA, FlexCLIK	N/A
40-62102-50	TEE, #8 X #8 X #8 Hose, FlexCLIK	40-62012-00
40-62102-51	TEE, #10 X #10 X #10 Hose, FlexCLIK	40-62012-02
40-62102-52	TEE, #12 X #12 X #12 Hose, FlexCLIK	40-62012-01
40-62103-50	90°, #8 FOR X #10 Hose, W/HSA, FlexCLIK	40-62022-00
40-62103-51	90°, #8 FOR X #8 Hose, W/HSA, FlexCLIK	40-62022-01
40-62103-52	90°, #8 FOR X #10 Hose, W/HSA, FlexCLIK	N/A
40-62112-50	Splicer, #6 Hose, FLX, With 1/4 Inch Schrader	40-60081-02
40-62112-51	Splicer, #8 Hose, FLX, With 1/4 Inch Schrader	40-60081-03
40-62112-52	Splicer, #10 Hose, FLX, With 1/4 Inch Schrader	40-60081-04
40-62128-52	Splicer, #6 Hose, FlexCLIK	N/A
40-62128-53	Splicer, #8 Hose, FlexCLIK	N/A
40-62128-54	Splicer, #10 Hose, FlexCLIK	N/A
40-62128-55	Splicer, #12 Hose, FlexCLIK	N/A
40-62128-56	Splicer, #16 Hose, FlexCLIK	N/A
40-62130-50	Y, 8(A)x8(B)-8(B), FlexCLIK	40-60084-06
40-62130-51	Y, 10(A)x10(B)-10(B), FlexCLIK	40-60084-05
40-62130-52	Y, 10(A)x10(B)-12(B), FlexCLIK	N/A
40-62130-53	Y, 12(A)x12(B)-12(B), FlexCLIK	N/A
40-62130-54	Y, 12(A)x12(B)-16(B), FlexCLIK	N/A
40-62131-50	90°, Splicer, #8 Hose, FlexCLIK	40-60137-03
40-62131-51	90°, Splicer, #10 Hose, FlexCLIK	40-60137-04
40-62131-52	90°, Splicer, #12 Hose, FlexCLIK	40-60137-05
40-62132-50	90°, #6 POR, #8 Hose, FlexCLIK	N/A
40-62132-51	90°, #10 POR, #12 Hose, FlexCLIK	N/A
40-62133-50	90°, Metric, MOR X #10 Hose, FlexCLIK	N/A
40-62134-50	90°, #6 MORX #8 Hose, FlexCLIK	N/A
40-62134-51	90°, #8 MORX #10 Hose, FlexCLIK	N/A
40-62135-50	90°, M20x1.5, FOR X #10 Hose, FlexCLIK	N/A
40-62135-51	90°, M27x2.0, FOR X #12 Hose, FlexCLIK	N/A
40-62135-52	90°, M20x1.5 W/HSP, FOR X #8 Hose, FlexCLIK	N/A
40-62136-50	90°, GMBlock X #10 Hose, FlexCLIK	40-62088-00
40-62136-51	90°, GMBlock X #12 Hose, FlexCLIK	40-62089-00
40-62144-50	180°, #6 MOR X #8 Hose, FlexCLIK	N/A
40-62144-51	180°, #10 MOR X #12 Hose, FlexCLIK	N/A

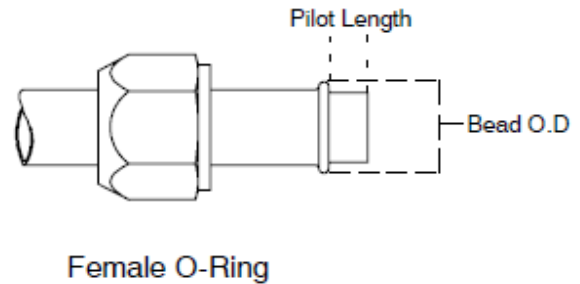
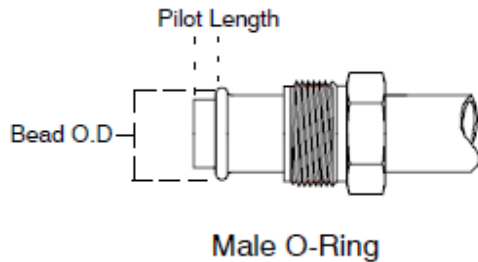
<b>FlexCLIK KITTED PN</b>	<b>FITTING DESCRIPTION</b>	<b>Quick-CLICK</b>
40-62151-50	45°, #6 FORS X #6Hose, FlexCLIK	N/A
40-62151-51	45°, #8 FORS X #8Hose, FlexCLIK	N/A
40-62151-52	45°, #10 FORS X #10Hose, FlexCLIK	N/A
40-62151-54	45°, #10 FORS X #10Hose, FlexCLIK	N/A
40-62151-55	45°, #12 FORS X #12Hose, FlexCLIK	N/A
40-62151-56	45°, #8 FORS X #10Hose, FlexCLIK	N/A
40-62151-57	45°, #16 FORS X #16Hose, FlexCLIK	N/A
40-62151-58	45°, #10 FORS X #10Hose, FlexCLIK	N/A
40-62152-50	Straight, #6 FORS X #6Hose, FlexCLIK	N/A
40-62152-51	Straight, #8 FORS X #8Hose, FlexCLIK	N/A
40-62152-52	Straight, #10 FORS X #10Hose, FlexCLIK	N/A
40-62152-53	Straight, #12 FORS X #12Hose, FlexCLIK	N/A
40-62152-54	Straight, #12 FORS X #12Hose, FlexCLIK	N/A
40-62152-55	Straight, #10 FORS X #12Hose, FlexCLIK	N/A
40-62157-50	Straight, #10 FOR X #10Hose, FlexCLIK	N/A
40-62157-51	Straight, #10 FOR X #12Hose, FlexCLIK	N/A
40-62157-52	Straight, #12 FOR X #12Hose, FlexCLIK	N/A
40-62157-53	Straight, #12 FOR X #16Hose, FlexCLIK	N/A
40-62212-53	Splicer, #12 Hose, FLX, With 1/4 Inch Schrader	40-60081-05
40-62212-54	Splicer, #16 Hose, FLX, With 1/4 Inch Schrader	N/A
40-64073-50	90°, #6 FFL X #6 Hose, FlexCLIK	40-60079-02
40-64073-51	90°, #6 FFL X #8 Hose, FlexCLIK	N/A
40-64073-52	90°, #8 FFL X #8 Hose, FlexCLIK	40-60079-03
40-64073-53	90°, #10 FFL X #10 Hose, FlexCLIK	40-60079-04
40-64073-54	90°, #10 FFL X #12 Hose, FlexCLIK	40-60079-07
40-64073-55	90°, #12 FFL X #12 Hose, FlexCLIK	40-60079-05
40-64074-50	#6 Straight, FOR X #6 Hose, FlexCLIK	40-60060-02
40-64074-51	#6 Straight, FOR X #8 Hose, FlexCLIK	40-60060-08
40-64074-52	#8 Straight, FOR X #8 Hose, FlexCLIK	40-60060-03
40-64074-53	#8 Straight, FOR X #10 Hose, FlexCLIK	40-60060-06
40-64074-54	#10 Straight, FOR X #10 Hose, FlexCLIK	40-60060-04
40-64074-55	#10 Straight, FOR X #12 Hose, FlexCLIK	40-60060-07
40-64074-56	#12 Straight, FOR X #12 Hose, FlexCLIK	40-60060-05
40-64074-57	#10 Straight, FOR X #8 Hose, FlexCLIK	N/A
40-64074-58	#12 Straight, FOR X #10 Hose, FlexCLIK	N/A
40-64074-59	#10 Straight, FOR X #16 Hose, FlexCLIK	N/A
40-64074-60	#12 Straight, FOR X #16 Hose, FlexCLIK	N/A
40-64075-50	90°, #6FOR X #6Hose, FlexCLIK	40-60061-02
40-64075-51	90°, #6FOR X #8Hose, FlexCLIK	40-60061-08



<b>FlexCLIK KITTED PN</b>	<b>FITTING DESCRIPTION</b>	<b>Quick-CLICK</b>
40-64075-52	90°, #8FOR X #8Hose, FlexCLIK	40-60061-03
40-64075-53	90°, #8 FOR X#10 Hose, FlexCLIK	40-60061-06
40-64075-54	90°, #10 FOR X #10 Hose, FlexCLIK	40-60061-04
40-64075-55	90°, #10 FOR X #12 Hose, FlexCLIK	40-60061-07
40-64075-56	90°, #12 FOR X #12 Hose, FlexCLIK	40-60061-05
40-64075-57	90°, #8FOR X #6Hose, FlexCLIK	N/A
40-64075-58	90°, #12 FOR X #10 Hose, FlexCLIK	N/A
40-64075-59	90°, #12 FOR X #16 Hose, FlexCLIK	N/A
40-64075-60	90°, #16 FOR X #16 Hose, FlexCLIK	N/A
40-64080-50	90°, #10 MOR X #12 Hose, FlexCLIK	40-60083-07
40-64080-51	90°, #6MOR X #8Hose, FlexCLIK	40-60083-08
40-64080-52	90°, #12 MOR X #12 Hose, FlexCLIK	N/A
40-64080-53	90°, #8 MOR X#10 Hose, FlexCLIK	N/A
40-64080-55	90°, #6MOR X #6Hose, FlexCLIK	40-60083-02
40-64080-56	90°, #8MOR X #8Hose, FlexCLIK	40-60083-03
40-64080-57	90°, #10 MOR X #12 Hose, FlexCLIK	40-60083-04
40-64080-58	90°, #12 MOR X #10 Hose, FlexCLIK	N/A
40-64080-59	90°, #12 MOR X #10 Hose, FlexCLIK	N/A
40-64081-50	Straight, #6MOR X #8Hose, FlexCLIK	40-60051-08
40-64081-51	Straight, #10 MOR X #12 Hose, FlexCLIK	40-60051-07
40-64081-52	Straight, #8MOR X #8Hose, FlexCLIK	40-60051-03
40-64081-53	Straight, #6MOR X #6Hose, FlexCLIK	40-60051-02
40-64081-54	Straight, #10 MOR X #10 Hose, FlexCLIK	40-60051-04
40-64081-55	Straight, #12 MOR X #12 Hose, FlexCLIK	N/A
40-64081-56	Straight, #10 MOR X #16 Hose, FlexCLIK	N/A
40-64081-57	Straight, #12 MOR X #16 Hose, FlexCLIK	N/A
40-64082-50	Straight, #10 MOR X #10 Hose, HS, FlexCLIK	N/A
40-64082-51	Straight, #6MOR X #6Hose, HS, FlexCLIK	N/A
40-64082-52	Straight, #8MOR X #8Hose, HS, FlexCLIK	N/A
40-64084-50	Straight, #8 FFL X #8 Hose, FlexCLIK	40-60078-03
40-64084-51	Straight, #6 FFL X #8 Hose, FlexCLIK	N/A
40-64084-52	Straight, #12 FFL X #12 Hose, FlexCLIK	40-60078-05
40-64084-53	Straight, #8 FFL X#10 Hose, FlexCLIK	40-60078-06
40-64084-54	Straight, #10 FF X #10 Hose, FlexCLIK	40-60078-04
40-64084-55	Straight, #6 FFL X #6 Hose, FlexCLIK	40-60078-02
40-64084-56	Straight, #10 FFL X #12 Hose, FlexCLIK	40-60078-07
40-64089-50	Straight, #6MIO X #6Hose, FlexCLIK	N/A
40-64089-51	Straight, #8MIO X #8Hose, FlexCLIK	N/A
40-64089-52	Straight, #10 MIO X #10 Hose, FlexCLIK	N/A

<b>FlexCLIK KITTED PN</b>	<b>FITTING DESCRIPTION</b>	<b>Quick-CLICK</b>
40-64089-53	Straight, #10 MIO X #12 Hose, FlexCLIK	N/A
40-64089-54	Straight, #12 MIO X #12 Hose, FlexCLIK	N/A
40-64092-50	90°, #10 FOR X #10 Hose W/1/4 Schrader, FLK	N/A
40-64092-51	90°, #12 FOR X #12 Hose W/1/4 Schrader, FLK	N/A
40-64094-50	90°, #10 F.Swivel, ORS X #10 Hose, FlexCLIK	40-60048-04
40-64094-51	90°, #6 F.Swivel, ORS X #6 Hose, FlexCLIK	40-60048-02
40-64094-52	90°, #8 F.Swivel, ORS X #8 Hose, FlexCLIK	40-60048-03
40-64094-53	90°, #12 F.Swivel, ORS X #12 Hose, FlexCLIK	40-60048-05
40-64094-54	90°, #4 F.Swivel, ORS X #6 Hose, FlexCLIK	40-60048-01
40-64094-55	90°, #10 F.Swivel, ORS X #12 Hose, FlexCLIK	40-60048-07
40-64094-56	90°, #8 F.Swivel, ORS X #6 Hose, FlexCLIK	40-60048-10
40-64094-57	90°, #10 F.Swivel, ORS X #16 Hose, FlexCLIK	N/A
40-64094-58	90°, #10 F.Swivel, ORS X #12 Hose, FlexCLIK	N/A
40-64094-59	90°, #16 F.Swivel, ORS X #16 Hose, FlexCLIK	N/A
40-64094-60	90°, #10 F.Swivel, ORS X #16 Hose, FlexCLIK	N/A
40-64094-61	90°, #18 F.Swivel, ORS X #10 Hose, FlexCLIK	N/A
40-64095-50	Splicer, #10 Hose, FlexCLIK, W/High Side Access	40-60059-04
40-64095-51	Splicer, #6 Hose, FlexCLIK, W/High Side Access	40-60059-02
40-64095-52	Splicer, #8 Hose, FlexCLIK, W/High Side Access	40-60059-03
40-64106-50	45°, #12 FOR X #12 Hose, FlexCLIK	40-60050-05
40-64106-51	45°, #6FOR X #6Hose, FlexCLIK	40-60050-02
40-64106-52	45°, #6FOR X #8Hose, FlexCLIK	40-60050-08
40-64106-52	45°, #6FOR X #8Hose, FlexCLIK	40-60050-08
40-64106-53	45°, #8FOR X #8Hose, FlexCLIK	40-60050-03
40-64106-54	45°, #8 FOR X #10 Hose, FlexCLIK	40-60050-06
40-64106-55	45°, #10 FOR X #10 Hose, FlexCLIK	40-60050-04
40-64106-56	45°, #10 FOR X #12 Hose, FlexCLIK	40-60050-07
40-64106-57	45°, #12 FOR X #16 Hose, FlexCLIK	N/A
40-64106-58	45°, #10 FOR X #16 Hose, FlexCLIK	N/A
40-64115-50	Splicer, #10 Hose, FlexCLIK, W/Low Side Access	40-60058-04
40-64115-51	Splicer, #12 Hose, FlexCLIK, W/Low Side Access	40-60058-05
40-64115-52	Splicer, #16 Hose, FlexCLIK, W/Low Side Access	40-64115-52

# O-Ring Pilot Thread Sizes



Male Thread O.D. (Inch)					Female Thread I.D. (Inch)		
Inch Size	Dash Size	Thread	Fraction	Decimal	Thread	Fraction	Decimal
3/8	6	5/8-18	5/8	.62	5/8-18	9/16	.57
1/2	8	3/4-18	3/4	.75	3/4-16	11/16	.69
5/8	10	7/8-18	7/8	.87	7/8-14	13/16	.81
3/4	12	1-1/16-16	1-1/16	1.06	11/16-14	1	.99

LongPilot				ShortPilot	
Inch Size	Nominal Tube Size	Bead O.D. (Inch)	Pilot Length	Bead O.D. (Inch)	Pilot Length
3/8	6	.52	.28	.52	.19
1/2	8	.64	.39	.64	.19
5/8	10	.77	.39	.77	.19
3/4	12	.91	.39	.91	.19

Note: This connection is common to air conditioning systems, both in vehicle and commercial applications. Both the male and female halves of the connections have a pilot, either long or short. The seal takes place by compressing an O-Ring adjacent to the bead of the tube. The threads hold the connection together mechanically.



# XIV. Electrical / Electronics

# Temperature Controllers

## Mini Vehicle Controller



P/N: 35-0748



P/N: 35-8071

**Specifications**

Operating Voltage:	+9VDC to 32V DC
Operating Temperature:	-40°C to 85 °C (-40°F to 185°F)
Inputs:	5 Digital and 9 Analog
Outputs:	6 High side, 2 Bidirectional, 1 Analog and 2 PWM
Communication:	RS-485 and CANBus (J1939)

## Electronic Climate Control



P/N: 35-0583



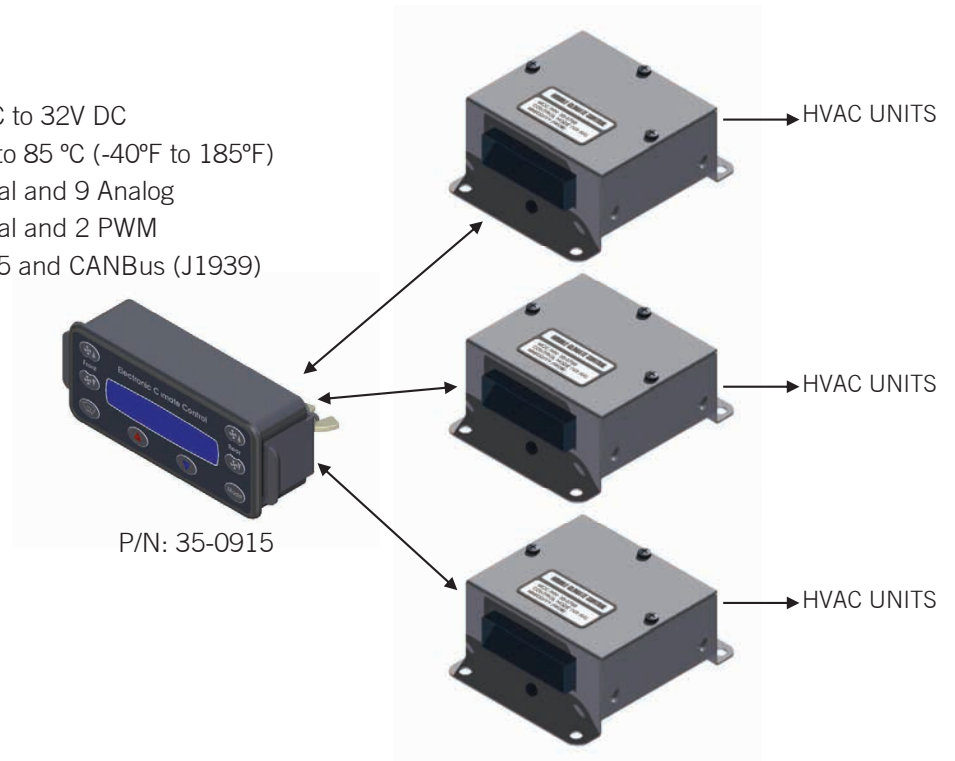
P/N: 35-0559

# Temperature Controllers

## Mini Vehicle Controllers

### Specifications

Operating Voltage: +9VDC to 32V DC  
 Operating Temperature: -40°C to 85 °C (-40°F to 185°F)  
 Inputs: 5 Digital and 9 Analog  
 Outputs: 9 Digital and 2 PWM  
 Communication: RS-485 and CANBus (J1939)



## ECC/MVC Display

### ECC Diagnostic Mode

Evap Time  
12.5 Hrs. Rst->

Component running hours

Low Press. Sw.  
0 Times Rst->

Pressure Switch Trips

Voltage  
13.8V

Supply Voltage

Return Temp. 75°F  
Open: 0 Short: 0 Rst->

Temperature Sensor  
Reading and errors

### MVC Diagnostic Mode



Output Parameter Status



Component Error List

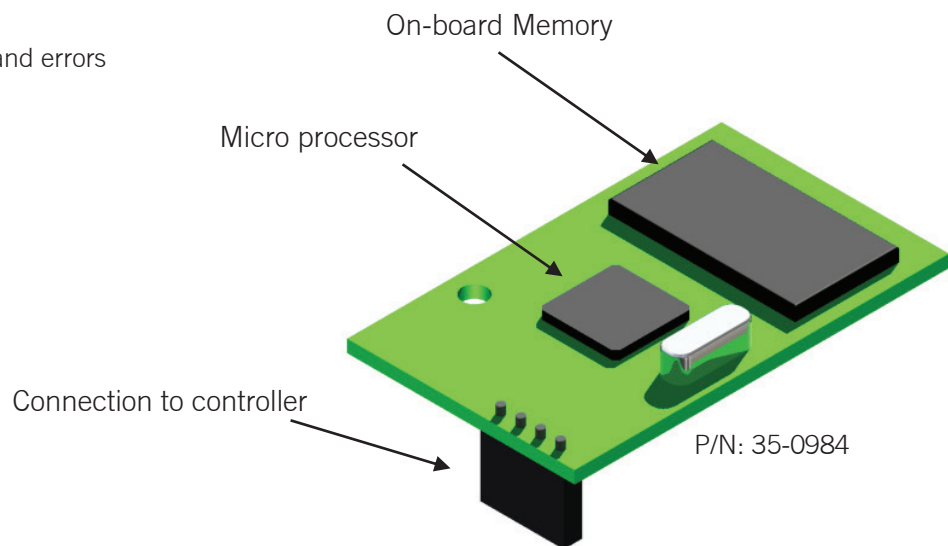
## Defroster Controller



P/N: 35-0828

## Data Logger

- Cabin set-point temperature
- Air sensor temperature readings and errors
- A/C compressor clutch cycle
- Battery supply voltage
- Refrigerant pressure
- Errors
- System current draw
- Differential air pressure
- Component total running hours
- Value of all input and outputs
- Evaporator blower speed
- Condenser fan speed
- Actuator position



P/N: 35-0984

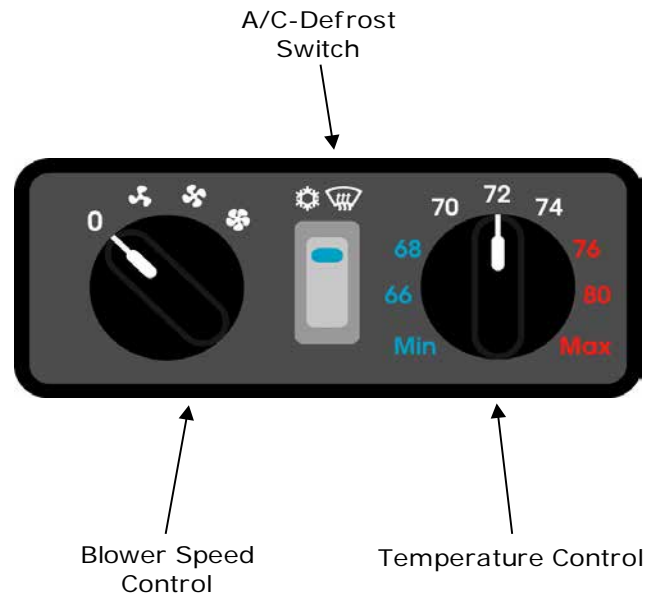
## Control Panel with Automatic Temperature Control

The Automatic Thermostat Module (ATM) uses a temperature set-point potentiometer, motorized heater valve and temperature sensor to maintain driver cab temperature.

The operator will choose a temperature setting which will be maintained by automatically adjusting the heater valve with the Automatic Thermostat Module.

The ATM will improve cab temperature stability and provide a more comfortable operating environment.

The blower speed and evaporator coil temperature are controlled by the production proven blower switch and Deicing Module.



### Automatic Thermostat Module



P/N: 35-0581

**Specifications:**

Operating Voltage:	16VDC to 32VDC
Storage Temperature:	-40°C to +105°C (-40°F to 220°F)
Operating Temperature:	-40°C to +85°C (-40°F to 185°F)
Controls Cabin temperature from	16° C (60.8°F) to 28° C (82.4°F)



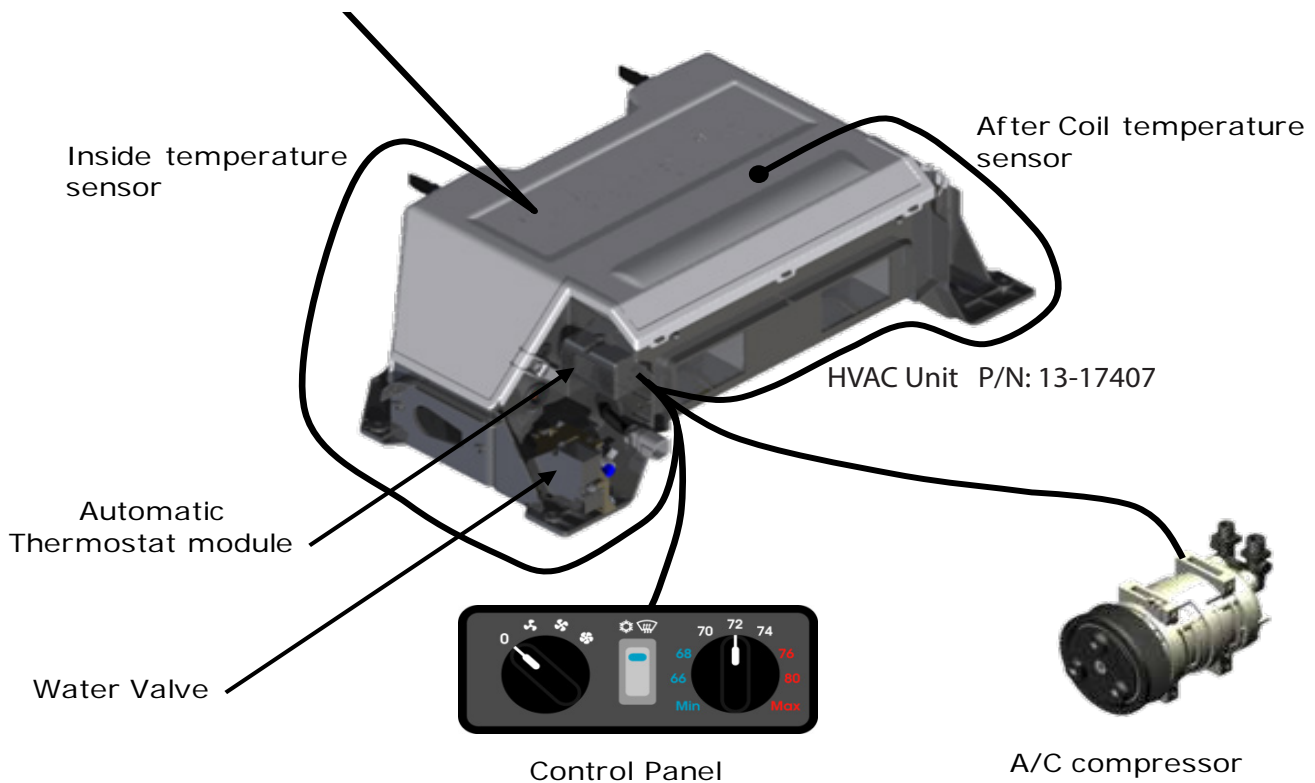
## Automatic Thermostat System

The Automatic Thermostat Module uses a microprocessor to calculate an appropriate position of the water valve to maintain cab temperature set-point.

There are two temperature sensors installed in this unit. The inside temperature sensor measures temperature of the air going to the unit. The after coil sensor measures the temperature of the air that is passing the heater coil. By measuring the after coil temperature the ATM can calculate the rate of temperature change of the discharge air of the HVAC unit.

With the measurement from the sensors, The module calculates the difference between inside and set-point temperature. From this difference, the thermostat module opens or closes the water valve accordingly.

When the temperature set-point potentiometer is turned to minimum temperature position, the water valve closes completely regardless of the inside temperature. This is the coldest setting. When the temperature set-point potentiometer is turned to the maximum temperature position, the water valve will open completely regardless of inside temperature. This is the hottest setting.



The Automatic Thermostat Module is protected against vibration & contaminants by polyurethane potting compound.

## Multiplex Nodes



P/N: 35-0573

### Specifications

Operating Voltage:	+9VDC to 32V DC
Operating Temperature:	-40°C to 85 °C (-40°F to 185°F)
Inputs:	6 Digital and 10 Analog
Outputs:	14 Digital and 2 PWM
Communication:	RS-485 and CANBus (J1939)



P/N: 35-0504

### Specifications

Operating Voltage:	+9VDC to 32V DC
Operating Temperature:	-40°C to 85 °C (-40°F to 185°F)
Inputs:	6 Digital and 10 Analog
Outputs:	14 Digital and 2 PWM
Communication:	RS-485 and CANBus (1939)

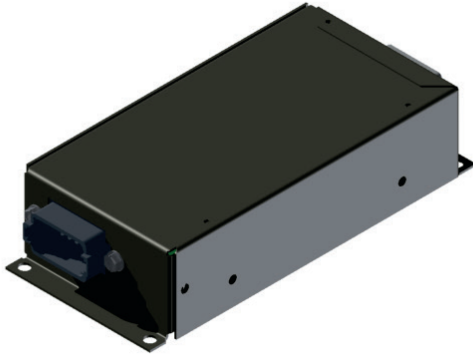


P/N: 35-0811

### Specifications

Operating Voltage:	+9VDC to 32V DC
Operating Temperature:	-40°C to 85 °C (-40°F to 185°F)
Inputs:	5 Digital and 9 Analog
Outputs:	6 High side, 2 Bidirectional, 1 Analog and 2 PWM
Communication:	RS-485 and CANBus (1939)

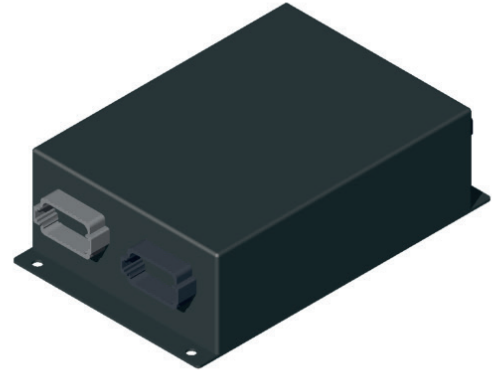
## Basic ECC



P/N: 35-0070

**Specifications**

Operating Voltage: +9VDC to 32V DC  
 Operating Temperature: -40°C to 85 °C (-40°F to 185°F)  
 Inputs: 3 Digital and 4 Analog  
 Outputs: 1 PWM and 3 Digital



P/N: 35-0239

**Specifications**

Operating Voltage: +9VDC to 32V DC  
 Operating Temperature: -40°C to 85 °C (-40°F to 185°F)  
 Inputs: 7 Digital and 4 Analog  
 Outputs: 10 Digital and 1 PWM  
 Communication: RS-485

## CANBus Controllers



P/N: 35-0549

**Specifications:**

Operating Voltage: 9VDC to 32VDC  
 Storage Temperature: -40°C to +105°C  
 Operating Temperature: -40°C to +85°C (-40°F to 185°F)  
 Communication: CANBus, RS-485 (-40°F to 220°F)  
 Microprocessor: 10MHz 64k Flash Processor 1k EEPROM



P/N: 35-0557

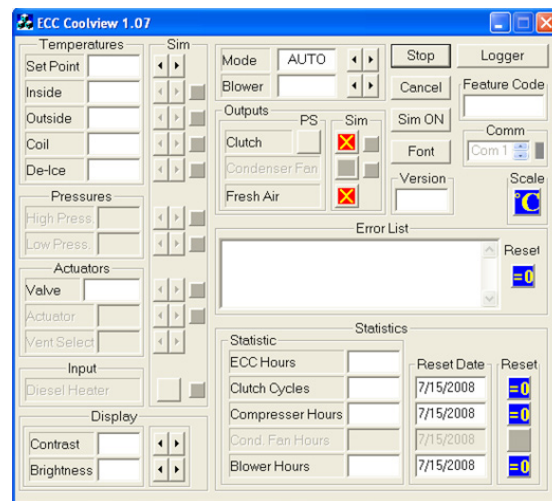
## EcoTemp NG Display

The EcoTemp NG Display is developed to meet the demanding requirements of the motor coach and transit bus HVAC systems. The EcoTemp NG Driver Display was designed as a programmable platform that can be easily customised to suit customer requirements.

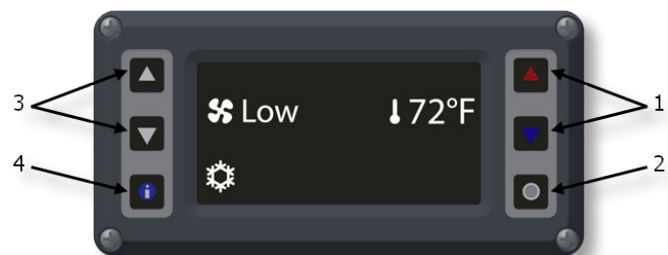
The large 2.5" x 1.5" OLED display offers wide viewing angle and is able to show text, graphics and full system messages for easy diagnostics. It has six configurable "soft keys" can be customized for basic or advance functions as per customer requirements.

During vehicle maintenance, service personnel can enter diagnostic mode by pressing preset sequence of buttons or using optional MCC Coolview via CAN Bus (J1939) connection. In this mode, errors stored in memory and real-time data of inputs and outputs are displayed for easy trouble shooting.

The industry leading OLED display with wide viewing angle supports unlimited graphics and text.



- 1- Temperature Set-Point  
Adjust temperature for passenger compartment.
- 2- On/Off Button  
Turns HVAC system On or Off
- 3- Cursor  
Cursor and mode selection
- 4- Information  
Displays system information



## EcoTemp NG Display

The EcoTemp NG controller is developed to meet the demanding requirements of the motor coach and transit bus HVAC systems. The Bus HVAC Controller was designed as a programmable platform that can be easily customised to suit customer requirements.

FET". These MOS-FET have over current and temperature protection and have no moving parts. With built-in over current and temperature protection, it means less downtime due to controller failure.

During vehicle maintenance, service personnel can enter diagnostic mode by pressing preset sequence of buttons or using optional MCC Coolview via CAN Bus (J1939) connection. In this mode, errors stored in memory and real-time data of inputs and outputs are displayed for easy trouble shooting.



EcoTemp NG Controller				
Operating Voltage		+9V to 32V DC		
Operating Temperature		-40°C TO 85°C		
Inputs	23 Digital	12V or 24V DC	Cool, Heat, Defrost Vent, Auto and Off	
		12V or 24V DC	Condensor fan high/low	
		12V or 24V DC	Test Mode	
	11 Analog	10kΩ @ 25°C	3 Temperature Sensors	
		0 to 4.5V DC	High Pressure Sensor	
		0 to 4.5V DC	Low Pressure Sensor	
		0 to 10kΩ	Valve 1 Position Sensor	
		0 to 10kΩ	Valve 2 Position Sensor	
	5 Digital or Analog	0V to Supply Voltage		
Outputs	14 Digital	12V or 24V DC		
	4 H Bridge	12V or 24V DC		
	4 PWM	12V or 24V DC	25kHz	
Communication	RS 485			
	2 CanBus	J1939		
Micro Processor	Clock Speed	10MHz	64k Flash Processor 1k EEPROM	

## EcoTemp Lite

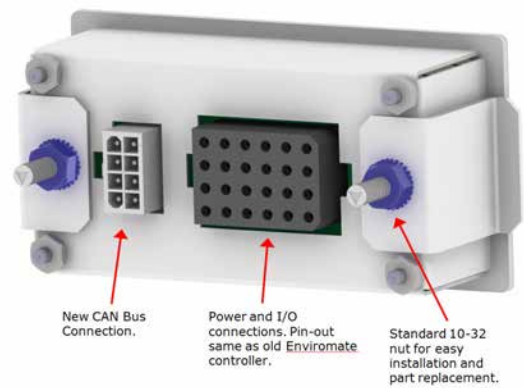
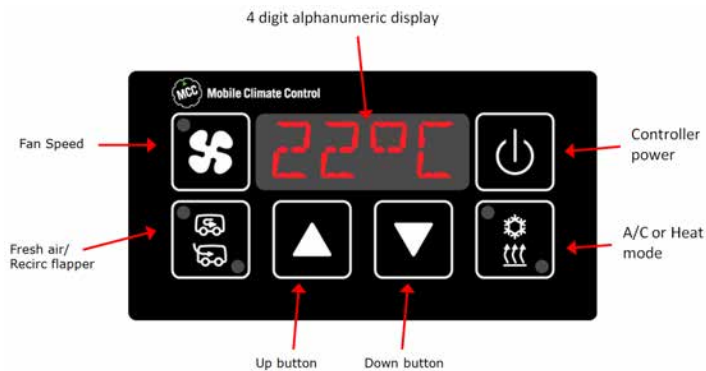
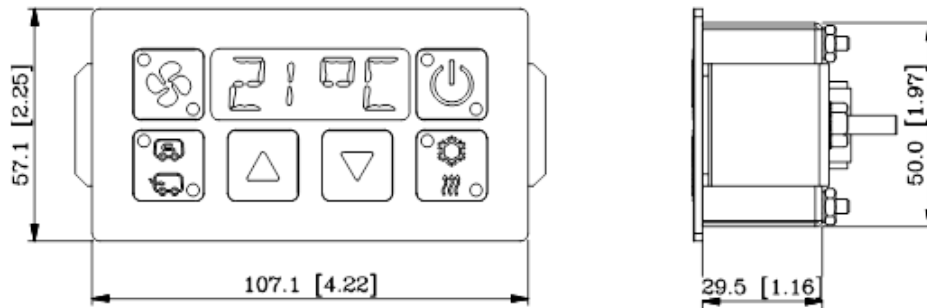
The EcoTemp Lite is a HVAC control unit designed for on-road use. It has a simple and easy to use layout, it is ideal for motor coaches and transit buses. The easy to ready read LED display shows temperature settings,

blower speed or error display. The bus controller was designed as a programmable platform that could easily be expanded and customized. Several methods of compressor protection are available.



Features	Benefits
<ul style="list-style-type: none"> <li>• Simple layout</li> </ul>	<ul style="list-style-type: none"> <li>• Large display and buttons. Less driver distraction Keep drive's eyes on the road</li> </ul>
<ul style="list-style-type: none"> <li>• Small foot print</li> </ul>	<ul style="list-style-type: none"> <li>• Takes up little space in dash board. Perfect for smaller size buses</li> </ul>
<ul style="list-style-type: none"> <li>• RS 485 and CAN BUS communication</li> </ul>	<ul style="list-style-type: none"> <li>• New feature! Allows easy and fast dignostics. Able to upgrade HVAC system software while vehicle is running Less vehicle downtime</li> </ul>
<ul style="list-style-type: none"> <li>• Built-in diagnostics</li> <li>• Easy software upgrade</li> <li>• Optional coolview system monitoring software</li> <li>• Easy to use and install</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces maintenance, troubleshooting and minimise downtime</li> </ul>

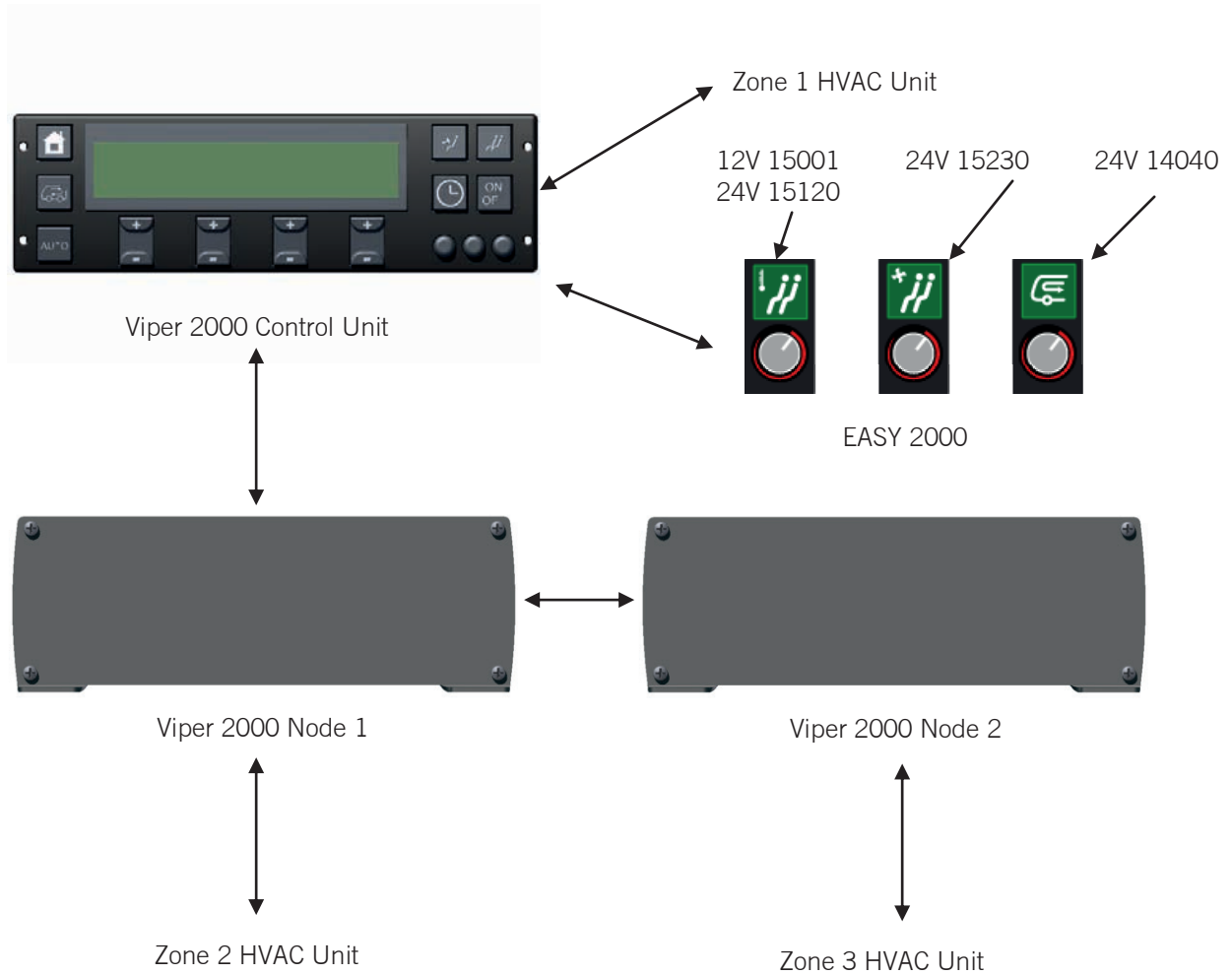
# EcoTemp Lite



## Technical Data

Operating Voltage	+9VDC to 32V DC
Operating Temperature	-40°C to 85 °C (-40°F to 185°F)
Inputs	5 Digital and 9 Analog
Outputs	10 High side, 1 Analog / PWM
Communication	RS-485 and CANBus (J1939)

# Viper 2000 Multi - Zone Control





## Viper 2000 System

Viper 2000 Display



P/N: 16649

Viper 2000 Node



P/N: 14389

## EasyTerm Quattro System



P/N: 17463

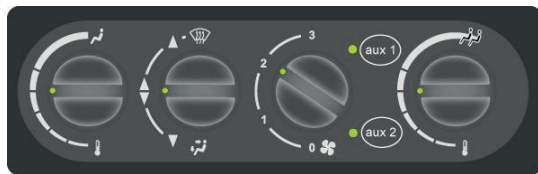
MCC's EasyTerm Quattro is an economically priced automatic climate controller for large vehicles such as buses and motor coaches in an easy to use design.



# Viper Mark 1

The Viper Mark 1 is a complete HVAC control system that has the ability to control two separate HVAC systems simultaneously. Designed for mass transit and motor coach applications. With dual heating system control, passenger and driver temperatures can be controlled separately.

P/N: 11459



Convector Unit      HVAC Unit

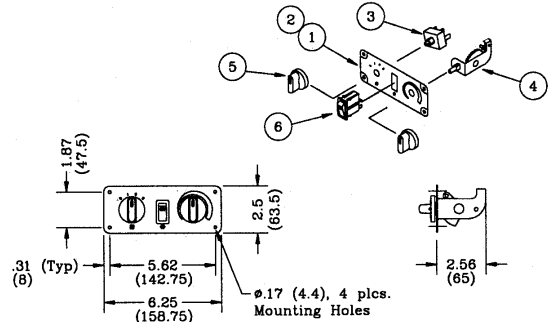
Heater Unit

# Control Panels

## 26-0413 Control Panel 12V 26-0342 Control Panel 24V



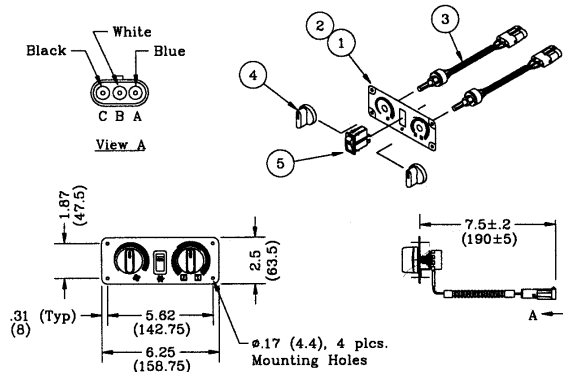
No.	Part No.	Description
1	24-2213	Control Plate
2	28-0200	Overlay
3	25-0044	Blower Switch
4	26-0350	Rotary Control
5	25-0581	Knob
6	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V



## 26-0445 Control Panel 12V 26-0446 Control Panel 24V



No.	Part No.	Description
1	24-2508	Control Plate
2	28-0245	Overlay
3	35-0036	Potentiometer Assy.
4	25-0581	Knob
5	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V

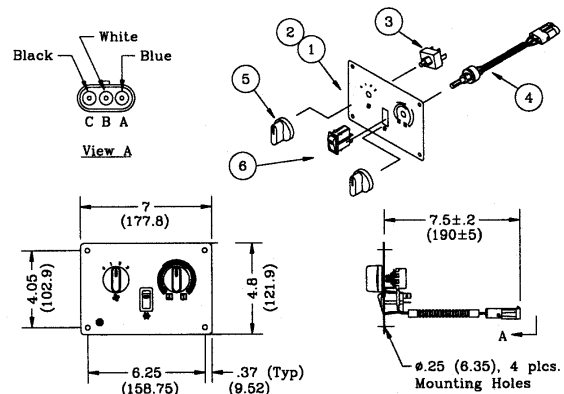


Connector Info: Connector 3-way Male Packard #12010717 with Male Terminal #12124582-L (3x) and Seal #12015323 (3x)

## 26-0415 Control Panel 12V 26-0416 Control Panel 24V



No.	Part No.	Description
1	24-2401	Control Plate
2	28-0224	Overlay
3	25-0044	Blower Switch
4	35-0036	Potentiometer Assy.
5	25-0581	Knob
6	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V

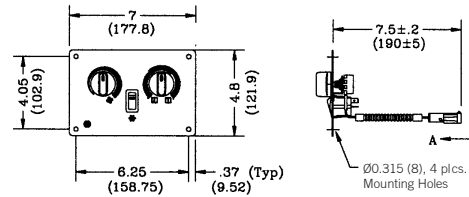
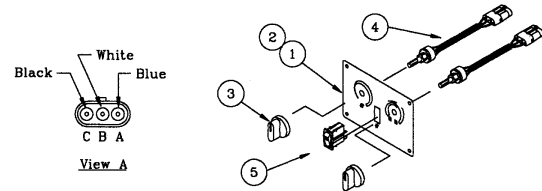


Connector Info: Connector 3-way Male Packard #12010717 with Male Terminal #12124582-L (3x) and Seal #12015323 (3x)

# Control Panels

## 26-0387 Control Panel 12V

## 26-0386 Control Panel 24V

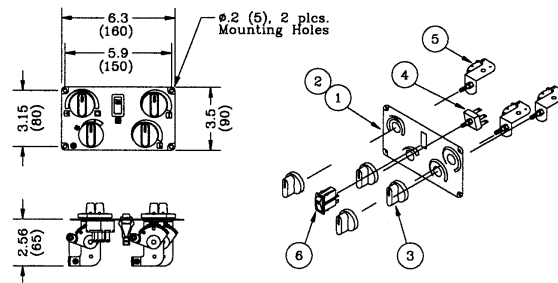


No.	Part No.	Description
1	24-3248	Control Plate
2	28-0223	Overlay
3	25-0581	Knob
4	35-0036	Potentiometer Assy.
5	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V

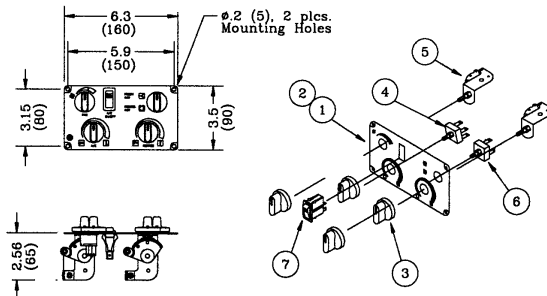
Connector Info: Connector 3-way Male Packard #12010717 with Male Terminal #12124582-L (3x) and Seal #12015323 (3x)

## 26-0398 Control Panel 12V

## 26-0444 Control Panel 24V



No.	Part No.	Description
1	24-2355	Control Plate
2	28-0215	Overlay
3	25-0581	Knob
4	25-0044	Blower Switch
5	26-0350	Rotary Control
6	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V

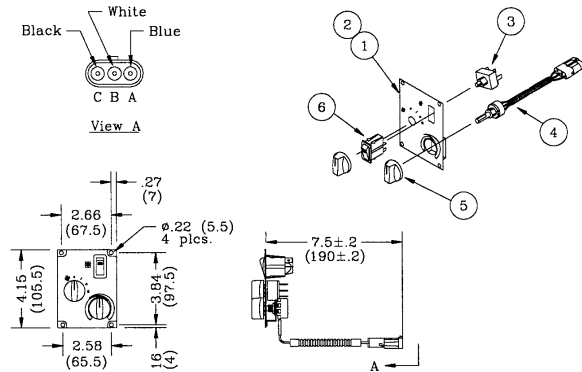


No.	Part No.	Description
1	24-2355	Control Plate
2	28-0163	Overlay
3	25-0581	Knob
4	25-0044	Blower Switch
5	26-0350	Rotary Control
6	25-0307	Switch On-Off
7	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V

# Control Panels

**26-0361 Control Panel 12V**
**26-0362 Control Panel 24V**

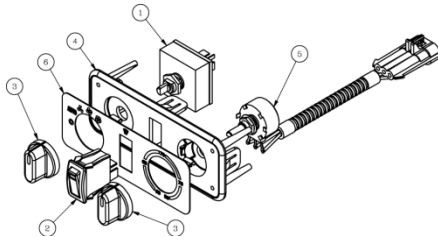

No.	Part No.	Description
1	24-2248	Control Plate
2	28-0214	Overlay
3	25-0044	Blower Switch
4	35-0036	Potentiometer Assy.
5	25-0435	Knob
6	25-1105	Rocker Switch (G) 12V
	25-1106	Rocker Switch (G) 24V



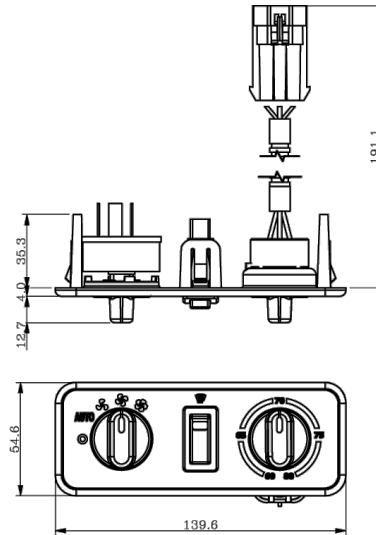
Connector Info: Connector 3-way Male Packard #12010717 with Male Terminal #12124582-L (3x) and Seal #12015323 (3x)

# Control Panels

## 56-0093 Control panel 12V



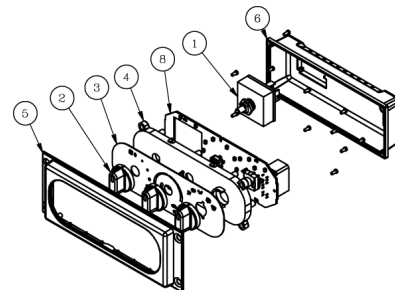
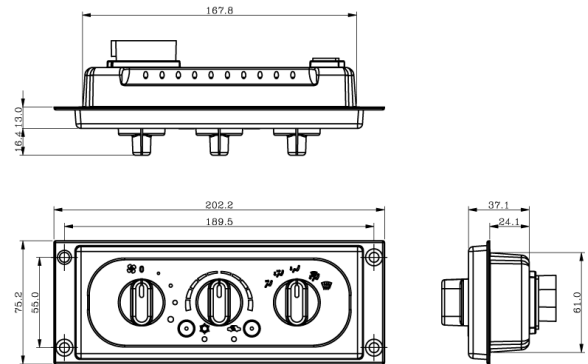
No.	Part No.	Description
1	25-0857	Switch W/Nut
2	25-1105	Rocker Switch (G) 12V
3	25-2884	Knob Assembly
4	28-2005	Control Plate
5	35-1016	Potentiometer ASSY.
6	56-0095	Overlay



## 56-0079 Control panel 12V



No.	Part No.	Description
1	25-0857	Switch W/Nut
2	25-2884	Knob Assembly
3	26-2018	Overlay
4	28-1988	Switch Holder
5	28-1989	Front Cover
6	28-1990	Rear Cover
7	31-1444	Connector
8	35-0989	Board Assembly



## Temperature Sensors

Temperature sensors are an essential part of a automatic climate control system. These sensors send temperature information to the climate controller so set-point temperature can be maintained.

There are four types of sensors used in MCC HVAC systems.

- Device sensor is located near the evaporator coil to prevent the coil from freezing.
- Outside sensor is used to measure air temperature that is coming in to the HVAC unit's air inlet.
- Return air sensor is used to measure re-circulated air temperature.
- Inside sensor is used to measure cabin air temperature.

P/N: 35-0008



Deice Sensor

P/N: 35-0176



Inside Air Sensor

P/N: 35-0011

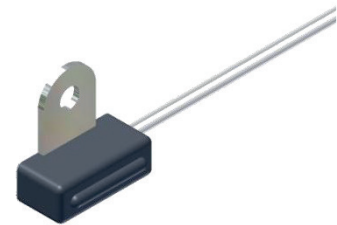


Outside Air Sensor



P/N: 35-0584

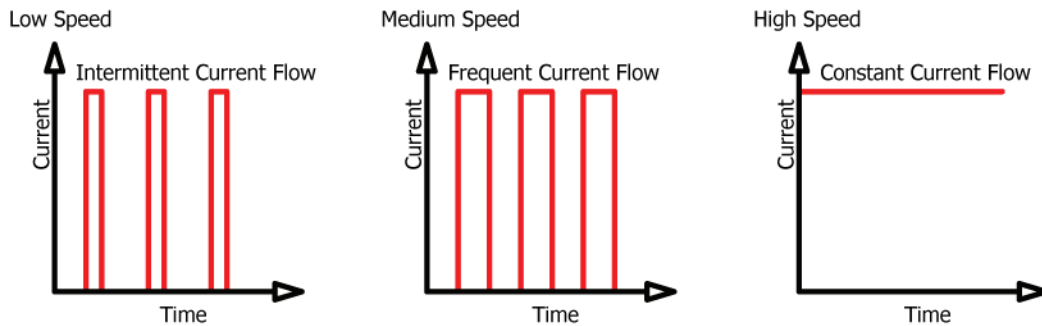
Return Air Sensor



P/N: 35-0012

## PWM Stepless Motor Drive

A Stepless Motor Drive Module controls motor speed by interrupting the current flow. The motor's speed is controlled by the duty cycle of output signal. At top speed (100% duty cycle), there is no current interruption. Without any moving parts, the power is delivered to the motor in "infinite" steps. A Stepless motor Drive allows more precise control, requires no maintenance and operates efficiently.

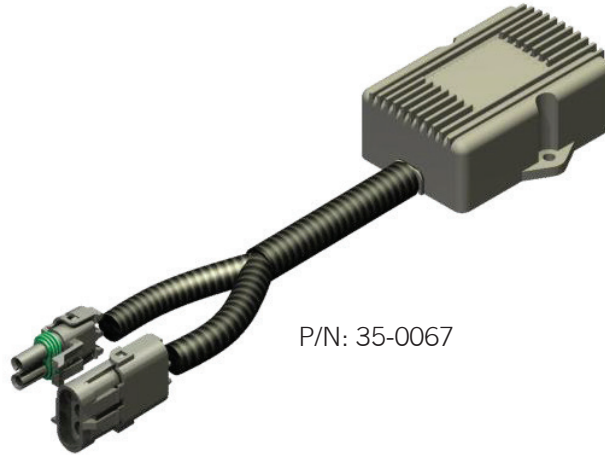


At low speed, current flow is switched on for a short time.

At high speed, current flow is not interrupted.



## Standard Stepless Motor Drive

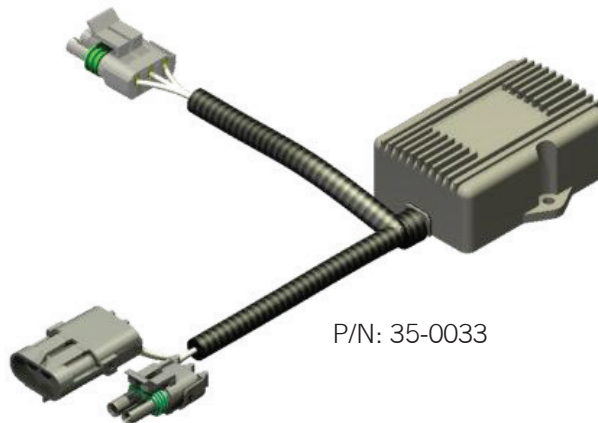


P/N: 35-0067

### Specifications

Operating Voltage	: 9VDC to 32VDC
Storage Temperature:	-40°C to +105°C (-40°F to 220°F)
Operating Temperature:	-40°C to +85°C (-40°F to 185°F)
PWM Signal Input:	9V to 32V
Output:	300W

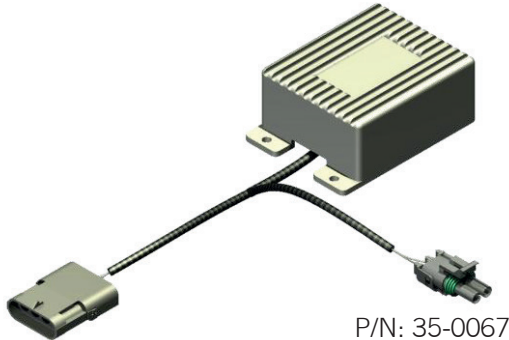
The Stepless Motor Drive Module is stand alone motor drive that uses an external PWM source to control blower's speed.



P/N: 35-0033

The Stepless Motor Drive Module uses a 10kΩ potentiometer to control the blower's speed.

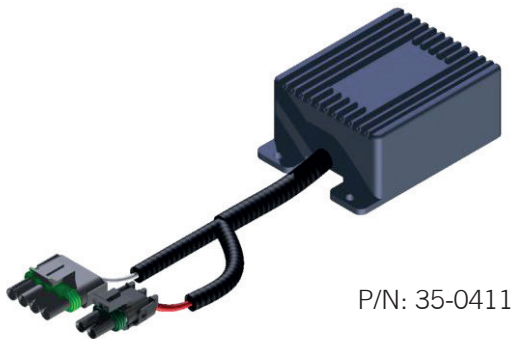
## Standard Stepless Motor Drive



### Specifications

Operating Voltage:	9VDC to 32VDC Storage
Temperature:	-40°C to +105°C (-40°F to 220°F)
Operating Temperature:	-40°C to +85°C (-40°F to 185°F)
PWM Signal Input:	9V to 32V
Output:	2700W

PWM Module with 400Hz input  
Converts 400Hz PWM input signal to 25kHz output.



### Specifications

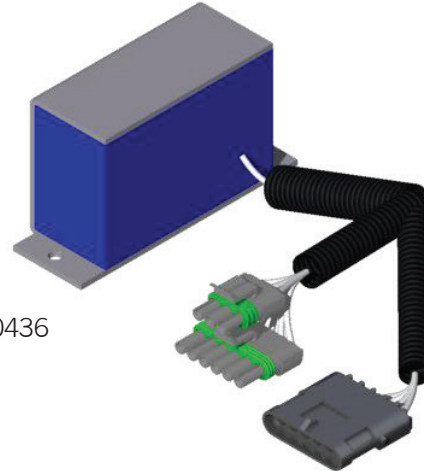
Operating Voltage:	9VDC to 32VDC
Storage Temperature:	-40°C to +105°C (-40°F to 220°F)
Operating Temperature:	-40°C to +85°C (-40°F to 185°F)
PWM Signal Input:	9V to 32V (400Hz)
Output:	2700W



# Brushless Motor Drives

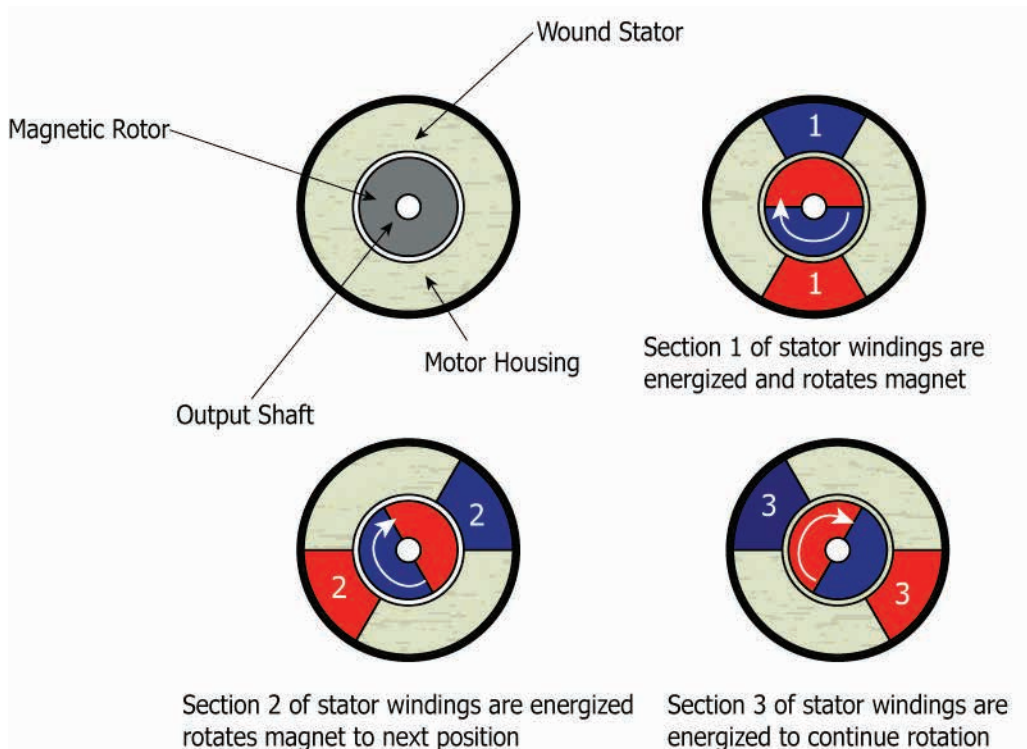
## Specifications

Operating Voltage:	16VDC to 27VDC
Storage Temperature:	-40°C to +105°C (-40°F to 220°F)
Operating Temperature:	-40°C to +85°C (-40°F to 185°F)
Signal Input:	0V DC to 5V DC
Output:	800W



P/N: 35-0436

Brushless Motor Drive



## PWM Interface Module



P/N: 35-0569

**Specifications:**

Supply Voltage: 9V DC to 32V DC  
Input Signal: PWM  
Output Voltage: 0V DC to 10V DC



P/N: 35-0425

**Specifications:**

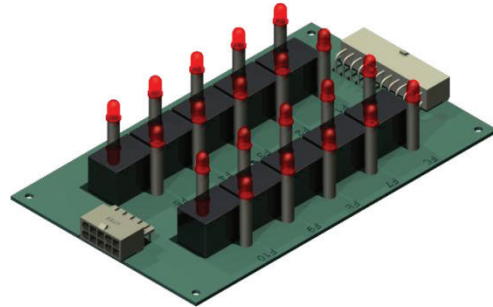
Supply Voltage: 9V DC to 32V DC  
Input Signal: PWM  
Output Voltage: 0V DC to 5V DC

# Relays



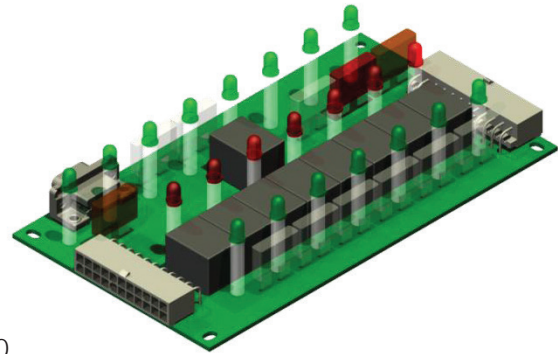
P/N: 35-0625

Relay: 12V 30A (Fuse protected)  
 Inputs: 10 Channel 500mA  
 Outputs: 10 Channel Supply Switching 10A



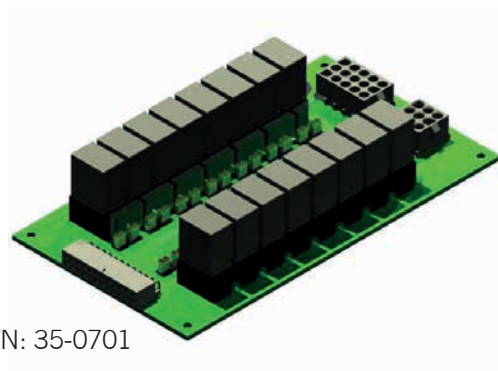
P/N: 35-0660

Relay: 24V 30A (Fused protected)  
 Inputs: 8 Channel 24V 5A  
 Outputs: 3 Channel 24V 20A  
 2 Channel 12V 1A  
 5 Channel Ground Switching 10A  
 1 Channel Supply Switching 10A  
 4 Channel for Actuator Flapper Door Control



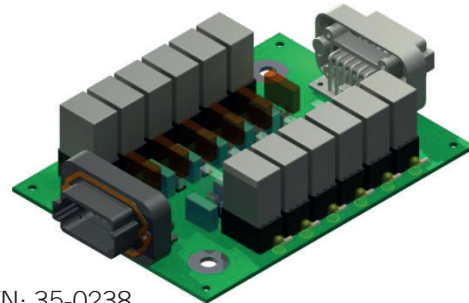
# Relays

Relay: 12V/24V DC Fuse protected  
 Inputs: 16 Channels Supply Switching 500mA  
 Output: 10 Channel single output 20A  
           2 Bus outputs 20A  
           12V Output for Actuator  
 Flapper door angle can be adjusted by resistor network.



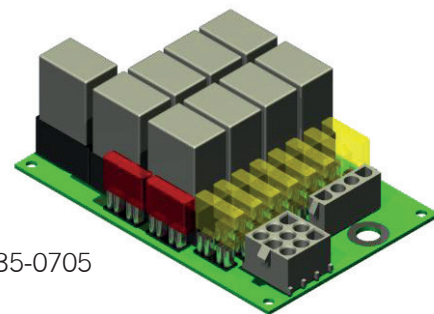
P/N: 35-0701

Relay: 12V DC/24V DC Fuse protected  
 Inputs: 10 Channel Supply Switching 500mA  
 Outputs: 6 Chanel Supply Switching 20A  
           1 Ground Switching 20A



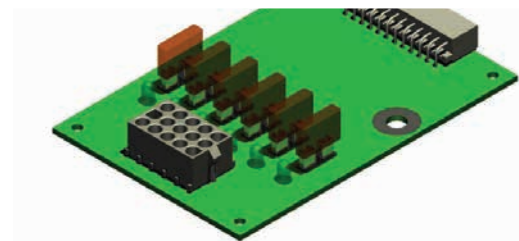
P/N: 35-0238

Relay: 12V DC/24V DC  
 Inputs: 5 Channels 500mA  
 Outputs: 3 Channel dual outputs 20A each  
           1 Actuator output  
           2 Channel bus



P/N: 35-0705

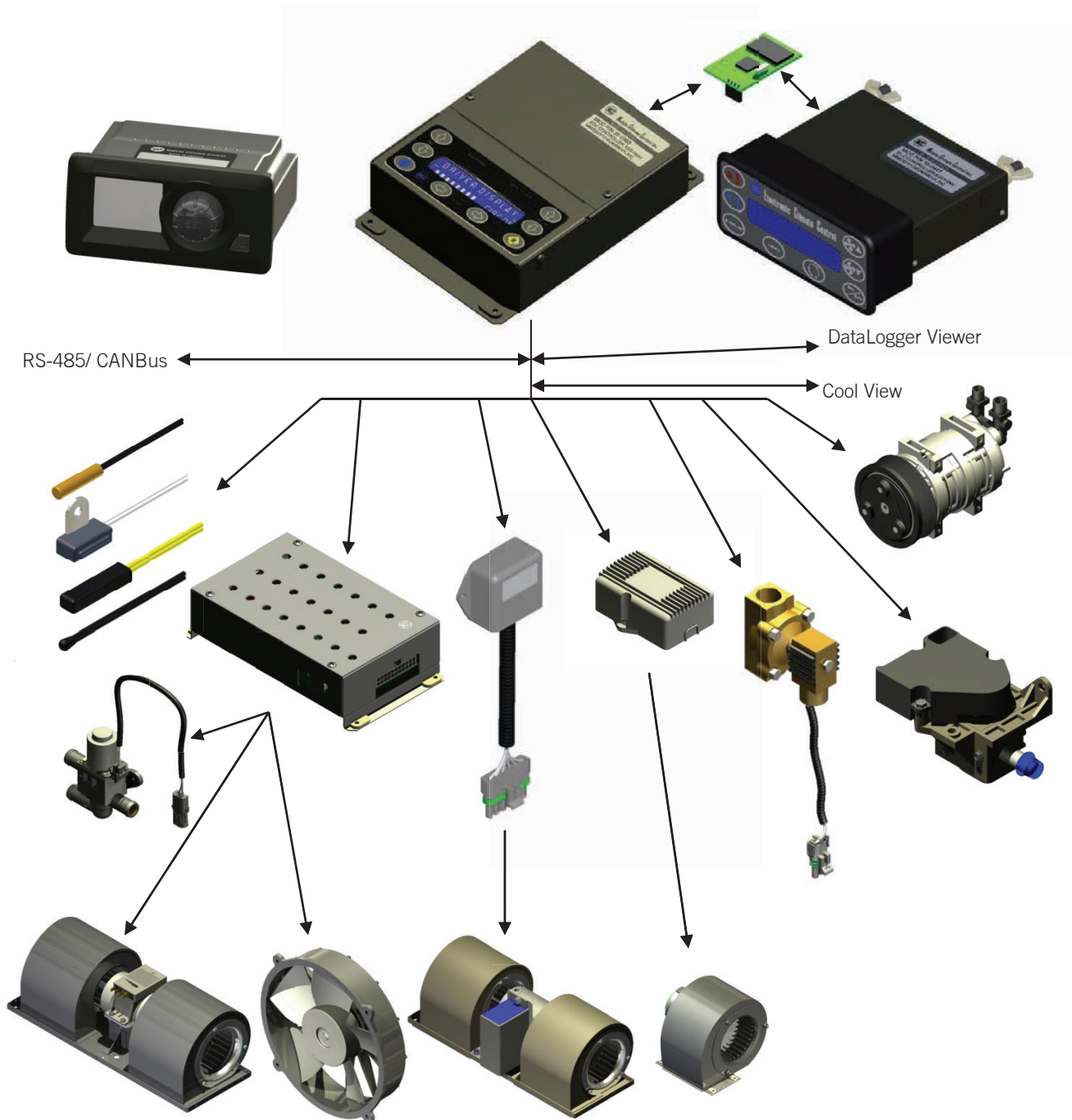
Relay: Solid state 12V/24V DC  
 Inputs: 5 Ground Switching high impedance inputs 500mA  
           2 PWM input  
 Outputs: 6 Supply Switching Output (Fuse protected) 20A  
           5 Low side output 20A  
           Bused 10V PWM for 3 Blowers 20A  
           Bused 5V PWM for 3 Condenser Fans 20A



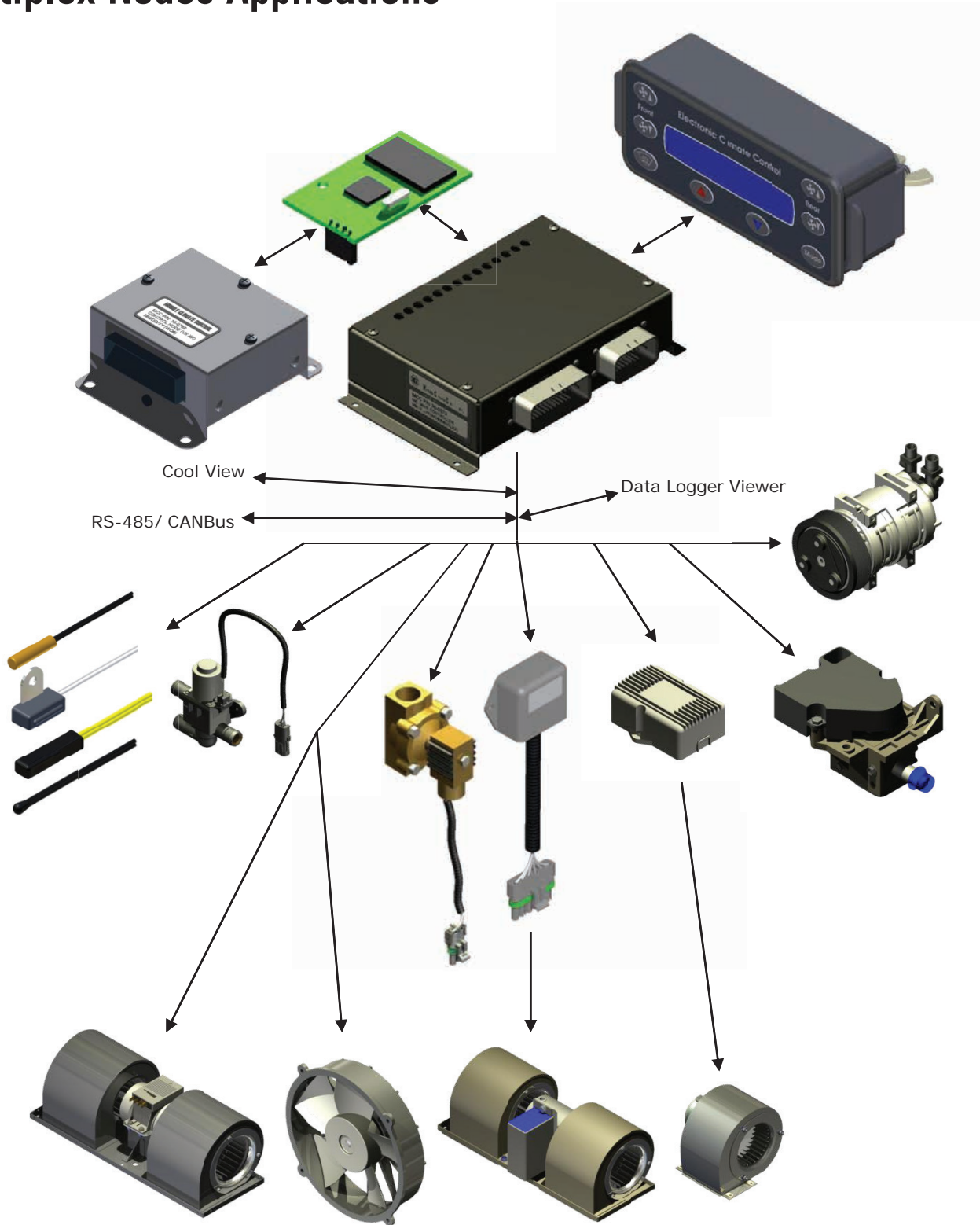
P/N: 35-0765



# ECC Applications



# Multiplex Nodes Applications





## EasyTurn Family



P/N:35-0816

### EasyTurn Defroster

The EasyTurn Defroster module is design to control driver defroster temperature from mini buses to highway coaches.



P/N: 35-0818

### EasyTurn Convector

This module is design to control floor temperature in a passenger compartment in transit bus and highway coaches.



P/N: 35-0817

### EasyTurn Compartment

The EasyTurn Compartment module is design to control temperature in passenger compartment in transit bus and highway coaches.



P/N 35-0815

### EasyTurn ATM

The EasyTurn Automatic Temperature Module (ATM) ideal for controlling cabin temperature in mini-buses and off-road equipments.



P/N: 35-0821

### EasyTurn Fan control



P/N: 35-0822



P/N: 35-0825

### EasyTurn A/C

The EasyTurn A/C Module controls A/C compressor and fan speed for fresh and recycled air. It is ideal for off-road and high-way applications.

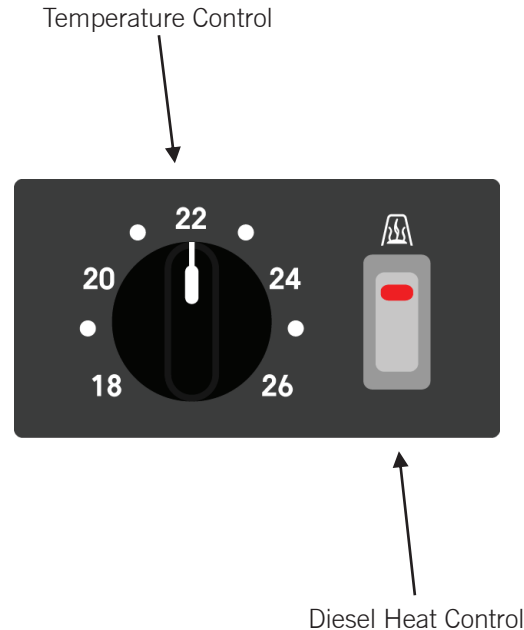
## Features:

- CANBus ready
- Flash memory – easily reprogrammable
- Designed to control interior climate in mini bus to full size bus
- Integrated backlighting
- Easy to install

## Automatic Thermostat Module



P/N: 35-0591



**Specifications:**

- Operating Voltage: 16VDC to 32VDC
- Storage Temperature: -40°C to +105°C (-40°F to 220°F)
- Operating Temperature: -40°C to +85°C (-40°F to 185°F)
- Controls Cabin temperature from 16° C (60.8°F) to 28° C (82.4°F)

## Electronic De-icing Thermostat



P/N: 35-0709

- Specifications: 9VDC to 32VDC
- Operating Voltage: Cut in: +2°C ±0.4°C
- Cut in/Cut out Temperature: Cut out: -2°C ±0.4°C
- Temperature
- Storage Temperature: -40°C to +105°C (-40°F to 220°F)
- Operating Temperature: -40°C to +85°C (-40°F to 185°F)
- Clutch: 7A

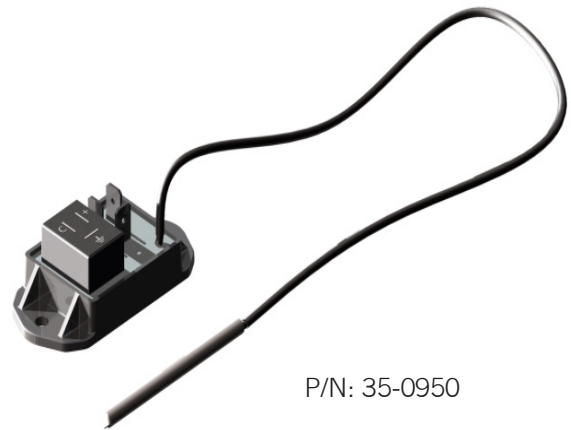
# Electronic De-icing Thermostat (EDT)

## 1. Description

The MCC Electronic De-icing Thermostat (EDT) is a microcontroller based module that measures evaporator coil temperature and cycles the compressor clutch to maintain a constant evaporator coil temperature. Onboard temperature sensor diagnostics are also built into the module. The EDT is very compact and with the same foot print as the older mechanically operated thermostats.

## 2. Basic Operation

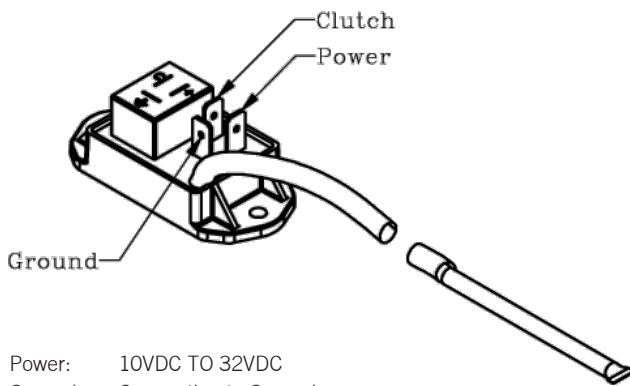
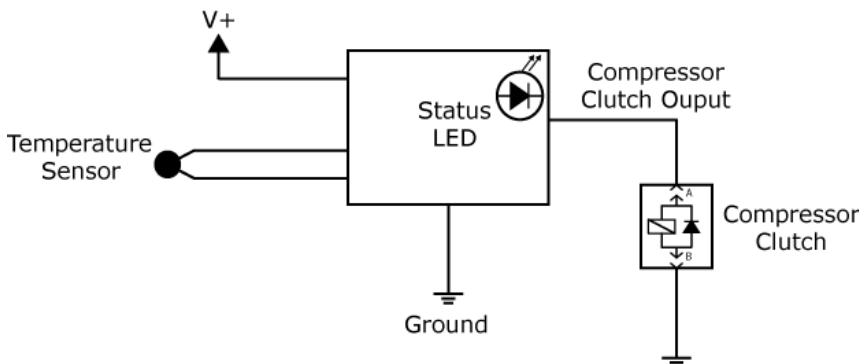
If the EDT does not detect any temperature sensor failure, it will turn the compressor clutch and status light on when the evaporator coil temperature is above +2°C. When the evaporator coil temperature is below -2°C, the EDT will turn off the compressor clutch output and status light.



P/N: 35-0950

The EDT has built-in algorithm to protect the A/C system in case of temperature sensor failure.

## 3. Application and Pin Out



- Power: 10VDC TO 32VDC
- Ground: Connection to Ground
- Clutch: Output connection Compressor Clutch (10 Amps Max)

# Electronic De-icing Thermostat (EDT)

## 4. Diagnostics

In an event of temperature sensor error, the compressor clutch output is turned off and the status light will indicate the type of error detected.

Status LED	Sensor Status
Single blink	Open
Double blink	Short to ground

## 5. Specifications

Operating Voltage: 10VDC to 32VDC

Voltage Cut in/Cut out Temperature

Cut in: +2°C ±0.4°C

Cut out: -2°C ±0.4°C

Temperature

Storage Temperature: -40°C to +105°C

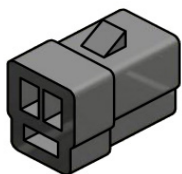
Operating Temperature: -40°C to +85°C

Clutch Output: 10A Maximum

### Electrical Connections:

Connector

Delphi: 02984378 MCC: 31-1029



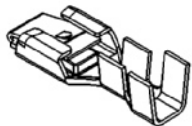
18GA  
Delphi P/N: 02965510 MCC: 31-1369



10GA-12GA  
TE: 4-520448-2MCC:31-1247



14GA-16GA  
TE: 3-350820-2/MCC: 31-1100



14GA  
Delphi: 02965867  
MCC: 31-1018

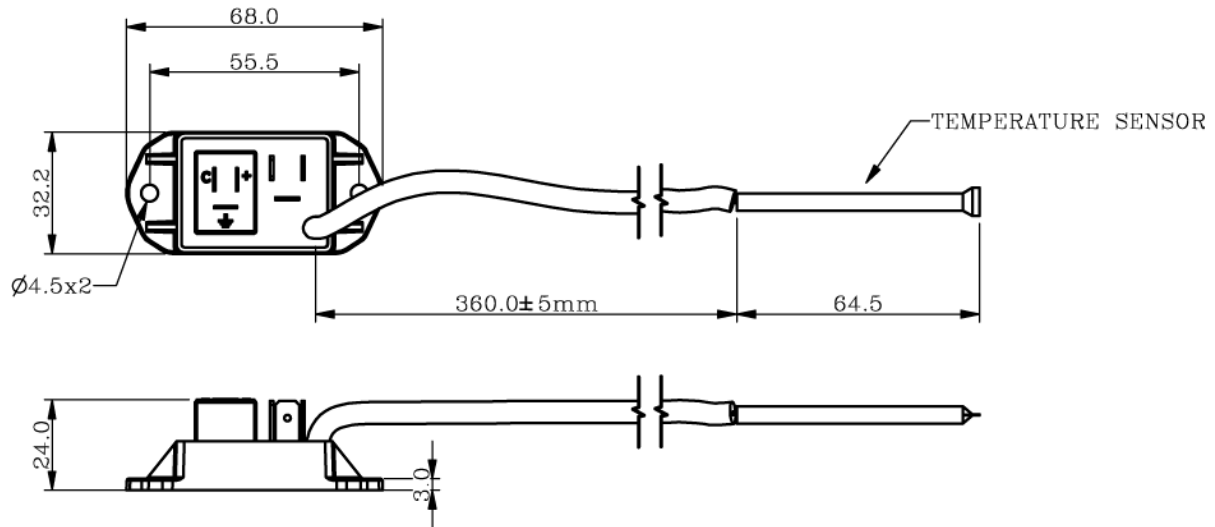


18GA  
TE: 2-520184/MCC: 31-1106

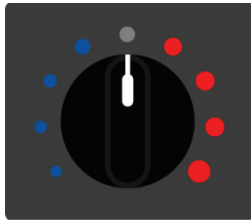
## Electronic De-icing Thermostat (EDT)

### 6. Physical Characteristics and Dimensions

The EDT measures approximately 68 mm long, 32 mm wide and 23 mm high. The printed circuit board is mounted in a plastic case and is encased in a polyurethane potting compound.



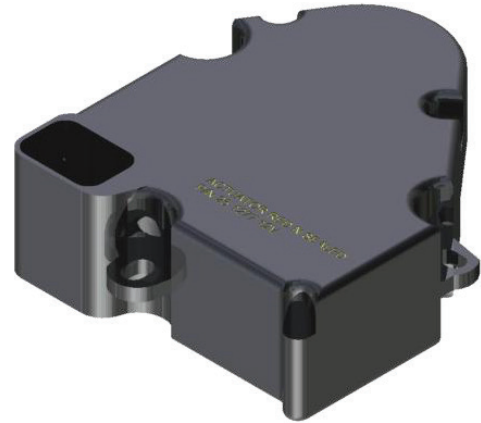
## Electronic Actuators



Temperature Control



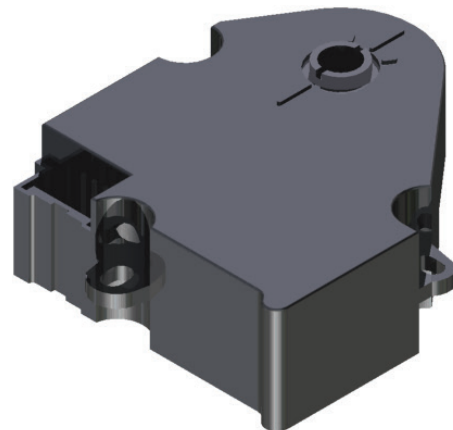
Flapper Door Control



Sealed Type 12V or 24V  
P/N: 25-1277 12V  
P/N: 25-2660 24V



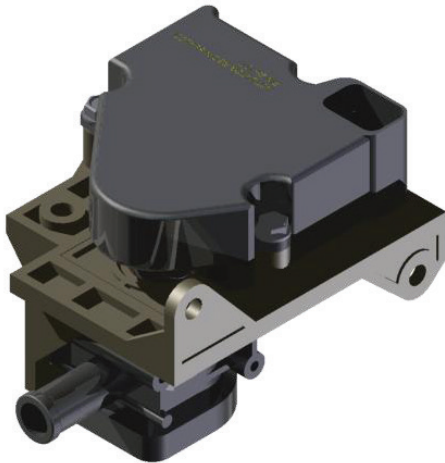
P/N: 26-1021  
Water Valve Assembly



Unsealed type 12V  
P/N: 12-1128 12V

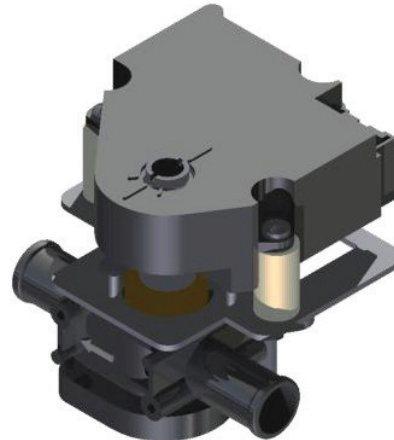
# Electronic Power Supplies

P/N: 26-1429

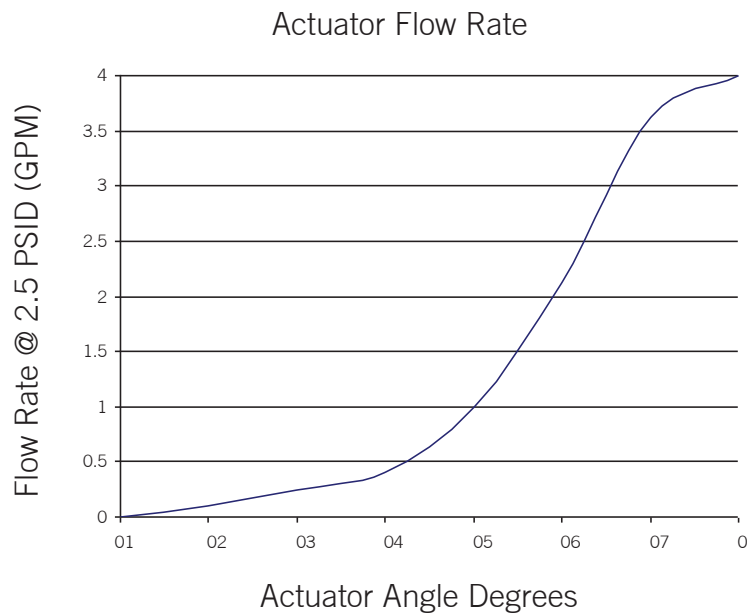


Water valve with sealed actuator

P/N: 26-0652



Water valve with unsealed actuator



## Status Module

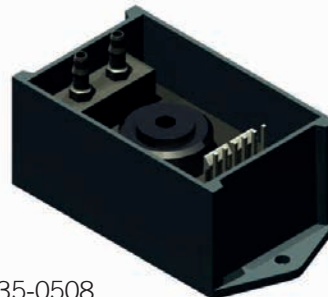


P/N: 35-0536

**Specifications:**

Operating Voltage: 9V DC to 32V DC  
 Operating Temperature: -40°C to +85°C (-40°F to 185°F)

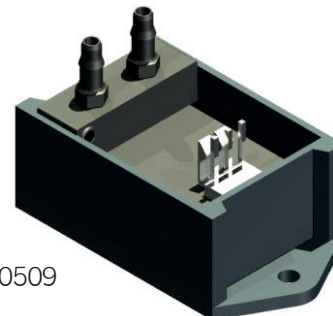
## Differential Pressure Transducer



P/N: 35-0508

**Specifications:**

Input Voltage: 4.8V to 15V DC  
 Pressure Range: 0.1 mbar(0.5V) to 10mbar(4.5V)  
 Storage Temperature: -40°C to +85°C (-40°F to 185°F)  
 Operation Temperature: -20°C to 70°C (-5°F to 160°F)  
 Humidity: 0% to 95% RH

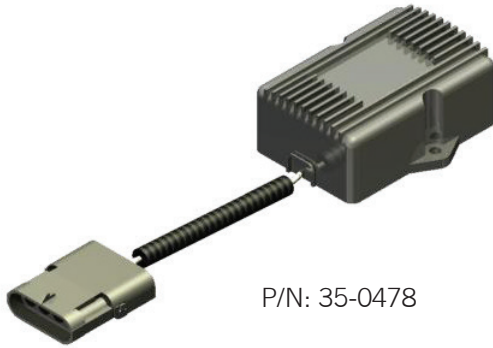


P/N: 35-0509

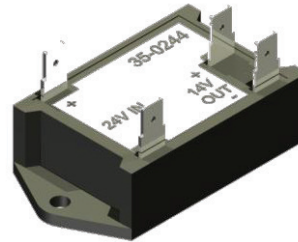


## Electronic Power Supplies

35-0244 and 35-0478 are voltage converters designed to convert 24V DC to 12V DC.



P/N: 35-0478



P/N: 35-0244

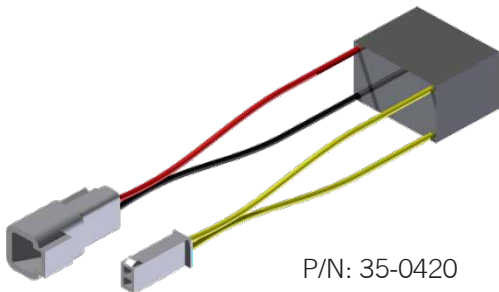
**Specifications:**

Input Voltage: 24V DC  
 Output Voltage: 14V DC  
 Operation Temperature: -40°C to +85°C  
 (-40°F to 185°F)

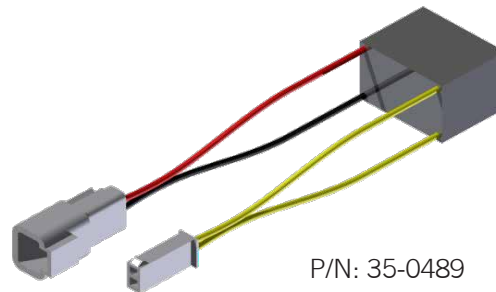
**Specifications:**

Input Voltage: 24V DC  
 Output Voltage: 14V DC  
 Operation Temperature: -40°C to +85°C  
 (-40°F to 185°F)

DC to AC converter for EL backlights in control panels.



P/N: 35-0420



P/N: 35-0489

**Specifications:**

Input Voltage: 12 DC  
 Output Voltage: 120V AC @ 600HZ  
 Operation Temperature: -40°C to +85°C  
 (-40°F to 185°F)

**Specifications:**

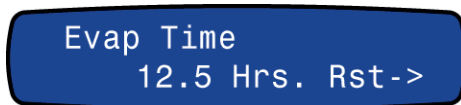
Input Voltage: 24V DC  
 Output Voltage: 120V AC @ 600Hz  
 Operation Temperature: -40°C to +85°C  
 (-40°F to 185°F)

## Coolview

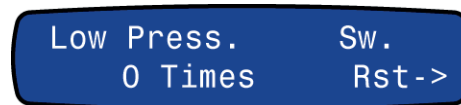
Since the ECC, MVC, Multiplex nodes and Electronic Thermostat are micro controller based, the control algorithm can be customized to each customer's individual requirements.

Each software contains customized climate control algorithm to control different HVAC components

### ECC



Component running hours



Pressure Switch Trips

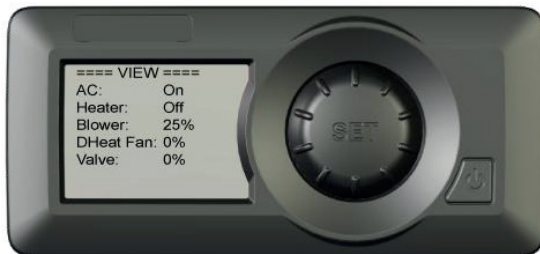


Supply Voltage



Temperature Sensor

### MVC

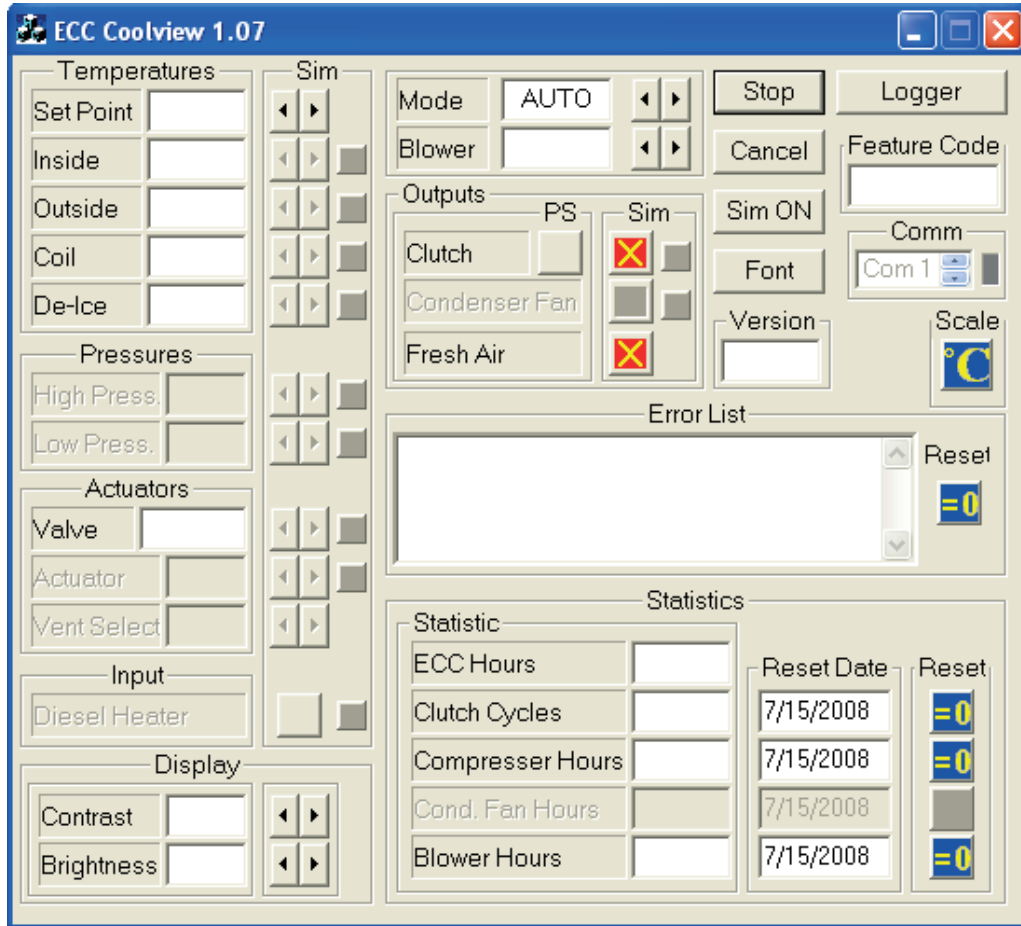


Output Parameter Status



Component Error List

# Coolview



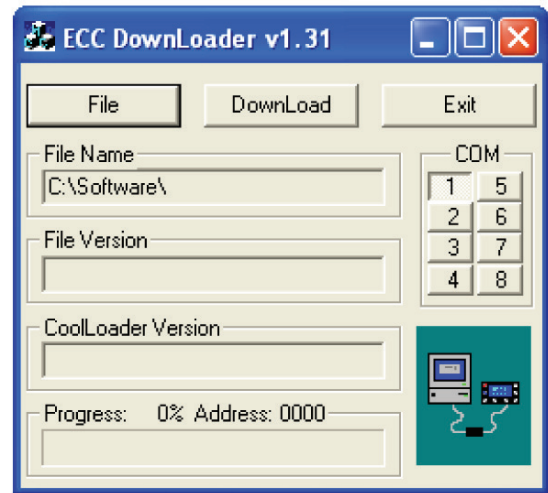
MCC's Coolview is designed to assist in diagnosing, monitoring and troubleshooting a vehicle's HVAC system.

Coolview Displays:      Sensor Temperatures  
                                  Status of Inputs and Outputs  
                                  HVAC Mode (Cool, Heat, Defrost, Auto and Diesel Heat)  
                                  Blower Speed, Actuators Position, Display Contrast and Brightness

System History :        ECC, Compressor and Blower Hours  
                                  Errors  
                                  Clutch Cycles

## ECC Downloader

Using any PC running Windows™ 2000/XP/VISTA/7 platform via RS-232 or USB port, software upgrades can be made. ECC Downloader that can reprogram the ECC while the vehicle is running.



## RS-485 Communication

The RS-485 to USB converter is designed for communication between a computer and ECC controller via USB port. It is compatible with MCC Coolview and ECC Downloader.



P/N: 35-0735

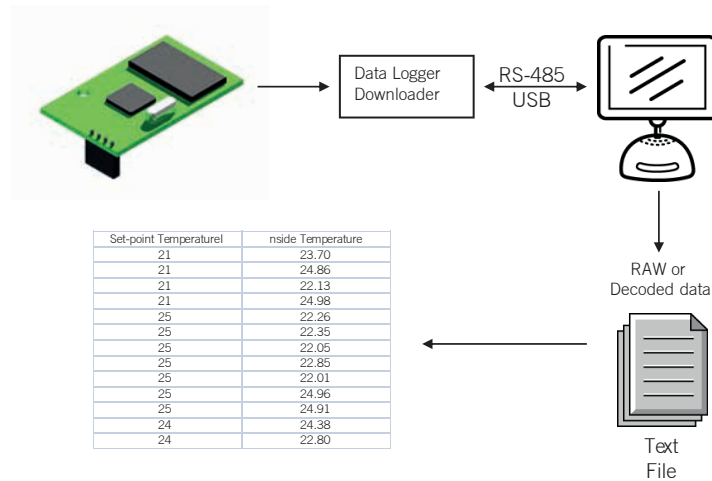
The RS-485 to RS-232 converter is designed for communication between a computer and ECC controller via RS-232 port. It is compatible with MCC Coolview and ECC Downloader. Simple Plug and Play setup requires no special drivers to install.



P/N: 35-0202

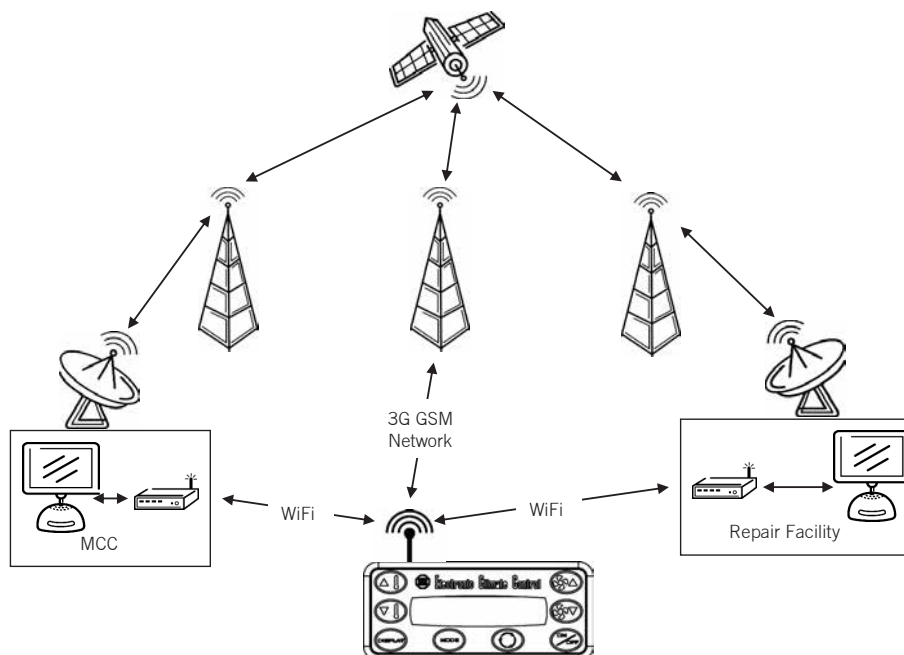
## Data Logger Downloader

The MCC Data Logger Downloader retrieves data that is saved in the Data Logger's on board memory via RS-485 or USB connection. The saved data can be in Raw or Decoded data format which can be used for troubleshooting and diagnostics.



## Coolview Fleet Tracking

MCC Coolview Fleet Tracking is a standard ECC with an optional WiFi or 3G GSM transceiver. Coolview Fleet Tracking allows real-time monitoring and diagnostic. Data stored ECC's memory can be downloaded anytime to be analyzed by MCC and local service personnel.





# XV. Parts

**Heater Solenoids Valve**



26-0348  
Heater solenoid valve 12V, 3/4" 2 way

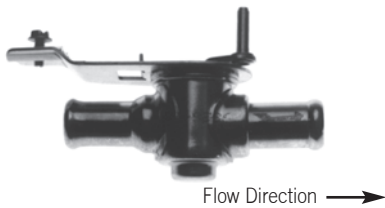


26-0330  
Heater solenoid valve 24V 3/4" 3 way



26-0194  
Heater solenoid valve 24V, 3/4" 2 way

**Heater Control Valves**



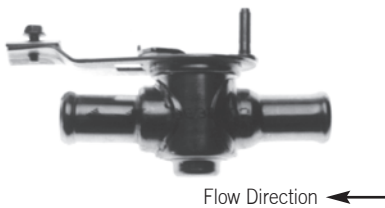
26-0025  
Heater control valve 5/8"\*  
pull to open



26-0043  
Heater control valve 5/8"  
3-way. Inlet from bottom  
when bracket on top\*.  
Pull for water flow to left side.



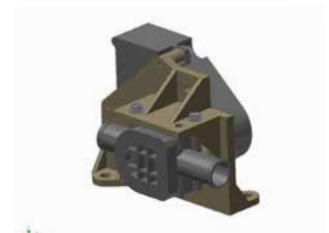
27-0064  
Shut off valve 5/8" x 5/8" hose



26-0074  
Heater control valve 5/8"\*  
pull to open



27-0100  
Shut off valve 5/8" hose  
x 3/8" male pipe

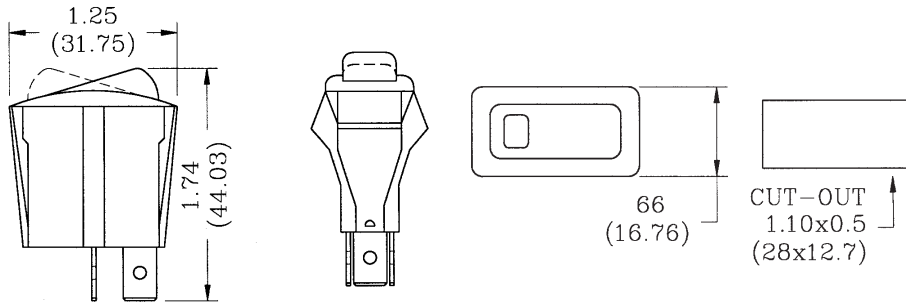


26-1661 24V  
26-1656 12V  
Motorized Heater  
control valve 5/8"

26-0154  
Heater control valve 3/4"\*  
pull to open

\*Heater control valve is directional and will leak if connected wrong

**Single Pole (Sealed) Rocker Switches**

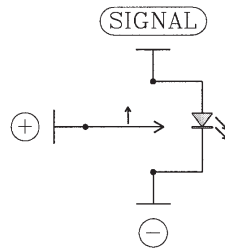
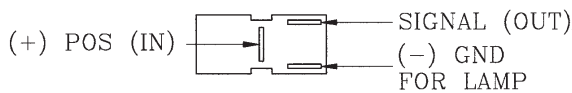


TERMINALS (BOTTOM VIEW)

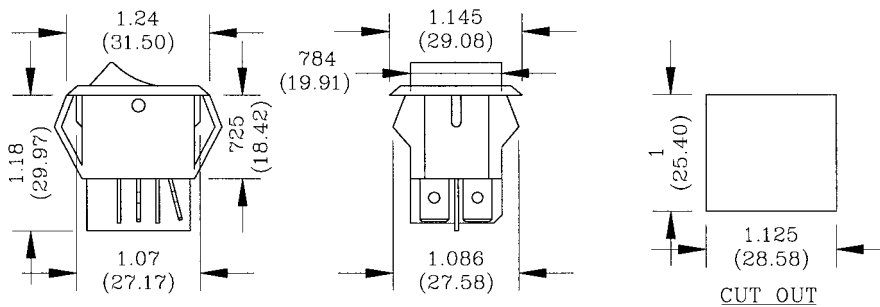
CIRCUIT DIAGRAM

**NOTES:**  
 CUT-OUT IS 1.10x.5  
 (28x12.7 mm)  
 LAMP IS A LED

- 25-1105
- Green, 12V
- 25-1106
- Green, 24V
- 25-1107
- Amber, 12
- 25-1108
- Amber, 24V



**Double Pole Rocker Switches**

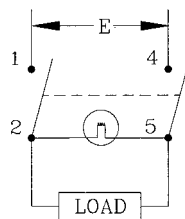
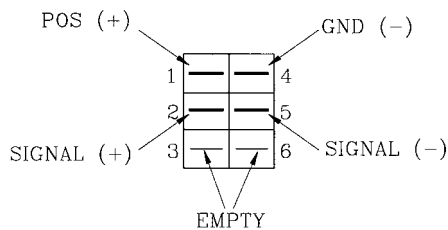


TERMINALS (BOTTOM VIEW)

CIRCUIT DIAGRAM

**NOTES:**  
 CUT-OUT IS  
 28.6x25.4 mm.  
 LAMP IS 12V (24V)  
 INCANDESCENT.

- 25-1167
- Green, 12V
- 25-1168
- Green, 24V



**Note:**  
 25-1167 replaces 25-0114 (12V)  
 25-1168 replaces 25-0084 (24V)

Used in A/C systems to turn system on/off. Provides a lighted indication when on. Green is used for the A/C. Amber for other functions.



# Expansion Solenoid Valves

## Expansion valves



**26-0162** Expansion valve R12/R134a, 2 Ton  
**26-0167** Expansion valve R22, 2 Ton  
 12" cap tube, 5/8"-18 male inlet and 3/4" -16 male outlet



**26-0580** Expansion valve R134a Externally equalized, 5/8"-18 male inlet, 3/4"-16 male outlet 18" capillary tube and 18" external capillary tube with 1/4" Fe nut, 1.5 Ton



**26-0190** Block expansion valve R12/R134a  
**26-0384** Block expansion valve R22  
 2 ton externally equalized, 3/4" -16 connection to coil, 5/8"-18 inlet and 7/8"-14 outlet female



**26-0006** Bulb clamp cadmium plated for above expansion valves

## Solenoid valves

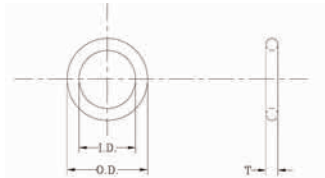


**25-0380** Solenoid valve 12V, R12/R134a, 5/8"-18 male  
**25-0381** Solenoid valve 24V, R12/R134a, 5/8"-18 male

## Thermostatic Expansion Valves

<u>Part No.</u>	<u>Description</u>
14-00344-00	TXV
14-00397-00	TXV, EM1, Gen V, R134a
14-01104-35	TXV, 5.5 ton, R134a
26-0190	Valve, Block
26-0580	Expansion Valve

## O-Rings



Part No.	Description	I.D.	O.D.	T
T27-0601	O-Ring #6	7.65	7/16"	1.78
27-0602	O-Ring #8	10.82	9/16"	1.78
27-0603	O-Ring #10	14	11/16"	1.78
27-0604	O-Ring #12	17.17	13/16"	1.78
27-0647	O-Ring #7			
27-0693	O-Ring			

For pressure switches  
For solenoid valve

## Hose Pipe Insulation & Sleeves

### Hose Pipe Insulation

Hose / pipe insulation is used to insulate heater and refrigerant hose. Sold in multiples of 6 feet.

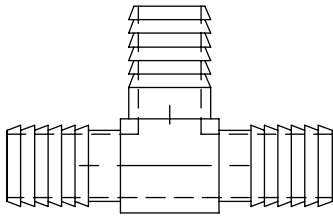
- 28-0077      Hose/ pipe insulation 1 1/8" ID x 3/8" wall  
Use for 5/8" HD heater hose and #10 refrigerant hose
- 28-0136      Hose/ pipe insulation 7/8" ID x 1/2" wall Use for 5/8" standard heater hose

### Polyurethane Sleeves

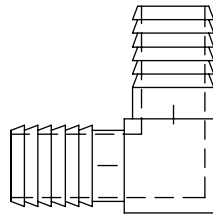
Polyurethane sleeve is used for hose protection in very difficult environments. This product is used extensively in the mining industry. Sold in multiples of 12 feet.

- 27-0806      Polyurethane sleeve for refrigerant hose #6
- 27-0807      Polyurethane sleeve for refrigerant hose #10

## Bronze & Brass



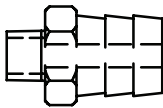
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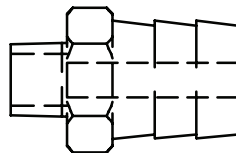
2

Item	Part No.	Description
1	40-62095-00	Fitting, Hose, Tee, Bronze, 1 Inch Heater Hose
2	40-62096-00	Fitting, Hose, Elbow, Bronze, 1 Inch Heater Hose

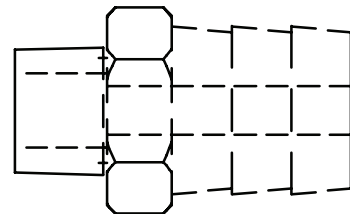
## Hose Barb



1



10



20

Item	Part No.	Description
1	40-01094-01	Fitting, Hose, Barb, 3/16 x 1/8 MPT
2	40-01094-02	Fitting, Hose, Barb, 1/4 x 1/8 MPT
3	40-01094-03	Fitting, Hose, Barb, 1/4 x 1/4 MPT
4	40-01094-04	Fitting, Hose, Barb, 1/4 x 3/8 MPT
5	40-01094-05	Fitting, Hose, Barb, 5/16 x 1/8 MPT
6	40-01094-06	Fitting, Hose, Barb, 5/16 x 1/4 MPT
7	40-01094-07	Fitting, Hose, Barb, 3/8 x 1/8 MPT
8	40-01094-08	Fitting, Hose, Barb, 3/8 x 1/4 MPT
9	40-01094-09	Fitting, Hose, Barb, 3/8 x 3/8 MPT
10	40-01094-10	Fitting, Hose, Barb, 1/2 x 1/4 MPT
11	40-01094-11	Fitting, Hose, Barb, 1/2 x 3/8 MPT
12	40-01094-12	Fitting, Hose, Barb, 1/2 x 1/2 MPT
13	40-01094-13	Fitting, Hose, Barb, 1/2 x 3/4 MPT
14	40-01094-14	Fitting, Hose, Barb, 5/8 x 3/8 MPT
15	40-01094-15	Fitting, Hose, Barb, 5/8 x 1/2 MPT
16	40-01094-16	Fitting, Hose, Barb, 3/4 x 1/2 MPT
17	40-01094-17	Fitting, Hose, Barb, 3/4 x 3/4 MPT
18	40-01094-18	Fitting, Hose, Barb, 1/8 x 1/8 MPT
19	40-01094-19	Fitting, Hose, Barb, 5/8 x 1/8 MPT
20	40-01094-20	Fitting, Hose, Barb, 1 x 3/4 MPT

**Splicers and Adapters**



27-0102  
Y-splicer 5/8" 43% fibreglass reinforced nylon 6/12. For 5/8 and 3/4" hose.



27-0244  
Straight splicer 3/4" x 5/8", steel



27-0278  
Elbow 5/8" Plastic  
27-0125  
Elbow 5/8" Copper (not pictured)



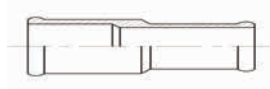
27-0018  
Straight splicer 5/8" copper  
27-1110  
Straight splicer 3/4" copper  
27-0018

27-0098  
Adapter converts 3/8" male to 1/2" male pipe (not pictured)

27-0140  
Adapter converts 3/4" male to 3/8" male pipe (not pictured)



27-0710  
T-splicer 5/8" Copper



<b>Part No.</b>	<b>Description</b>
27-2107	Splicer - Straight 5/8" Hose x 1/2" Hose
27-0244	3/4" Hose x 5/8" Hose
27-0018	5/8" Hose x .035" Hose



### Nipples



27-0141  
Elbow 3/8" male x 3/8" female

27-0140  
Adapter 3/4" male NPT x 3/8 female NPT, brass



27-1159  
Hex nipple 3/4" hose x 3/4" male  
NPT, brass



27-0097  
Hex nipple 5/8" hose x 3/8" male  
NPT, steel  
27-0371  
Hex nipple 3/4" hose x 1/2" male  
NPT, steel

### Heater Hose

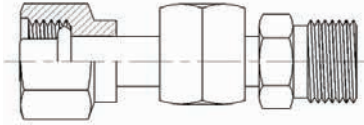


- 27-0017 Heater hose elbow 5/8" (standard) black.
- 27-0019 Heater hose elbow 3/4" (standard) black

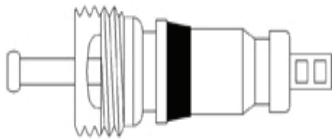
- 27-0025 Heater hose 5/8" (standard) black sold per 250 feet reels
- 27-0220 Heater hose 3/4" (standard) black sold per 50 feet rolls
- 27-0225 Heater hose 5/8" (heavy duty) black sold per 50 foot rolls
- 27-0235 Silicon hose 5/8" (long life) green or blue sold per foot
- 27-0238 Silicon hose 3/4" (long life) green or blue sold per foot

(See also hose insulation and sleeves under hose section.)

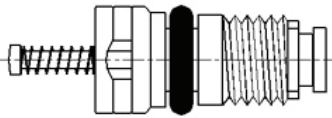
## Service for (R134a)



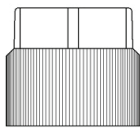
Part No.	Description
27-0015	Switch Port In-Line O-Ring style 5/8"-18 M 5/8 "-18 Fe Port is 3/8 "-24



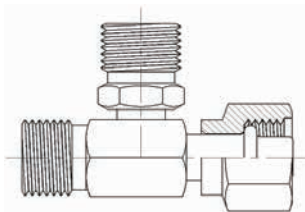
Part No.	Description
YC-14-00351-00	Valve Core Standard flow .210"-36 M



Part No.	Description
27-1235	Valve Core Hi-flow .75"x 6 M Seal Compounds Compatible with R134a and Lubricants



Part No.	Description
28-0287	Plastic Cap for R134a Service Port Hi-Side Cap (Standard Flow)
28-0246	Plastic Cap
28-0247	Plastic Cap
27-1234	Valve Core
28-0288	Lo-Side Cap (High Flow)

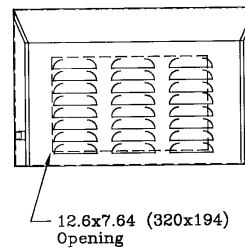
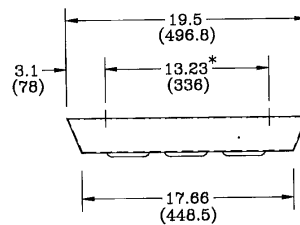
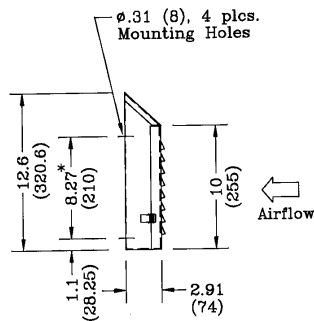
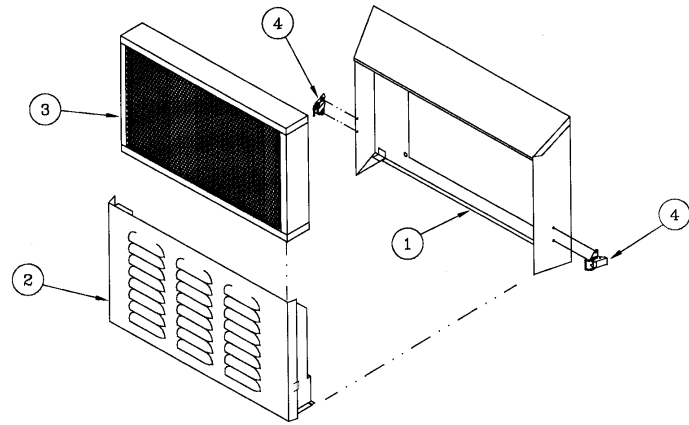


Part No.	Description
27-3376	Adapter Tee O-ring style 5/8"-18 M
27-3375	7/8"-14 M



Part No.	Description
27-1803	Screw-on Adapter Straight R134a Service Port For retrofit 7/16"-20 Fe 13mm R134 Permanently Converts Service To Low Side Port

# Filter Kit 601



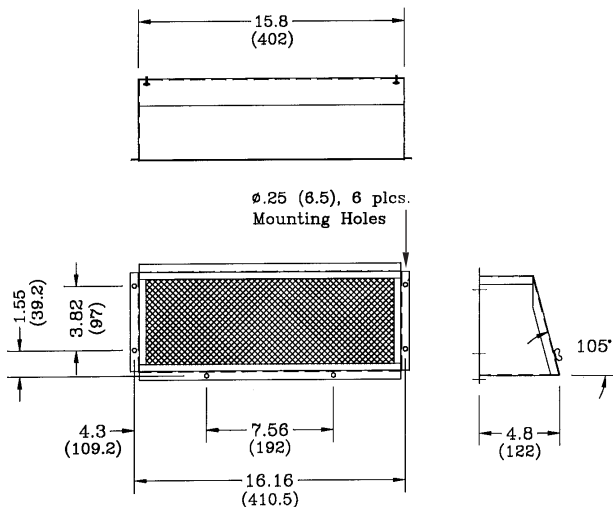
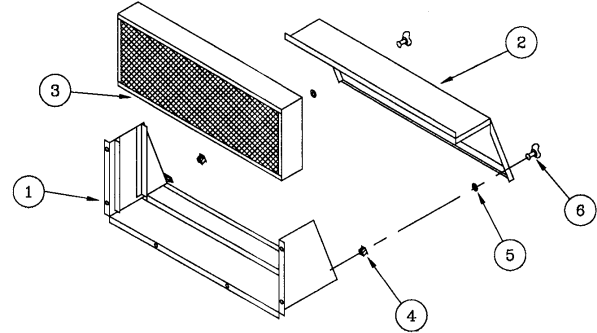
## Part Descriptions: Specifications

Part No.	No.	Part No.	Description
16-0195	1	24-1151	Filter Assy.
Made of 18GA (1.25mm) Cold Rolled Steel and finished in a black semi-gloss epoxy powder coat.	2	24-1152	Casing
* Mounting holes location	3	26-0004	Cover
	4	29-0022	Filter
			Latch

## Features

The 601 has an aluminum frame and a disposable filter element.

# Filter Kit 602



**PN**

- 28-0150
- 38-00547-00
- 38-00547-04
- 38-00573-01
- 38-00573-04

**Description**

- Filter, Air 48.5" x 5" x 0.5", 30 PPI
- Filter, Air 1.00" x 16.5" x 46", Washable
- Filter, Air 1.00" x 18" x 46"
- Filter, Air 9" x 36.5", EM1, Gen V
- Filter, Air 1.00" x 18" x 46"

## Part Descriptions: Specifications

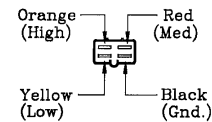
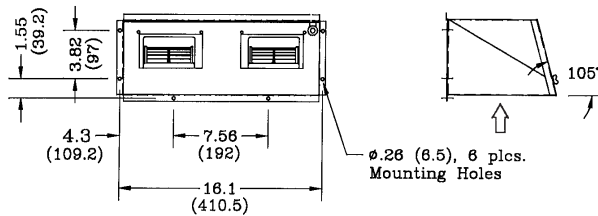
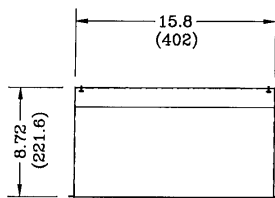
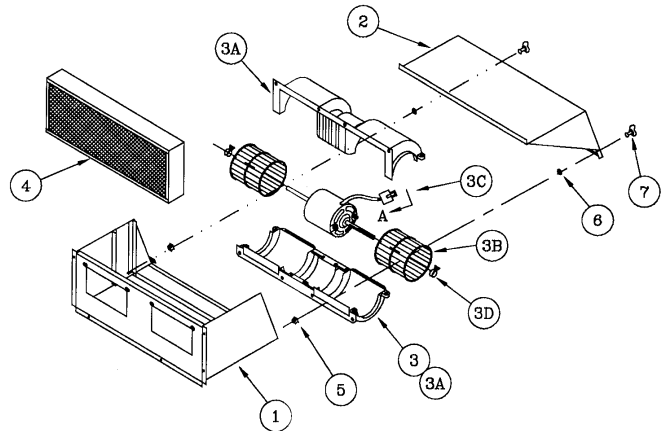
Part No.	No.	Part No.	Description
16-0200	1	24-2220	Filter Assy.
Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.	2	24-2209	Filter Box
	3	26-0041	Cover
	4	29-0075	Air Filter
	5	29-0077	Retainer
	6	29-0082	Receptacle
			Stud Wing Head

## Features

The 602 has an aluminum frame and a disposable filter element.



# Filter Kit 603 - Pressurizer



View A

Packard EL 4-way Conn. #294544 with #2971962-L Terminal (4x)

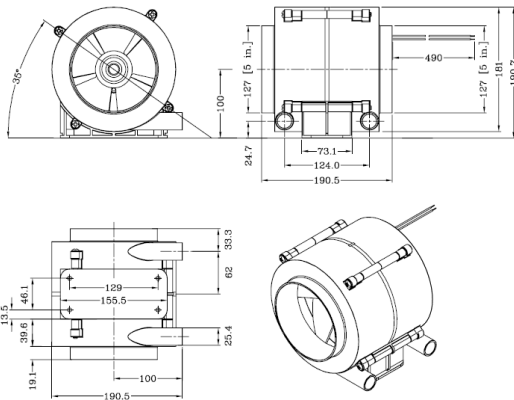
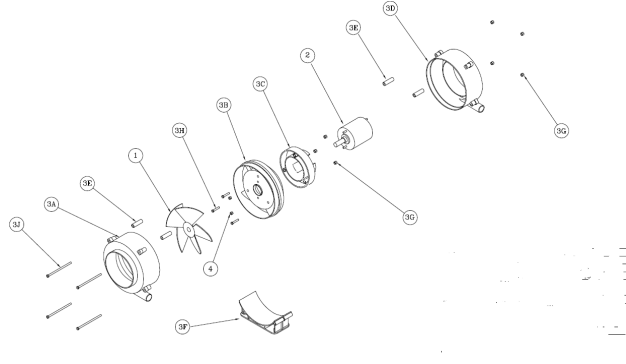
## Part Descriptions: Specifications

Part No.	No.	Part No.	Description	No.	Part No.	Description	
16-0353	Filter Assy./12V	1	24-1627	Filter Box	4	26-0041	Air Filter
16-0354	Filter Assy./24V	2	24-1628	Cover	5	29-0075	Receptacle
Current	-12 Amps/12V	3	15-0533	Blower 12V	6	29-0077	Retainer
	-6 Amps/24V	3A	15-0534	Blower 24V	7	29-0078	Stud Wing Head
Made of 18GA (1.25mm) Cold Rolled Steel and finished in black semi-gloss epoxy powder coat.		3B	25-0017	Blower Housing			
		3C	25-0021	Blower Wheel			
		3D	25-0643	Blower Motor 12V			
			25-0644	Blower Motor 24V			
			25-0022	Clip			

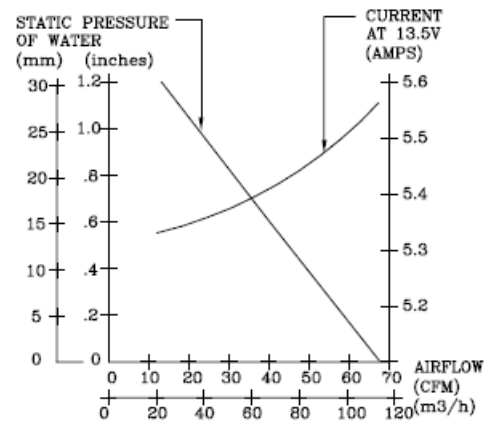
## Features

The 603 has an aluminum frame and a disposable filter element.

# Filter Kit 605 - Pressurizer



**Airflow**



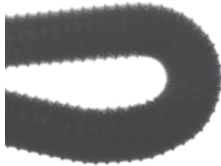
## Part Descriptions: Specifications

No.	Part No.	Description
4	29-0230	HEX NUT (10-32)
3K	29-0746	BASE INSERT (M6)
3J	29-0745	¼ - 20X5" SLOT SCREW
3H	29-0744	¼ - 20X1.25" HEX HEAD BOLT
3G	29-0743	HEX LOCK NUT (1/4-20)
3F	28-0623	BASE
3E	28-0622	SPACERS
3D	28-0621	OUTLET
1	25-0013	FAN

No.	Part No.	Description
3C	28-0620	MOTOR MOUNT
3B	28-0619	LOUVER MOUNT
3A	28-0881	Ø3" INLET
3	28-0649	BODY ASSY. (Ø3" INLET)
2	25-0894	MOTOR 24V



**Air Hose**



23-0102  
2" Low friction, non collapsible,  
sold in length of 47" (1200 mm)

23-0104  
2.5" Low friction, non collapsible,  
sold in length of 47" (1200 mm)



23-0015	2"	Collapsible	sold in multiples of 50 feet
23-0020	2.5"	"	"
23-0025	3"	"	"
23-0035	3.5"	"	"
23-0040	4"	"	"

**Round Louvers**



27-1211  
max 3" diameter stainless steel

27-0183  
3.16 - 4.5" diameter stainless steel



23-0045  
Nylon strap up to 3" diameter

Louvres shown have diameters of 3.94" (100 mm) and are manufactured of super tough nylon. The ST801 was specially designed for extreme low temperatures. The louvres must be used with any of the adapters below.

**Adapters for 23-0005, 45, 47 & 86**



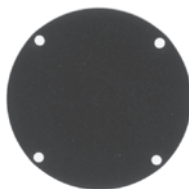
23-0048  
Adapter, Nylon 66



23-0017  
Hose adapter, 2"  
23-0018  
Hose adapter, 2.5"



23-0032  
Hose adapter, 3",  
Nylon 66



23-0006  
Cover plate (ABS)



23-0143  
Hose adapter,  
60mm, Nylon 66

Mounting hole Ø 3.1" (79mm) . Screw hole 4 x Ø 84 mm.



### Round Louvers



23-0171  
Rotates and closes, adapter include



23-0172  
Rotates and closes, hose adapter 2" included

Above louvers are manufactured of prime grade ABS. The overall Ø 2.75" (70 mm), screw hole Ø 2.204" (56 mm) (4x), mounting hole Ø 2.10" (53.5mm). Adapter will also accept snap in installation without screws.



23-0100  
Rotates and closes comes with 4" hose adapter (ABS) . Four screw holes at Ø 4.93" (125.2mm)  
Used in the RV and motor home industry.



23-0065  
Non adjustable, mounts in 3" (76.2mm) hole.  
Mounting spring included.  
Low cost (ABS) .

### Ball Type Louvers (ABS)



23-0164  
Black ball, hose adapter 2" included  
23-0067  
Black ball, hose adapter 2.5" included



23-0057  
Chrome ball, hose adapter 2.5" included



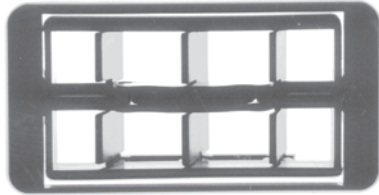
23-0087  
Black ball, adapter included  
23-0097  
Large black ball, adapter included mounts in a Ø 3" (76.2mm) hole.

Louvers  
23-0164, 23-0057, 23-0067, and 23-0087  
Mount in a Ø2.5" (63.5 mm) hole.



23-0098  
Large black ball, hose adapter Ø 2.5" included  
Louvers 23-0097 and 23-0098 mounts in a Ø 3" (76.2mm) hole.

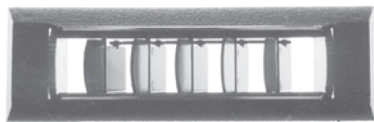
**Rectangular and Square Louvers (closable and adjustable)**



23-0042  
3.65" (92.2mm) x 1.88" (47.8mm) , (ABS)  
snaps into hole  
3.41" (86.6mm) x 1.72" (43.7mm)



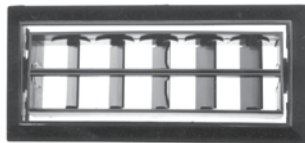
23-0027  
2.45" (62.2mm) x 2.44" (62mm) , (ABS)  
2" hose adapter included, snaps into hole  
2.2" (55.9mm) x 2.375" (60.3mm)



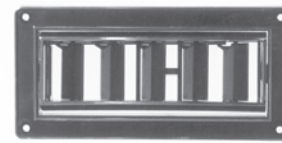
23-0029  
6" (152.4mm) x 1.87" (47.6mm) , (ABS)  
snaps into hole  
5.73" (145.5mm) x 1.72" (43.7mm)



23-0046  
6" (152.4mm) x 1.562" (39.7mm), (ABS)  
snaps into hole  
5.75" (146mm) x 1.375" (34.9mm)



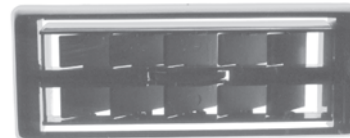
23-0055  
7.1" (180.3mm) x 3.3" (83.8mm) , (ABS)  
snaps into hole  
6.38" (162.1mm) x 2.48" (63mm)



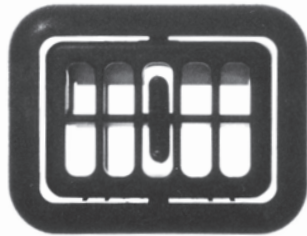
23-0053  
5.43" (137.9mm) x 2.68" (68.1mm) ,  
(ABS) fits hole  
4.75" (120.7mm) x 2" (50.8mm)



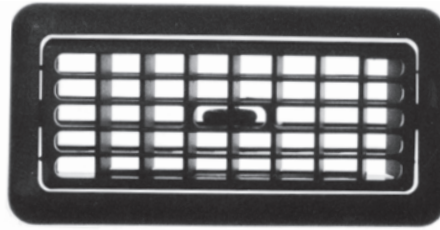
23-0054  
Adapter for 23-0053 with 2.5" (63.5mm)  
hose adapter. (ABS)



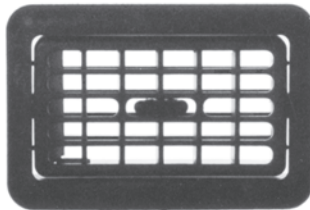
23-0116  
5.43" (138mm) x 2.17" (55mm) , (ABS)  
snaps into hole  
5.12" (130mm) x 1.81" (46mm)

**Rectangular and Square Louvers (closeable & adjustable)**


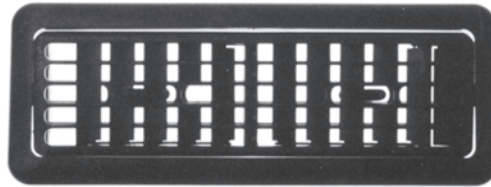
23-0173



23-0175



23-0174



23-0176

DIMENSIONS						
ABOVE LOUVERS SNAP INTO 1/16" (1.59mm) TO 1/8" (3.19mm) WALL THICKNESS OPENINGS						
Part No.	Overall Size		Mounting Hole		Snap-in	Hose* Adapter
	in.	mm	in.	mm		
23-0173	2.62 x 3.45	66.5 x 87.6	2.02 x 2.85	51.3 x 72.4	yes	no
23-0174	3.82 x 5.64	97.0 x 143.3	2.82 x 5.13	71.6 x 130.3	yes	no
23-0175	3.82 x 7.87	97.0 x 199.9	2.85 x 7.34	72.4 x 186.5	yes	no
23-0176	3.82 x 10.11	97.0 x 256.8	2.82 x 9.61	71.6 x 244.1	yes	no

\*Louvers available on request with Ø2.5" (63.5 mm) hose adapter as a one piece design.



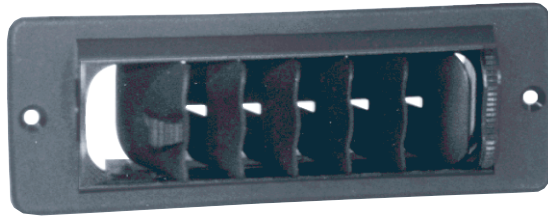
23-0177



23-0178

DIMENSIONS					
ABOVE LOUVERS SNAP INTO 1/16" (1.59mm) TO 1/8" (3.19mm) WALL THICKNESS OPENINGS					
Part No.	Overall Size		Mounting Hole	Snap-in	Hose* Adapter
	in.	mm			
23-0177	2.17x 6.08	55.1 x 154.4	request sample	yes	No
23-0178	2.17 x 6.08	55.1 x 154.4	request sample	yes	No

**Rectangular and Square Louvers (closable and adjustable)**

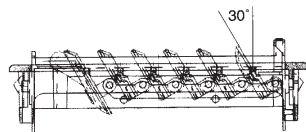
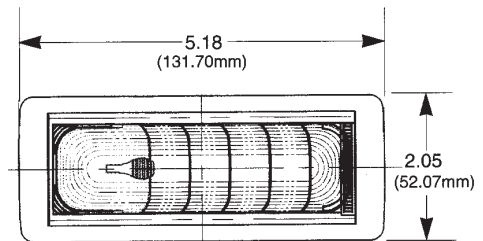
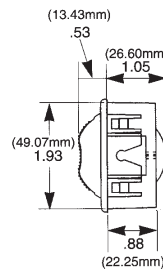
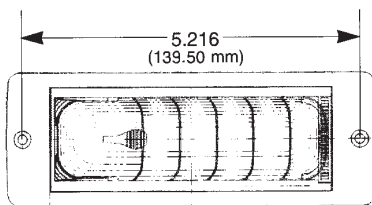


23-0186

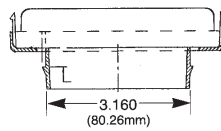
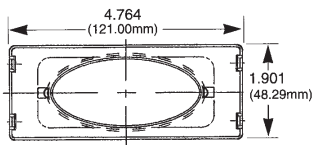


23-0145

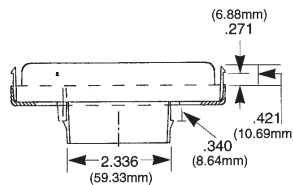
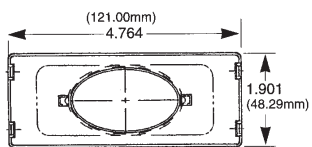
Louver Vents



**Hose Adapters**



23-0203 Hose Adapter  $\varnothing$  2.5" (63.5 mm)



Hose Adapter  $\varnothing$  2" (50.8 mm)



**Windshield Louvers**



23-0094  
9.33" (237mm) x 1.18" (30mm) .  
Two centered screw holes at 8.70" (221mm) .(ABS)



23-0115  
8.07" (205mm) x 1.02" (26mm) (ABS)  
Snaps into oblong hole 7.80" (98mm) x 0.69" (17.5mm) (ABS)



23-0095  
As 23-0094 but angled 40° from vertical line

**Hose adapters**

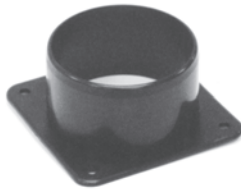


23-0110 /2"  
2.36" (60mm) , four screw holes Ø 2.56" (65mm) , mounts in 2" (50.8mm) hole (ABS)

23-0125 /2.5"  
2.91" (74mm) , four screw holes Ø 3.25" (83mm) , mounts in 2.48" (62.8mm) hole (ABS)



23-0049 y-splicer 2.5" (ABS)



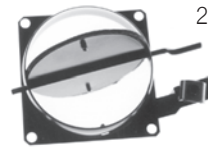
23-0141  
60mm, nylon 66



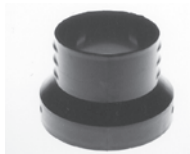
23-0051 Reducer from 2.5" - 3" (ABS)



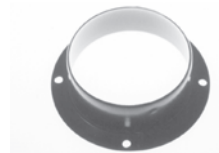
23-0037 2" Snap in mounting (ABS)  
23-0038 2.5" Snap in mounting (ABS)  
23-0039 3" Snap in mounting (ABS)



23-0129 4" Steel with flapper door: four screw holes at Ø 5.30" (134.6mm)



23-0050 Reducer from 2.5" - 2" (ABS)



23-0091 3" Steel four screw holes at Ø 3.54" (90mm)

23-0090 4" Steel four screw holes at Ø 4.72" (120mm)

23-0142 3.5" (88mm) , nylon 66



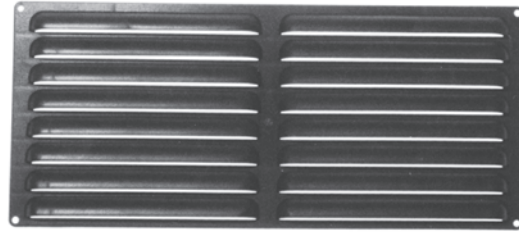


### Recirculating Air Grills



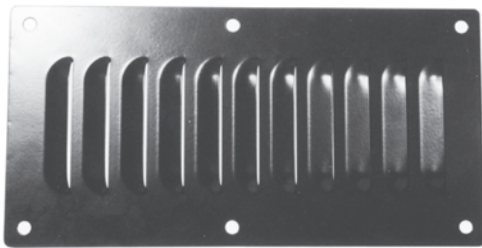
23-0084

Grill 5.51" (140mm) high x 6.18" (157mm) wide (ABS)  
For opening 4.96" (126mm) high x 5.31" (135mm) wide  
Four screw holes at 5.12" (130mm) high x 5.79" (147mm) wide.



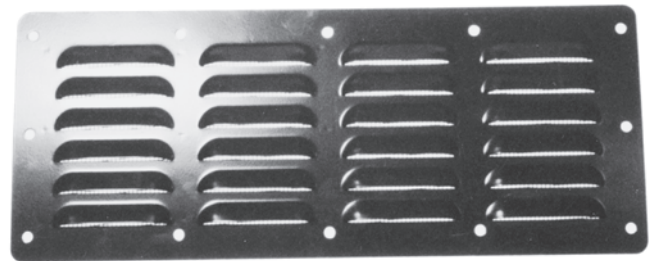
23-0041

Grill 5.51" (140mm) high x 12.36" (314mm) wide (ABS)  
For opening 4.96" (126mm) high x 11.18" (284mm) wide  
Four screw holes at 5.12" (130mm) high x 11.97" (304mm) wide.



24-0025

Grill Steel 12" (304.8mm) x 6.13" (155.7mm)



23-0075

Grill Steel with metal mesh 7.50" (190.5mm) x 18.5" (469.9mm)



Knobs



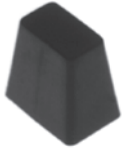
25-0061  
Fan plate for rotary switches



25-0133  
Lever, 1/4" slot, black, for 25-0100 and lever controls



25-0067  
Fan/blower, Ø 1", D-shaft



25-0186  
Lever, 1/4" slot, black, for 25-0100 lever controls



25-0581  
Position, Ø 1 3/8", rubber coated with set screw and brass insert.



25-0072  
Position, Ø 1", D shaft



25-0142  
Position, Ø 1.5" with set screw and brass insert



25-0435  
Position, Ø 1 1/8" with set screw



25-0068  
Thermostat, Ø1", D-shaft



26-0266  
Ball, thread Fe 10-32 brass insert Ø 1"



25-0061  
Fan plate for rotary switches



26-0263  
Knurled, thread Fe 1/4"-20 brass insert Ø 1"



25-0549  
Position, Ø 7/8" with set screw and metal insert

### Caps



Part No.	Description
28-0065	Cap #8 M
28-0068	Cap #8 Fe
28-0064	Cap #6 M
28-0067	Cap #6 Fe
28-0066	Cap #10 M
28-0069	Cap #10 Fe

### Insulation Tape



26-0032 Insulation tape 1/8" x 2" x 30 ft. (3.2 mm x 51 mm x 10 meter)  
 (Prevents condensed water from forming on expansion valves and copper tubes.)  
 26-0324 Insulation tape as above but 2 ft long.  
 26-0158 Insulation tape as above but 1850mm.

### Hose Clamp



1108 Hose clamp for 1/2" tube O.D.

### Circulation Pump



These pumps are used when the main pump in the vehicle is insufficient to support the coolant flow to an auxiliary heater. The circulation pump is of a very high quality. The compact design (length 177mm, width 68mm, height 85mm) and low weight makes installation a breeze. It is weather proof, dust-proof and can be installed in dirty, humid environments. This high-tech pump has a 5000-hour continual service life! Comes with black painted aluminum bracket.

Technical specifications: Magnetic drive (no shaft between motor and pump) , CE-marked (radio disturbance shielded) as perEN55014, Ball bearing-permanent magnet motor, Liquid temperatures -40°C to 100°C, Ambient operational temperatures -40°C to70°C.

Pressure and Capacity data (based on water at 20° C)	Back Pressure		FLOW			AMPERAGE	
	Bark	Pa	ft	l/min	USGPM	12V	24V
26-0688 (12V) Ø16 5/8" 71-4161 (24V)	0.1	10	3.3	15.0	4.0	1.2	0.6
	0.15	15	4.9	12.0	3.2	1.0	0.5
	0.2	20	6.6	4.0	1.1	0.8	0.4
64-5012 (12V) Ø20 3/4"	0.1	10	3.3	17.0	4.5	1.2	
	0.15	15	4.9	12.0	3.2	1.0	
	0.2	20	6.6	3.0	0.8	0.8	

**Drain, Hose and Clamps**



27-0091  
Drain clamp (Do not use between drain connector and drain valve.)



27-0030  
Drain hose 1/2" ID x 5/8" O.D.



27-0032  
Drain tee



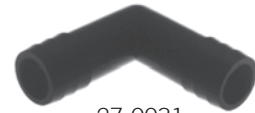
27-0421  
Drain Valve 1" kazoo tube.



27-0264  
Air Restrictor

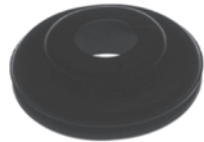
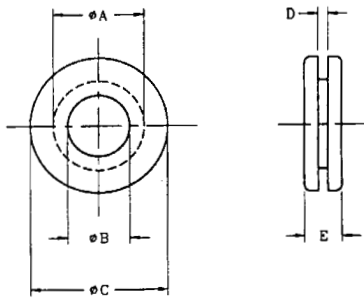


27-0422  
Drain connector, connects between drain valve and drain hose.



27-0031  
Drain elbow

**Rubber Grommets**



Part No.	A	B	C	D	E
28-0014	9.5	7	14.3	1.6	6.35
28-0004	12.7	9.5	17.5	1.6	7
28-0045	17.5	11	24	1.6	8
28-0083	17.5	11	24	4.8	11
28-0293	19.05	12.7	24.6	2.4	7.14
28-0009	22.2	16	28.5	1.6	8
28-0008	26.98	19	35	1.6	9.5
28-0007	35	28.5	50.8	1.2	9.5
28-0005	32	16-30	47	2.0	9.5

Note: Dimensions in mm

**Grommets and Clamps**



27-0209  
Gear clamp 3/4" hose, stainless steel



27-0048  
Constant Tension Clamp



27-0910  
Constant Gear Tension Clamp

PN	Diameter	
	Max	Min
27-2487	0.65" (16.5 mm)	0.547" (13.9 mm)
27-0048	1.024" (26 mm)	0.866" (22 mm)
27-2277	1.138" (28.9 mm)	0.992" (25.2 mm)
27-2039	1.023" (26 mm)	0.866" (22 mm)

PN	Diameter	
	Max	Min
27-0910	1 1/16" (27 mm)	11/16" (17.5 mm)
27-3176	1 1/16" (27 mm)	9/16" (14.3 mm)
27-3838	1 1/2" (38 mm)	13/16" (20.6 mm)
27-3716	3 1/8" (79 mm)	2 1/4" (57 mm)
39-0004	3 5/8" (92 mm)	2 3/4" (70 mm)

### Grommets and Clamps



28-0005  
Grommet fits 1.25" (32 mm) hole.  
Use to protect refrigeration or heater hose



27-0012  
Hose clamp for #6 hose

27-0502  
Hose clamp for 5/8" tube O.D. (Drain)

### Gear Clamp



27-1211  
27-0183



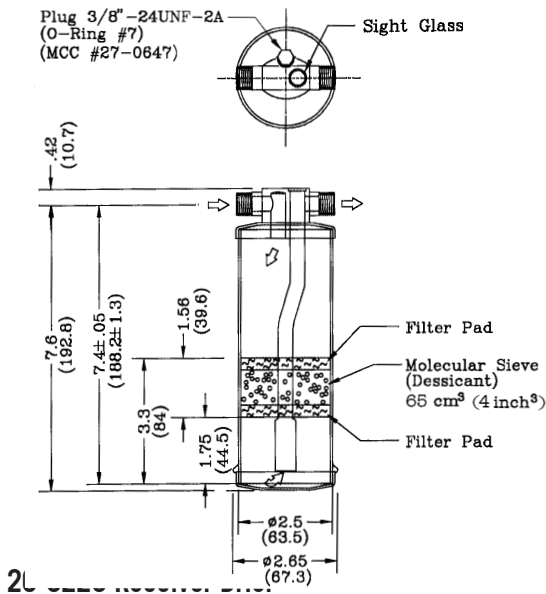
23-0045  
Nylon strap up to 3"  
diameter

PN	Diameter	
	Max	Min
27-0183	4.50" (114mm)	2.5" (64mm)
27-0059	1.06"(27mm)	0.71" (18mm)
27-2193	2.5" (64 mm)	1.56" (40 mm)
27-3579	2.75" (70mm)	1.81" (46 mm)
27-1211	3.25" (83 mm)	2.31" (59 mm)
27-2686	6.0" (152 mm)	4.0" (102 mm)
27-3496	1.25" (32 mm)	0.5" (13 mm)
27-0209	1.125" (28.6 mm)	0.75" (19.1 mm)
27-2687	1.75" (44 mm)	0.75" (19.1 mm)

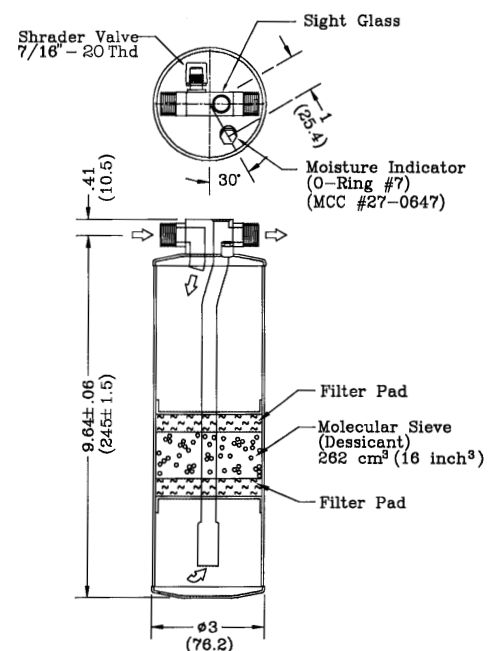
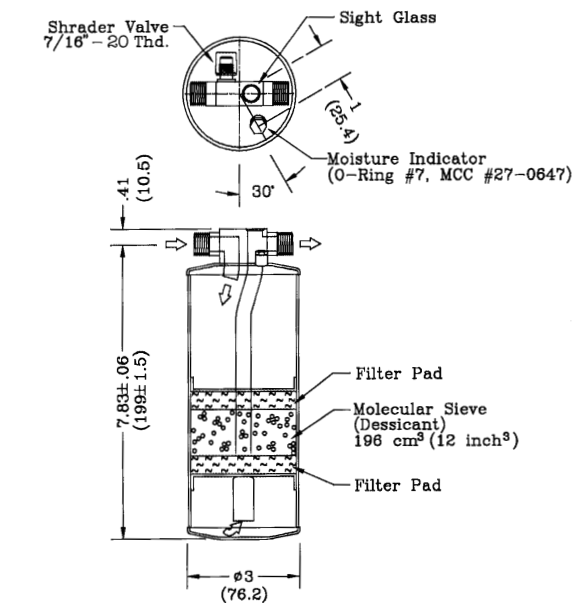
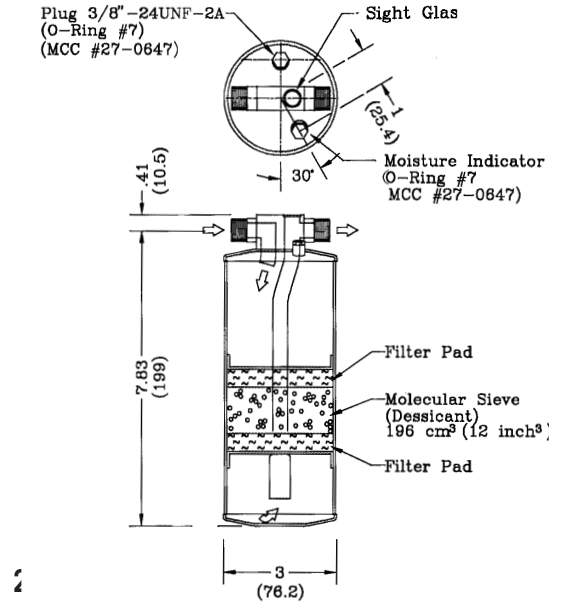
# Receiver Driers

Most of MCC high capacity receiver driers are equipped with a moisture indicator that turns colour from blue to beige. It takes the guesswork out of determining moisture content in the system. Beige means replace receiver drier and refrigeration oil by draining compressor. Then recharge the system. Blue means OK. RD's should be mounted as close to the condenser as possible and in the air stream of the radiator fan. Please note that many of the forced air condensers are already equipped with a RD. All RD's are equipped with sight glass and some with shradar valves, making it possible to replace the pressure switch without the loss of refrigerant. We recommend installation of a pressure switch on the RD.

## 26-0014 Receiver Drier

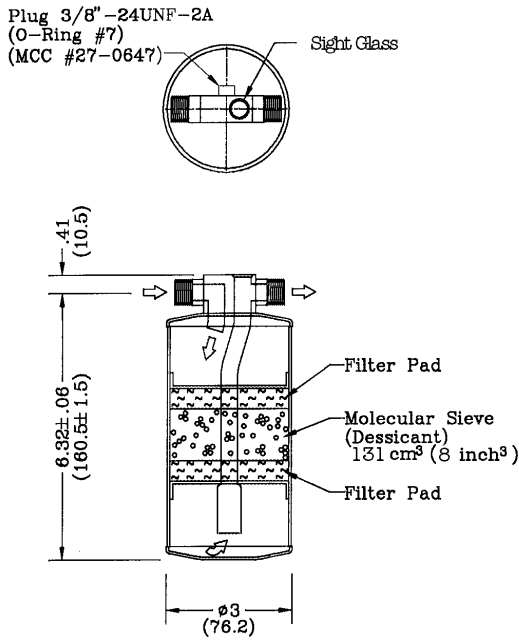


## 26-0219 Receiver Drier

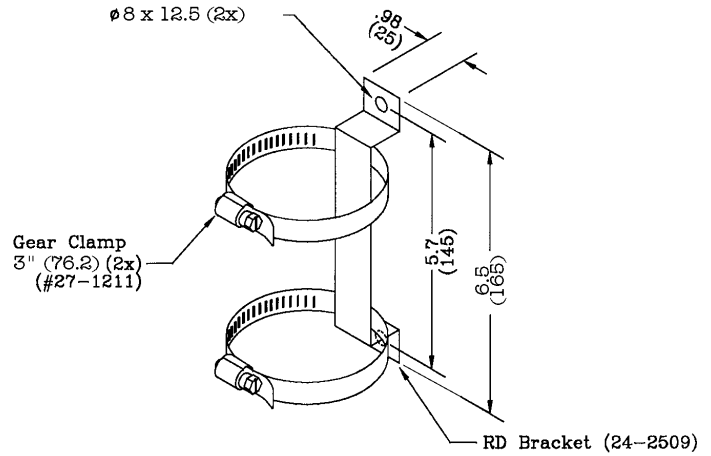


# Receiver Driers

## 26-0016 Receiver Drier



## 26-0449 Receiver Drier Bracket Assy.



Note: RD Bracket Assy. made of 12GA (2.5mm) satin coated steel and powder coated black.

Part No.	Description
14-00326-05	Filter Drier
14-00320-00	Filter Drier, 3/4" ORS x 5/8" ORS
65-00193-00	Receiver w/ Filter Drier
14-00288-00	Filter Drier /Sightglass, 16 cu.in., 1/2" Male O-Ring

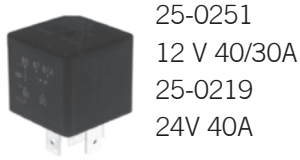


MCC P/N: 14-00320-00



MCC P/N: 65-00193-00

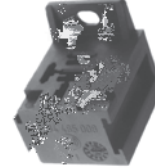
**Relays**



25-0251  
12 V 40/30A  
25-0219  
24V 40A

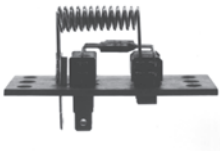


25-0074  
12V 40/30A

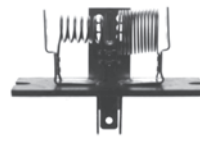


25-0221  
Socket for 25-0251  
and 25-0219

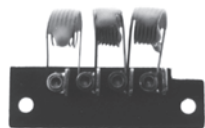
**Resistors**



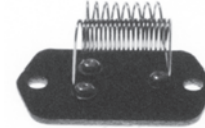
25-0136 12V(0.4 | +0.4 | )300°F(150°C)  
meltfuse  
25-0156 24V (1.8 | +2.0 | )  
25-0552 24V (0.8 | +1.8 | )



25-0120  
12V (0.5 | +1.3 | )  
25-0139  
12V (0.35 | +1.5 | )



25-0095  
12V (0.5 | +0.5 | +1 | )



25-0090  
24V (1.4 | +4.5 | )



25-0601 12V (0.4 | +1.5 | ) ceramic 333°F (167°C) meltfuse  
25-0602 24V (1.2 | +3.5 | ) ceramic 333°F (167°C) meltfuse  
25-0604 24V (0.8 | +1.8 | )  
29-0130 Resistor bracket for ceramic resistor Used with blower #515 (not pictured)

**Diodes**



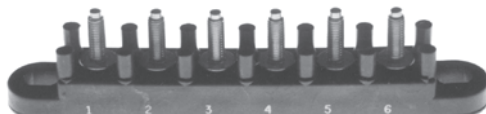
25-0097 Heavy duty type, 12 amp, 10-32 thread

**Automatic Circuit Breakers**



25-0026 12V, 30 amp, 1/4" male terminal (Not pictured)  
25-0406 24V, 20 amp, 10-32 thread  
25-0421 24V, 12 amp, 10-32 thread  
25-0442 12V, 40 amp, 10-32 thread

**Junction Block**



25-0006 10-32 thread brass studs, rated 30A, 600V.  
Max 302°F (150°C)



## Pressure Switches

Pressure switches safeguard the compressor against extreme high and low pressures. This occurs when condenser capacity is reduced or after a loss of refrigerant. Recommended to be installed on the receiver-driers. They can also be installed on special fitting with switch port.



25-0038  
R12 Male 3/8" - 24  
25-0058  
R12 Male 3/8" - 24  
25-0308  
R134a Male 3/8" - 24  
25-0667  
R134a Male 3/8" - 24



25-0343  
R134a Fe 7/16" - 20  
fits schrader valves  
25-0674  
R134a Fe 7/16" - 20  
fits schrader valves

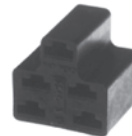
Cut Out Pressure Settings Psig (MPa)			
Part	High	Medium	Low
25-0038	370 (2.6)	-	27 (0.2)
25-0058	370 (2.6)	213 (1.5)	27 (0.2)
25-0308	455 (3.1)	-	28 (0.2)
25-0667	455 (3.1)	228 (1.6)	28 (0.2)
25-0343	455 (3.1)	-	28 (0.2)
25-0674	455 (3.1)	228 (1.6)	28 (0.2)

## Rotary Switches



25-0029  
For 3 speed motors, 15 amp, 4 pos  
25-0044  
For 3 speed motors, 25 amp, 4 pos  
25-0305  
For 2 speed motors, 15 amp, 3 pos  
25-0307  
On/off, 15 amp, 2 pos

Rotary switches include 25-0066 nut. Switches 25-0029/44/28 include an A/C circuit that closes when in low, medium or high speed



25-0034  
Connector for 25-0029/44



25-0028  
For 3 speed motors, 15 amp with resistor, 4 pos. Must be mounted in the air stream for cooling

## Toggle Switches



25-0536  
Two positions  
25-0537  
Three positions



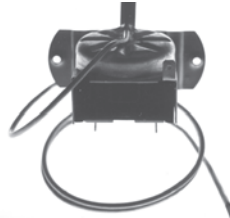
25-0100  
For 3 speed motors, 15 amp, 4 pos  
Includes an A/C circuit that closes when in low medium or high speed.

**Thermostats**

**All thermostats include nut 25-0066.** Thermostats are used to prevent icing of the coil by cycling the compressor clutch. Temp settings are 26° F (-3°C) cut out and 35° F (2° C) cut in. Capillary tube to be inserted at the coldest area in the coil. It must be inserted with minimum 15% of the capillary tubes total length.



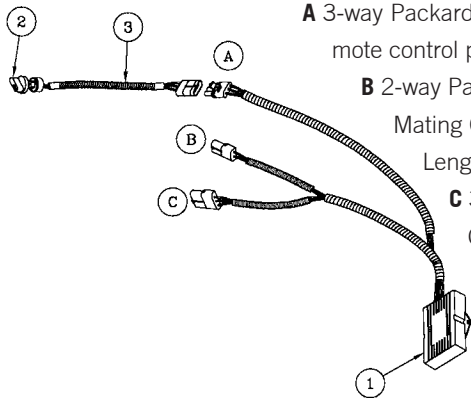
- 25-0030 19" capillary tube
- 25-0045 36" capillary tube
- 25-0118 As above with PVC tube protected capillary tube



- 25-0069 24" capillary tube
- 28-0031 PVC tube 1/4" OD  
**(Not pictured)**  
(used to protect capillary tube, specify length when ordering)

**Stepless Blower Controller**

**19-0062 Blower Speed Kit**



**A** 3-way Packard Weather Pack to Potentiometer Assy., an extension wire harness can be supplied for remote control panel installations. Length 21.7±0.2 (550±5)

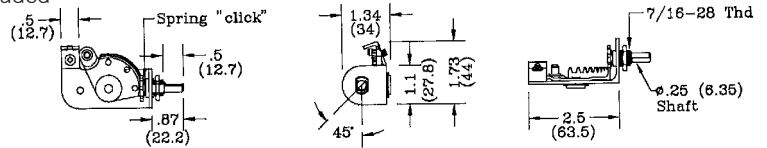
**B** 2-way Packard Weather Pack to Blower Motor Terminals: (A) Battery -A , (B) Motor-B  
Mating Connector: MCC #31-1068, with terminal MCC #31-1039  
Length 23±0.2 (585±.5)

**C** 3-way Packard Weather Pack to Power Input Terminals: (A) Battery-A, (B) Ground-C (C) Ignition-G Mating Connector: MCC #31-1091, with terminal MCC #31-1026 Length 23±0.2 (585±5)

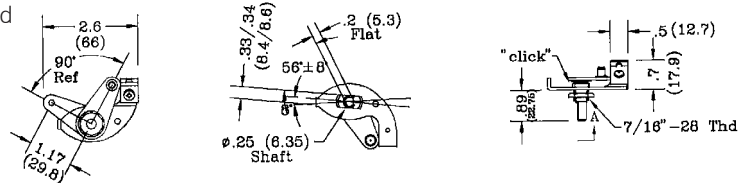
No.	Part No.	Description
1	35-0033	Motor Stepless Control
2	25-0581	Knob
3	35-0036	Potentiometer Assy.

**Rotary Controls**

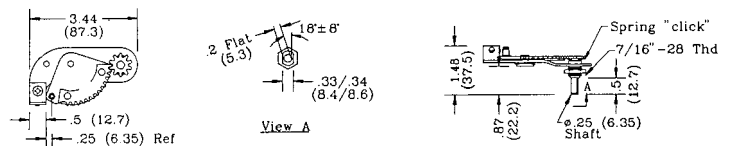
26-0350 Heavy duty steel rotary control, nut 25-0066 included



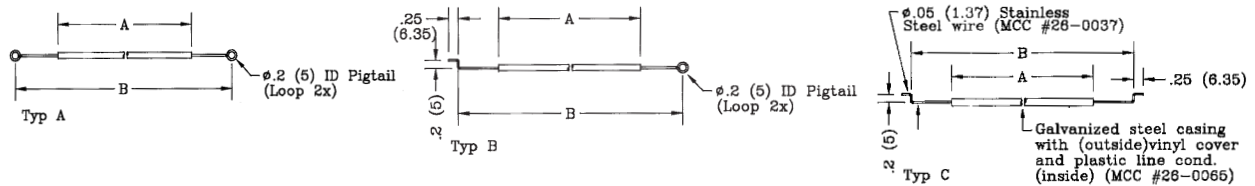
26-0345 Heavy duty steel rotary control, nut 25-0066 included



26-0359 Heavy duty steel rotary control, nut 25-0066 included



**Bowden Cables**



26-0037 Stainless steel wire  
Specify length when ordering

26-0065 Vinyl cover galvanized steel spring with plastic insert.  
Specify length when ordering.

29-0424 3/16" pushnut used for holding pigtails on shafts

(Use this Bowden Cable with metal controls only.)  
Vinyl cover to be removed under cable clamp.

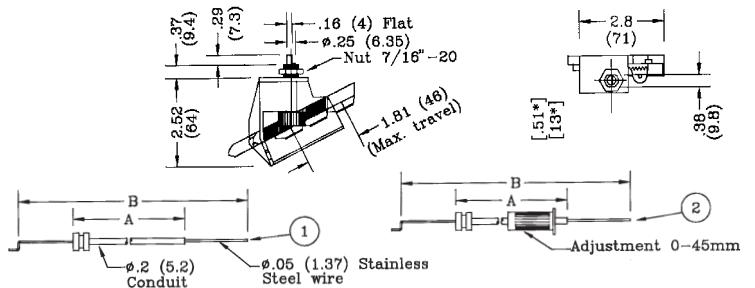
**Injection Molded Rotary Control & Cable**

26-0095 Medium duty injection molded rotary control, nut included.

26-0335 As above but with extended shaft (13mm) nut included.

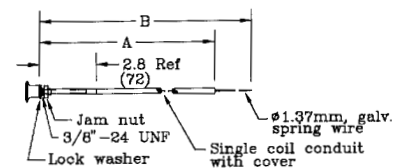
Sym	Part No.	Description	Note	A mm	B mm	A in	B in
	29-0040	Nut 7/16" - 20					
2	26-0099	Bowden Cable	With adjuster	2100	2250	82	88
2	26-0097	Bowden Cable	With adjuster	1100	1250	46	49
1	26-0098	Bowden Cable	W/O adjuster	2100	2250	82	88
1	26-0096	Bowden Cable	W/O adjuster	1100	1250	46	49

Use these bowden cables with injection molded controls only



**Push & Pull Control**

26-0008 Pull and push control for heavy duty use. A = 84" (2124 mm) B = 90" (2286 mm) 26-0058 26-0058 Longer version of above. A = 156" (3962 mm) B = 162" (4124 mm)



**Fuse Holder**
**INLINE FUSE HOLDER**

25-0682	Fuse holder (in Line)	Little Fuse	FHAC - 2	.75
25-0568	Fuse 3A	Little Fuse	ATO - 7.5	.18
25-0569	Fuse 5A	Little Fuse	ATO - 7.5	.18
25-0683	Fuse 7.5A	Little Fuse	ATO - 7.5	.18
25-0684	Fuse 10A	Little Fuse	ATO - 10	.18
25-0685	Fuse 15A	Little Fuse	ATO - 15	.18
25-0686	Fuse 20A	Little Fuse	ATO - 20	.18
25-0687	Fuse 25A	Little Fuse	ATO - 25	.18
25-0688	Fuse 30A	Little Fuse	ATO - 30	.18
25-0689	Fuse 40A	Little Fuse	ATO - 40	.18



**FlexClik Assembly Tools**



**07-00507-00**  
MCC FlexCLIK System  
Installation Kit



**07-00508-00**  
Ratching Connecting Tool  
for #16 Hose



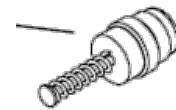
**07-00467-00**  
Connecting Tool (Pliers)



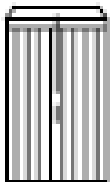
**AC101-708**  
Hose Cutter Tool  
**AC101-711**  
Hose Cutter Replacement Blade



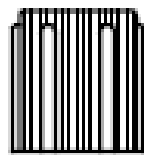
**Y03-00001-00**  
Core Access Tool (High &  
Low Access Fittings)



**Y27-00047-00**  
Access Core, R134a Low Side  
**Y27-00047-01**  
Access Core, R134a High Side



**Y27-00048-00**  
Cap, Access Port, R134a Low Side



**Y27-00048-01**  
Cap, Access Port, R134a High Side

### Pag Compressor Oil & Fin Comb



30-0005

Fin comb for 6, 8, 10, 12, 14 and 15 fins/inch coils. Can be used for heater, evaporator and condenser coils.



30-0001

Pag OIL for compressors, 1 liter bottle

## Notes



# XVI. APUS





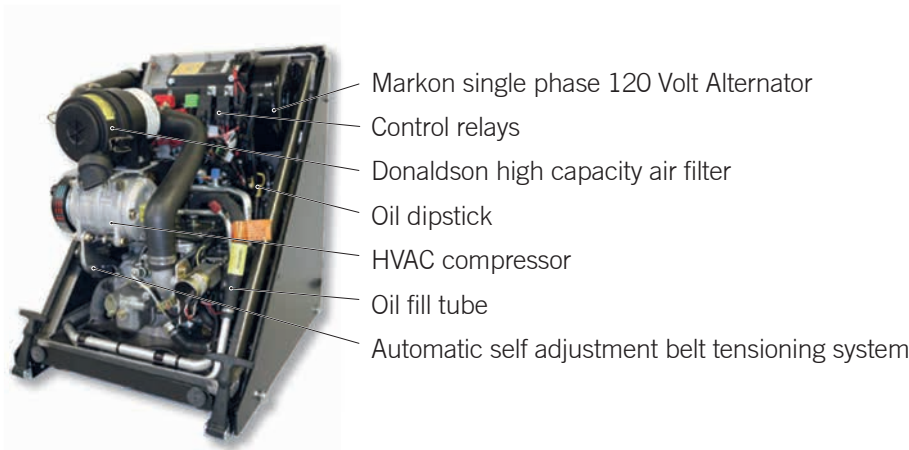
## Diesel APU EcoPower 3500

# There's a lot to gain from a good night's sleep

Made in the USA, the EcoPower 3500 is an auxiliary power system that provides heating, cooling and electrical power during downtime. Stop idling, power on the APU and save thousands of dollars annually in engine wear, fuel consumption and lodging costs.

The EcoPower 3500 is lightweight, compact and easy to install with minimal cab disruption. It operates totally independent of the truck's electrical and coolant system

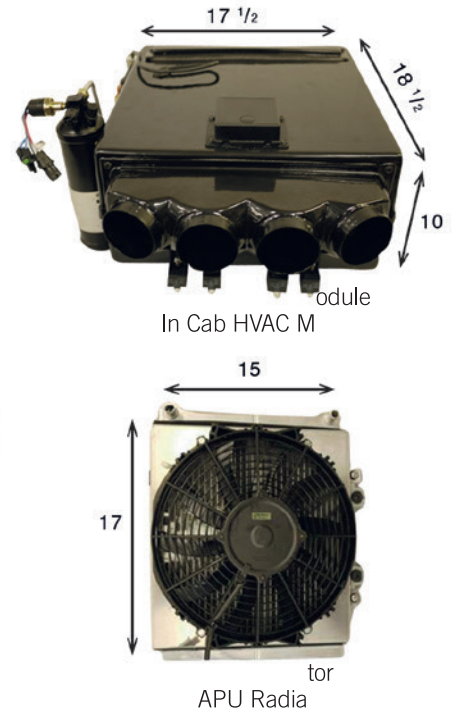
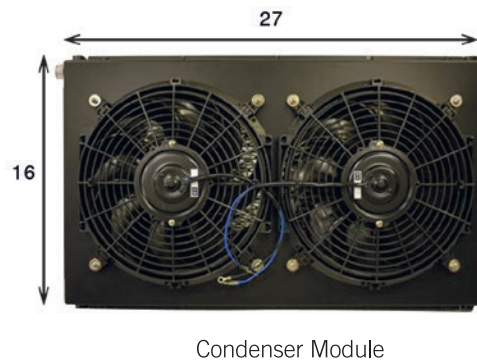
Whether in heating or cooling mode, the EcoPower 3500 draws no electrical power from the vehicle. Patented technology enables the system to provide 10,000 Btu/hr (3kW) heating without utilizing the vehicle's coolant circuit. The fully integrated compressor drives 18,000 Btu/hr (5kW) of cooling capacity. The system is comprised of a diesel power unit, in cab HVAC unit, radiator, condenser, and multiple ducting kit options to accommodate a wide variety of sleeper cab configurations.



### Features

- High cooling/heating capacity
- 3500 Watts of electrical power
- Low initial cost
- Fast payback
- Small compact system
- Easy to install
- Minimal cab disruption
- Lower weight than comparable capacity systems
- Low maintenance
- Meets anti-idling regulations
- Standalone heating, cooling and electric power generation
- CARB approved, high durability 1-cyl Kubota engine

Dimensions in inches



### Technical Data

Cooling capacity (ARI) <sup>[1]</sup>	18000 Btu/hr (5 kW)
Heating capacity	10000 Btu/hr (3 kW)
Refrigerant	R134a
Airflow	260 CFM (442 m <sup>3</sup> /hr)
Battery	60 Amp battery charger
Weight	418 lbs (190 kg)
Oil change interval	1000 hr

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

## Electric APU **EcoSleeper Lite**

# Stay comfortable and save while you rest

Relax in peace and quiet, without engine noise. The MCC EcoSleeper Lite will always give you comfortable sleeping temperature during your down time, whether the heat of the day or warm nights.

Turn off the engine, set the climate with the Electronic Climate Controller and you turn down operating costs.

The MCC battery powered A/C system maintains an even temperature without using the truck's engine. The system is comprised of an Evaporator Unit, a Condenser Unit, a Compressor Unit and an Electronic Climate Controller.

It is easy to both install and maintain.

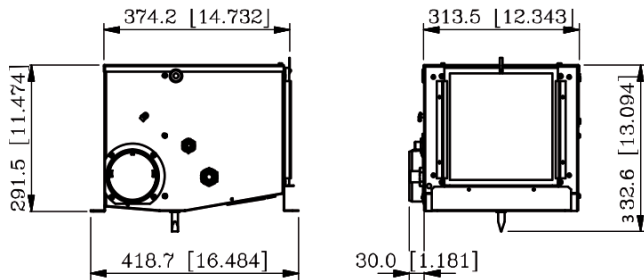


### Features

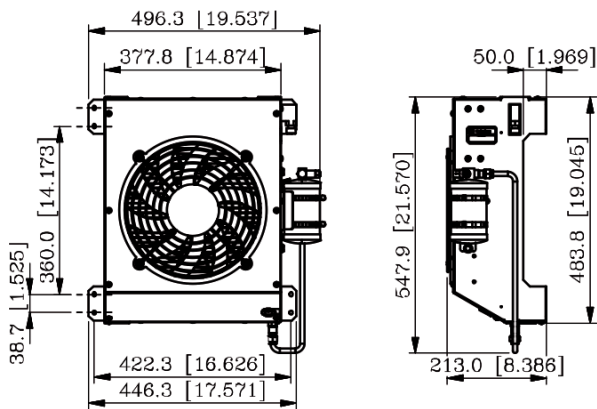
- Meets stringent anti-idling regulations
- Quiet operation less than 65dB
- Stand alone electronic climate control
- Unit run-time 8 hours (Using four AGM batteries)
- Simple unit installation and low maintenance operation
- Reduce engine wear
- Low battery voltage protection
- Fast payback
- Low weight
- Easy installation
- Low maintenance
- No fuel burned during cooling
- Advanced electronic climate control built in system
- Aluminum enclosure for durability
- Robust mounting kit options



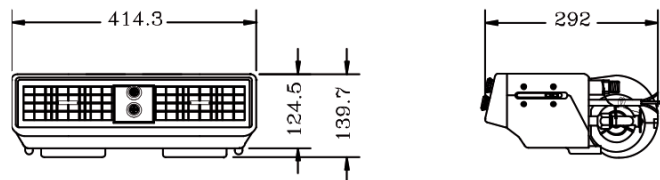
### Ducted evaporator unit



### Condenser unit



### Non-ducted evaporator unit








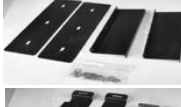


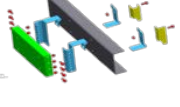


### Technical Data

	EcoSleeper Lite 8500	EcoSleeper Lite 13000
Cooling capacity (@95°F)	8500 Btu/hr (2.5 kW)	13000 Btu/hr (4 kW)
Run time (hrs)	Up to 8	Up to 8
Refrigerant	R134a	R134a
Number of batteries	4	4 + truck batteries
Voltage	12V	24V
Number of major components	4	4
Power Requirements	700 Watts Max	1200 Watts Max
Air flow	300 CFM (509.7 m <sup>3</sup> /hr)	300 CFM (509.7 m <sup>3</sup> /hr)
Approx. system weight without batteries	55 lbs (25 kg)	55 lbs (25 kg)

\*Truck alternator must be a minimum of 220 Amp capacity

# EcoPower 3500

P/N	Photo	Model
090-00611		<b>EcoPower 3500 APU Complete System with Auto Start Complete APU Assembly Package</b>
089-00019		APU
093-00838		Condenser Kit
093-00840		Install Kit
093-00842		Radiator Kit
093-00841		Duct Kit
093-00839		Hose Kit
090-00615		System Heat/Cool Kit
<b>Required Condenser Mounting Kit - Choose One</b>		
093-00849		Cab Mounting Condenser Bracket Kit
093-00850		Frame Mounting Condenser Bracket Kit
093-00851		Headache Rack Mounting Condenser Bracket Kit
<b>Optional APU Mounting System</b>		
Y72-25001-01		10" Frame No Drill Install Kit

# EcoSleeper Lite

P/N		Model	Btu/kW	Input Voltage
<b>A</b>				
Y-25-00037-00		Modular Compressor Box With No Cover		
Y-25-00039-00		EcoSleeper Lite 8500 King Leo	8500	12V
Y-25-00041-00		EcoSleeper Lite 13000 Bitzer w/ 24V - 12V DC to DC converter EcoSleeper Lite 13000 King Leo	13000 13000	12V 24V
<b>B</b>				
Y-24-00142-00		Covers Plain Cover <b>[Not Required when using integrated condenser cover assy]</b>		N/A
<b>OR</b>				
Y-54-00001-00		Cover Assembly with Integrated Condenser		12V
Y-54-00002-00		Cover assembly with integrated Condenser		24V
<b>C</b>				
50-1327		Evaporator and Condenser Modules		
50-1326		Rooftop based on "Ecoflex 6+" with evaporator and condenser Rooftop based on "Ecoflex 6+" with evaporator and condenser		12V 24V
<b>OR</b>				
13-0223		Day-cab plastic evaporator with louvers		12V
13-0224		Day-cab plastic evaporator with louvers		24V
<b>OR</b>				
13-2221		Under-bunk evaporator		12V
13-2222		Under-bunk evaporator		24V
<b>AND</b>				
14-4317		Remote condenser		12V
14-4316		Remote condenser		24V
<b>OR</b>				
14-4319		Undercab condenser		12V
14-4304		Undercab condenser		24V
<b>D</b>				
Y-19-IK0002-00		Compressor Box Mounting kit		
Y-19-IK0002-01		Floor Mount through floor of compressor box		N/A
Y-19-IK0002-03		Back wall mount through back wall of compressor box Frame/Wall bracket with HD support brackets		N/A N/A
<b>E</b>				
Y-19-IK0001-10		Refrigerant Hose/Elec Harness Kit		
Y-19-IK0001-10		10 foot Kit Class-8 Truck with Cond Jumper		12V/24V
Y-19-IK0001-25		25 Foot Kit Deliver Van with Cond Jumper		12V/24V
<b>F</b>				
35-1005		Driver Control MVC (Mini Vehicle Controller)		12V/24V
<b>G</b>				
Y-24-00121-00		MCC Recommended battery boxes		
Y-24-00122-00		In-Frame Aluminum (4 battery Merritt 258) Side-Frame Aluminum (4 battery Merritt 3505)		12V/24V 12V/24V
<b>H</b>				
35-1046		MCC Recommended Shore Power Charles Charger (120 VAC to 12 VDC 100 amp)		N/A

