

RIGID HVAC CO., LTD

RIGID *MIRCO DC AIRCON*

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1. WHAT'S MIRCO DC AIRCON?

RIGID Micro DC Aircon is a compact solution for small & confined space cooling, such as cabins, cuddy cabins and electric vehicles etc.

The Small DC air conditioner module can run on power DC 12V/24V/ 48V, it easily connects to challenge confined space and extreme hot ambient!

Our portable air conditioner module is a sub-system perfect match for customer's small space cooling which is powered by battery, grid, car power and solar power.

Similar to the traditional air conditioner, this type dc air conditioner is available as an outdoor or indoor unit because of its lightest weight and smallest size.

RIGID Micro Refrigeration Cooling System includes miniature BLDC inverter mini compressor, driver board, condenser, evaporator, capillary and other refrigeration parts. All these cooling parts are well integrated in one unit. It meets customer's specific demand where weight and space is critical.

- Super small volume: 338*208*145mm (13.3*8.2*5.7 inch)
- Super light weight: 4kgs (8.8lbs)
- Variable speeds mini dc compressor
- Mirco DC Aircon runs on 12V, 24V and 48V
- Low vibration with anti-vibration cushion
- High temperature working condition, can work on battery, solar power, car power.

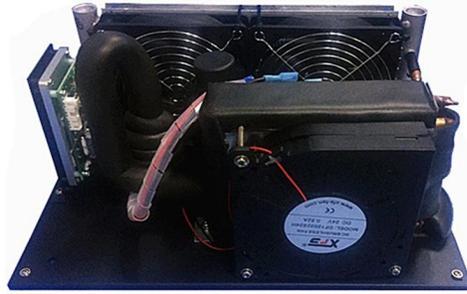
2. WHY USE RIGID MICRO DC AIRCON?

Over last 8 years, RIGID has been providing compact and mobile refrigeration system to microclimate and confined cooling devices. We design, build and service custom miniature cooling system for customers' demanding heating and cooling requirements.

RIGID specializes in air conditioning, chilled liquid module and direct refrigeration systems, supplying OEM refrigeration solutions to the medical, laser and electronics industrial markets and a number of notable applications.

As the Miniature DC Compressor innovation leader in China, RIGID Technology is creative and capture new technologies in Mirco DC Aircon. With the advantage of our refrigeration expertise, RIGID mini chillers are able to apply to all small cooling systems.

Rigid mirco DC Aircon is a compact cooling module used as small space chiller along with many other small cooling applications, such as laser cooling, electronics cooling, personal cooling, medical cooling, etc.



**Micro Air Conditioner Module
DC 12V/24V/48V**

**Smallest Size
Lightest Weight**



3. HOW IS RIGID MICRO DC AIRCON?

RIGID Micro DC Air conditioner module is cooling sub system. This small DC aircon is available to use outdoor or indoor unit because of its Compact size,light weight and industrial-class reliability, which is the essential components for various small and compact cooling applications.

RIGID's miniature compressor is the world's smallest compressor and its brushless DC motor permits variable speed to match the cooling load. We use this type BLDC rotary compressor making the micro dc aircon system efficient and portable allowing you to stay cool anywhere, anytime.

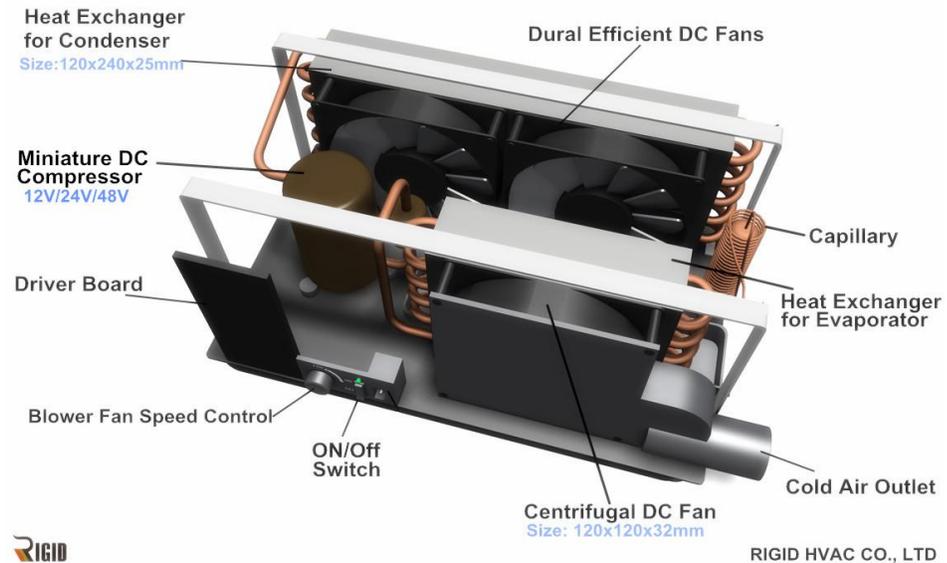
RIGID Micro DC A/C unit specializes in working for active thermal management solutions for confined space and extreme hot conditions. RIGID has a large sum of invest back into R&D each year. We have engineering and manufacturing capacities to handle OEM or ODM projects and provides the complete cooling solutions for all customers.

- Personal Cooling Systems
- Integrated design, easily install
- Large refrigeration capacity
- Minimize weight & footprint & noise
- Reliable & Energy efficient and very competitively price
- Provide perfect performance where requests micro cooling solutions



4. KEY FEATURES OF RIGID MICRO DC AIRCON?

- Customize designs are available
- Low power draw and quiet operation
- Reliable and precise temperature control
- Complete module subsystem, easy to Integrate
- Endure hot ambient temperature up to 55C degree
- Ultra compact design, lightest weight and smallest size
- Compact design to meet all miniature cooling applications
- Excellent Cooling Performance with miniature dc compressor



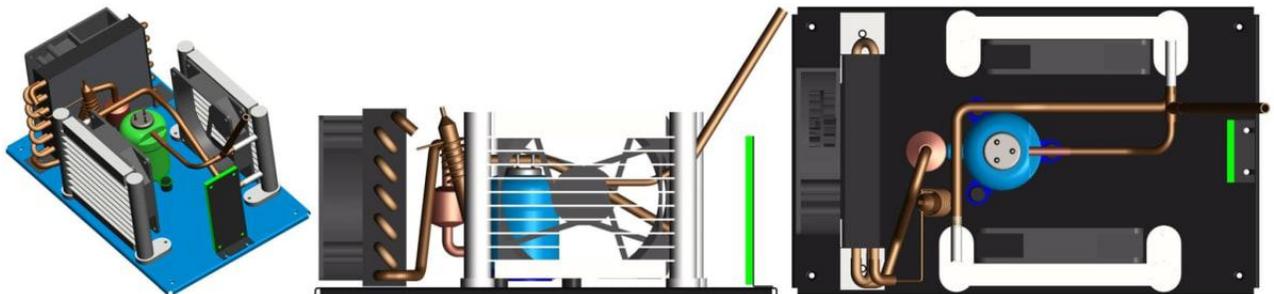
5. RIGID PROVIDES OEM SERVICE

RIGID has developed standard and custom systems for a variety of applications with our technology. Since 2010, we are looking for novel solutions, and now capture new technologies. Our success is based on openness, team spirit and desire to actively development and improvement.

RIGID is specialized in the design and development of Mirco DC Aircon to meet custom requirements.

If your application needs performance at or below ambient temperature, RIGID will develop a miniature cooling system to meet your special needs.

We can provide highly effective and efficient cooling systems at the minimum operating cost.



6. RIGID MICRO DC AIRCON PRINCIPLE

RIGID Micro Refrigeration Cooling System includes miniature BLDC inverter compressor, driver board, condenser, evaporator, capillary and other refrigeration parts. The **compressor** is the heart of a cooling system, it uses a small amount of energy to generate the refrigerant flow and heat transfer as desired.

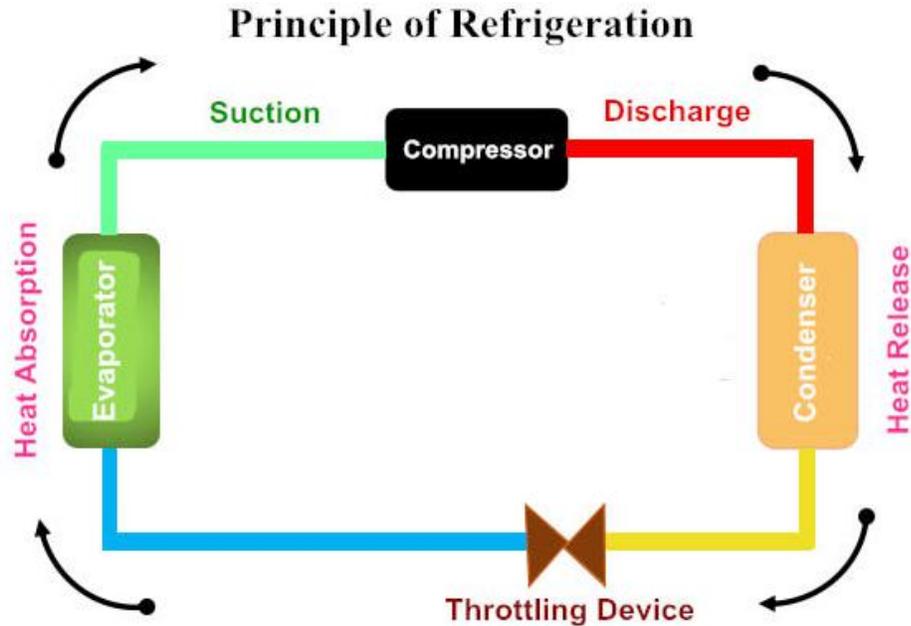
RIGID developed a miniature BLDC rotary compressor which efficiently generates a significant cooling capacity within a small volume. The **compressor** takes in low pressure refrigerant vapor and compresses it to a high pressure and temperature.

The refrigerant undergoes an isothermal phase change (gas to liquid) and rejects heat to the ambient environment at a high pressure within the **condenser**.

The refrigerant throttled to a low pressure and temperature (typically below ambient) through the **expansion valve**. Refrigerant enters the **evaporator** primarily as a liquid and again undergoes an isothermal phase change (this time from liquid to gas) as the evaporator absorbs heat from the environment.

The refrigerant again enters the compressor as a low pressure vapor restarting the cycle.

The refrigeration cycle is demonstrated in the figure below.



7. RIGID MICRO DC AIRCON APPLICATION

Rigid micro DC Aircon is a compact cooling module used as small space chiller along with many other small cooling applications, such as laser cooling, electronics cooling, personal cooling, medical device cooling, a number of notable applications.

It meets customer's specific demand where weight and space is critical.

Similar to the traditional air conditioner, this type dc air conditioner is available as an outdoor or indoor unit because of its lightest weight and smallest size.

Typical Applications

- Laser Cooling
- Electronics Cooling
- Personal Cooling
- Equipment Cooling
- Computer Cooling
- Thermal Regulation
- Environmental Control
- Laboratory Equipment

RIGID 12V/24V/48V DC Aircon Module Usage & Application:



8. RIGID MIRCO DC AIRCON PARAMETERS

8.1 Cooling Capacity

This is usually defined as the specified nominal cooling capacity at normal working conditions of the system in watts, according to evaporating and condensing temperatures. The capacity is determined by the mass flow rate of refrigerant, which depends on the condensing unit compressor's displacement, RPM, and volumetric efficiency. RIGID compact dc refrigeration system capacity ranges from 100W to 550W.

8.2 Refrigerant Type

Refrigerant selection can be made on the basis of availability, performance, and ecological considerations. RIGID refrigeration system has been verified for use with R134a environmentally friendly refrigerant.

8.3 Ambient Temperature

RIGID Mirco DC Aircon is available to use indoors and outdoor, and a minimum of +5°C is required in order for proper lubrication. In 2017, RIGID has successfully developed T-tropical series mini compressor, which is able to work in 52 degree Celsius ambient temperature.

8.4 Electrical Power Available

RIGID mirco DC aircon is mainly used for the mobile or portable refrigeration systems. It can be powered by the DC power such as batteries, fuel cells, vehicle alternators, solar panels, or from an AC inverter power supply. The compressor must be selected for use according to the DC voltage available. RIGID compressors are available in 12V, 24V and 48V versions.

8.5 Size and Cooling

RIGID mirco DC aircon are extremely small, high-performance for end users refrigeration devices. It is effective, lightweight and easy to use anywhere/anytime. The cooling capacity ranges from 100W to 550W.

The Micro 12V/24V/48V DC air conditioner module is just a sub-system, it is good for customers who is able to deal with system control. They want cooling subsystem module only to integrate or assemble with their application or equipment. Customer’s control board can connect with our DC compressor driver board to control compressor speed and get the best performance they needed. It allows customer to use their own control board and adapt the compact module directly into their own system.

RIGID 12V/24V/48V DC Aircon Module Specification & Parameters:

Product Name	Mirco DC Aircon
Application	Laser Chillers, Medical Device Cooling, Electronics Cooling, Etc
Compressor Type	RIGID Miniature BLDC Compressor
Refrigerant	R134A
Displacement	1.4cc, 1.9cc and 3.25cc per revolution
Cooling Capacity (ASHRAE), W(Btu)	100-550W(341.2-1705Btu)
Speed	Variable 2000-6500rpm
Motor	Brushless DC Motor
Norminal Input Voltage	12V, 24V or 48V
Maximum Current	10A, 8.5A and 4.2A respectively
Evaporator Temperature Range	-40~+45°C
Other Cooling Parts	No Housing, on/off button
Drive Board	Included(Sine Wave Version)