

# RIGID HVAC

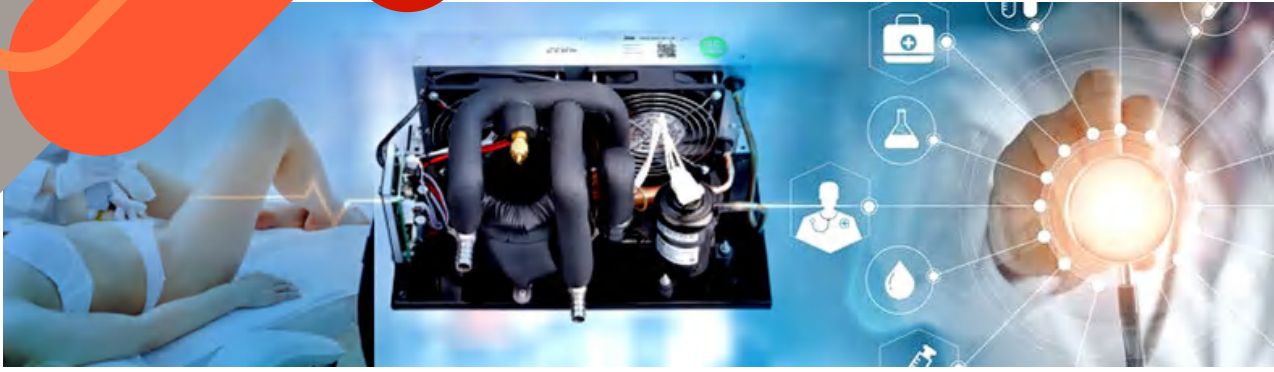
**Cooling Specialist**

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**Miniature Compressor: Endless Possibilities!  
The Compressor Chills Out, Your Device Stands Out.**

[WWW.RIGIDCHILL.COM](http://WWW.RIGIDCHILL.COM)





## **ABOUT RIGID**

RIGID is the miniature compressor innovation leader in China. We keep looking for novel solutions in compact & portable refrigeration technology.

Our product lines include Air cooling, Liquid cooling, and Direct Refrigeration micro-cooling systems. Products are widely used in commercial, industrial, and personal refrigeration applications, and other tiny liquid cycle refrigeration devices. The qualification of most products has met the technical and quality standards of Germany, the U.S., the UK, and Asian countries.

With nearly 12 years of persistent endeavors of our people, RIGID has established a whole set of management systems and has passed ISO9001:2008 International Quality Management System, and has gained CCC, CE, RoHS, and UL certificates.

Today Rigid has helped many companies and startups upgrade their devices with the latest micro cooling technology.

## **FEATURE PRODUCTS**

**OFFERING FULL SIZE BRUSHLESS DC MINI COMPRESSORS AND THERMAL MANagements WITH ULTRA-COMPACT SIZES.**

- ***Miniature Compressor***: Compatible with various refrigerants R134a, R290, R1234yf, and most low GWP refrigerants.
- ***Air Conditioning***: The world's smallest, compact, battery-driven DC air conditioning unit. Lightweight and portable.
- ***Compact Liquid Chiller***: Efficient active cooling for laboratory, chip, laser, medical, beverage, life science, electronics, automotive, etc.
- ***FPSC Stirling Cooler***: It's a breakthrough in Small and Deep Freezing. Temperature down to -99°C in just a few minutes.

# CUSTOM COMPACT COOLING - MOBILE DIRECT CURRENT COOLING SYSTEM

## RIGID TECHNOLOGY

For over a decade, RIGID has honed its expertise in creating unique cooling systems using vapor compression technology. We specialize in developing compact & portable cooling solutions that are unparalleled in the marketplace, making us the preferred choice for partners seeking cutting-edge technology.

Collaborating closely with your team, RIGID strives to create the most efficient thermal solutions that provide exceptional cooling performance in the smallest package. Our long-term and high-volume relationships have therein allowed us to forward that value to our clients. Our experience and rich resources in the industry have enabled us to successfully serve our clients for over 12 years.

## PRODUCTS





# Miniature Compressor

01



## 12V Mini Compressor

- Refrigerant: R134a
- Capacity: 455~850W (1,550~2,898Btu)
- Small in size, yet large in power density
- 2,000~6,000 rpm variable speeds drive board
- Suited for mobile or portable applications in LBP, MBP, and HBP systems.
- Features: Smallest footprint, lightest-weight, reliable, efficient, and affordable cost.

02



## 24V Mini Compressor

- Refrigerant: R134a / R290
- Capacity: 455~1,780W (1,550~6,069Btu)
- Small in size, yet large in power density
- 2,000~6,500 rpm variable speeds drive board
- Suited for mobile or portable applications in LBP, MBP, and HBP systems.
- Features: compact, lightest-weight, reliable, efficient, and affordable cost.

03



## 48V Mini Compressor

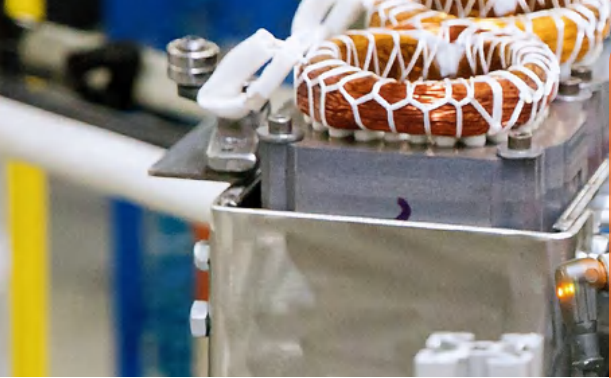
- Refrigerant: R134a / R290
- Capacity: 455~1,780W (1,550~6,069Btu)
- Small in size, yet large in power density
- 2,000~6,500 rpm variable speeds drive board
- Suited for mobile or portable applications in LBP, MBP, and HBP systems.
- Features: Powerful, compact, reliable, efficient, and affordable cost.

04



## Small AC Compressor

- R134a / R410a / R290 available
- Cooling Capacity: 275~1,500W (938~5,135Btu)
- Voltage: 110~120V/50~60HZ; 220~240V/50~60HZ
- Higher COP  $\geq 3.0$  W/W (Coefficient Of Performance)
- Applications: Dehumidifier, Air Conditioning, Refrigerator, Freezer
- Features: Small size, lightweight, low current, efficient, and affordable cost.



# Miniature Compressor: Endless Possibilities!

*The Compressor Chills Out, Your Device Will Stand Out.*



## MINIATURE COMPRESSOR

*THE FUTURE OF COMPACT & PORTABLE COOLING AND HEATING.*

Miniature, low noise, rotary brushless DC refrigeration compressors, comes with variable speed drive board.

### System Highlights

- 12V / 24V / 48V
- *Small & Compact*
- *Efficient operation*
- *Low current & Low noise*
- *Only 1/7 of the volume, and 1/12 of the weight than the reciprocating compressor.*

### Typical Applications

- *Laser & Chips*
- *Medical & Laboratory*
- *Electronics & Instrument*
- *Portable Air Conditioners*
- *Mini-Chilled Water Systems*
- *Mobile Refrigerator & Air Conditioner.*

## BACKGROUNDS



RIGID Miniature Rotary DC Compressors (12V, 24V, 48V) are exceptionally compact and deliver exceptional performance. Their small, powerful brushless compressor is the size of a child's fist. Current models range from 455W to 1,780W under standard ASHRAE conditions using a brushless motor configuration. With 12V, 24V, and 48V configurations and R134a / R410a / R290 / R1234YF refrigerants, these mini-compressors can be used in a wide range of refrigeration and air conditioning conditions in LBP, MBP, and HBP applications.

## SYSTEM DEFINITION



RIGID Miniature DC Compressors are the result of a breakthrough in vapor compression technology with low vibration and low noise operation. Their tiny size is the first real innovation in micro-compressor technology in a century. These miniature compressors are powerful and highly efficient DC refrigeration compressors, ideal for lasers, electronic cooling, mobile or portable refrigeration, and many types of commercial equipment where space and weight are important.



Compact Size



Premium Quality



Energy Efficiency



### Compact Size

1

The world's smallest footprint, designed for mobile, compact & confined spaces. Only 1/7 the volume, 1/12 the weight of reciprocating compressors.

### Premium Quality

2

RIGID mini compressors have a reputation for durability, as evidenced by thousands of installations worldwide. RIGID's unwavering commitment to excellence is demonstrated by its ISO 9001:2015 Quality Management System.

### Energy Efficiency

3

Miniature, brushless direct current compressor with a high-efficiency, high-energy-density motor, combine with variable-speed sine wave drive board. It provides a higher Coefficient Of Performance >3.5W/W.



# DC Air Conditioning

01



## Micro DC Aircon - Cool

- 11lbs (5.0kgs)
- R134a refrigerant
- 12V / 24V / 48V DC
- Capacity: 450W~550W(1,876Btu)
- Temperature Range: 5°C~26°C
- Brushless direct-current compressor
- Features: Small, rugged, efficient, and affordable cost.

02



## Micro DC Aircon - Twin Cylinder

- 24lbs (11.0kgs)
- Voltage: 24V / 48V DC
- Refrigerant: R134a / R290
- Capacity: >650W (2,216Btu)
- Temperature Range: 5°C~26°C
- Brushless direct-current Twin-cylinder compressor
- Features: Small, rugged, efficient, and powerful cooling.

03



## Micro DC Aircon - Cool & Heat

- R134a Refrigerant
- 12V / 24V / 48V DC
- Cooling: 450W-550W (1,876Btu)
- Electric heating, 300W/400W PTC Heater
- Temperature Range: 5°C~50°C
- Brushless direct-current compressor
- Features: Small, rugged, efficient, dual function of Heat & Cool.

04



## Portable DC Air Conditioner

- 12V/24V/48V DC
- R134a Refrigerant
- Capacity: 550W~700W (2,387Btu)
- Battery-operated dc air conditioner
- Portable and Off-the-Grid available
- The remote controller included, plug and play
- Features: Smaller and lighter, rugged and more efficient portable air conditioner.

# Compact, Light, Rugged Micro Aircon for Small Space Cooling.



## MICRO DC AIRCON

RIGID Micro DC Aircon uses vapor compressor compression air conditioning technology to cool electronics below ambient temperature. The small size, lightest-weight, and durability of DC Aircon make it ideal for mobile and portable applications including electronics.

### System Highlights

- *3 times smaller*
- *4 times more efficient*
- *5 times lighter in weight*
- *Twin-cylinder compressor*
- *550~700W cooling capacity*
- *Tropical compressor resisting high-temp 50°C.*

### Typical Applications

- Batteries
- Laser Cooling
- Electric Vehicles
- Electronics Cooling
- Medical Equipment
- Thermal Management.

## BACKGROUNDS

RIGID Micro DC Aircon is an ideal air conditioning solution for off-grid areas. It operates on DC power sources such as batteries, solar power, or DC power, and uses miniature DC compressors which are smaller and more efficient than those traditional AC compressors. These features make it perfect for portable and battery air conditioning applications while also being energy-efficient and eco-friendly.

## SYSTEM DEFINITION

The Micro DC Aircon is an extremely small, lightweight, robust air conditioning system for cooling electronics and confined spaces. RIGID DC Aircon maintains air temperatures at or below ambient, allowing commercial off-the-shelf lasers, electronics, and confined spaces to operate safely in extreme environments. The Micro DC Aircon is fully ruggedized for hot areas such as the Middle East.

Weighing only 11 pounds (5.0Kgs), the Micro Aircon Unit continuously maintains a temperature of  $\leq 68^{\circ}\text{F}$  ( $20^{\circ}\text{C}$ ) inside the enclosure in an environment of  $122^{\circ}\text{F}$  ( $50^{\circ}\text{C}$ ) while absorbing 550 watts of heat. The electronics remain sealed against all environmental contaminants, improving reliability.



High Capacity



DC Power



Off-the-Grid

### 1 High Capacity

DC Air Conditioning units are efficient vapor compression refrigeration systems using RIGID's mini rotary direct current compressor. The DC A/C circulates the chilled air to maintain setpoint temperatures.

### 2 DC Power

RIGID DC air conditioner uses direct current compressors to power the air conditioners. The power source can be banks of batteries or solar panels. They are portable and available for Off-Grid solar & telecom applications.

### 3 Off-the-Grid

The DC Air Conditioner can work off the grid with powerful solar panels and a converter system. By using a dc compressor, it can be connected to the grid or be completely off-grid. Both of the systems will allow you to power the DC A/C with batteries. It reduces electricity costs rapidly.



# Compact Liquid Chiller

01



## Coaxial Liquid Chiller

- 12V / 24V / 48V DC
- R134a / R290 Refrigerant
- Adopts miniature dc compressor
- Capacity: 100~550W (360~1,880Btu)
- Temperature Range:  $\pm 20^{\circ}\text{C}$  (-4~68 $^{\circ}\text{F}$ )
- 2,000~6,500 rpm variable speeds drive board
- Features: Small, reliable, efficient, and affordable cost.

02



## Plate Liquid Chiller

- 12V / 24V / 48V DC
- R134a / R290 Refrigerant
- Adopts miniature dc compressor
- Capacity: 100~550W (360~1,880Btu)
- Temperature Range:  $\pm 20^{\circ}\text{C}$  (-4~68 $^{\circ}\text{F}$ )
- 2,000~6,500 rpm variable speeds drive board
- Features: Small, reliable, efficient, and affordable cost.

03



## Stainless Steel Coil Chiller

- 12V / 24V / 48V DC
- R134a / R290 Refrigerant
- Adopts miniature dc compressor
- Capacity: 100~550W (360~1,880Btu)
- Temperature Range:  $\pm 20^{\circ}\text{C}$  (-4~68 $^{\circ}\text{F}$ )
- 2,000~6,500 rpm variable speeds drive board
- Features: Small, reliable, efficient, and affordable cost.

04



## Large Power Chiller

- 12V / 24V / 48V DC
- R134a Refrigerant
- Powerful direct current compressor
- Capacity: 850~1,780W (2,898~6,070Btu)
- Compact in size, yet large in power density
- Liquid chiller draws less power and rejects less heat
- Temperature stability with high performance and accuracy.





# Compact & Powerful DC Liquid Chiller for Chilling Recirculated Water.



## COMPACT LIQUID CHILLER

RIGID compact liquid chiller is a powerful and efficient refrigeration engine used to chill a recirculating water loop. Widely used in battery, medical, military, laser, electronics, electric vehicles, and laboratory equipment.

### System Highlights

- *Lightweight*
- *Small & Compact*
- *Easy to integrate*
- *Efficient operation*
- *Low cost / Low noise*
- *DC power & Battery-friendly*

### Typical Applications

- *Laboratory*
- *Laser Cooling*
- *Electronics Cooling*
- *Personal Cooling*
- *Medical Cooling*
- *Thermal Management*

## BACKGROUNDS

Clients often approach RIGID for its expertise in portable direct current refrigeration. However, they also wanted a small cooling system that incorporated their own refrigerant circuit and controls. In response to these requests, RIGID developed a range of compact liquid chillers that provide only the core refrigeration components, allowing end users to easily integrate the compact chillers directly into their system.

## SYSTEM DEFINITION

The Compact Liquid Chiller consists of a hermetic refrigeration system containing a miniature variable speed dc compressor, drive board, condenser, thermostatic expansion valve, or capillary and evaporator. It is supplied fully charged with refrigerant R-134a (or R290), insulated, and mounted on a base plate for easy installation in the final application. The chiller is easily integrated into customer's devices. To use, simply connect the refrigerant loop to the evaporator and ensure airflow over the condenser. The drive board can be interfaced by the user to control the compressor speed as required.



High Capacity



High Reliability



High Efficiency 

1

### High Capacity

RIGID liquid chillers provide a reliable and efficient means of cooling a wide range of applications including lasers, electronics, automation equipment, medical devices, laboratory equipment, and electric vehicle charging cables.

2

### High Reliability

RIGID chillers have a reputation for durability, as evidenced by thousands of installations worldwide. RIGID's unwavering commitment to excellence is demonstrated by its ISO 9001:2015 Quality Management System.

3

### High Efficiency

Miniature, brushless direct current compressor with a high-efficiency, high-energy-density motor, combine with variable-speed sine wave drive board. It allows end users to adapt the chiller module directly into their systems.



# AlphaCooler & 24V Cooler

01



## AlphaCooler (Water-Cool)

- LC1910E-PRO & LC1920E-PRO
- 12V or 24V DC
- Capacity: 100W ~ 450W (360~1,535Btu)
- Touch Screen & Remote Controller
- Cooling Temp: -5°C ~ 20°C (23°F ~ 68°F)
- Parts: 1 x Power cord; 2 x Liquid pipe; 4 x Quick connector; 1 x Fuse.
- Optional: Remote Controller, Cooling Vest, Customer's Logo, Custom-made.

02



## AlphaCooler-PRO (Water-Cool)

- LC2810E-PRO / LC2820E-PRO
- 12V or 24V DC
- Capacity: 100W ~ 500W (360~1,700Btu)
- Touch Screen & Remote Controller
- Cooling Temp: -5°C ~ 20°C (23°F ~ 68°F)
- Parts: 1 x Power cord; 2 x Liquid pipe; 4 x Quick connector; 1 x Fuse.
- Optional: Remote Controller, Cooling Vest, Customer's Logo, Custom-made.

03



## 24V Liquid Cooler (Heat & Cool)

- Model Number: LC3220E-H
- Voltage: 24V DC
- Digital Display Controller
- Heating & Cooling Dual Function
- Capacity: 100W ~ 550W (360~1,876Btu)
- Cooling Temp: -5°C ~ 20°C (23°F ~ 68°F)
- Features: Small, reliable, efficient, and affordable cost. Accept personalized design.

04



## Air Cooler (Air Cool Unit)

- 12V/24V/48V DC
- R134a Refrigerant
- Capacity: 550W~700W (2,387Btu)
- Battery-operated dc air conditioner
- Portable and Off-the-Grid available
- The remote controller included, plug and play
- Features: Compact & Lightest, rugged & efficient portable air cooler.
- Accept personalized design.



# Lightweight, Iceless and Hassle-free. Designed for Racing!



## ALPHACOOLER

AlphaCooler is a light-and-lively mini cooling system. Less Weight. More Power. Minimal footprint with extraordinary cooling capacity. This compact cooler is a commercial off-the-shelf product. No Maintenance. No Ice. No Hassle. It can provide 24/7 continuous cooling in a hot environment.

### System Highlights

- No Ice. No Hassle.
- Lightweight & Portable
- 24/7 Work Continuously
- Bear High Temperature 60°C (140°F)
- Car Power & Battery-Friendly

### Typical Applications

- Racing
- Motorcycle
- Body Cooling
- Personal Cooling
- Medical Cooling
- Laser & Electronics

## BACKGROUNDS



AlphaCooler provides outstanding water cool for the duration of use. In addition, its small size allows it to be taken anywhere. In the past, they were often not usable by racing drivers they required the user to be tethered to a stationary source of ice-water mixture. After 5 years of research and development, RIGID has successfully developed this active water cooler. The AlphaCooler is portable and lightweight enough for field workers and drivers to use.

## SYSTEM DEFINITION



AlphaCooler is a compact and portable cooler designed for racing drivers to combat heat in the most extreme situations. The cooler is a commercial off-the-shelf product. Unlike traditional cooling methods such as dry ice that are tedious and require a lot of manual labor, the groundbreaking ice-less system uses no ice and requires no labor.

No Maintenance. No Ice. No Hassle. AlphaCooler is capable of operating on battery, DC, vehicle power, solar, or a wall outlet. The advances of this compact cooler are its ultra-compact size, lightweight, and outstanding performance, which greatly enhance its portability.



High Capacity



High Reliability



High Efficiency



### High Capacity

1

The AlphaCooler compact cooler is an active personal cooling system. It has been widely used by race car drivers to maintain normal body temperature during racing activities. AlphaCooler works safely, quickly, and efficiently.

### High Reliability

2

The AlphaCooler has a reputation for durability, as evidenced by thousands of installations worldwide. RIGID's unwavering commitment to excellence is demonstrated by its ISO 9001:2015 Quality Management System.

### High Efficiency

3

Miniature, brushless direct current compressor with a high-efficiency, high-energy-density motor, combine with variable-speed sine wave drive board. Designed for racing, AlphaCooler Provides active cooling to drivers in extreme conditions.

# FPSC Stirling Cooler

01



## FPSC Cooler - RS40

- Voltage: 12V DC
- Working current: 6A
- Noise:  $\leq 38$ dB
- Size: OD $\Phi$ 86mm x Length 260mm
- Temp Range in Cold Fin (Cold part):  $-100^{\circ}\text{C} \sim 0^{\circ}\text{C}$
- Features: Oil-free, ultra-quiet, vibration-free, green energy for ultra-low temperature;

02



## FPSC Cooler - RS100

- Voltage: 12-30V DC
- Working current: 6A
- Noise:  $\leq 38$ dB
- Size: 132 x 132 x 336mm (LxWxH)
- Temp Range in Cold Fin (Cold part):  $-150^{\circ}\text{C} \sim 0^{\circ}\text{C}$
- Features: Oil-free, ultra-quiet, vibration-free, green energy for ultra-low temperatures.

03



## FPSC Cooler - RS100 PLUS

- Voltage: 12-30V DC
- Working current: 6A
- Noise:  $\leq 38$ dB
- Size: 167x 156 x 291mm (LxWxH)
- Temp Range in Cold Fin (Cold part):  $-160^{\circ}\text{C} \sim 0^{\circ}\text{C}$
- Features: Oil-free, ultra-quiet, vibration-free, green energy for ultra-low temperatures.

04



## -86°C Stirling Freezer - RG01L86

- Stirling Vaccine Freezer
- Voltage: 12-24V DC
- 70% Energy Savings
- Intelligent temperature control
- Cooling Temperature to  $-86^{\circ}\text{C}$  in 2.5 mins (after 1hr pre-cooling)
- Built-in battery,  $\geq 1$ H (when the vaccine freezer runs at full power)
- Features: Oil-free, ultra-quiet, vibration-free; Efficient, lightweight, and flexible to install in various applications, especially for medicine and vaccine cold chain storage.



# FPSC – State of the Art

## Small and Portable - Freon, CFC, HFC Free.

# -160°C



## FPSC STIRLING COOLER

FPSC, Free Piston Stirling Coolers, are the complete CFC-free system, using natural He gas. It is small and portable, it's widely used for precise temperature control for under -50°C.

### System Highlights

- 100% CFC free
- Energy Saving
- Super Cooling Capacity
- Environmentally Friendly
- Lightweight & Small Size
- Temperature down to -86°C for a few minutes.

### Typical Applications

- Life Science
- Biotech Pharma
- Smart Cold Chain
- Military & Aerospace
- Petrochemical & Oil Refine
- Laboratory Equipment and Instruments.

## BACKGROUNDS

The FPSC is a type of heat pump that's more energy efficient and environmentally friendly than traditional cooling systems. It uses helium gas instead of standard refrigerants to transfer heat. This is made possible by using advanced technology and not relying on Freon, CFC, or HFC chemicals. The FPSC can be used to cool an object down to a temperature between 5°C and -160°C at an ambient temperature condition of 23°C.

## SYSTEM DEFINITION

RIGID has developed a new type of cooler called the Free Piston Stirling Cooler (FPSC). The FPSC cooler is better than traditional compressor systems because it can get really cold (-86°C or even -160°C) without many moving parts. This makes it less likely to break down and more efficient. It can be used in many different fields such as food, laboratory, science, medicine, and electronics.

The FPSC has a high efficiency. It can be as much as 6 times higher than thermoelectric (Peltier) coolers.



Environmentally Friendly



Super Cooling Capacity



Innovative & State of the Art

### 1 Environmentally Friendly

Helium is a natural gas that's harmless to the human body, does not deplete the ozone layer, and doesn't contribute to global warming. When used as a refrigerant, helium efficiently replaces the current generation of environmentally harmful refrigerants.

### 2 Super Cooling Capacity

Temperatures below -50C within minutes. This is extremely difficult to achieve with vapor compressors. The FPSC is highly efficient. It's up to 6 times higher than thermoelectric (Peltier) coolers. The coefficient of Performance (COP) is as high as 1.1.

### 3 State of the Art Technology

Stirling engine technology is a breakthrough in cold and deep cooling. Unlike a compressor, it is a cooling system that continuously repeats Helium gas compression and adiabatic expansion, using naturally occurring helium gas as a refrigerant.



**COOLING & HEATING**

# **THERMAL MANAGEMENT**

**RIGID is a manufacturer of vapor compression refrigeration systems with innovative solutions for your cooling & heating applications. A leader in the design and manufacture of compact cooling & heating systems.**



Patent by :

**RIGID TECHNOLOGY**