

DESIGN EXCELLENCE

Blue-Airco is an advanced marine full low-voltage air-conditioning system that offers a highly efficient and sustainable solution to ensure precise climate control giving the best comfort on board. The 12, 24 and 48 VDC variants currently under patent, provide a solution suitable for all types of craft, from small boats to vessels over 60 feet.

Blue-Airco operates on low-voltage direct current that is converted into three-phase alternating current, always at low voltage, with variable frequency, thus allowing optimal and precisely adjustable performance, ensuring constant internal temperature within the compartment. The system includes an electronic expansion valve that allows control of the superheating and subcooling values of the refrigerant fluid, optimizing the energy efficiency in any operating condition. The fan section is equipped with a variable-speed high efficiency BLDC motor, electronically controlled to ensure high performance and silence.

The compressor starts smoothly at very low speed thanks to the torque and speed control, then it accelerates to cool down or heat up the air fast. As the air temperature approaches the desired value the compressor and fan will slow down in order to maintain the air temperature very close to the SET POINT, without fluctuations, while the expansion valve will finely regulate the refrigerant flow rate to the compressor to optimize the performance with the highest energy saving.

This is not just a modification or enhancement to something that already exists; it is entirely new and ground-breaking technology for the boat industry reducing energy consumption by 50% compared to ON-OFF systems. With no start-up peak current and low power consumption this allows vessels without a generator to run air conditioning silently from their domestic batteries. In ECO mode these units draw no more than 160W in 12V, ensuring peace and quiet overnight.

Blue-Airco offers numerous advantages over traditional marine air conditioning systems, including:

- **Compact and Lightweight Design:** Very compact design and low weight.
- **Energy Efficiency:** 50% higher energy efficiency compared to ON/OFF systems and 20% higher than traditional DC-AC-DC inverters.
- **No Start-Up Peak Current:** Thanks to inverter technology.

- **Exclusive Conversion Process:** Full low-voltage air conditioning with variable speed, achieved through a conversion process from DC input to variable frequency AC three-phase, low voltage. Patent pending technology.
- **Maximum Energy Efficiency:** Absence of DC-AC converters and rectifiers.
- **Quiet and Reliable Operation:** Controlled fan and compressor speed with superheating management.
- **Electronic Expansion Valve:** Across the entire range to maximize energy efficiency in all usage conditions.
- **BLDC Motors:** For compressors, fans, and pumps, ensuring maximum energy efficiency.
- **Safe Refrigerant:** Uses non-flammable R410A refrigerant for maximum energy efficiency.
- **Corrosion Resistance:** Titanium alloy heat exchanger ensures immunity to corrosion.
- **Longevity:** Long lifespan from design efficiencies, high-quality materials, and state-of-the-art technology.
- **Thermal Comfort:** Maximum thermal comfort without temperature fluctuations.
- **ECO Function:** Minimizes battery consumption with a 160W (12V) input power, ensuring extremely quiet operation.
- **Ideal for Generator-Free Boats:** Perfect for boats without a generator or those wishing to turn off the generator at night without sacrificing air conditioning.

The low voltage air-conditioners currently available in the marine market are ON-OFF type or 2-speed compressors without electronic expansion valve and none permit fine adjustment the speed of the compressor and fan, causing high energy consumption and poor comfort, especially at partial loads. There are in the marine market also “low voltage” variable speed air-conditioners, however they first convert the low voltage DC power to high voltage AC and then they employ a rectifier to convert the high voltage AC to high voltage DC. The DC/AC converter and rectifier cause important energy losses, high voltage in the system, higher temperature with decrease of reliability as a consequence.

ENVIRONMENTAL STATEMENT

Blue-Airco has invested significant resources in research and development to reduce to a minimum the refrigerant emissions and to reach “leakage zero”. By optimizing the heat exchangers and minimizing the overall volume of the refrigerant circuit, the refrigerant charge has been reduced by around 30% compared to other air-conditioners available in the marine market. The target “leakage zero” has been reached by eliminating flare joints and pressure testing every air-conditioning unit with helium allowing detection of even the smallest leaks. Moreover, the very low vibration level of the variable speed compressor and the titanium condenser coil, protecting the circuit from marine corrosion, ensure the integrity of the circuit over the time.

Special mention for comfort & entertainment afloat

The environmental impact has been reduced at each stage of the production process, for example, the soldering to join copper pipes is done using hydrogen, which is produced on-site and has significantly improved the working environment for the employees and eliminated other normally occurring health and safety issues associated with brazing. At the same time, it gives a higher quality due to better soldering with a more concentrated heat and electronically adjusted flame. The climate impact is negligible because the hydrogen is produced locally at the workstations from distilled water, thus eliminating the consumption of conventional energy sources such as propane and acetylene and thereby no need for truck transportation of bottles.

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COMFORT & ENTERTAINMENT AFLOAT



DC variable speed self-contained unit

Company: Blue-Airco Srl

Stand: 07.414

Jury Comment: An advanced self-contained air-conditioner able to operate on vessel house battery systems, with variable speed to quickly reach the desired internal temperature and maintain it in an energy efficient way on DC house battery banks.

