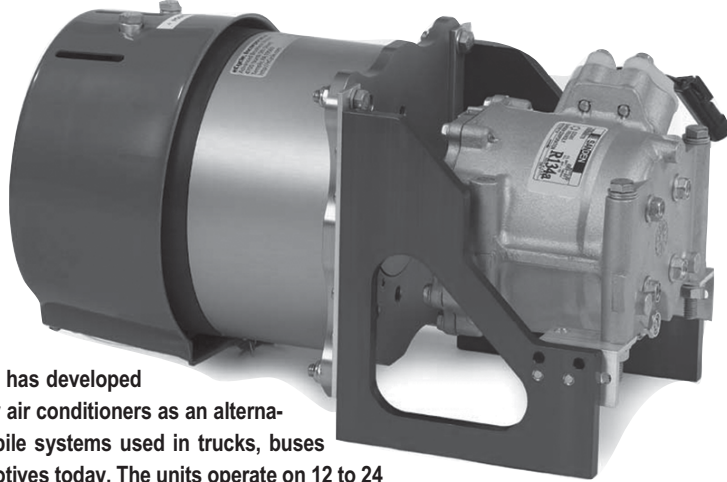


Using Batteries To Cool



eCycle Inc. has developed two battery air conditioners as an alternative to mobile systems used in trucks, buses and locomotives today. The units operate on 12 to 24 Vdc and produce 12,000 to 24,000 Btus in an under-the-hood module that integrates directly with the vehicle's climate control system or an auxiliary stand alone unit.

With the emphasis placed on reducing engine idling, eCycle Inc. has introduced two new low-voltage, battery-powered air conditioners (BAC). The new units are designed to supply air conditioning in trucking, transit, locomotives, recreational vehicles, back-up systems, off-the-grid power and marine vessels through batteries or an auxiliary power unit (APU).

"An efficient climate control system is an important part of an idle reduction strategy," said Michael Sharer, eCycle's senior vice president of marketing at the Temple, Penn.-based company. "In many cases, installing our equipment is an upgrade from the original equipment. You will get increased cooling capacity using far less energy."

As an idle reduction technology, eCycle said the BAC systems offer an alternative to mobile air conditioning units that consume more fuel for operation. According to eCycle, vehicle air conditioners in the U.S. consume 7 billion gallons of fuel each

year and produce 16 million metric tons of carbon. The EPA does list battery-operated air conditioners as a possible anti-idling technology.

Operation of the air conditioners uses 12 to 24 Vdc voltage, the standard electric system of most vehicles. Two configurations are available: an under-the-hood module that integrates directly with the vehicle's climate control system or an auxiliary stand alone unit. Both air conditioning units can operate directly from batteries or in conjunction with an APU.

The LVAC12V BAC produces 12,000 Btus and the LVAC24V model has an output of 24,000 Btus. To power the Btu output, eCycle has integrated a Sanden scroll air compressor powered by an eCycle SolidSlot brushless motor. An evaporator and controls are also equipped and packaged into a sheet metal enclosure. Thanks to the BACs' ability to operate on 12 to 24 Vdc voltage, additional batteries are not needed to power the unit, eCycle said.

To maintain compressor efficiency, the speed of the SolidSlot motor is regulated. Its stator is constructed from 29 gauge, M15 electrical steel laminations, which are stacked and bonded. Aluminum trapezoidal bars are inserted into the stator core, which eCycle said provides a 90% slot fill. For the rotor, eCycle uses steel bar with 12 neodymium-iron-boron magnets, rated to 356°F, mounted on the circumference. The rotor is balanced prior to assembly and incorporates Nachi 30 mm double-row angular contact bearings.

Integrated electronics are mounted on the rear cover of the BAC and cooled through a brushless fan. This enables the motor to run directly from a battery or with a dc motor controller. For increased flexibility, the electronic commutator (electrical switch) can be mounted remotely and air- or liquid-cooled. A magnetically coupled coolant pump can also be added if necessary, eCycle said.

"We're offering low-voltage battery air conditioning units, because we manufacture the key component — the SolidSlot brushless motor/generator," said Daniel Sodomsky, eCycle's president and CEO. "We believe eCycle's low-voltage battery air conditioning unit is a superior product in both design and performance and will set new standards in climate control technology."

The company's BAC technology was initially used in the aerospace industry to provide nonflight critical air conditioning. Recently, it was used in a light jet application. The BACs are produced at eCycle's Temple factory. Units are currently in production. The company's portfolio also includes auxiliary power units, hydraulic power units, compressor drives, hybrid superchargers, drives for electric and hybrid-electric vehicles, and custom-engineered propulsion and power generation products for the marine market. **dp**