

HPS Specialties LLC

EC Motors Mandate

U.S. Department of Energy (DOE)

The DOE mandated furnace manufacturers to utilize efficient EC motors in replacement of PSC motors which will save 3.99 quads of electricity and more than \$9 billion in energy costs by 2030.

What are EC Motors?

Electronically commutated motors (ECM's) convert AC current to DC current and do not use power to create a magnet rotor field. They use a microprocessor controller to energize and de-energize each winding of the stator with power that produces an electrical current. This microprocessor uses closed-loop feedback which results in more precise control of the magnetic fields. This also eliminates losses seen in traditional mechanical commutated motors since the process is brushless.

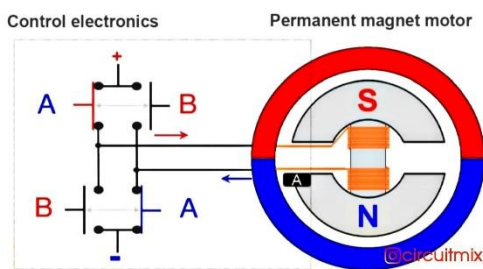


Figure 1. Typical EC Motor

What are AC Motors?

The most typical AC motor is the induction model. This operates by using an electromagnetic induction from the stator's magnetic field to create electric current in the rotor to in turn produce torque. They do not run at synchronous speed with the current which makes speed control more difficult.

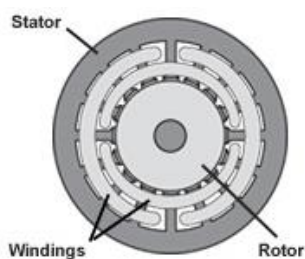
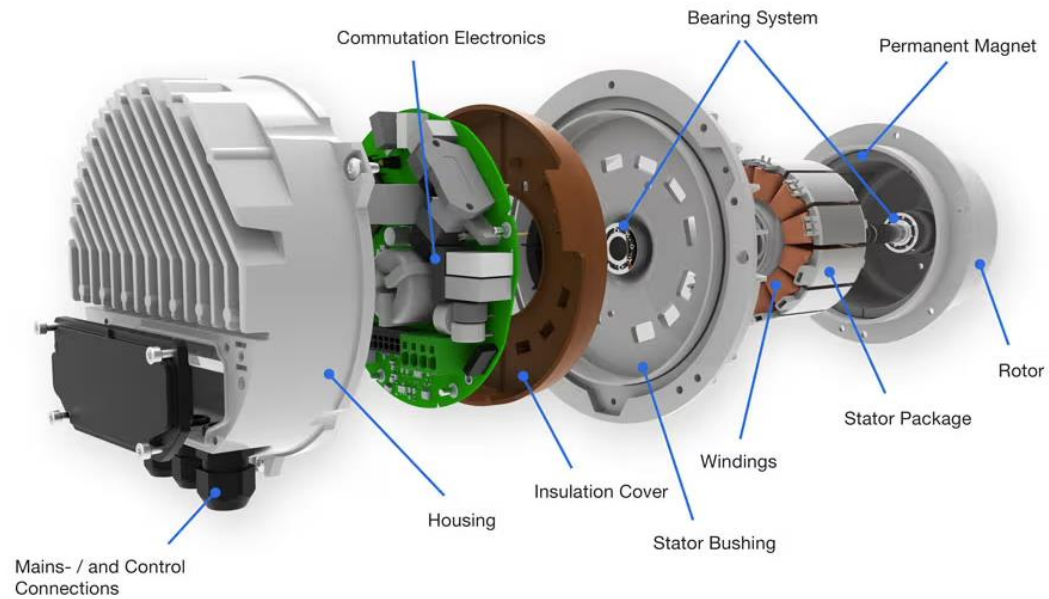


Figure 2. Typical AC Motor Construction



EC Motors vs. AC

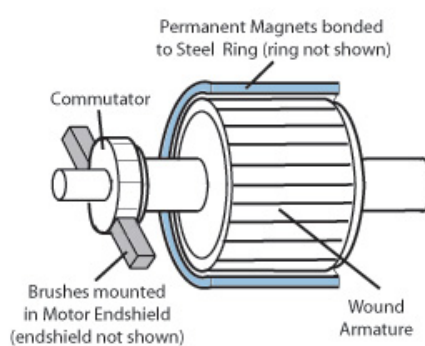
EC Motor Advantages

1. EC motors control their own speed without the need for an external VFD. A VFD usually is used to monitor the pressure, temperature, and more.
2. EC Motors are much quieter since they can start slowly as opposed to a torque-start which is typical for AC induction motors.
3. Common efficiency is greater than 90% according to the National Institute of Health due to the ability to lower the torque when the static pressure decreases to maintain the desired airflow.

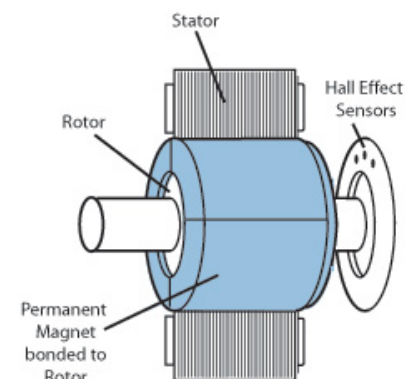
Brushless Motor Advantages

1. Higher efficiency since they can control continuously at maximum rotational force. The brush motors can only reach max torque at specific points in the rotation.
2. Incorporates feedback to control the torque and speed more precisely.
3. Increased durability and lower noise levels since brushes are eliminated from the design. Brushes can cause loud sparks and the commutator to wear down from continuous moving contact.

Brushed DC Motor



Brushless DC Motor



Q-Pac Motors

Q-Pac is the leader in ECM fan system technology for the commercial HVAC market. Their plug and play capability allows for easy install or replacement. Labeled wires are included with an option for customized wire lengths. Q-Pac also specializes in manufacturing single point quick connect control panels with BACnet compatibility, power monitoring, and hand-off-auto control.

Reach out to HPS Specialties below to perform an on-site evaluation of your existing fans and selection of the proper ECM array replacements!

