DVM Motor Solutions

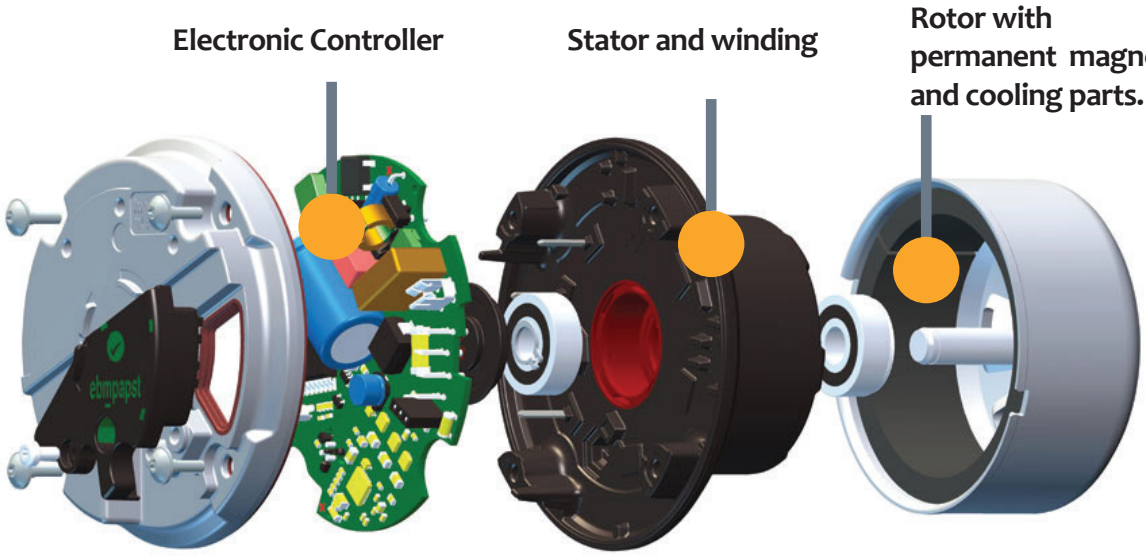
The Strategic Horsepower to Drive Efficiency

EC Motors

DVM INDUSTRIES

Electronically commutated (EC) motors are highly efficient, programmable, brushless DC motors utilizing permanent magnet rotor and a built-in inverter. Basically, it is a DC motor (in a DC motor the mechanical commutation switches the direction of the current) with a built-in VFD (Variable Frequency Drive) and a DC to AC transformer.

However in EC motors, the mechanical commutation and the brushes are replaced by an electrical commutation. EC Motors are extremely efficient, especially at reduced speeds compared to traditional motors. Also, they have a built-in speed controller eliminating the need for a separate VFD.



With an EC motor the electronic circuitry stands in lieu of the traditional mechanical commutation meaning the right amount is being supplied in the right direction at exactly the right time providing precise motor control. EC motors are very valuable for small motor sizes, where a variable frequency drive (VFD) is not cost-effective. They are also great for installations where constant design flow is required because the motor design is more efficient.

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What is ECM Technology?

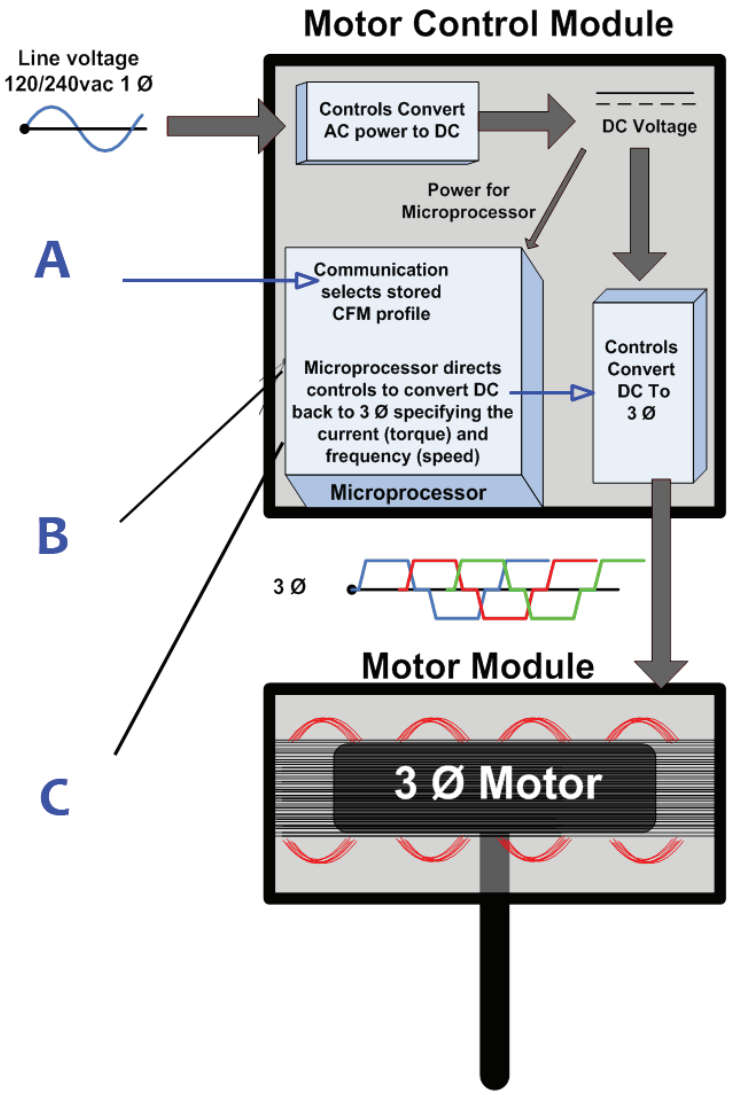
EC Technology stands for Electronically Commutated and combines AC and DC voltages, which is essentially a fan with a brushless DC motor, bringing the best of both technologies: the motor runs on a DC voltage, but with a normal AC supply. The EC motor incorporates voltage transformation within the motor. The non-rotating part of the motor (stator) is extended to make room for an electronic PCB (Printed Circuit) board which includes power transformation AC to DC, as well as the controls.

Why EC Motors?

- EC motors can be retrofitted to replace existing AC motor components
- High Efficiency Variable Speed Motor.
- Permanent magnet motor and electronic control allows for higher efficiencies and higher energy savings.
- Similar to an interval horsepower motor with a VFD (Variable Frequency Drive)
- As speed is reduced the savings is to the cubed root.

EC Motor Benefits

- **30 – 80% More Efficient** – High Energy Energy Savings- Payback 1-3 Years.
- **Motors run extremely quiet,** typically 70% less than your standard motor.
- Due to high efficiencies, less heat is generated, reducing stress on the windings and bearings **which extends the life of the motor.**
- Soft ramp up and ramp down in speed results in **less wear and tear** of the equipment.
- **Recondition vs Replace:** Cleaning system and replacing the motor to an EC motor not only saves substantial energy but is much more cost effective vs replacing the entire unit.



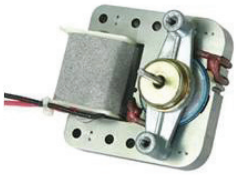
Communication from Air Handler demand (heat, cool, fan...) **A**

The microprocessor constantly monitors motor speed (RPM) or torque **B**

The Microprocessor continously directs the controls to adjust torque and/or speed to maintain designed output program. **C**

Different Types – Different Efficiencies

There are many different types of electric motors and configurations, but there are three types used mainly in HVAC and refrigeration applications: shaded pole (induction), permanent split capacitors (brushed DC), and electronically commutated motors.



Shaded Pole Motor

Very old Technology

Induction
Single phase
Rotating flux
20% efficiency

PSC Motor

Old Technology

Induction.
Single phase
Relay contacts
35-55% efficiency

ECM Motor

NEW Technology

DC machine
Single and 3 phase
Multiple signal control
65-85+% efficiency

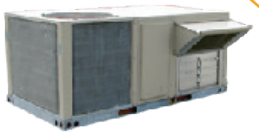
Applications for EC Motors in your building

Rooftop Package Units

Fan Powered Terminal Box

Fan Coil

Air Handler

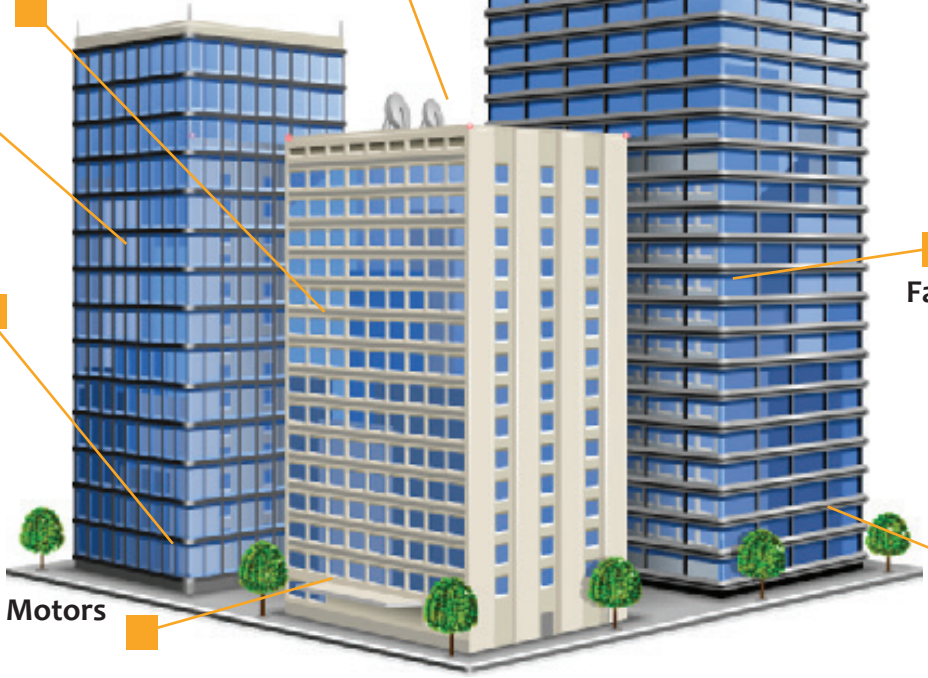


Fan Filter Unit (FFU)

Large Air Handler

Commercial Refrigeration

Pool Motors



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Case Study - Hilton Hawaii, HVAC FCU EC Motor

DVM Industries compared the operation of the vertical fan coil unit. The property is located in Honolulu, Hawaii. The purpose of the study was to compare the performance of the existing fan coil unit with a PSC motor against the performance of a fan coil unit retrofit with an EC Motor.

Compare PSC to EON 42 Frame EC Motor

Existing Motor	RPMs	Watts
1/6th HP 115 Volt PSC	1267 – High Speed	240
1/6th HP 115 Volt PSC	810 – Medium Speed	160
1/6th HP 115 Volt PSC	560 – Low Speed	105

Retrofit Motor	RPMs	Watts	Savings
1/8th HP 115 Volt EC	1225 – High Speed	100	58%
1/8th HP 115 Volt EC	820 – Medium Speed	46	72%
1/8th HP 115 Volt EC	560 – Low Speed	18	83%

Financial Benefits for EC Motors

New York and other states' utility companies offer financial incentives to cover the incremental costs of energy efficient refrigeration for commercial and industrial buildings. DVM helps you navigate through this process to maximize rebates, offset the capital cost of your projects and to maximize savings.

Coverage of project installation cost.

Energy rebate programs nationwide.

NEXT STEPS

1. **Contact DVM Industries today to Setup a Site Audit.**
2. **Develop ROI Analysis & Payback including incentives.**
3. **Develop Action List with DVM Team.**

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