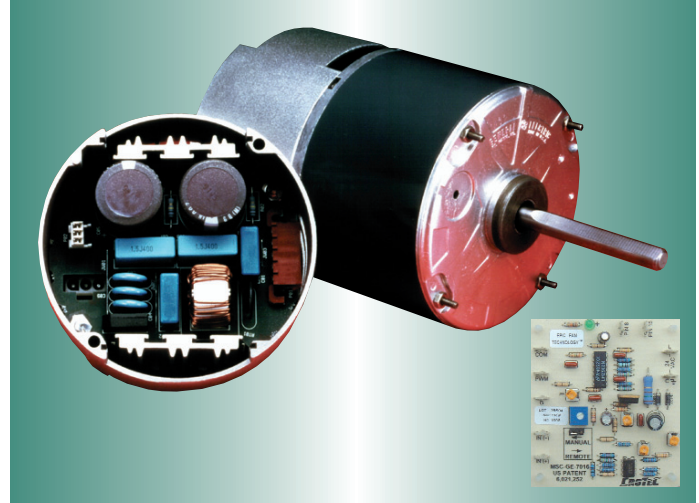


# THE ECM MOTOR STORY by Nailor Industries Inc.

## EPIC™/ECM MOTOR TECHNOLOGY

- Significant energy savings (67% average compared to PSC motors)
- Unique factory pre-set air volume capability (+/- 5%)
- Pressure independent fan operation
- LED for visual indication of air volume
- Field adjustable fan air volume controller
- Remote fan air volume adjustment capability from BAS
- Larger turn down ratios mean more flexibility for tenant changes



Since 1985, equipment manufacturers have used GE ECM™ motors in residential air conditioners and furnaces. These motors have made it possible to achieve SEER ratings of 12 and higher. Until more recently though, they were only manufactured in 120 and 240 VAC, which precluded their use in commercial applications. Following two years of research and development and the availability of a new 277 VAC version, Nailor was first to introduce the GE ECM™ motor to the commercial HVAC market (Ashrae Journal, April 1997) as an option for use in series fan powered terminal unit applications.

## WHAT IS AN ECM MOTOR?

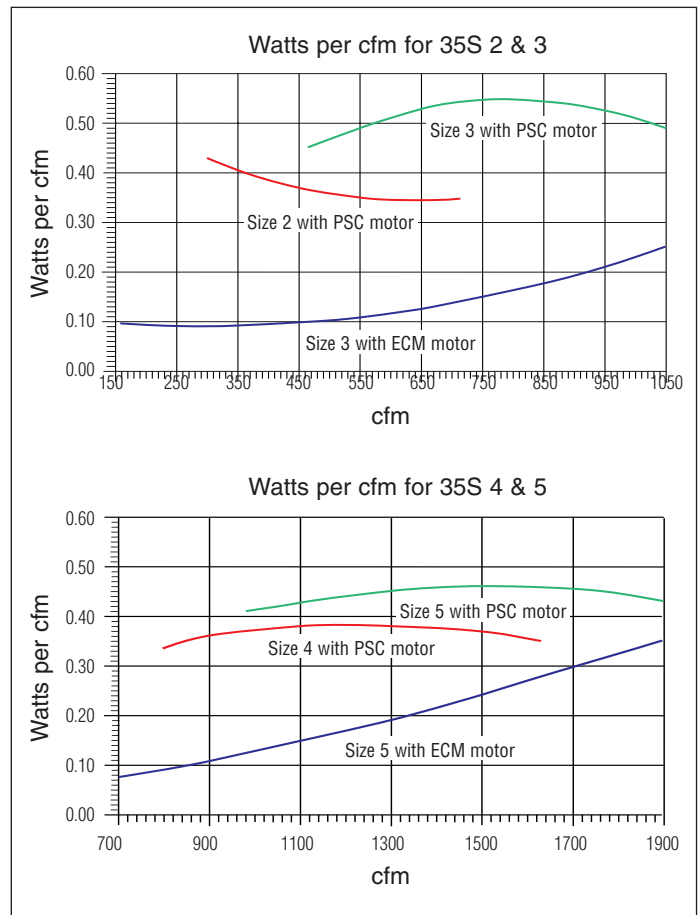
The ECM (Electronically Commutated Motor) is an ultra high efficiency programmable brushless DC motor utilizing a permanent magnet rotor and a built-in inverter. DC motors are significantly more energy efficient than AC motors and much easier to control. The major weakness of series fan powered terminal units until now, has been their low fan motor efficiency. The widely used single speed fractional horsepower permanent split capacitor (PSC) induction motor in combination with an electronic SCR speed controller is extremely inefficient at typical operating conditions. Due to acoustical considerations, the fan motor is usually adjusted to operate at considerably less than full load (where PSC motor efficiencies may be as high as 62%). PSC motor efficiency drops off dramatically when turned down; typically by at least half. Installed PSC motor efficiencies are therefore typically in the range of only 12 – 45%. ECM motors in contrast, maintain a high efficiency of 65 – 72% at all speeds.

In addition to lower operating costs, EPIC™/ECM motor technology allows Nailor to pre-set the fan airflow volume at the factory.

The graphs in Table 1 show the lower watts per cfm (translating into lower operating costs as shown on the next page) and wider operating ranges of series terminals employing GE ECM™ motors versus PSC induction motors.

## FEATURES AND BENEFITS

Soft starts and slewed speed ramps are programmed into the ECM motor eliminating stress transmitted to the mounting bracket or hardware. They incorporate ball bearings providing permanent lubrication unlike sleeve bearings requiring a minimum rpm operation for oiling. The wider operating range of



**Table 1. Power consumption comparison of GE ECM™ versus PSC motors.**

the ECM motor allows each model to actually replace two models using induction motors. This feature alone provides several benefits; a simpler product line to choose from, little or no equipment changes necessary when tenants change, more similar sized units on the job, decreased spare parts inventory and increased contractor flexibility. The low operating temperature of the ECM motor (essentially ambient) requires very little energy to offset the heat gain from the motor versus PSC motors which run hot (typically around 90 – 150°F).