



GE ECM by Regal-Beloit introduced the **Constant Torque** motor (model X13) to the residential HVAC industry (split systems and package systems 5 ton or less) in 2006. The term “Constant Torque” defines the type or style of ECM it is programmed to function as.

The X13 is constructed as one piece, with the two components of any ECM, the motor control and motor, housed inside one motor shell. It is programmed to provide a constant level of torque (power) to the motor. This is a multi-tap motor with the ability to have from 1 to 5 programmed levels of torque, similar to the speeds of a PSC induction motor. It is a cross between a full-blown ECM motor and a standard PSC motor.

However, the torque value programmed into each tap is determined by the HVAC Manufacturer. Each value equals a specific amount of torque/power to create the proper amount of airflow for each system demand (heat, cool, continuous fan). This value is also specific and unique to each manufacturer’s model and size system.

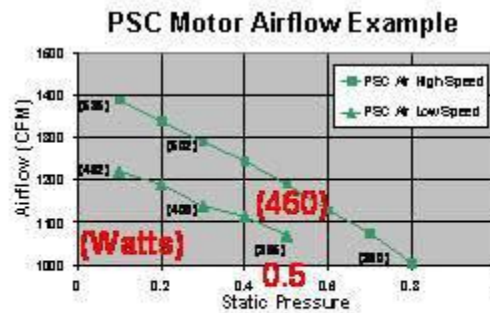
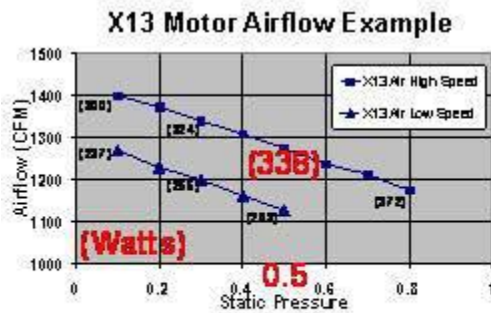
To summarize, this motor is operated by two programs. The HVAC manufacturer’s programmed torque value determines what amount of torque/power is needed by demand and, the constant torque programming makes sure that selected amount of torque is maintained even if static pressure changes.

The three main benefits of this motor over conventional PSC motors include higher efficiency, more precise airflow, and properly maintained torque during changes in system static pressure (constant torque).

Benefit

Constant torque allows the motor to maintain the torque delivered to the motor if static pressure increases. PSC motors will decrease in torque when static pressure increases, causing the airflow to decrease as well. When torque is maintained, airflow does not decrease as fast. This decreases the effect static pressure has on loss of airflow, providing better system performance and efficiency.

The X13 uses less energy (watts) than the PSC motor.



The ability to program the torque value by demand allows the HVAC manufacturer to deliver more precise airflow and only program the amount of selections needed..

Even though changing tap connections does change the speed of the motor, it is important, in theory at least, to understand that these are programmed levels of torque. Referring to the taps as “speeds” or “speed taps” could be confusing if the following key points are not also understood.

1. Manufacturers could program the taps in any order they choose. For example they could put the higher cooling airflow selection on Tap 1 and the lower heating airflow selection on Tap 2. Most manufacturers are programming the motor starting at Tap 1 and building in torque values respectively.

2. -Each tap can have a unique amount of torque programmed for a specific purpose. For example switching from Tap 1 to Tap 2 may very well increase the airflow but not necessarily at a specific interval like changing from low-speed to medium low-speed on a PSC motor would. Even more important, each motor has a unique program. Changing taps on one motor will most likely have different results than any other.
3. -It is not necessary to program all of the taps. If the manufacturer only needs two functions, they may only program two taps, and so on up to five. All X13 motors will physically have 5 taps.

The static pressure of the installed system should be checked and compared to the manufacturer's blower performance charts. If it is above the maximum listed for that unit, improvements should be made to lower it. Any static pressure below the maximum is typically acceptable. However, the closer the pressure is to the manufacturer's recommended, the quieter and more efficient it will be.

The X13 motor provides the energy savings of an ECM with the simplicity of traditional PSC motor set-up and service.