General Motor Knowledge
Part 4
Lynn R. Dutro
November 24, 1992

torque (tôrk), in physics, is a force or combination of forces that produces a twisting or rotating motion.

Our revolving magnetic field produces forces that act on the rotor. If these forces are greater than the friction of the bearing, the rotor will spin. Any force in excess of that required to over come the bearing friction is available at the rotor shaft. This force has been defined as torque. Torque is a force acting over a distance. Like a child on a see-saw, torque is how much you weigh and how long your end of the board is. The units of torque that we use to describe the output of our motors is Ounce-Inches, OzIn. A force (weight here on earth) of only one half of one ounce (½ Oz) acting over a lever arm (its side of the see-saw) 5 inches long will produce a torque of two and one half Ounce-Inches (2.5 OzIn). This is one half ounce times five inches (½ Oz x 5 In = 2.5 OzIn). This is the torque developed by one of our SP-B203 motors.

The torque available at the shaft of our motor is capable of doing work. Work over a period of time is power. The unit of power that we use when talking about our motors is the watt, 746 watts = 1 horsepower. The SP-B203 normally develops 2.3 watts of power at its shaft. This is 2.3 divided by 746 or 1/324 of a horsepower. We build what are known as subfractional horsepower electric motors!

Electricity, by itself, can not turn a fan blade. The electrical power must first be converted to a rotating power or torque. We must put 11 watts of electrical power into one of our SP-B203 motors in order to get 2.3 watts of fan blade turning power out. Power Out divided by Power In is equal to Efficiency. This number multiplied by 100 is equal to Percent Efficiency. Our SP-B203 is 21% efficient. Our permanent split capacitor version, the PSC4BC203, develops 2.3 watts of output power with only 6.5 watts electrical input for over 35% efficiency.

Our final electrical test stands measure the torque and watts input for every motor that we produce. These values are then compared to established test limits. From this comparison we can determine how well our motors can convert electrical power into mechanical power, power that can turn a fan blade. This is a direct reflection of the quality of motor construction.

I suppose that I should stop now and ask if there are any questions. Hearing none, Merry Christmas!