DIFFERENCE BETWEEN RUN AND START CAPACITORS

The simplest way to explain the mechanics of a capacitor would be to compare it to a battery; both store and release electricity. Capacitors are charged with electricity then release its stored energy at a rate of sixty times per second in a 60 cycle alternating current system. The sizing is critical to motor efficiency just as sizing of batteries is critical to a radio. A radio that requires a 9V battery will not work with a 1.5V size battery. Thus, as the battery becomes weaker the radio will not play properly. A motor that requires a 7.5 uF capacitor will not work with a 4.0 uF capacitor. Much the same way, a motor will not run properly with a weak capacitor. This is not to imply bigger is better, because a capacitor that is too large can cause energy consumption to rise. In both instances, be it too large or too small, the life of the motor will be shortened due to overheated motor windings. Motor manufacturers spend many hours testing motor and capacitor combinations to arrive at the most efficient combination. There is a maximum of +10% tolerances in microfarad rating on replacement start capacitors, but exact run capacitors must be replaced. Voltage rating must always be the same or greater than original capacitor whether it is a start or run capacitor. Always consult manufacturers to verify correct capacitor size for the particular application.

Two basic types are used in electric motor:

1) **Run capacitors** are rated in a range of 3–70 microfarad (uF). Run capacitors are also rated by voltage classification. The voltage classifications are 370V and 440V. Capacitors with ratings above 70 microfarad (uF) are starting capacitors. Run capacitors are designed for continuous duty, and are energized the entire time the motor is running. Single phase electric motors need a capacitor to energize a second phase winding. This is why sizing is so critical. If the wrong run capacitor is installed, the motor will not have an even magnetic field. This will cause the rotor to hesitate at those spots that are uneven. This hesitation will cause the motor to become noisy, increase energy consumption, cause performance to drop, and cause the motor to overheat.

Examples of our Motor Run Capacitors:
CBB65 Oil-filled Capacitors
ADP Dry-type Black Box Capacitors
CBB60B Dry-type Capacitors
Italfarad Dry-type Plastic Case Capacitors

2) **Starting capacitors** are housed in a black plastic case and have uF range as opposed to a specific uF rating on run capacitors. Start capacitors (ratings of 70 microfarad or higher) have three voltage classifications: 125V, 250V, and 330V. Examples would be a 35 uF at 370V run capacitor and an 88–108 uF at 250V start capacitor. Start capacitors increase motor starting torque and allow a motor to be cycled on and off rapidly. Start capacitors are designed for momentary use. Start capacitors stay energized long enough to rapidly bring the motor to 3/4 of full speed and are then taken out of the circuit.

Examples of our Motor Start Capacitors: CD60B Aluminum Electrolytic Capacitors