Application Notes

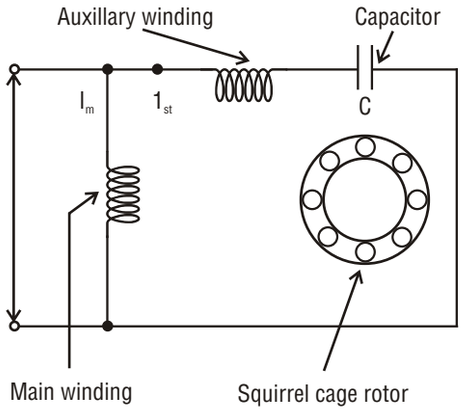
Deki
only better

Fan Motor Capacitors

Electric motors are the most common and simple machines which find application in almost all appliances which we have today. Single-phase induction motors are simple, robust and reliable. They are used in enormous numbers especially in domestic and commercial applications.

Normally single phase induction motor is used in ceiling Fan. We know that for the working of any electrical motor whether it is AC or DC motor, we require two fluxes as, the interaction of these two fluxes produced the required torque, which is desired parameter for any motor to rotate.

Single-phase induction motors are not self-starting without an auxiliary stator winding driven by an out of phase



current of near 90o. Once started the auxiliary winding is optional. The auxiliary winding of a permanent-split capacitor motor has a capacitor in series with it during starting and running.

The capacitor shown above is called Fan Motor Run Capacitor. Run capacitors are designed for continuous duty while the motor is powered, which is why electrolytic capacitors are avoided, and low-loss polymer capacitors are used. Run capacitors are mostly polypropylene film capacitors and are energised the entire time the motor is running. Normally fan motor run capacitors are rated in a range of 1.5 to 10 µF, with voltage classifications of 370 V or 440 V. If a wrong capacitance value is installed, it will cause an uneven magnetic field around the rotor. This will lead the rotor to hesitate at the uneven spots, resulting in irregular rotation, especially under load. This hesitation can cause the motor to become noisy, increase energy consumption, cause performance to drop and the motor to overheat.

How to Choose the Right Capacitor

We have checked the stress across the motor run capacitor and found that maximum voltage comes up to 415 at normal input voltage (230~240 VAC). As it is a AC voltage corona discharge may occur owing to air packets inside the capacitor. Corona discharge is a small but locally intense electrical discharge that injects charge into the insulating film adjacent to edges of metallisation or a location where air is trapped between foil/metallisation and the film. The discharge is caused by a voltage gradient large enough to ionize molecules in either the film or small air pockets. Each discharge does some small but cumulative damage to the film. Corona is an important consideration for AC and/or pulse applications where the cumulative damage can rapidly accrue and cause dielectric failure. For film/foil parts this will result in a short circuit. For capacitors employing metallized film the “clearing” around the dielectric failure sites results in progressive capacitance loss.

CORONA EFFECT / CORONA DISCHARGE...

Loss in the capacitor value leads to the decrease in the speed as well as torque of the fan motor.

At Deki, we do a thermal operation to remove the air packets inside the capacitor. The resultant advantages are:

1. No corona discharge
2. Better capacitance stability
3. Longer fan life

Series	Deki Series Code	Capacitance Value	Rated Voltage
Motor Run	123,137	1.0µF to 10.0µF	440VAC

For details regarding Deki’s fan motor capacitors, please contact us on info@dekielectronics.com