
AC/DC FANS

I. AC FAN MOTORS

AC Fan Motors have been used extensively in industry primarily of equipment cooling or for air circulation. The Technology used in the manufacture of the traditional AC Fan Motors has the following advantages and disadvantages:

A. Advantages:

- a. Low Cost
- b. Simple design for under 30W
- c. Capability to produce high power fan motors compared to more sophisticated designs requiring thyristors.

B. Disadvantages:

- a. High running temperature rise resulting in life reduction of the bearings.
- b. High locked rotor temperature rise for impedance protection designs.
- c. Heavy weight construction requiring aluminum die cast housing due to elevated temperatures.
- d. Low efficiency resulting in high operating costs.
- e. Frequency dependence of their rated speed. For example a 2 pole fan motor can achieve a maximum theoretical speed of 3000RPM @ 50Hz and 3600RPM at 60Hz under no load conditions. In practice a typical Fan Motor of 120x120x38mm can achieve a maximum speed of 2700RPM at 50Hz and 3200RPM at 60Hz.
- f. The maximum PQ (pressure x air volume) that the AC fan can deliver is typically 1/2 of the AC/DC fan.
- g. Metal structure which requires grounding.
- h. Large hub area, more silicon steel and copper weight.

II. AC/DC Fan Motors

PELKO Motors is introducing a new line of AC Fan Motors in order to overcome the drawbacks of the traditional AC Motor design. The advantages and disadvantages of the New AC/DC Fan Motor design are:

A. Advantages:

- a. Low running temperature rise resulting in much longer bearing life. The life of the AC/DC is at least triple compared to the standard AC fan with same PQ.
- b. Zero Temperature rise under locked rotor condition. The AC/DC fan motor is electronically protected.
- c. Light weight rugged construction because the motor temperature requirements are low and glass filled PBT is sufficient.
- d. High efficiency. Typically the AC/DC fan can deliver the same PQ as the conventional AC fan with only 25% of the power. This feature alone ensures quick payback.
- e. The speed is independent of the AC source frequency being 50Hz or 60Hz and can operate at 400 Hz.
- f. The maximum PQ (pressure x air volume) that the AC/DC fan can deliver is typically double of the standard AC fan.
- g. The AC/DC fans are double insulated, thus requiring no grounding
- h. Small hub area, less silicon steel and copper weight.

B. Disadvantages

- a. Design complexity which can be reduced by new component design.
- b. Higher cost. It is estimated to be 1.5times the cost of the standard AC. However as this product line is mass produced cost reduction can be achieved so that their cost can be almost equal to the conventional AC fan motors.
- c. This AC/DC technology is targeting the smaller power (under 20W) market in order to achieve the best cost-performance and replace the existing 120mm fans which have been the work horse of the industry (covering about 75% of this market).