Terminology

EC Fans

JOHNSON ELECTRIC

Introduction

In this introduction to EC fan terminology, we'll unravel the key concepts that drive these advanced fans, from their energy-efficient design to their precise control capabilities. Whether you're an engineer seeking optimal air circulation solutions or a business owner aiming for cost-effective ventilation, understanding these terms will empower you to make informed decisions and unlock the full potential of EC fan technology.

Foundational Concepts

EC Fans

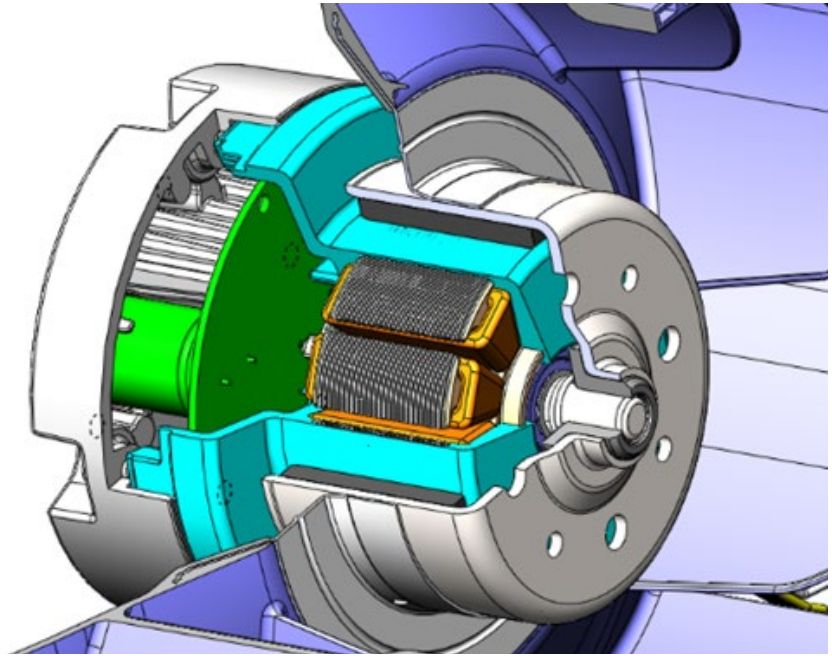
JOHNSON ELECTRIC

EC Fan

An Electronically Commutated (EC) fan, also known as a Brushless DC fan, is a type of fan that uses electronic circuitry to control the motor's operation. It offers higher efficiency, lower power consumption, and variable speed control compared to traditional AC fans.

JOHNSON ELECTRIC

Brushless DC Motor



The motor used in EC fans is a brushless DC motor, which means it operates without the need for physical brushes to commutate the motor windings. This design reduces friction and increases efficiency and longevity.

JOHNSON ELECTRIC

Important Foundational Concepts

- **Cubic Feet/Minute (CFM)**
  - **CFM measures the volume of air moved by the fan in a minute, representing the fan's airflow capacity.**
- **Static Pressure**
  - **The pressure generated by the fan against resistance within the system, like ductwork or filters, impacting the fan's ability to maintain airflow.**
- **Total Static Pressure**
  - **The sum of system resistance and ductwork pressure, it's the total force the fan must overcome to maintain the desired airflow.**
- **Efficiency**
  - **Motor efficiency is a measure of how effectively an electric motor converts input electrical energy into useful mechanical work while minimizing energy losses.**
- **Variable Speed Control**
  - **JE EC fans offer adjustable speed settings, allowing fine-tuning of airflow to match different ventilation needs.**
  - **Types of speed control:**
    - 0-10v
    - Pulse width modulation (PWM)
    - Universal Asynchronous Receiver-Transmitter (UART)
    - Field Oriented Control (FOC)
- **Soft-Start**
  - **A feature where the fan starts gradually rather than abruptly, reducing initial power surges and mechanical stress.**

JOHNSON ELECTRIC

Fan Laws

Fan laws are mathematical relationships that describe the changes in airflow, pressure, power, and other characteristics of a fan system when operating conditions such as speed or impeller diameter change. These laws are essential for understanding how changes in fan parameters affect the overall performance of ventilation and air handling systems. There are three primary fan laws:

- **Fan Law 1 (Flow Rate)**
  - **This law states that the airflow (volume) rate produced by a fan is directly proportional to its fan speed (RPM) while maintaining constant static pressure and impeller diameter.**
    - Mathematically: New Flow Rate = (New RPM) / (Original RPM) * Original Flow Rate
- **Fan Law 2 (Pressure)**
  - **Fan Law 2 states that the pressure generated by a fan is proportional to the square of its fan speed while maintaining constant airflow rate and impeller diameter.**
    - Mathematically: New Pressure = (New RPM)^2 / (Original RPM)^2 * Original Pressure
- **Fan Law 3 (Power)**
  - **This law describes how the power required by a fan changes with changes in speed, while maintaining constant airflow rate and static pressure. Power is proportional to the cube of the fan speed.**
    - Mathematically: New Power = (New RPM)^3 / (Original RPM)^3 * Original Power

For More Information

Contact us: Ventilationus@johnsonelectric.com

JOHNSON ELECTRIC