

# ENERGY EFFICIENT CEILING FAN SOLUTION



ALLEN Calsoft Labs' brushless DC (BLDC) motor based ceiling fan control solution takes energy efficiency and ease-of-operation to a whole new level. This path-breaking solution offers a number of unique benefits including,

- 50 to 60% power savings compared to conventional ceiling fans
- Low noise
- Easy remote control based operation

Brushless DC (BLDC) motors offer several advantages over conventional AC operated ceiling fans, including higher efficiency and reliability, reduced noise, longer lifetime (no brush and commutator erosion), elimination of ionizing sparks from the commutator, and overall reduction of electromagnetic interference (EMI).

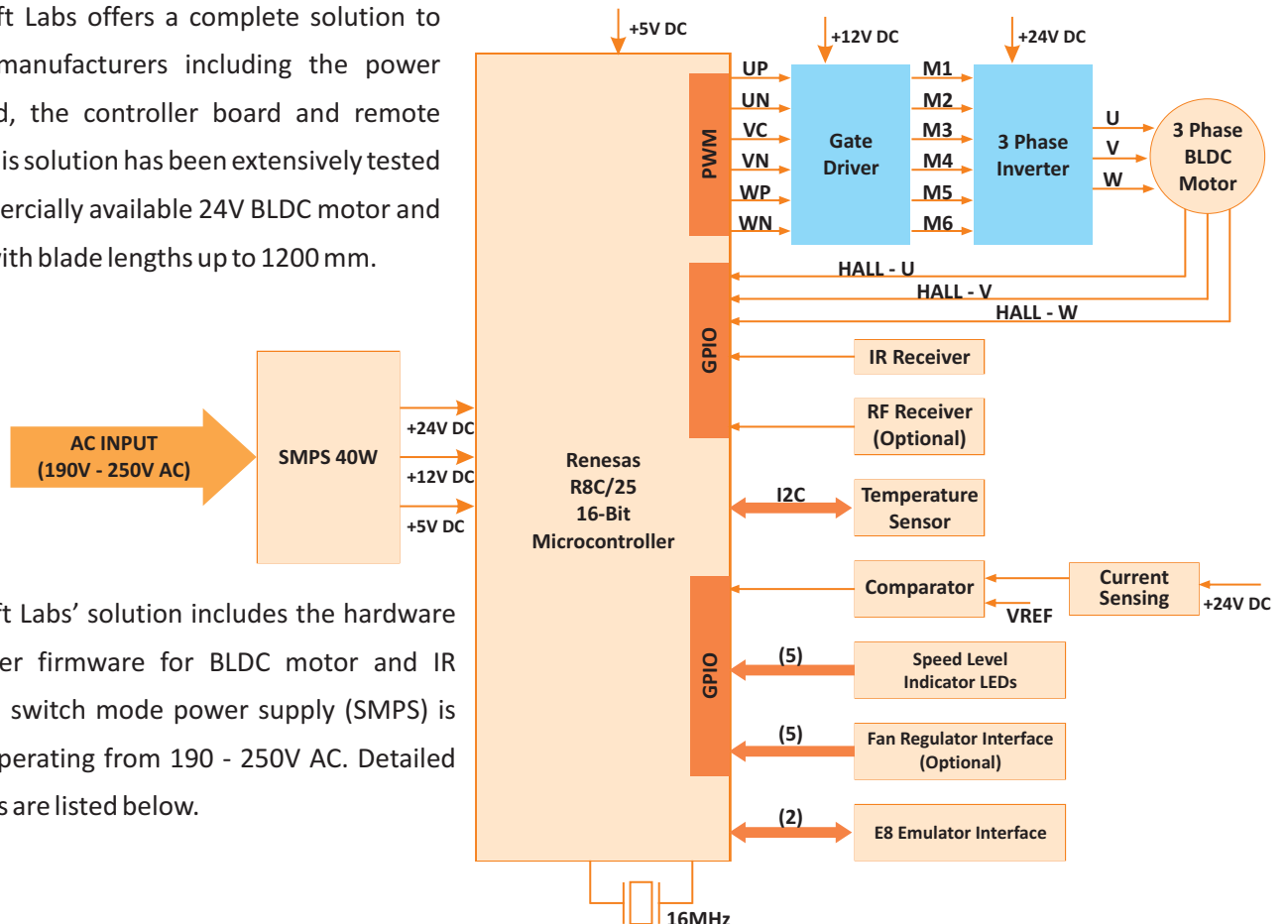
In general, BLDC motors are often more efficient at converting electricity into mechanical power than brushed DC or AC motors. This improvement is largely due to the absence of electrical and friction losses due to brushes.

## ALLEN Calsoft Labs' Solution

ALLEN Calsoft Labs offers a complete solution to ceiling fan manufacturers including the power supply board, the controller board and remote controller. This solution has been extensively tested with a commercially available 24V BLDC motor and ceiling fans with blade lengths up to 1200 mm.

ALLEN Calsoft Labs' solution includes the hardware and controller firmware for BLDC motor and IR receiver. The switch mode power supply (SMPS) is capable of operating from 190 - 250V AC. Detailed specifications are listed below.

The block diagram below shows the key components of the solution.



## Specifications

### Power Supply

SMPS Power Rating (max)	40W
SMPS Efficiency	>80%
Internal Circuitry Power Consumption (Controller and Power supply)	<6W
AC Input Operating Voltage Range	190 - 250V
DC Input Operating Voltage Range	24V DC
SMPS output	
Output 1	24V, 1.5A
Output 3	12V, 0.4A
Output 3	5V, 0.3A

### BLDC motor

Input Voltage Rating (max)	24V DC
Input Current Rating (max)	1 - 1.2A
Motor type	3 Phase
Speed with Blade (min)	100 - 110 RPM
Speed with Blade (max)	332 - 340 RPM
Speed Control	Hall sensor approach
Efficiency (Electrical to Mechanical)	85 - 90%
Airflow	>220 m <sup>3</sup> /min
Operating Voltage	24V DC
Power Consumption at 330 - 335 RPM	<30W
Protection	Short Circuit Protection

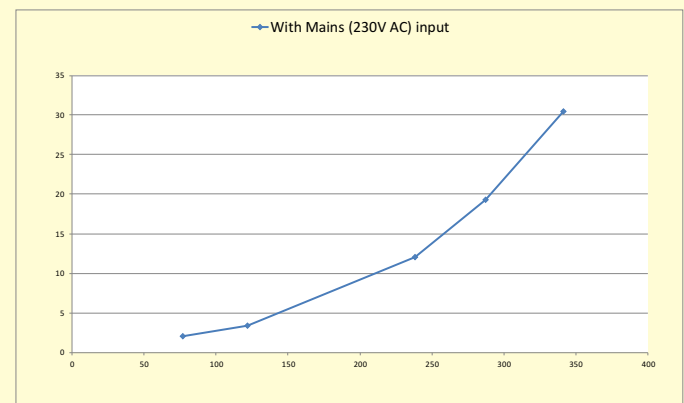
### Product Customization

ALTEN Calsoft Labs' Energy Efficient Ceiling Fan solution is available as a turnkey for ceiling fan manufactures. ALTEN Calsoft Labs also offers engineering services for any modifications and/or customization by leveraging its resource pool of 800+ engineers based in India.

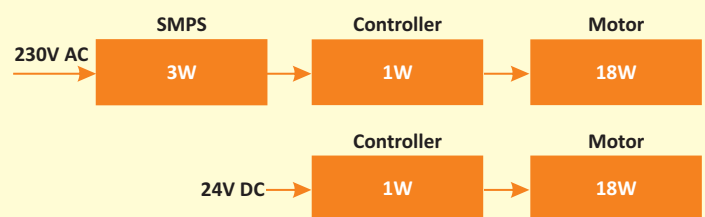
### System Features

- Control logic for Hall sensor based speed control
- Temperature sensor logic for speed variation
- Infra red (IR) receiver for remote operation
- Fan On/Off, speed increase/decrease, temperature sensor enable/disable, etc. through IR remote
- Can be operated from 230V AC or 24V DC power supply
- Short circuit and Stall protection

### Power Consumption vs Speed



### Total Power Consumption breakup



#### ABOUT ALTEN CALSOFT LABS

ALTEN Calsoft Labs is a next gen digital transformation, enterprise IT and product engineering services provider. The company enables clients innovate, integrate, and transform their business by leveraging disruptive technologies like mobility, big data, analytics, cloud, IoT and software-defined networking (SDN/NFV). ALTEN Calsoft Labs provides concept to market offerings for industry verticals like education, healthcare, networking & telecom, hi- tech, ISV and retail. Headquartered in Bangalore, India, the company has offices in US, Europe and Singapore. ALTEN Calsoft Labs is a part of ALTEN group, a leader in technology consulting and engineering services.

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