

**SERIES:** CFM-35BF | **DESCRIPTION:** DC AXIAL FAN**FEATURES**

- dual ball bearing system
- 35 x 35 mm frame
- multiple speed options
- PWM/tachometer wires available

**MODEL**

|                    | input voltage |             | input current <sup>1</sup> |         | input power <sup>1</sup> |         | rated speed <sup>1</sup> | airflow <sup>2</sup> | static pressure <sup>3</sup> | noise <sup>4</sup> |
|--------------------|---------------|-------------|----------------------------|---------|--------------------------|---------|--------------------------|----------------------|------------------------------|--------------------|
|                    | rated [Vdc]   | range [Vdc] | typ [A]                    | max [A] | typ [W]                  | max [W] | typ (RPM±10%)            | [CFM]                | [inch H <sub>2</sub> O]      | typ [dBA]          |
| CFM-3510BF-160-188 | 12            | 10.8~13.2   | 0.04                       | 0.06    | 0.48                     | 0.72    | 6,000                    | 3.93                 | 0.08                         | 18.8               |
| CFM-3510BF-170-222 | 12            | 10.8~13.2   | 0.06                       | 0.09    | 0.72                     | 1.08    | 7,000                    | 4.59                 | 0.10                         | 22.3               |
| CFM-3510BF-190-277 | 12            | 10.8~13.2   | 0.07                       | 0.11    | 0.84                     | 1.32    | 9,000                    | 5.90                 | 0.17                         | 27.7               |

Notes:

1. At rated voltage, after 3 minutes.
2. At rated voltage, room temperature, 65% humidity, 0 inch H<sub>2</sub>O static pressure.
3. At rated voltage, 0 CFM airflow.
4. Measured in an anechoic chamber as per ISO3745/GB4214-84 at rated voltage, with background noise 20±2 dBA at 1 m from the fan intake.
5. All specifications are measured at 25°C, 65% relative humidity unless otherwise specified.

**PART NUMBER KEY****CFM-3510BF-160-188- XX - CXX**

Base Number

Fan Signals

"blank" = no signals

20 = tachometer signal

22 = tachometer signal / PWM control signal

Reserved for Custom Configurations

INPUT

| parameter               | conditions/description | min  | typ | max  | units |
|-------------------------|------------------------|------|-----|------|-------|
| operating input voltage |                        | 10.8 | 12  | 13.2 | Vdc   |
| starting voltage        |                        |      | 7.0 |      | Vdc   |

PERFORMANCE<sup>6</sup>

| parameter       | conditions/description                             | min   | typ | max   | units                 |
|-----------------|----------------------------------------------------|-------|-----|-------|-----------------------|
| rated speed     | at rated voltage, 25°C, after 3 minutes            | 6,000 |     | 9,000 | RPM                   |
| air flow        | at 0 inch H <sub>2</sub> O, see performance curves | 3.93  |     | 5.90  | CFM                   |
| static pressure | at 0 CFM, see performance curves                   | 0.08  |     | 0.17  | inch H <sub>2</sub> O |
| noise           | at 1 m, rated speed                                | 18.8  |     | 27.7  | dBA                   |

Note: 6. See Model section on page 1 for specific values.

PROTECTIONS / FEATURES<sup>7</sup>

| parameter           | conditions/description            | min | typ | max | units |
|---------------------|-----------------------------------|-----|-----|-----|-------|
| polarity protection | on all models                     |     |     |     |       |
| tachometer signal   | available on “20” and “22” models |     |     |     |       |
| PWM control signal  | available on “22” models          |     |     |     |       |

Notes: 7. See Application Notes for details.

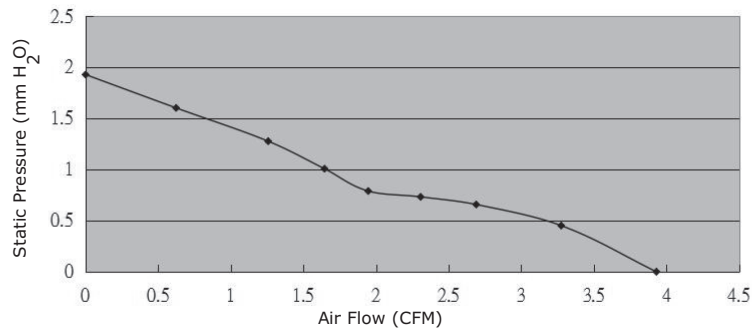
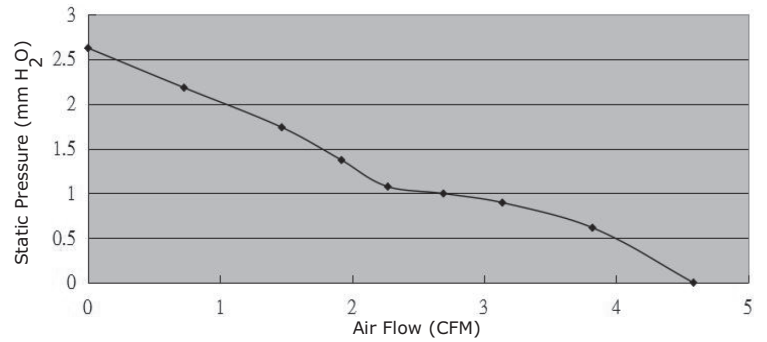
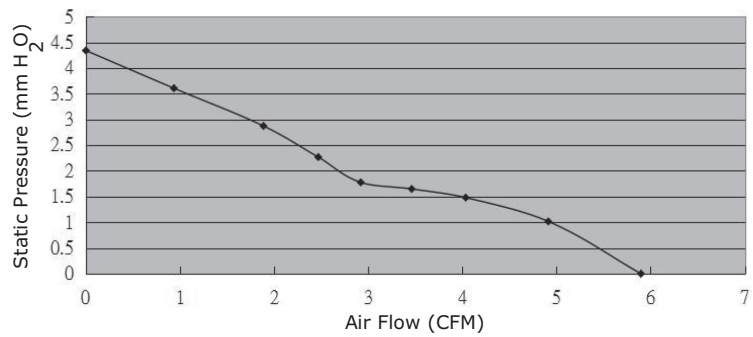
SAFETY & COMPLIANCE

| parameter             | conditions/description                                            | min | typ    | max | units |
|-----------------------|-------------------------------------------------------------------|-----|--------|-----|-------|
| insulation resistance | at 500 Vdc between frame and positive terminal                    | 10  |        |     | MΩ    |
| dielectric strength   | at 500 Vac, 60 Hz, 1 minute between housing and positive terminal |     |        | 5   | mA    |
| safety approvals      | UL/cUL 507, TUV (EN/IEC 62368-1:2020+A11)                         |     |        |     |       |
| EMI/EMC               | EN 55032:2015, EN 55035:2017                                      |     |        |     |       |
| life expectancy       | at 40°C, 65% RH, 90% confidence level                             |     | 70,000 |     | hours |
| RoHS                  | yes                                                               |     |        |     |       |

ENVIRONMENTAL

| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -10 |     | 70  | °C    |
| storage temperature   |                        | -40 |     | 75  | °C    |
| operating humidity    | non-condensing         | 35  |     | 85  | %     |
| storage humidity      | non-condensing         | 35  |     | 85  | %     |

## PERFORMANCE CURVES

**CFM-3510BF-160-188****CFM-3510BF-170-222****CFM-3510BF-190-277**

MECHANICAL

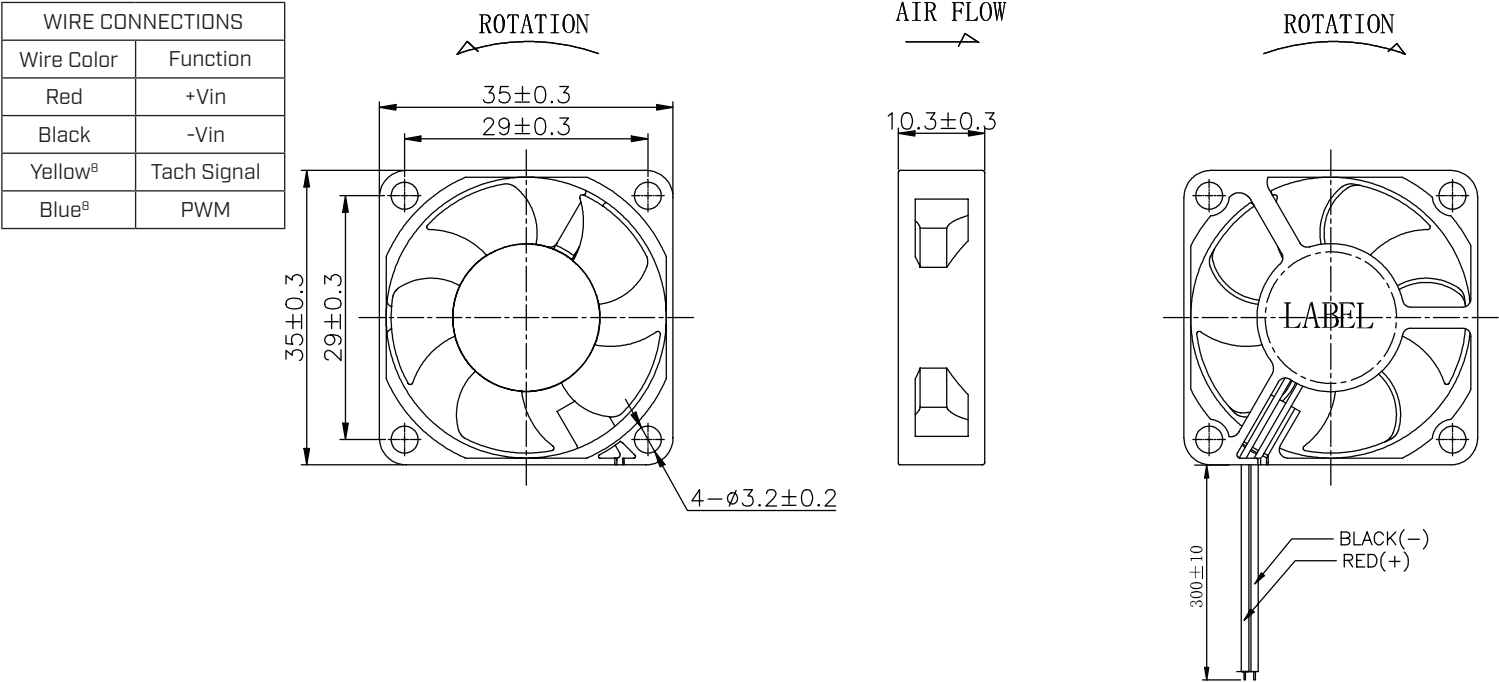
| parameter             | conditions/description                           | min | typ | max | units |
|-----------------------|--------------------------------------------------|-----|-----|-----|-------|
| motor                 | 4 pole DC brushless                              |     |     |     |       |
| bearing system        | dual ball bearing                                |     |     |     |       |
| direction of rotation | counter-clockwise viewed from front of fan blade |     |     |     |       |
| dimensions            | 35 x 35 x 10.3                                   |     |     |     | mm    |
| material              | PBT (UL94V-0)                                    |     |     |     |       |
| weight                | CFM-3510BF-160-188                               |     | 8.9 |     | g     |
|                       | CFM-3510BF-170-222                               |     | 9.3 |     | g     |
|                       | CFM-3510BF-190-277                               |     | 9.4 |     | g     |

MECHANICAL DRAWING

units: mm

2 wire versions (+Vin & -Vin): UL 1061, 26 AWG  
3 wire versions (+Vin, -Vin, & tach): UL 1061, 26 AWG  
4 wire versions (+Vin, -Vin, tach, & PWM): UL 1061, 28 AWG

| MOUNTING SCREW (Pan Head) |      |                |            |
|---------------------------|------|----------------|------------|
| Screw Type                | Size | Standard       | Torque     |
| Machine Screw             | M2.5 | JIS B1111-1974 | 7.5 kgf-cm |



Notes: <sup>a</sup> Wires only present on versions with output signals.

## APPLICATION NOTES

### Polarity Protection

Able to withstand 10 minutes of reverse polarity connection between the positive and negative wires without causing damage.

### Tachometer Signal [Yellow Wire]

The tachometer signal is for detecting the rotational speed of the fan motor. The output will be a square wave when fan is operating and  $V_{FG}$  or  $V_{CE}$  depending on the locked rotor position when fan motor is locked (See Figures 1~2 below).

Figure 1: Tachometer Output Circuit

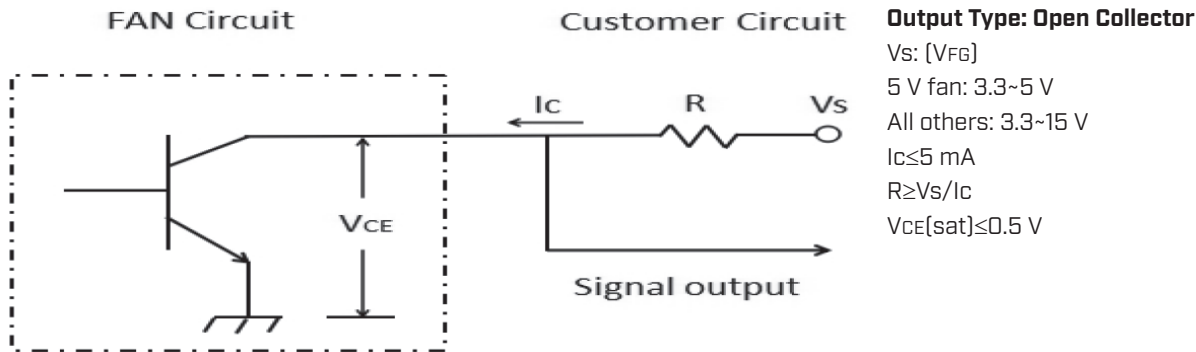
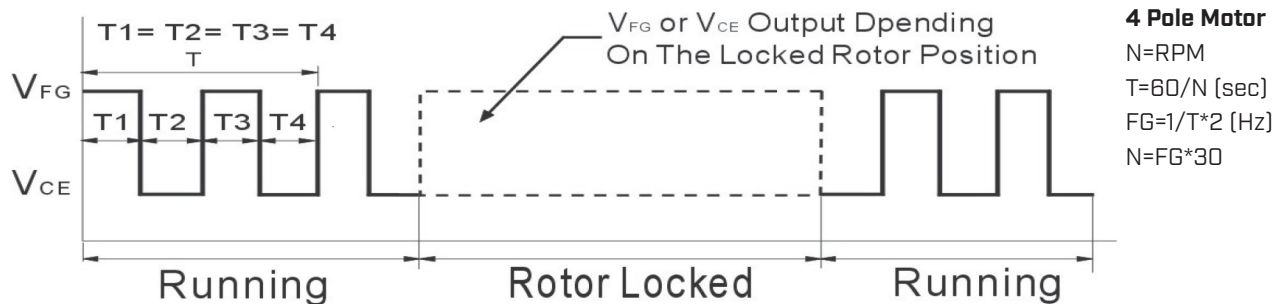


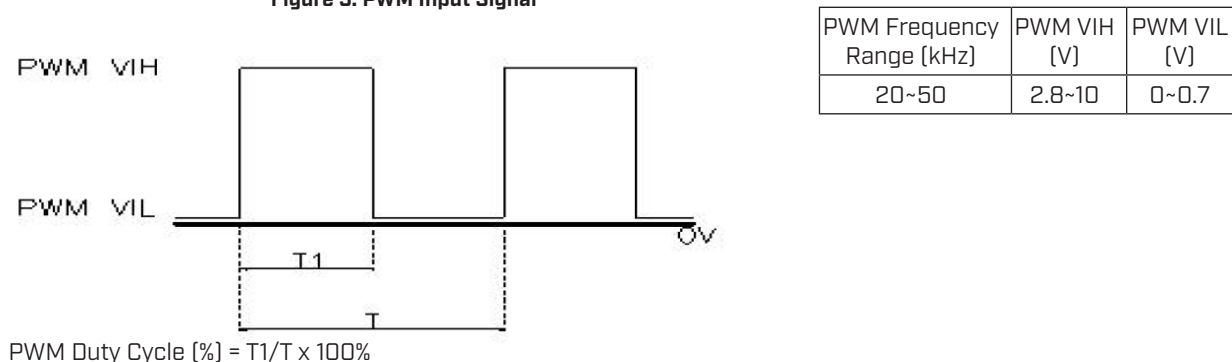
Figure 2: Tachometer Output Waveform



### PWM Signal [Blue Wire]

This wire is for speed control of the fan motor using a PWM input signal from the customer circuit (See Figure 3 below).

Figure 3: PWM Input Signal



REVISION HISTORY

| rev. | description                       | date       |
|------|-----------------------------------|------------|
| 1.0  | initial release                   | 10/05/2021 |
| 1.01 | added PWM signal versions         | 05/18/2022 |
| 1.02 | logo, datasheet style update      | 08/12/2022 |
| 1.03 | updated PWM details               | 03/19/2024 |
| 1.04 | CUI Devices rebranded to Same Sky | 09/12/2024 |

The revision history provided is for informational purposes only and is believed to be accurate.



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