



## SERIES: CFM-120 | DESCRIPTION: DC AXIAL FAN

### FEATURES

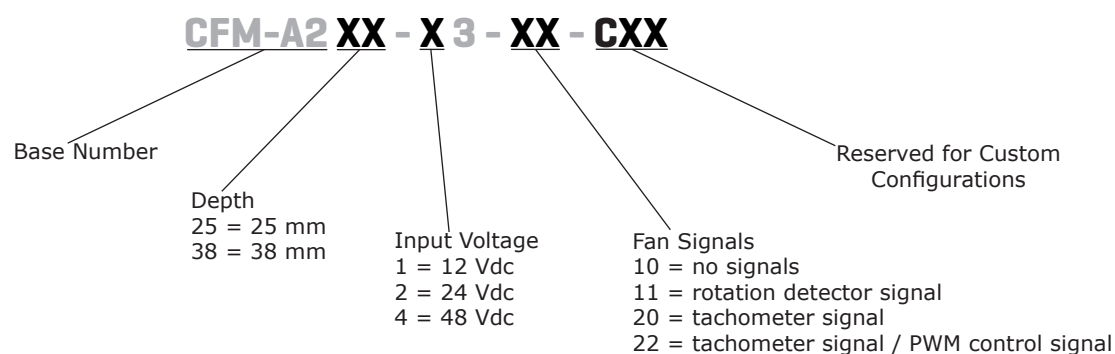
- 120 x 120 mm frame
- high fan speed for greater air flow
- dual ball bearing construction
- auto restart protection standard on all models



| MODEL       | input voltage |             | input current |         | input power | rated speed | air flow <sup>1</sup> | static pressure <sup>2</sup> | noise     |
|-------------|---------------|-------------|---------------|---------|-------------|-------------|-----------------------|------------------------------|-----------|
|             | rated (Vdc)   | range (Vdc) | typ (A)       | max (A) | max (W)     | typ (RPM)   | (CFM)                 | (inch H <sub>2</sub> O)      | max (dBA) |
| CFM-A225-13 | 12            | 6~13.8      | 0.59          | 0.79    | 9.48        | 4,100       | 126.89                | 0.49                         | 53.5      |
| CFM-A225-23 | 24            | 16~27.6     | 0.31          | 0.39    | 9.36        | 4,100       | 126.89                | 0.49                         | 53.5      |
| CFM-A225-43 | 48            | 30~55.2     | 0.17          | 0.23    | 11.04       | 4,100       | 126.89                | 0.49                         | 53.5      |
| CFM-A238-13 | 12            | 6~13.8      | 1.40          | 1.75    | 21          | 4,600       | 200.9                 | 0.78                         | 61.5      |
| CFM-A238-23 | 24            | 16~27.6     | 0.77          | 0.88    | 21.12       | 4,600       | 200.9                 | 0.78                         | 61.5      |
| CFM-A238-43 | 48            | 30~55.2     | 0.36          | 0.48    | 23.04       | 4,600       | 200.9                 | 0.78                         | 61.5      |

Notes: 1. At 0 inch H<sub>2</sub>O static pressure.  
2. At 0 CFM airflow.

### PART NUMBER KEY



## INPUT

| parameter               | conditions/description | min | typ   | max   | units |
|-------------------------|------------------------|-----|-------|-------|-------|
| operating input voltage | 12 Vdc input models    | 6   | 12    | 13.8  | Vdc   |
|                         | 24 Vdc input models    | 16  | 24    | 27.6  | Vdc   |
|                         | 48 Vdc input models    | 30  | 48    | 55.2  | Vdc   |
| current                 | CFM-A225-13            |     | 0.59  | 0.79  | A     |
|                         | CFM-A225-23            |     | 0.31  | 0.39  | A     |
|                         | CFM-A225-43            |     | 0.17  | 0.23  | A     |
|                         | CFM-A238-13            |     | 1.40  | 1.75  | A     |
|                         | CFM-A238-23            |     | 0.77  | 0.88  | A     |
|                         | CFM-A238-43            |     | 0.36  | 0.48  | A     |
| power                   | CFM-A225-13            |     | 7.08  | 9.48  | W     |
|                         | CFM-A225-23            |     | 7.44  | 9.36  | W     |
|                         | CFM-A225-43            |     | 8.16  | 11.04 | W     |
|                         | CFM-A238-13            |     | 16.80 | 21    | W     |
|                         | CFM-A238-23            |     | 18.48 | 21.12 | W     |
|                         | CFM-A238-43            |     | 17.28 | 23.04 | W     |
| starting voltage        | at 25°C                |     |       |       |       |
|                         | 12 Vdc input models    |     | 6     |       | Vdc   |
|                         | 24 Vdc input models    |     | 12    |       | Vdc   |
|                         | 48 Vdc input models    |     | 24    |       | Vdc   |

## PERFORMANCE

| parameter       | conditions/description                             | min   | typ    | max   | units                 |
|-----------------|----------------------------------------------------|-------|--------|-------|-----------------------|
| rated speed     | at 25°C, after 10 minutes                          |       |        |       |                       |
|                 | CFM-A225 models                                    | 3,690 | 4,100  | 4,510 | RPM                   |
|                 | CFM-A238 models                                    | 4,140 | 4,600  | 5,060 | RPM                   |
| air flow        | at 0 inch H <sub>2</sub> O, see performance curves |       |        |       |                       |
|                 | CFM-A225 models                                    |       | 126.89 |       | CFM                   |
|                 | CFM-A238 models                                    |       | 200.9  |       | CFM                   |
| static pressure | at 0 CFM, see performance curves                   |       |        |       |                       |
|                 | CFM-A225 models                                    |       | 0.49   |       | inch H <sub>2</sub> O |
|                 | CFM-A238 models                                    |       | 0.78   |       | inch H <sub>2</sub> O |
| noise           | at 1 m                                             |       |        |       |                       |
|                 | CFM-A225 models                                    |       | 51.5   | 53.5  | dBA                   |
|                 | CFM-A238 models                                    |       | 59.5   | 61.5  | dBA                   |

## PROTECTIONS / SIGNALS<sup>1</sup>

| parameter               | conditions/description            | min | typ | max | units |
|-------------------------|-----------------------------------|-----|-----|-----|-------|
| auto restart protection | available on all models           |     |     |     |       |
| rotation detector       | available on "11" models          |     |     |     |       |
| tachometer signal       | available on "20" and "22" models |     |     |     |       |
| PWM control signal      | available on "22" models          |     |     |     |       |

Notes: 1. See application notes for details.

## SAFETY & COMPLIANCE

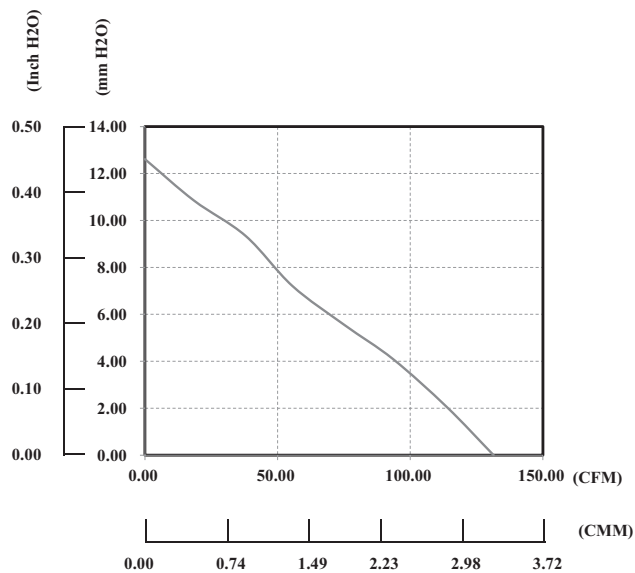
| parameter                      | conditions/description                                                             | min | typ    | max | units |
|--------------------------------|------------------------------------------------------------------------------------|-----|--------|-----|-------|
| insulation resistance of frame | at 500 Vdc between frame and positive terminal                                     | 10  |        |     | MΩ    |
| dielectric strength            | at 500 Vac, 60 Hz, 1 minute between frame and positive terminal                    |     |        | 5   | mA    |
| safety approvals               | UL/cUL 507, TUV (EN 62368-1)                                                       |     |        |     |       |
| EMI/EMC                        | EN 55022:2010+AC:2011 Class B, EN 61000-3-2:2014, EN 61000-3-3:2013, EN 55024:2010 |     |        |     |       |
| life expectancy                | at 45°C, 15~65% RH                                                                 |     | 70,000 |     | hours |
| RoHS                           | yes                                                                                |     |        |     |       |

## ENVIRONMENTAL

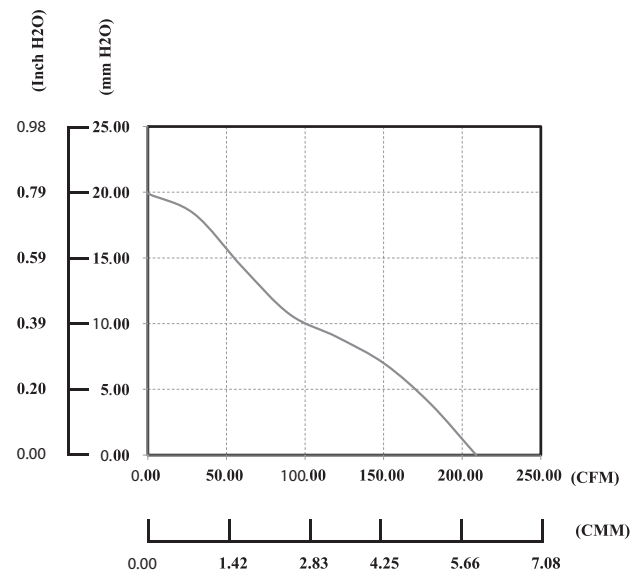
| parameter             | conditions/description | min | typ | max | units |
|-----------------------|------------------------|-----|-----|-----|-------|
| operating temperature |                        | -10 |     | 70  | °C    |
| storage temperature   |                        | -40 |     | 70  | °C    |
| operating humidity    | non-condensing         | 5   |     | 90  | %     |
| storage humidity      | non-condensing         | 5   |     | 95  | %     |

## PERFORMANCE CURVES

### CFM-A225



### CFM-A238



## MECHANICAL

| parameter             | conditions/description                                             | min | typ   | max | units    |
|-----------------------|--------------------------------------------------------------------|-----|-------|-----|----------|
| motor                 | 4 pole DC brushless                                                |     |       |     |          |
| bearing system        | ball bearing                                                       |     |       |     |          |
| direction of rotation | counter-clockwise viewed from front of fan blade                   |     |       |     |          |
| dimensions            | CFM-A225 models 120 x 120 x 25.4<br>CFM-A238 models 120 x 120 x 38 |     |       |     | mm<br>mm |
| material              | PBT (UL94V-0)                                                      |     |       |     |          |
| weight                | CFM-A225-13                                                        |     | 190.0 |     | g        |
|                       | CFM-A225-23                                                        |     | 189.8 |     | g        |
|                       | CFM-A225-43                                                        |     | 190.6 |     | g        |
|                       | CFM-A238-13                                                        |     | 297.0 |     | g        |
|                       | CFM-A238-23                                                        |     | 283.7 |     | g        |
|                       | CFM-A238-43                                                        |     | 283.2 |     | g        |

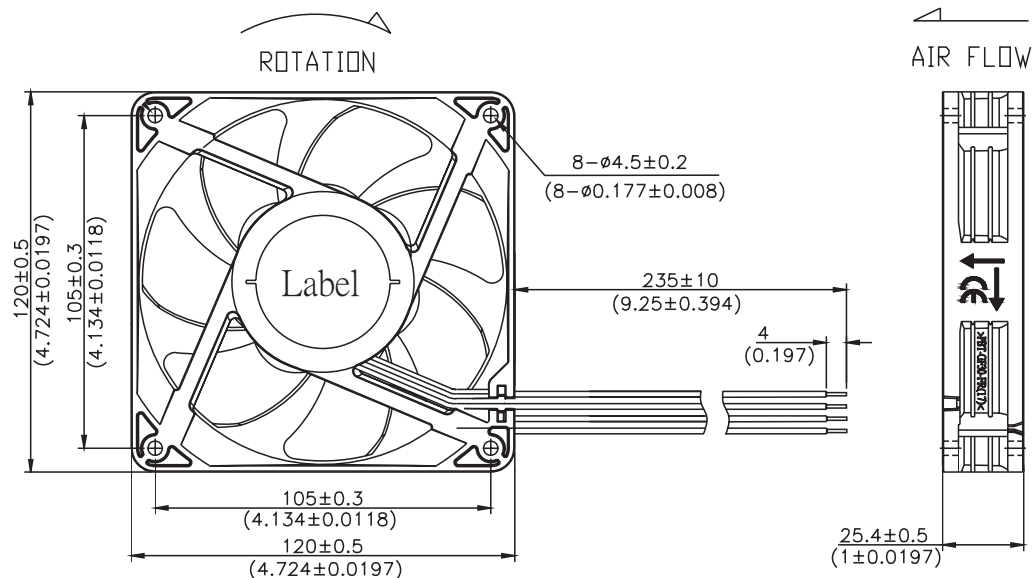
## MECHANICAL DRAWING

units: mm [inch]

### CFM-A225

wire: UL 1007, 24 AWG

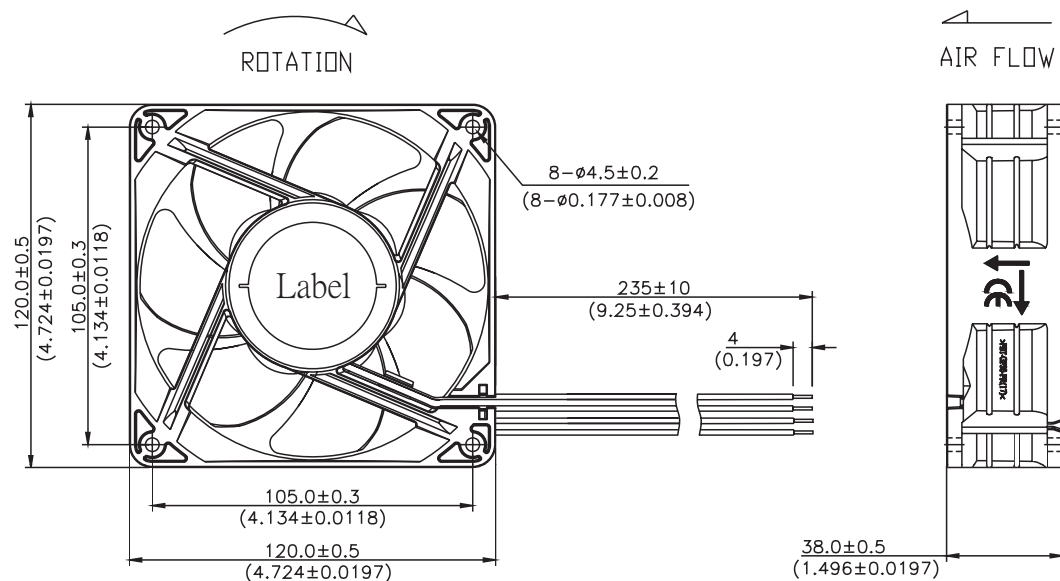
| WIRE CONNECTIONS    |           |
|---------------------|-----------|
| Wire Color          | Function  |
| Red                 | +Vin      |
| Black               | -Vin      |
| Yellow <sup>1</sup> | FG Signal |
| White <sup>1</sup>  | RD Signal |
| Blue <sup>1</sup>   | PWM       |



### CFM-A238

wire: UL 1007, 24 AWG

| WIRE CONNECTIONS    |           |
|---------------------|-----------|
| Wire Color          | Function  |
| Red                 | +Vin      |
| Black               | -Vin      |
| Yellow <sup>1</sup> | FG Signal |
| White <sup>1</sup>  | RD Signal |
| Blue <sup>1</sup>   | PWM       |



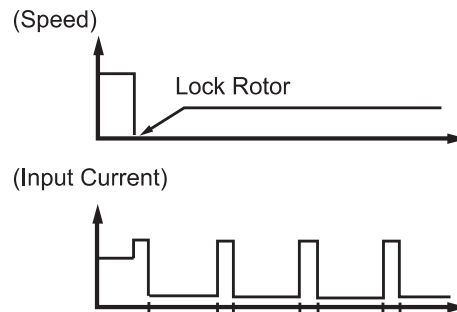
Note: 1. Wires only present on versions with output signals.

## APPLICATION NOTES

### Auto Restart Protection/Current Limit Protection

When the fan motor is locked, the device will cut off the drive current within two to six seconds and restart automatically after a few seconds. If the lock situation is continued, the device will work on a repeated cycle of cut-off and restart until the lock is released. (See Figure 1 below).

**Figure 1 Current Limit Protection**



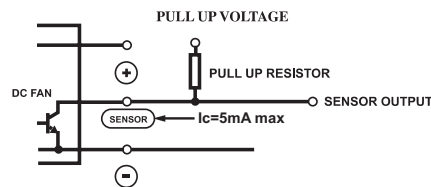
### Lock Sensor/Rotation Detector

Lock Sensor is used to detect if the fan motor is operating or stopped. Alarm High: the output will be logical low when fan is operating and be logical high when fan motor is locked. (See Figures 2~3 below).

**Figure 2 Alarm High Output Waveform**



**Figure 3 RD Signal Output Circuit: Open Collector**



### Pulse Sensor/Tachometer Signal/FG

Pulse Sensor is for detecting the rotational speed of the fan motor. At locked rotor condition, the signal stops cycling and the output is fixed at VoH or VoL (See Figures 4~5 below).

**Figure 4 Output Waveform**

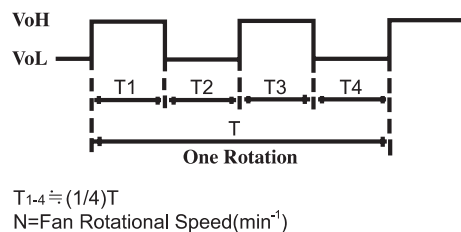
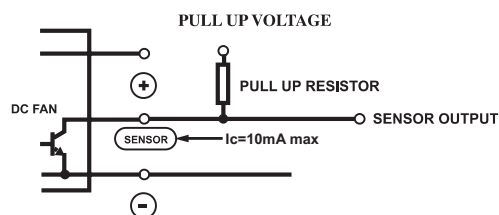


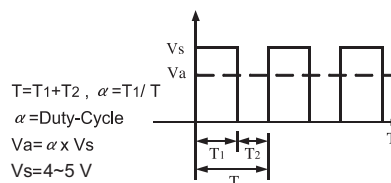
**Figure 5 FG Signal Output Circuit: Open Collector**



### PMW Control Signal

A speed control lead can be provided that will accept a PWM signal from the customer circuit to vary the speed of the fan. The change in speed is linear by changing the Duty-Cycle of the PWM. Open collector type and pull-up voltage is changed by maximum operating voltage and sink current by consuming current. (See Figure 6 below).

**Figure 6 Duty Cycle**



## REVISION HISTORY

| rev. | description                                           | date       |
|------|-------------------------------------------------------|------------|
| 1.0  | initial release                                       | 08/15/2016 |
| 1.01 | updated datasheet                                     | 07/27/2017 |
| 1.02 | updated to be certified to EN 62368-1 safety standard | 07/09/2019 |

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



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