CUI DEVICES

SERIES: CFM-50S | DESCRIPTION: DC AXIAL FAN

FEATURES

- sleeve bearing system
- 50 x 50 mm frame
- multiple speed options
- PWM/tachometer wires available

MODEL

MODEL	input voltage		input current[1]	input power[1]	rated speed[1]	airflow[2]	static pressure[3]	noise[4]
	rated (Vdc)	range (Vdc)	max (A)	max (W)	typ (RPM±10%)	(CFM)	(inch H_2O)	typ (dBA)
CFM-5020S-130-235	12	10.8~13.2	0.08	0.96	3,000[5]	8.09	0.06	23.5
CFM-5020S-145-323	12	10.8~13.2	0.14	1.68	4,500[5]	12.14	0.13	32.3
CFM-5020S-160-385	12	10.8~13.2	0.23	2.76	6,000	16.18	0.24	38.5

Notes:
1. At rated voltage, after 3 minutes.
2. At rated voltage, room temperature, 65% humidity, 0 inch H_20 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. Typical rated speed is measured as RPM±600 at rated voltage.
6. All specifications are measured at 25°C, 65% relative humidity unless otherwise specified.

PART NUMBER KEY

CFM-5020S-130-235 - 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[7]		10.8	12	13.2	Vdc
starting voltage			7.0		Vdc

Note: 7. See Model section on page 1 for specific input voltage ranges.

PERFORMANCE[8]

parameter	conditions/description	min	typ	max	units
rated speed	at rated voltage, 25°C, after 3 minutes	3,000		6,000	RPM
air flow	at 0 inch H_2O, see performance curves	8.09		16.18	CFM
static pressure	at 0 CFM, see performance curves	0.06		0.24	inch H_2O
noise	at 1 m, rated speed	23.5		38.5	dBA

Note: 8. See Model section on page 1 for specific values.

PROTECTIONS / FEATURES[9]

parameter	conditions/description	min	typ	max	units
auto restart	only available on CFM-5020S-160-385 models				
polarity protection	only available on CFM-5020S-130-235 & CFM-5020S-145-323 models				
tachometer signal	available on "20" and "22" models				
PWM control signal	available on "22" models				

Notes: 9. See Application Notes for details.

SAFETY & COMPLIANCE

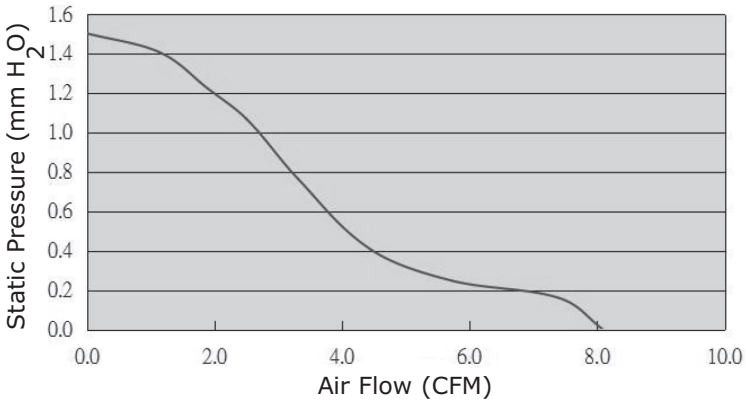
parameter	conditions/description	min	typ	max	units
insulation resistance	at 500 Vdc between frame and positive terminal	10			MΩ
dielectric strength	at 500 Vac, 60 Hz, 1 minute between housing and positive terminal			5	mA
safety approvals	UL/cUL 507, TUV (EN/IEC 62368-1:2020+A11)				
EMI/EMC	EN 55032:2015, EN 55035:2017				
life expectancy	at 25°C, 65% RH, 90% confidence level		30,000		hours
RoHS	yes				

ENVIRONMENTAL

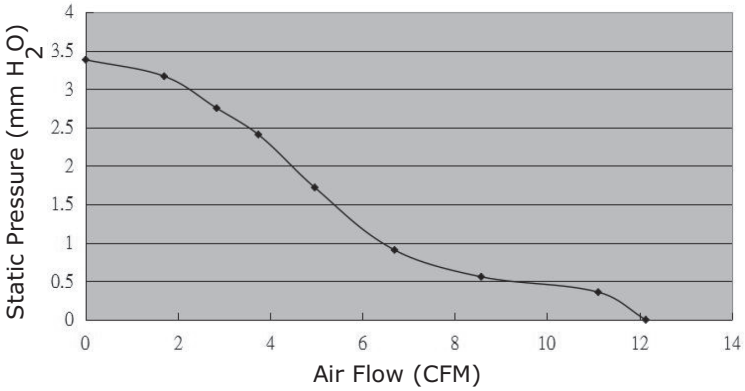
parameter	conditions/description	min	typ	max	units
operating temperature		-10		70	°C
storage temperature		-40		75	°C
operating humidity	non-condensing	35		85	%
storage humidity	non-condensing	35		85	%

PERFORMANCE CURVES

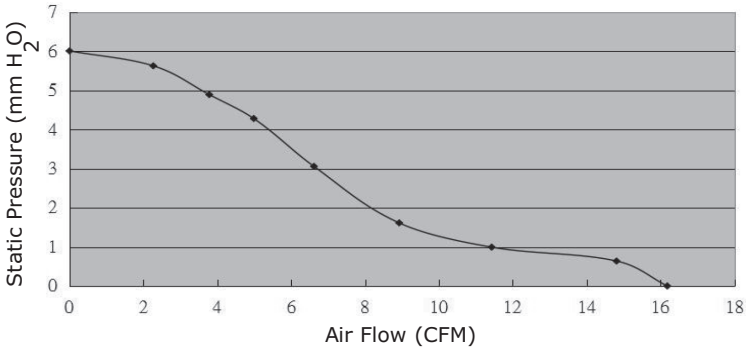
CFM-5020S-130-235



CFM-5020S-145-323



CFM-5020S-160-385



MECHANICAL

parameter	conditions/description	min	typ	max	units
motor	4 pole DC brushless				
bearing system	sleeve bearing system				
direction of rotation	counter-clockwise viewed from front of fan blade				
dimensions	50 x 50 x 20				mm
material	PBT (UL94V-0)				
weight	CFM-5020S-130-235 CFM-5020S-145-323 CFM-5020S-160-385		32.0 27.7 28.8		g g g

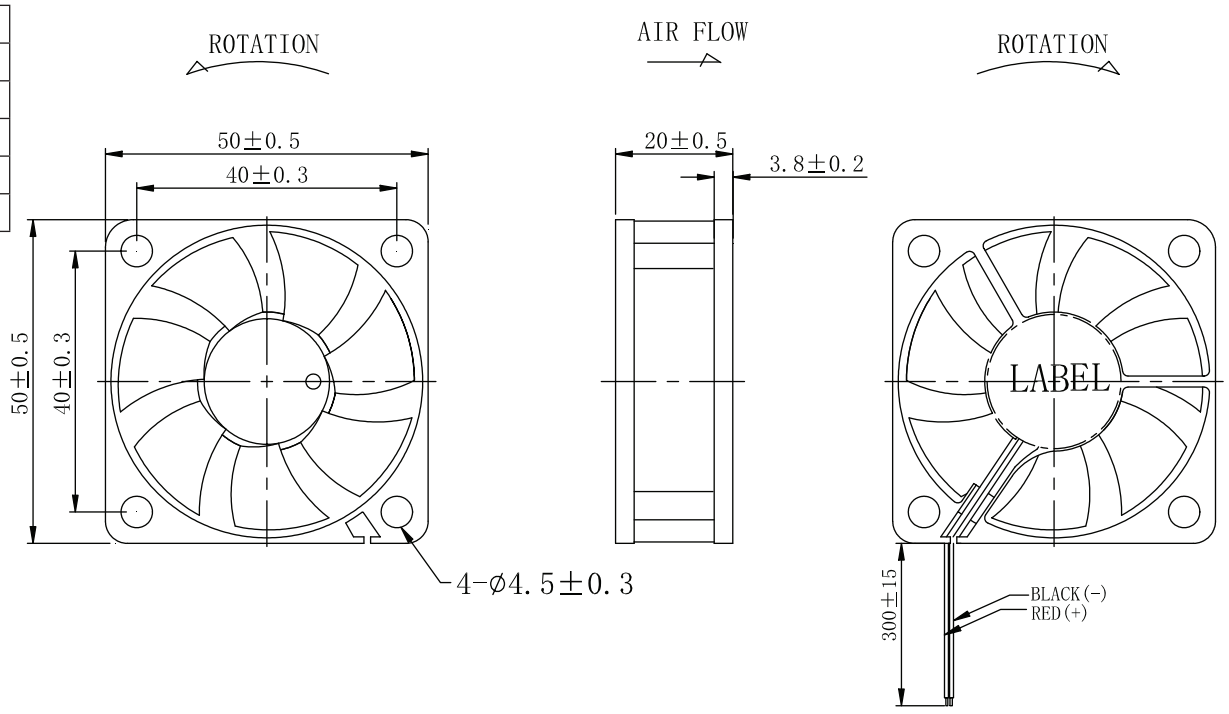
MECHANICAL DRAWING

units: mm

2 wire versions (+Vin & -Vin): UL 1007, 26 AWG
3 wire versions (+Vin, -Vin, & tach): UL 1007, 26 AWG
4 wire versions (+Vin, -Vin, tach, & PWM): UL 1061, 26 AWG

MOUNTING SCREW (Pan Head)			
Screw Type	Size	Standard	Torque
Machine Screw	M4	JIS B1111-1974	7.5 kgf-cm
Self-tapping Screw	M5	JIS B1122 Type 2	7.5 kgf-cm

WIRE CONNECTIONS	
Wire Color	Function
Red	+Vin
Black	-Vin
Yellow[10]	Tach Signal
Blue[10]	PWM



Notes: 10. Wires only present on versions with output signals.

APPLICATION NOTES

Auto Restart Protection

When the fan motor is locked by an external force, the device will temporarily turn off electrical power to the motor and restart automatically when the locked rotor condition is released.

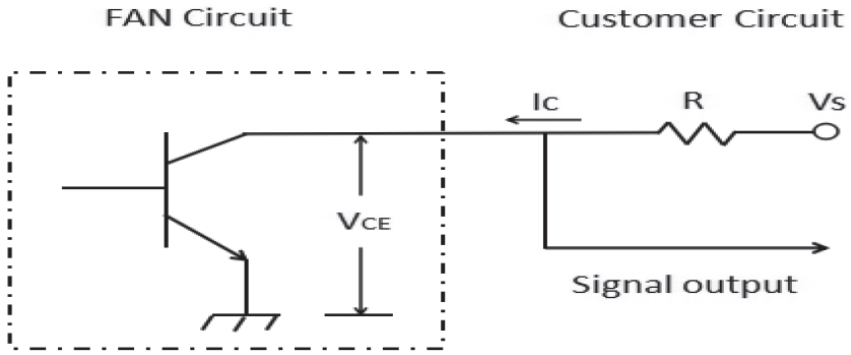
Polarity Protection

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

Tachometer Signal (Yellow Wire)

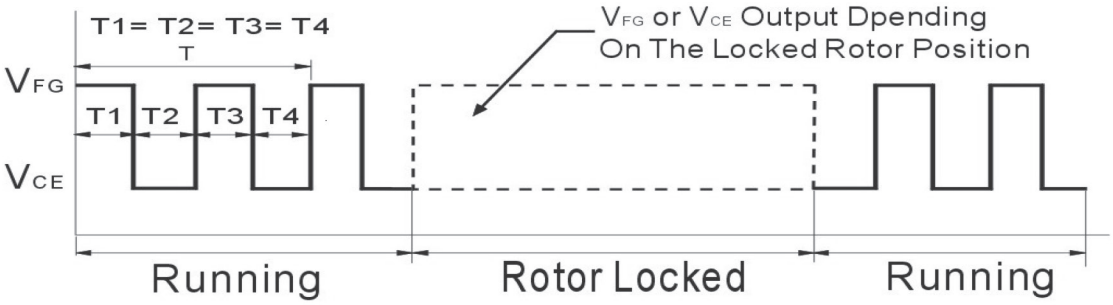
The tachometer signal is for detecting the rotational speed of the fan motor. The output will be a square wave when fan is operating and V_{FG} or V_{CE} depending on the locked rotor position when fan motor is locked (See Figures 1~2 below).

Figure 1: Tachometer Output Circuit



Output Type: Open Collector
Vs: (V_{FG})
5 V fan: 3.3~5 V
All others: 3.3~15 V
Ic≤5 mA
R≥Vs/Ic
V_{CE}(sat)≤0.5 V

Figure 2: Tachometer Output Waveform

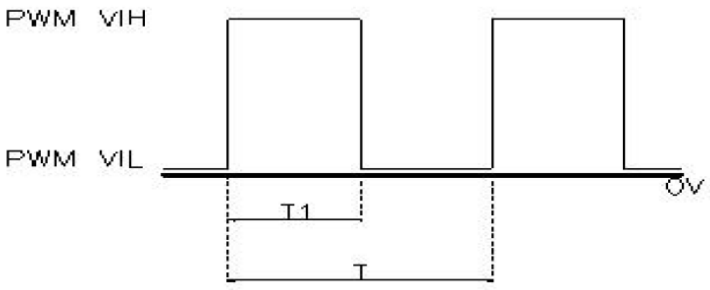


4 Pole Motor
N=RPM
T=60/N (sec)
FG=1/T*2 (Hz)
N=FG*30

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



PWM Duty Cycle (%) = T1/T x 100%
PWM Frequency Range: 20~30 kHz
PWM VIH = 2.8~5.5 V
PWM VIL = 0~0.6 V

REVISION HISTORY

rev.	description	date
1.0	initial release	10/18/2021
1.01	added PWM signal versions	05/19/2022

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