

1. Introduction

This document specifies the mechanical, electrical, and reliability characteristics of Foxconn DC brushless fan. Please use and store this DC fan under the suggested conditions.

2. Suggest Environment Condition

- 2.1 Operating: -40~70°C and 5~90%[RH]
- 2.2 Storing: -40~75°C and 5~95%[RH]

3. Rated Test Condition

3.1 Environment condition

Temperature: 25 °C

Humidity: 65%[RH]

Atmosphere: 1 atm

3.2 Rated Voltage : 12.0 VDC

3.3 Duration Time : After 2 minutes in free air

4. Fan Characteristics (All values are measured in the rated test condition as described in item.3)

No.	Items	Specification	Remark
4.1	Rated Voltage	12 VDC	
4.2	Operation Voltage	10.8~13.2 VDC	
4.3	Consuming Current	2.70A (5.00A max.)	Safety current is referred to Label in Section 5 Mechanical Drawing.
4.4	Consuming Power	32.4W (60.00W max.)	
4.5	Rated Speed	12000±10% RPM	
4.6	Maximum Air Flow	3.52 M ³ /min (3.17min.) 124.31 CFM (111.88min.)	Details in Section 6
4.7	Maximum Static Pressure	78.74 mmH ₂ O (63.78min.) 3.10 inH ₂ O (2.51min.)	Details in Section 6 Measured at Q=0
4.8	Acoustic Noise	66.0 dB(A) (70.0max.)	Details in Section 7
4.9	Life Expectancy (L ₁₀)	70,000 Hours @ 40°C	Refer to Section 9.2
4.10	Insulation Strength	10 MΩ min. at 500 VDC	Measure between frame and terminal (+)
4.11	Dielectric Strength	5 mA max. at 500 VAC 60 Hz and 1 minute	Measure between frame and terminal (+)
4.12	Insulation Level	UL Class A	

5. Mechanical Drawing Label Drawing

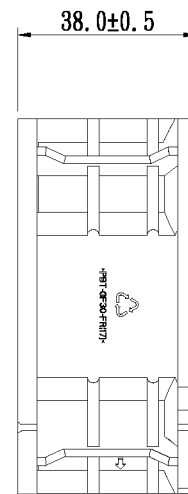
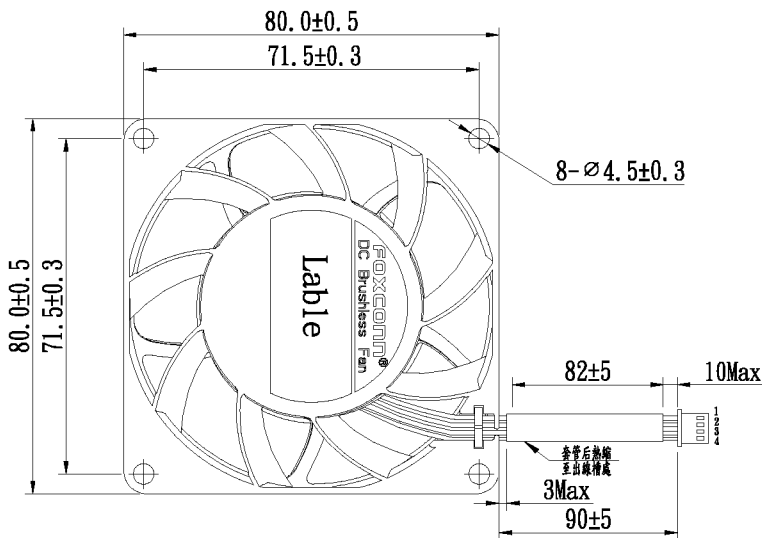
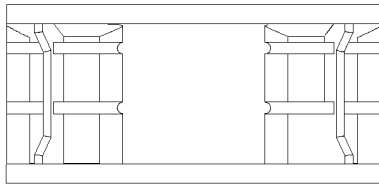


or



Date Code

Date Code



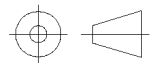
Rotation

Air Flow Direction

Note:

- 5.1. Frame : Plastic, UL 94V-0 Black;
- 5.2. Impeller : Plastic, UL 94V-0 Black;
- 5.3. Lead Wire : UL 1061 AWG#24 and UL1061 AWG #26;
- 5.4. Housing : WST P4-I25002PS-2 or Equivalent;
- 5.5. Terminal : WST P4-I25002 or Equivalent;
- 5.6. H/S TUBE : ID: ∅ 3.5mm, BLACK, 125 °C, 600V, VW-1;
- 5.7. Bearing Type : Two Ball Bearings (2B);
- 5.8. Weight : 216 Gram(Ref.);
- 5.9. This product meets IP55 requirement;
- 5.10. This product is RoHS 2.0 compliant.

Unit:mm



↓ Gravity
Direction

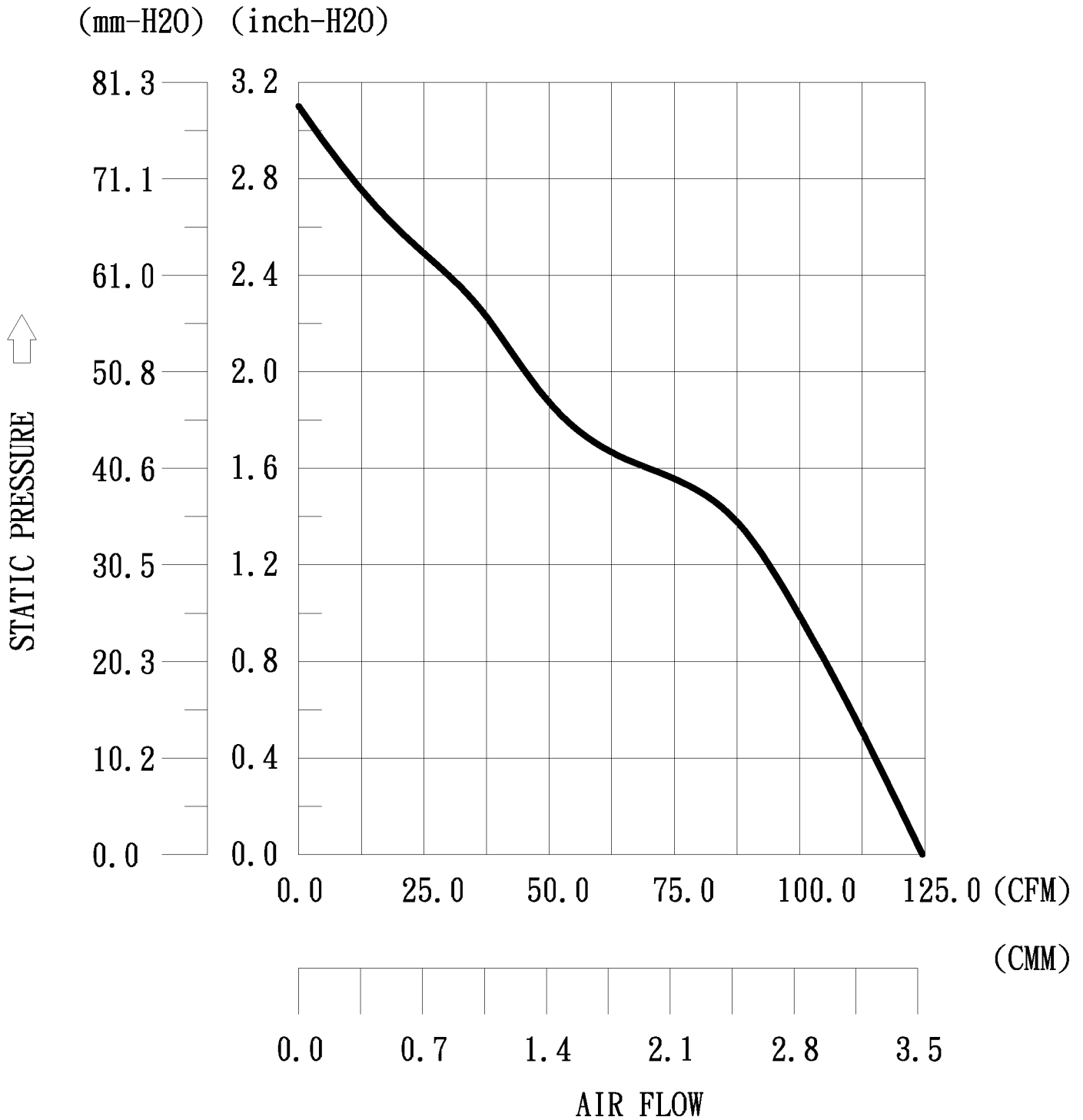
Third Angle
Projection

Pin Assignmant

NO.	Signal	Wire Gauge	Color
1	(-)	UL1061 AWG #24	Black
2	FG	UL1061 AWG #26	Blue
3	PWM	UL1061 AWG #26	Yellow
4	(+)	UL1061 AWG #24	Red

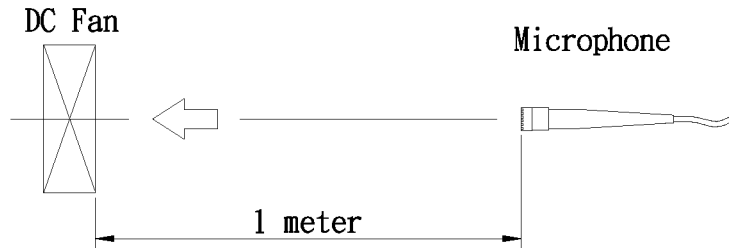
6. Performance Curve

The following PQ curve are measured in wind tunnel by AMCA 210 Standard.



7. Noise Measuring Conditions

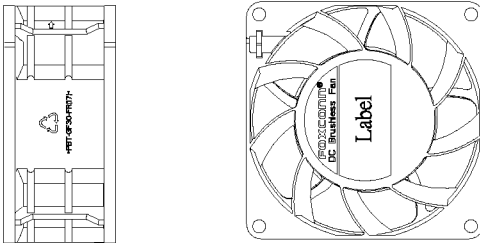
- 7.1 Noise is measured at semi-anechoic chamber in free air with microphone at a distance of 1 meter apart from the axis of fan at intake side.
- 7.2 Chamber background noise level: < 16.0dB(A)
- 7.3 Chamber cut-off frequency: 100Hz



8. Mounting Position

The DC brushless fan should be mounted as what suggested below. (denoted by)

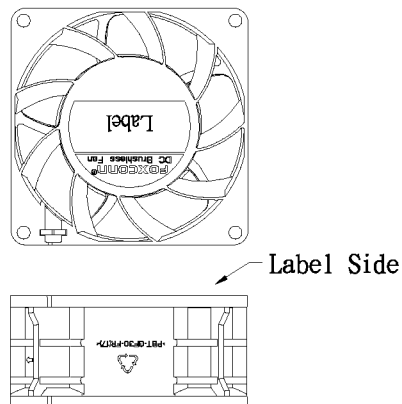
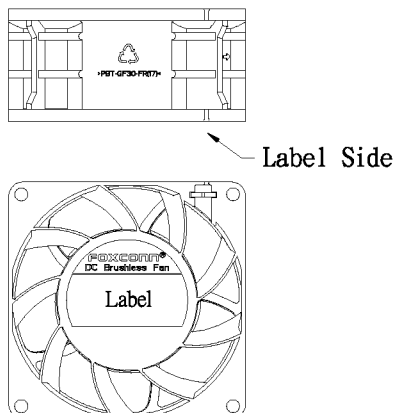
Label is in vertical direction



Label is in horizontal direction

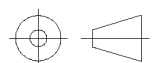
Label Side Downward

Label Side Upward



Unit:mm

↓ Gravity Direction



Third Angle Projection

9. Reliability and Life Test

9.1 Reliability Test

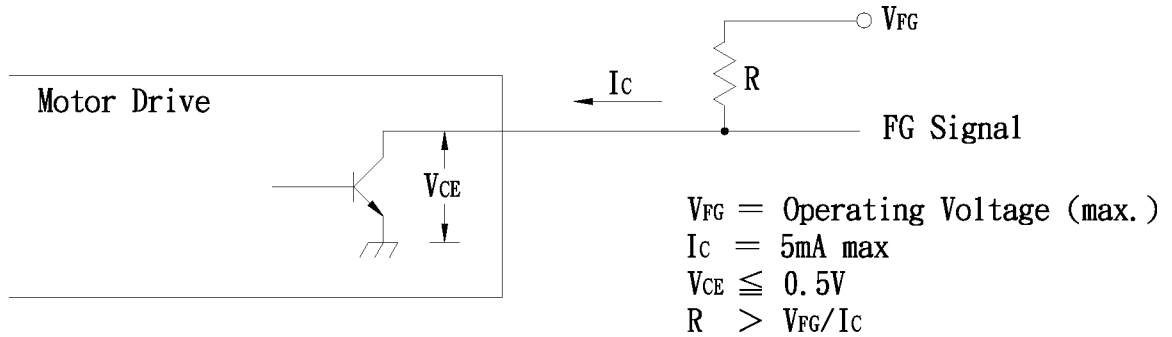
No.	Items	Test Condition
9.1.1	Low Temperature Test (Non-operating)	1). Temperature: -40 ± 2 °C 2). Duration: 96 hours 3). Normal ambient condition for 4 hours
9.1.2	High Temperature Test (Non-operating)	1). Temperature: 85 ± 2 °C 2). Duration: 96 hours 3). Normal ambient condition for 4 hours
9.1.3	Thermal Shock Test (Non-operating)	1). Low Temperature: $-40^{\circ}\text{C}/30\text{min.}$ 2). High Temperature: $+85^{\circ}\text{C}/30\text{min.}$ 3). Transition time: Less than 5 minutes 4). Number of cycles: 10
9.1.4	Humidity Exposure Test (Non-operating)	1). Temperature: 70°C 2). Humidity: 90 ~ 95%[RH] 3). Duration: 96 hours
9.1.5	Mechanical Shock Test (Non-operating)	1). Pulse Shape: half-sine 2). Peak Acceleration: 50G 3). Duration Time: 11 ms 4). Orientation: X, Y, Z, -X, -Y, -Z 5). 5 shocks each orientation (totally 30 shocks)
9.1.6	Vibration Test (Non-Operating)	1). Frequency Range: 10 ~ 100 Hz 5 min/sweep 2). Input Acceleration: $49 \text{ m/ s}^2(5\text{G})$ 3). Duration Time: 30 minutes / per axis 4). Direction: 3 mutually perpendicular axes (X, Y, Z axes) 5). Test Cycles: 1 cycle

9.2 Life Test

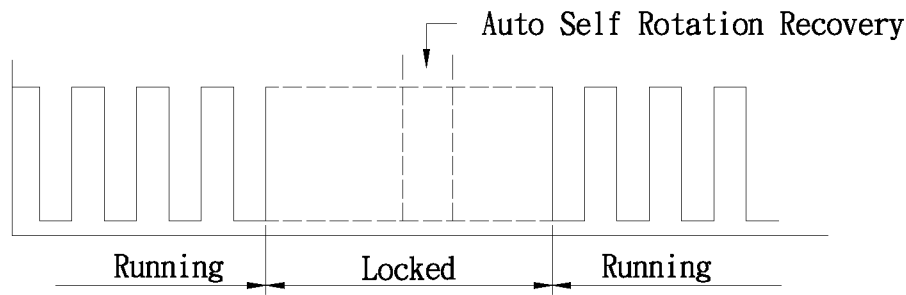
Items	Test Condition	Failure Criteria
Life Demonstration (Operating)	1). Taken accelerated life test 2). Taken zero failure Weibull test strategy 3). Rated voltage 4). Max. operating temperature	Speed < initial - 15% Current > initial + 15% Noise > initial + 3 dB(A)

10. Electrical Characteristics

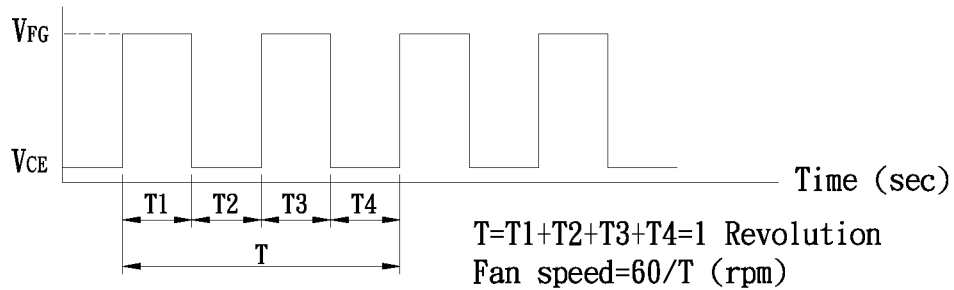
10.1 Output circuit - Open collector mode:



10.2 Frequency Generator Waveform:



For 4 poles / per revolution



10.3 Polarity Protection

At rated voltage, the DC fan would withstand the reverse connection between positive and negative leads.

10.4 Locked Rotor Protection

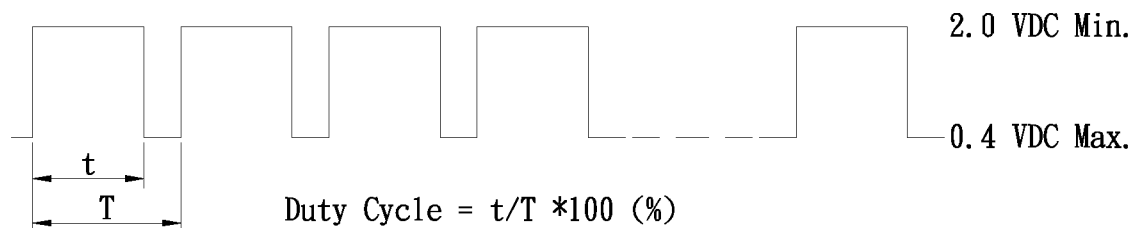
At rated voltage, winding coil of DC fan would not be damaged while the rotor is locked.

10.5 Auto-Restart

With locked rotor protection, the fan will restart once the lock state is over.

11. PWM Control Input Signal

11.1 PWM Signal Waveform:



Frequency of control signal : 25 kHz

At 100% duty cycle, the rotor will spin at maximum speed

With control signal lead disconnected, the fan will spin at maximum speed

11.2 Table of Fan Speed and PWM Signal:

Duty Cycle	0 %	100 %
Fan speed	0 rpm	12000±10% rpm

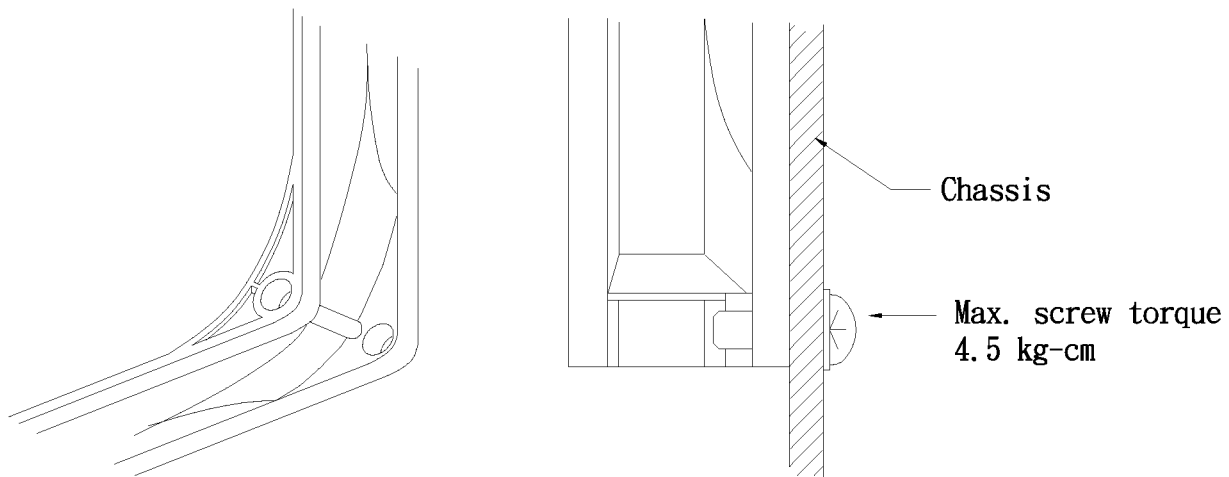
The Min. Started Duty Cycle is 25% .

Appendix

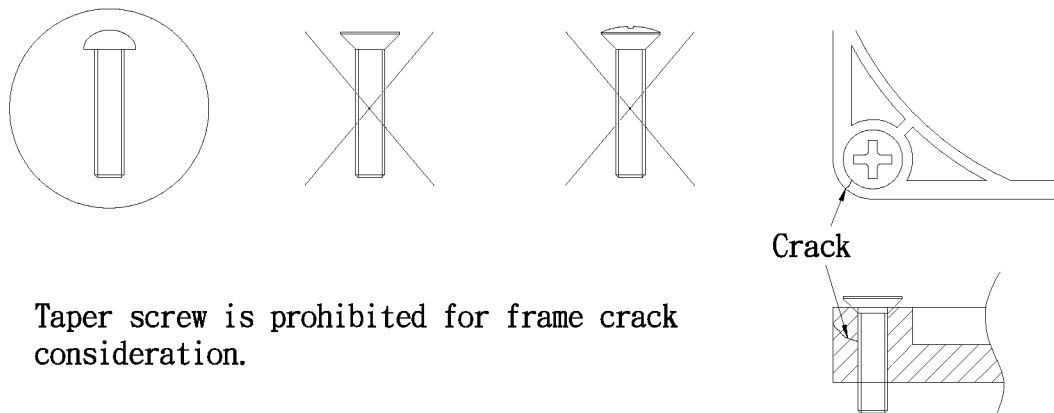
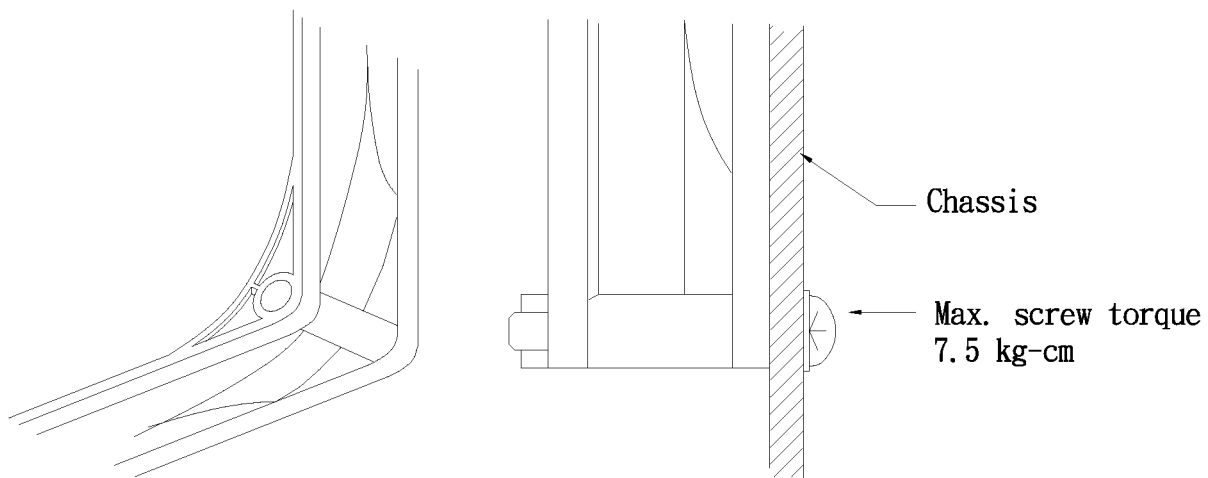
1. The fan's performance is not guaranteed if the application condition falls outside the parameters on the approval sheet.
2. A written notice is required to be submitted to Foxconn prior to approval if any deviation exists.
3. Damage may be caused when a) pressure is applied to the impeller, b) the fan is handled by the lead wires, or c) the fan is dropped.
4. There is no guarantee that the fan will be free from any safety problems or failures as caused by powder, dust, water, or encroachment of insect into the hub, unless otherwise specified.
5. The above-mentioned conditions are example samples and should be viewed as the first point of reference prior to all other information.
6. It is very important to establish the correct polarity before connecting the fan to the power source. Damage may be caused to the fan if it is connected with reverse polarity.
7. The fan will be damaged where any corrosive fluids are introduced.
8. Please ensure the fan is required to be stored according to the storing condition specified. Storing the fan in a high humidity environment is not allowed. The fan's performance is required to be verified if the fans have been stored over 6 months.
9. Intentionally or not, any force applied to the impeller of a fan without the locked rotor protection feature will lead to performance failure, unless otherwise specified.
10. Incorrect mounting of fans may cause unexpected resonance, vibration, and subsequent noise.
11. In consideration of safety, a suitable fan guard should be fitted to the fan to prevent any potential injury.
12. Except where specifically stated, all tests are carried out at relative (ambient) temperature, 25°C and 65% humidity. The value is only for the fan performance itself.
13. A " 4.7 μ F" or higher capacitor is recommended to be connected to the fan externally when multiple fans are used in parallel to avoid any unstable power.
14. The fan warranty is limited to the replacement of the failed fan free of charge, if and only if the failure is found within two years after it was shipped out from factory, and if the cause of the failure is proven to be attributable to the supplier. Our liability does not extend to the consequential damages caused by the failed fan.

12. Screwing Torque Suggestion

* Flange Frame



* Rib Frame



Taper screw is prohibited for frame crack consideration.