

FOXCONN TECHNOLOGY CO., LTD  
鴻準精密工業股份有限公司

# PART APPROVAL SHEET

Customer Name: \_\_\_\_\_  
 Customer P/N: \_\_\_\_\_ N/A P/N Rev: \_\_\_\_\_ N/A  
 End Customer: \_\_\_\_\_ N/A  
 End Customer P/N: \_\_\_\_\_ N/A P/N Rev: \_\_\_\_\_ N/A  
 Model No: \_\_\_\_\_ PIA040H12P  
 Foxconn P/N: \_\_\_\_\_ PIA040H12P-PA0-AB P/N Rev: \_\_\_\_\_ X0

<< Revision History >>

Rev.	Revision Description	Date	Remark
X0	Initial Drawing	2020/08/26	

<< Customer Signature >>

Please sign back if the part is approved

**Address:**

China: No. 35, Hua Bao North Road, Chengxi Industrial Park, Foshan City, Guangdong Province, China.  
 Post code: 528051  
 Tel: (86-757)88021668 Ext: 17650-4  
 Fax: (86-757)88021668 Ext: 17881  
 Taiwan: No. 2, Ziyou St., Tucheng Dist., New Taipei city 236, Taiwan (R.O.C.)  
 Post code: 236  
 Tel: (886-2)22680970 Ext: 6752  
 Fax: (886-2)22680972

**連絡地址:**

中國: 廣東省佛山市城西工業區華寶北路35號  
 郵編: 528051  
 電話: (86-757)88021668 Ext: 17650-4  
 傳真: (86-757)88021668 Ext: 17881  
 台灣: 新北市土城區土城工業區自由街2號  
 郵編: 236  
 電話: (886-2)22680970 Ext: 6752  
 傳真: (886-2)22680972

<< Foxconn Signature >>

Approved By	Checked By	Safety checked By	Prepared By

## 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:           -10~70°C    and  5~90%[RH]  
2.2 Storing:             -40~75°C    and  5~95%[RH]

## 3. Rated Test Condition

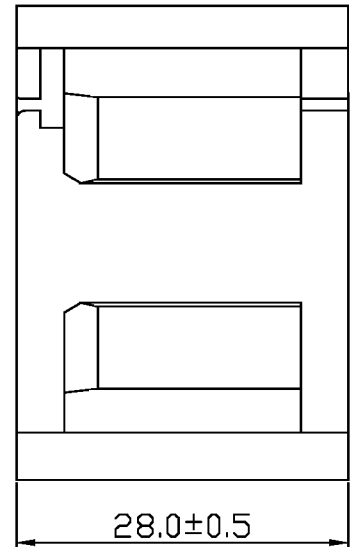
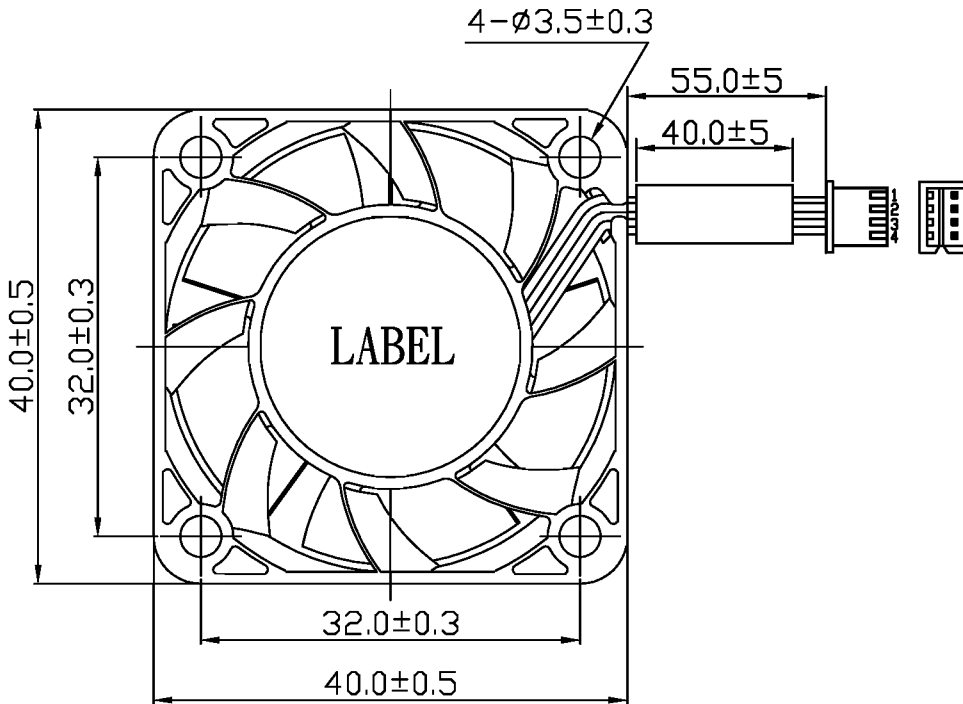
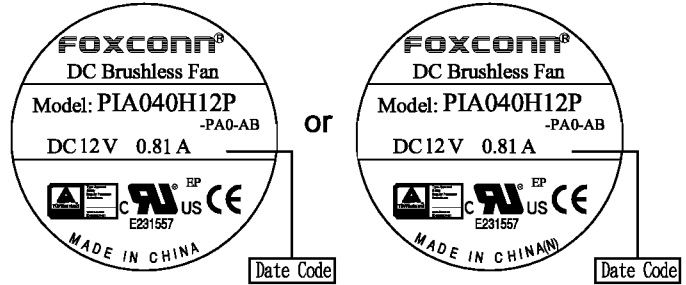
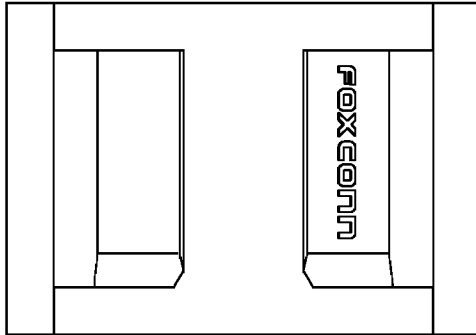
- 3.1 Environment condition  
    Temperature: 25 °C  
    Humidity: 65%[RH]  
    Atmosphere: 1 atm  
3.2 Rated Voltage : 12.0 VDC  
3.3 Duration Time : After 2 minutes in free air

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

No.	Items	Specification	Remark
1	Rated Voltage	12.0 VDC	
2	Operation Voltage	10.8~13.2 VDC	
3	Consuming Current	0.61A (0.81 Max.)	Safety current is referred to Label in Section 5 Mechanical Drawing.
4	Consuming Power	7.32 W (9.72W max.)	
5	Rated Speed	18000±10% RPM	
6	Maximum Air Flow	0.75 M <sup>3</sup> /min(0.67min.) 26.33 CFM (23.69min.)	Details in Section 6
7	Maximum Static Pressure	51.82 mmH <sub>2</sub> O (41.97min.) 2.04 inH <sub>2</sub> O (1.65min..)	Details in Section 6 Measured at Q=0
8	Acoustic Noise	53.8 dB(A)(57.8max.)	Details in Section 7
9	Life Expectance	70000 hours at 40°C	Refer to Section 9.2
10	Insulation Strength	10 MΩ min. at 500 VDC	Measure between frame and terminal(+)
11	Dielectric Strength	5 mA max. at 500 VAC 60 Hz and 1 minute	Measure between frame and terminal(+)
12	Insulation Level	UL Class A	

## 5. Mechanical Drawing

### Label Drawing



← Air Flow Direction

Unit:mm

ROTATION DIRECTION

#### Note:

1. Frame : PLASTIC, UL 94V-0 Black
2. Impeller : PLASTIC, UL 94V-0 Black
3. Lead Wire : UL1061 AWG#26
4. H/S Tube : ∅3.0, 125°C, 600V, Black, VW-1, Red Phosphorus-free
5. Housing : HST H2500J-04 or JST XHP-4
6. Terminal : HST T2500J or JST SXH-002T-P0.6  
JST SXH-001T-P0.6
7. Bearing Type : Two Ball Bearings (2B)
8. Weight : 45 Gram
9. This product is RoHS 2.0 compliant.
10. Conformal coating on PCBA to protect the boards components.

#### Pin Assignment

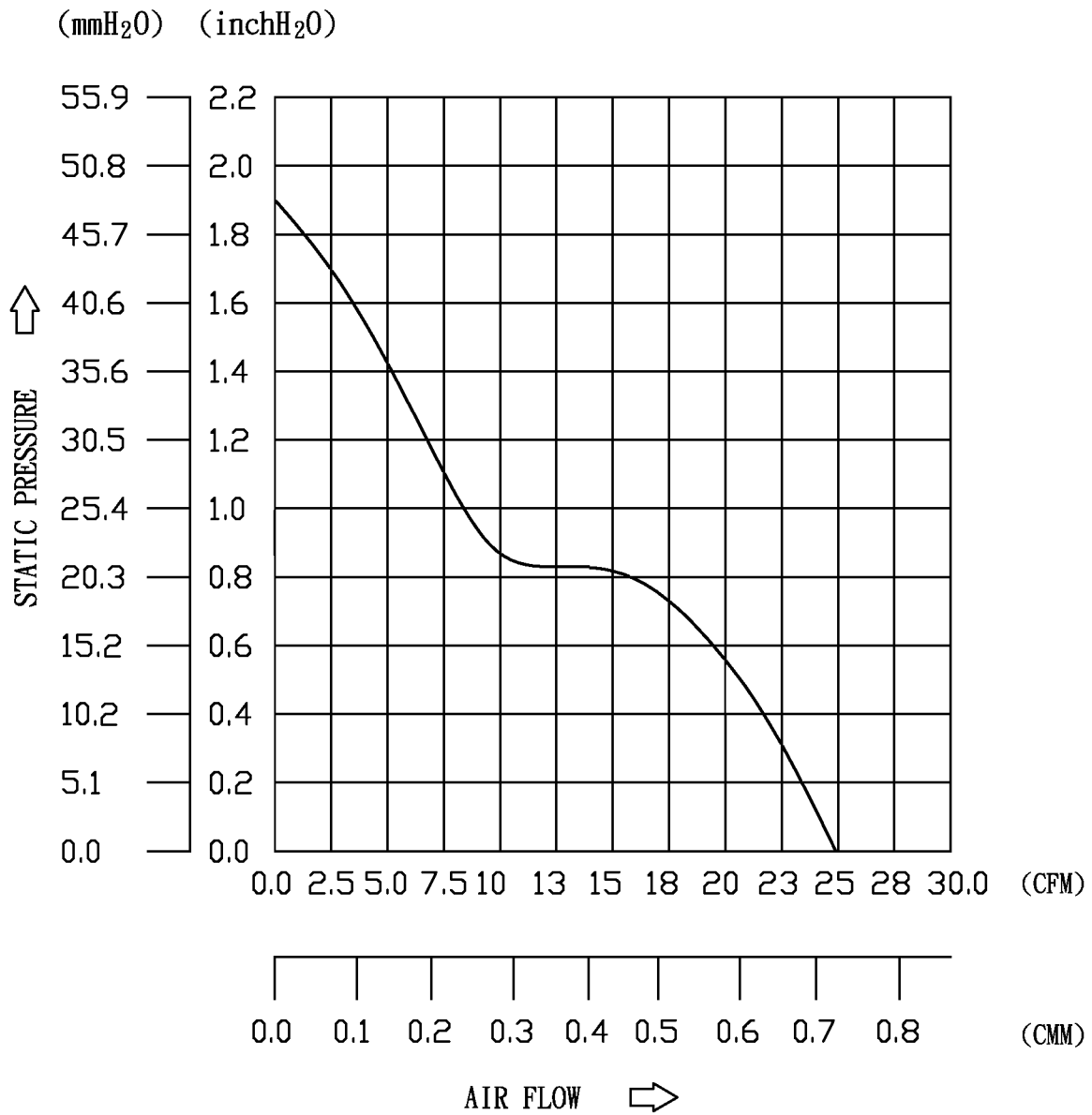
NO.	Signal	Color
1	PWM	BLUE
2	FG	YELLOW
3	(+)	RED
4	(-)	BLACK

↓ Gravity Direction

⊕ Third Angle Projection

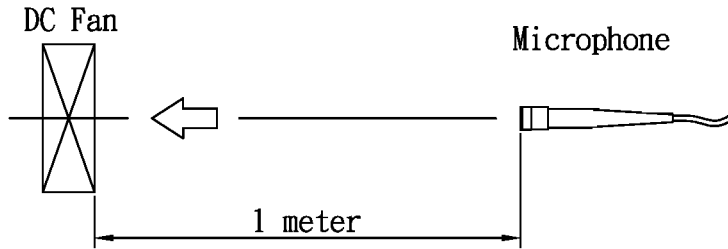
## 6. Performance Curve

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

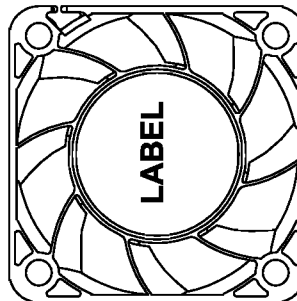
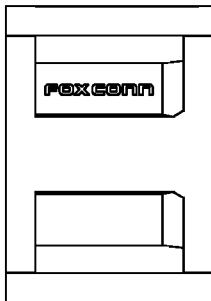


## 8. Mounting Position

We would like to suggest you mounting DC fan in following selection direction (denoted by ), if you have another mounting type, please contact with us

### Shaft horizontal

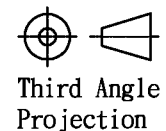
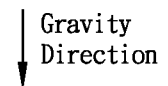
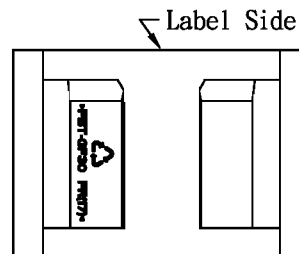
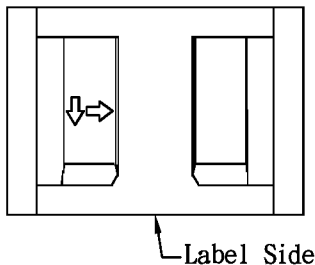
- Any Horizontal Direction



### Shaft Vertical

- Label Side Downward

- Label Side Upward



## 9. Reliability and Life Test

### 9.1 Reliability Test

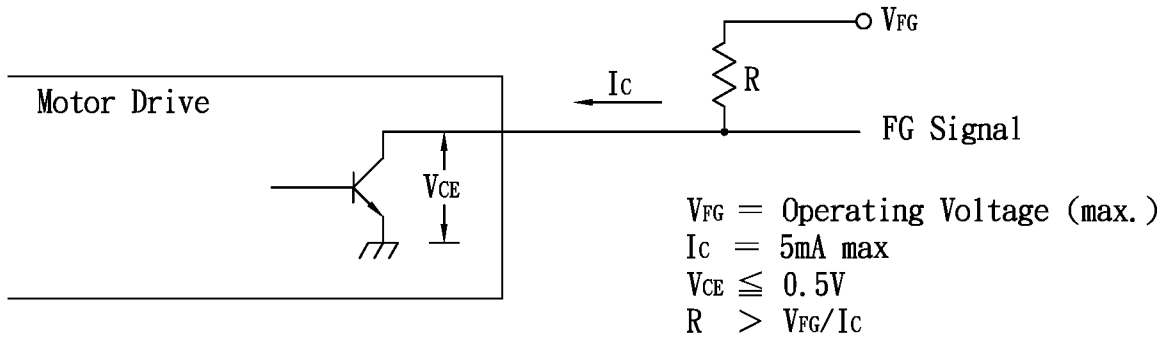
No.	Items	Test Condition
1	Low Temperature Test (Non-Operating)	1). Temperature: $-40\pm 2$ °C 2). Duration: 96 hours 3). Normal ambient condition for 4 hours
2	High Temperature Test (Non-Operating)	1). Temperature: $85\pm 2$ °C 2). Duration: 96 hours 3). Normal ambient condition for 4 hours
3	Thermal 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
4	Humidity Exposure Test (Non-Operating)	1). Temperature: $70^{\circ}\text{C}$ 2). Humidity: 90 ~ 95%[RH] 3). Duration: 96 hours
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)
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

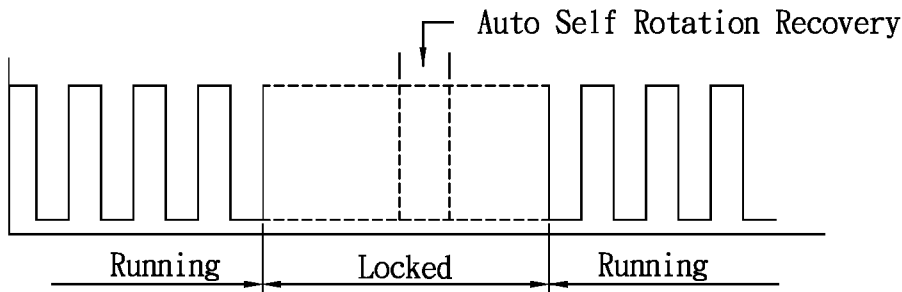
Items	Test Condition	Failure Criteria
Life Demonstratin (Operating)	1). Taken accelerated life test 2). Taken zero failure Weibull test strategy 3). Rated voltage 4). Max. operating temperature	Speed < initial - 15% Current > initial + 15% Noise > initial + 3 dB(A)

## 10. Electrical Characteristics

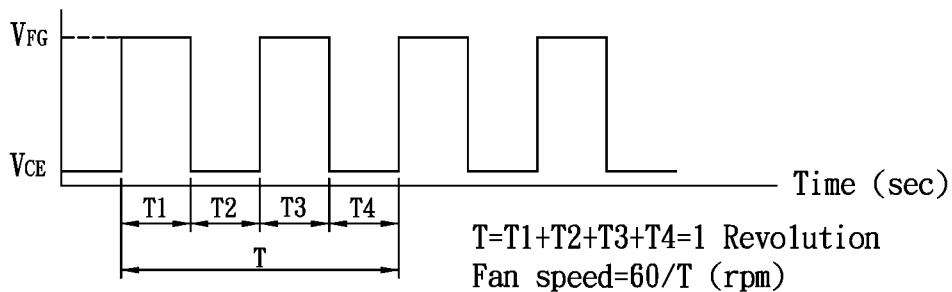
### 10.1 Output circuit - Open collector mode:



### 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 Lock Protection

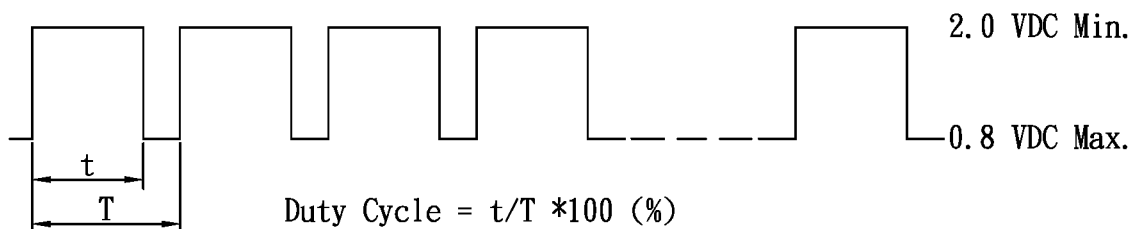
At rated voltage, winding coil of DC fan has not burning when lock rotor for 72 hours

### 10.5 Auto-Restart

The current will shut down and restart while lock the fan rotor.

## 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 (OPERATION VOLTAGE : 12 VDC AND OPERATION CONDITION: 25°C)

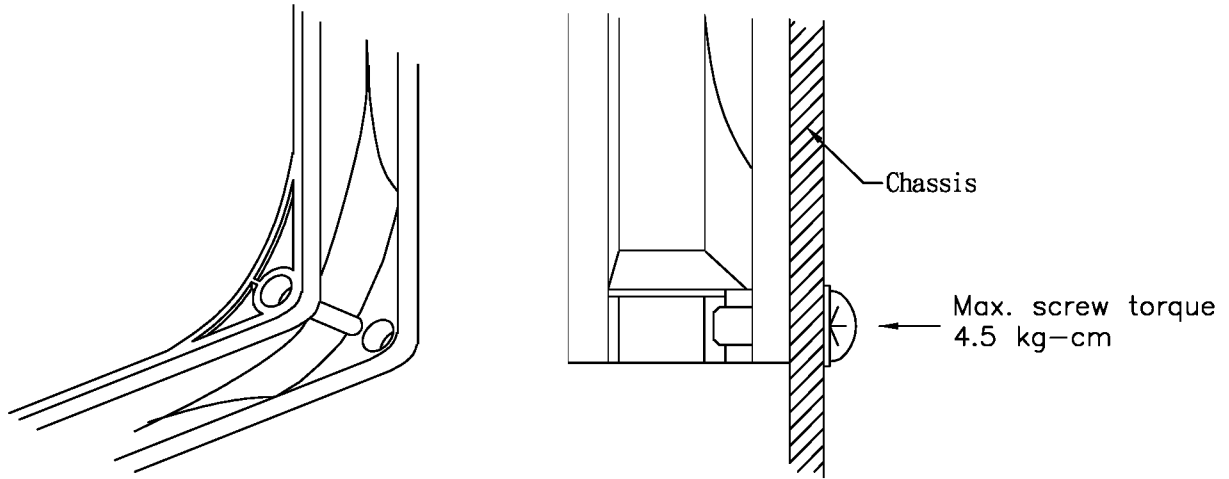
Duty Cycle	0 %	30 %	52 %	67 %	90 %	100 %
Fan speed	1000±500 rpm	3300±500 rpm	8300±10% rpm	11000±10% rpm	16000±10% rpm	18000±10% rpm

The Min. Started Duty Cycle is 0% .

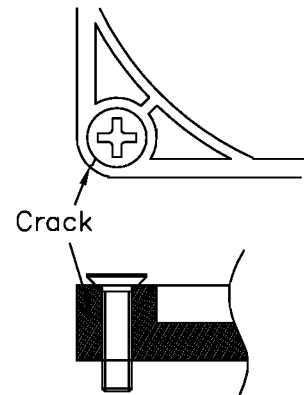
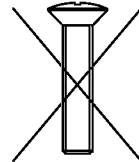
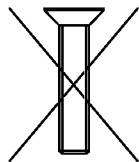
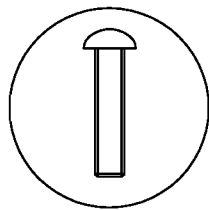
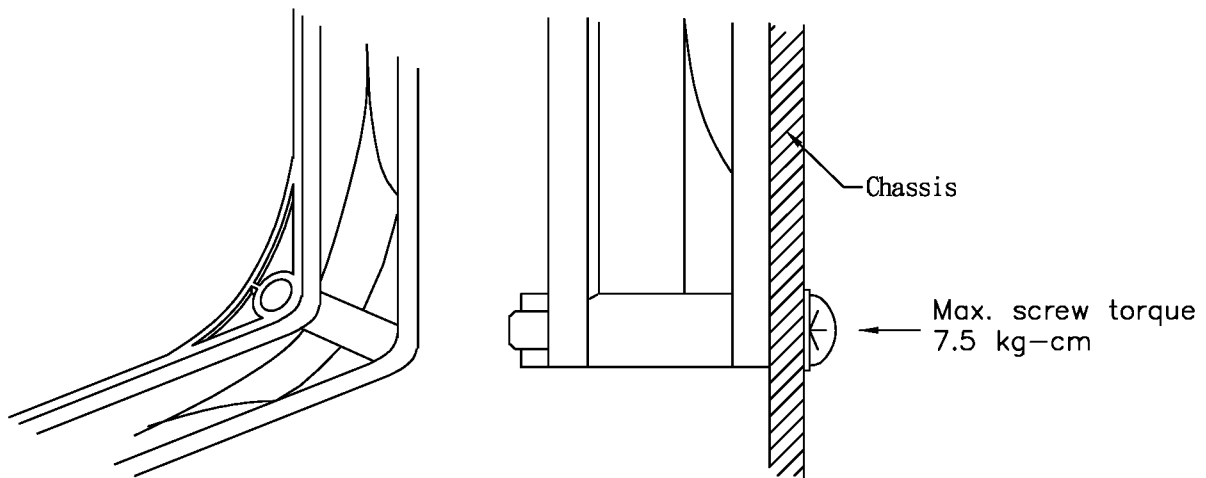


## 12. Screwing Torque Suggestion

### \* Flange Frame



### \* Rib Frame



Taper screw is prohibited for frame crack consideration.

## 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 $\mu$ 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.