# SPECIFICATION FOR APPROVAL

Customer : STD

Description : DC FAN

Customer Part No. _____ REV. : _____

Delta Model No. : FFB0424EHN-CP0 REV. : 00

Sample Issue No. : _____

Sample Issue Date : APR.01.2024

PLEASE SEND ONE COPY OF THIS SPECIFICAITON BACK AFTER YOU SIGNED APPROVAL FOR PRODUCTION PRE-ARRANGMENT.

APPROVED BY:

DATE :

DELTA ELECTRONICS, INC.
TAOYUAN PLANT
252, SHANGYING ROAD, GUISHAN INDUSTRIAL ZONE,
TAOYUAN CITY 33341, TAIWAN
TEL:886-(0)3-3591968
FAX:886-(0)3-3591991

# *** SAMPLE HISTORY***

CUSTOMER: STD

CUSTOMER P/N:

DELTA MODEL: FFB0424EHN-CP0

| REV. | DESCRIPTION | DRAWN | CHECKED | | | APPROVED | ISSUE DATE |
|---|---|---|---|---|---|---|---|
| | | | ME | EE | CE | | |
| 00 | ISSUE SPEC | 高國興 04/01'24 | 高國興 04/01'24 | 魯耿銘 04/01'24 | --- | 吳俊男 04/01'24 | 04/01'24 |
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DELTA ELECTRONICS, INC.
252, SHANGYING ROAD, GUISHAN INDUSTRIAL ZONE, TEL : 886-(0)3-3591968
TAOYUAN CITY 33341, TAIWAN FAX : 886-(0)3-3591991

# STATEMENT OF DEVIATION

■ NONE

□ DESCRIPTION:

DELTA ELECTRONICS, INC.
252, SHANGYING ROAD, GUISHAN INDUSTRIAL ZONE, TEL : 886-(0)3-3591968
TAOYUAN CITY 33341, TAIWAN FAX : 886-(0)3-3591991

# SPECIFICATION FOR APPROVAL

Customer : STD

Description : DC FAN

Customer P/N : rev. :

Delta model no. : FFB0424EHN-CP0 Delta Safety Model No.: FFB0424EHN-C

Sample revision. : 00 Issue no.:

Sample issue date : APR.01.2024 Quantity :

1. SCOPE:
THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN.

2. CHARACTERS:

| ITEM | DESCRIPTION |
|---|---|
| RATED VOLTAGE | 24.0 VDC |
| OPERATION VOLTAGE RANGE | 20.4 - 26.4 VDC |
| INPUT CURRENT(AVG.)★<br>(AT RATED VOLTAGE / FREE AIR) | 0.15 (MAX. 0.20) A<br>SAFETY CURRENT ON LABEL : 0.28A |
| INPUT POWER(AVG.)★<br>(AT RATED VOLTAGE / FREE AIR) | 3.60 (MAX. 4.80) W |
| SPEED<br>(AT RATED VOLTAGE / FREE AIR) | 13100 ± 10% R.P.M. |
| MAX. AIR FLOW<br>(AT ZERO STATIC PRESSURE) | 0.50 (MIN. 0.45) $M^3$/MIN.<br>17.67 (MIN. 15.903) CFM |
| MAX. AIR PRESSURE<br>(AT ZERO AIRFLOW) | 26.41 (MIN. 21.39) mm$H_2O$<br>1.04 (MIN. 0.842) inch$H_2O$ |
| ACOUSTICAL NOISE (AVG.) | 50.0 (MAX. 54.0) dB-A |
| INSULATION TYPE | UL: CLASS A |
| INSULATION STRENGTH | 10 MEG OHM MIN. AT 500 VDC<br>(BETWEEN FRAME AND (+) TERMINAL) |
| DIELECTRIC STRENGTH | 5 mA MAX. AT 500 VAC 50/60 Hz ONE MINUTE,<br>(BETWEEN FRAME AND (+) TERMINAL) |

★AVG. IS THE AVERAGE VALUE DURING STEADY OPERATION, AND MAX. IS MAXIMUM AVERAGE VALUE INCLUDED PRODUCTION TOLERANCE. ABOUT THE PEAK VALUE, NEED TO USE OSCILLOSCOPE TO MEASURE.

(continued)

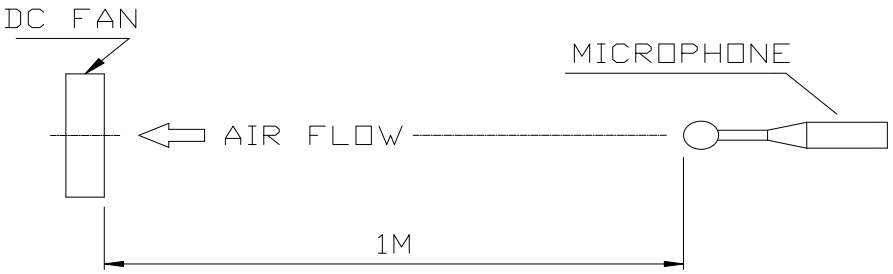
PART NO:

DELTA MODEL: FFB0424EHN-CP0

| | |
|---|---|
| LIFE EXPECTANCE (L10)<br>(AT LABEL VOLTAGE) | 70,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH. |
| ROTATION | CLOCKWISE VIEW FROM NAME PLATE SIDE. |
| LOCKED ROTOR PROTECTION | THE CURRENT WILL SHUT DOWN, WHEN ROTOR LOCKED AND FIXED. |

NOTES:

1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP THROUGH 10 MINUTES.
2. STANDARD AIR PROPERTY IS AIR AT (Td) 25°C TEMPERATURE, (RH) 65% RELATIVE HUMIDITY , AND (Pb) 760 mmHg BAROMETRIC PRESSURE.
3. THE VALUES WRITTEN IN PARENS , ( ), ARE LIMITED SPEC.
4. ACOUSTICAL NOISE MEASURING CONDITION:




NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN SEMI-ANECHOIC CHAMBER WITH MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE.

PART NO:

DELTA MODEL: FFB0424EHN-CP0

3.MECHANICAL:

3-1. DIMENSIONS---------- SEE DIMENSIONS DRAWING
3-2. FRAME---------- PLASTIC UL: 94V-0
3-3. IMPELLER---------- PLASTIC UL: 94V-0
3-4. BEARING SYSTEM---------- TWO BALL BEARINGS
3-5. WEIGHT---------- 47 GRAMS(REF.)

4. ENVIRONMENTAL:

4-1. OPERATING TEMPERATURE---------- -10 TO +70 DEGREE C
4-2. STORAGE TEMPERATURE---------- -40 TO +75 DEGREE C
4-3. OPERATING HUMIDITY---------- 5 TO 90 % RH
4-4. STORAGE HUMIDITY---------- 5 TO 95 % RH

5. PROTECTION:

5-1. LOCKED ROTOR PROTECTION
IMPEDANCE OF MOTOR WINDING PROTECTS MOTOR FROM FIRE IN 96 HOURS OF LOCKED ROTOR CONDITION AT THE RATED VOLTAGE.

5-2. POLARITY PROTECTION
BE CAPABLE OF WITHSTANDING IF REVERSE CONNECTION FOR POSITIVEAND NEGATIVE LEADS.

6. RE OZONE DEPLETING SUBSTANCES:

6-1. NO CONTAINING PBBs, PBBOs, CFCs, PBBEs, PBDPEs AND HCFCs.

7. PRODUCTION LOCATION

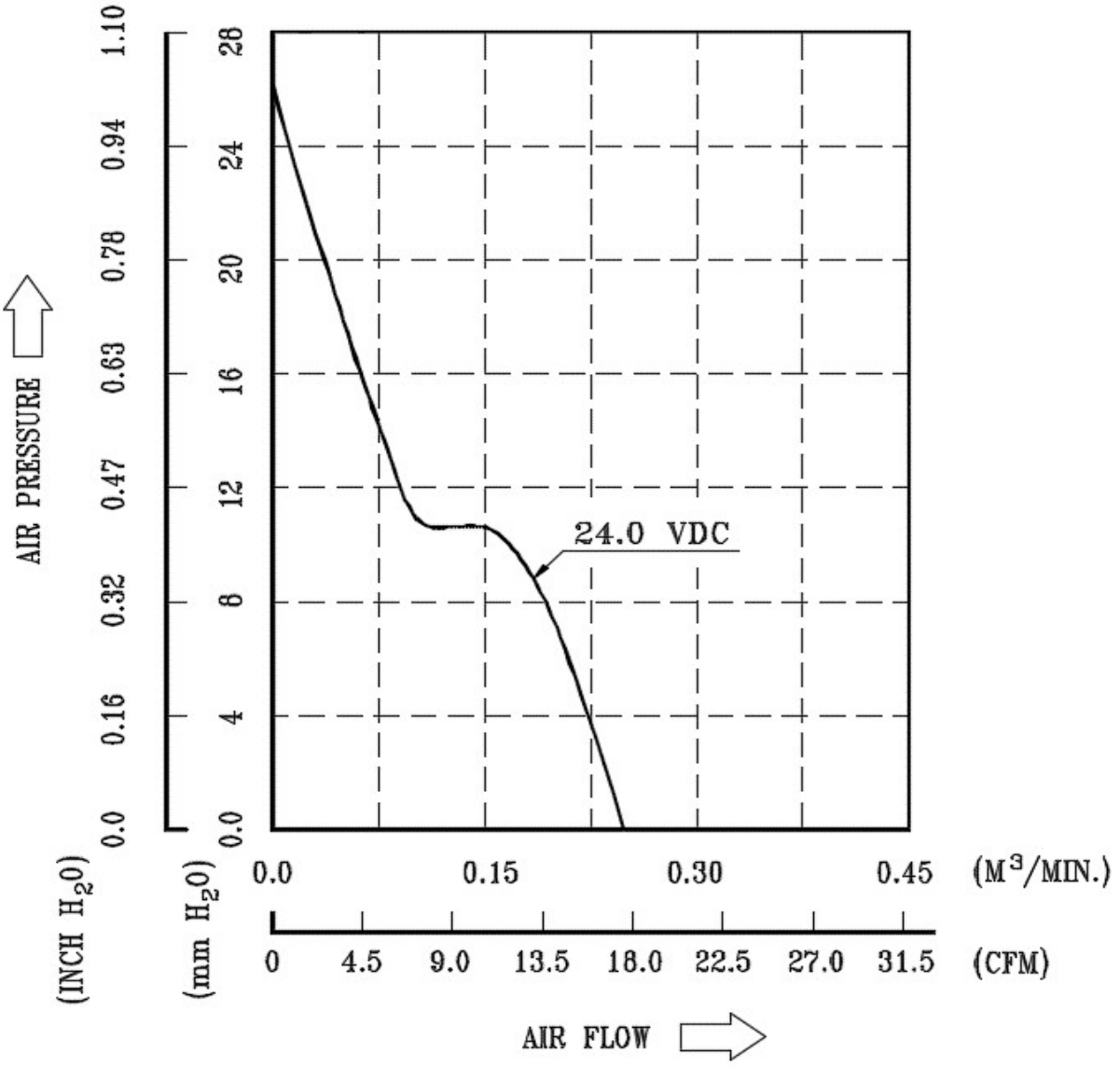
7-1. PRODUCTS WILL BE PRODUCED IN CHINA OR THAILAND.

8. FAN MAY HAVE MULTIPLE SOURCES FOR RAW MATERIALS.
MAIN MATERIALS AND ALTERNATIVE MATERIALS WILL MEET FAN SPEC CHARACTERISTIC.

PART NO:

DELTA MODEL: FFB0424EHN-CP0

9. P & Q CURVE:



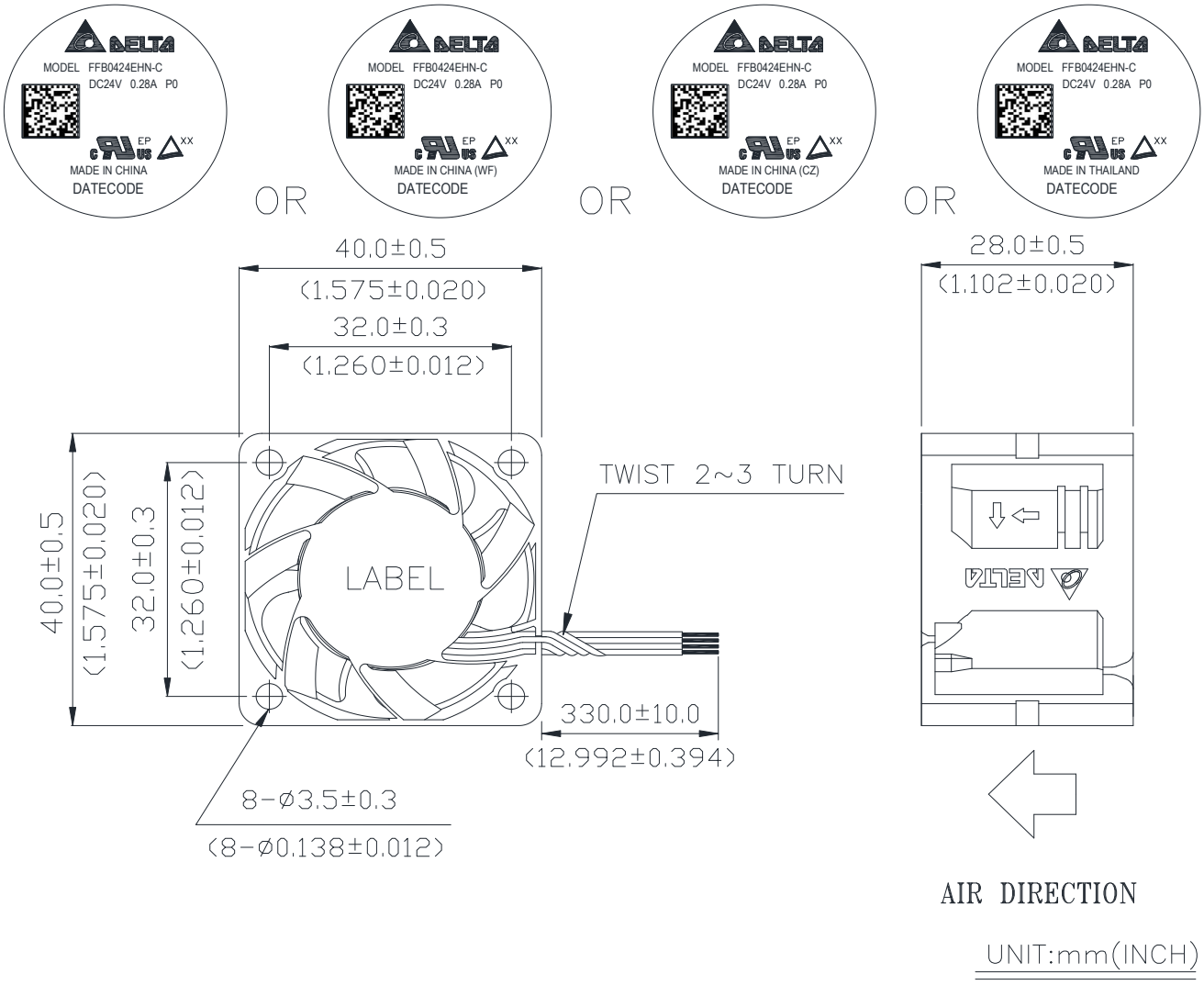

*TEST CONDITION: INPUT VOLTAGE-----OPERATION VOLTAGE
TEMPERATURE------ROOM TEMPERATURE
HUMIDITY-----65%RH

PART NO:

DELTA MODEL: FFB0424EHN-CP0

10. DIMENSION DRAWING:

LABEL CONTENT:




NOTES:

1. CABLE WIRE: UL10368 AWG#28
   RED WIRE ------ (+)
   BLUE WIRE ----- (F00)
   YELLOW WIRE ----- (PWM)
   BLACK WIRE ----- (-)
2. THIS PRODUCT IS RoHS COMPLIANT

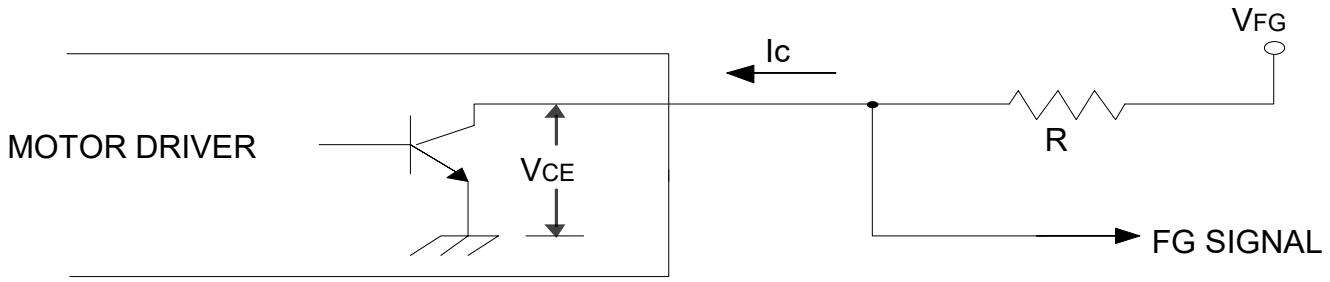
★ 3. IF THE CUSTOMER NEEDS TO CRIMP THE TERMINAL BY HIMSELF, PLEASE ENSURE THAT THE MACHINE IS WELL GROUNDED BEFORE CRIMPING THE TERMINAL TO AVOID ACCIDENTAL ABNORMAL VOLTAGE AFFECTING THE FAN.

PART NO:

DELTA MODEL: FFB0424EHN-CP0

11. FREQUENCY GENERATOR (FG) SIGNAL:

11-1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:




CAUTION:

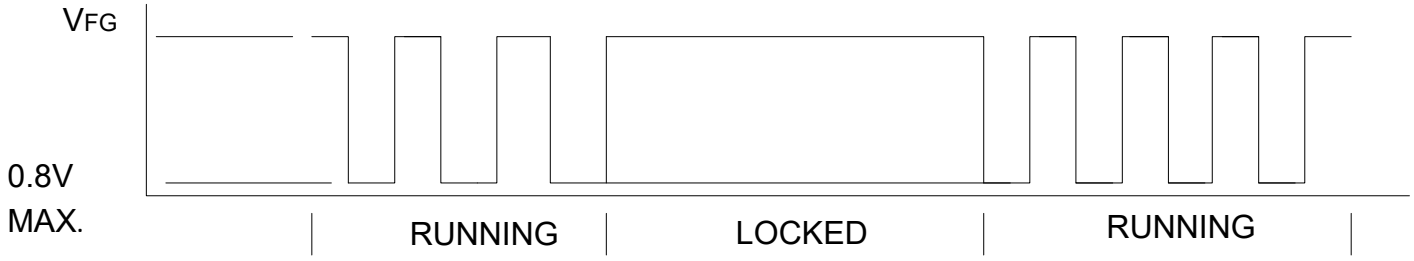
THE LEAD WIRE OF FG SIGNAL CAN NOT TOUCH THE LEAD WIRE OF POSITIVE OR NEGATIVE.

11-2. SPECIFICATION:

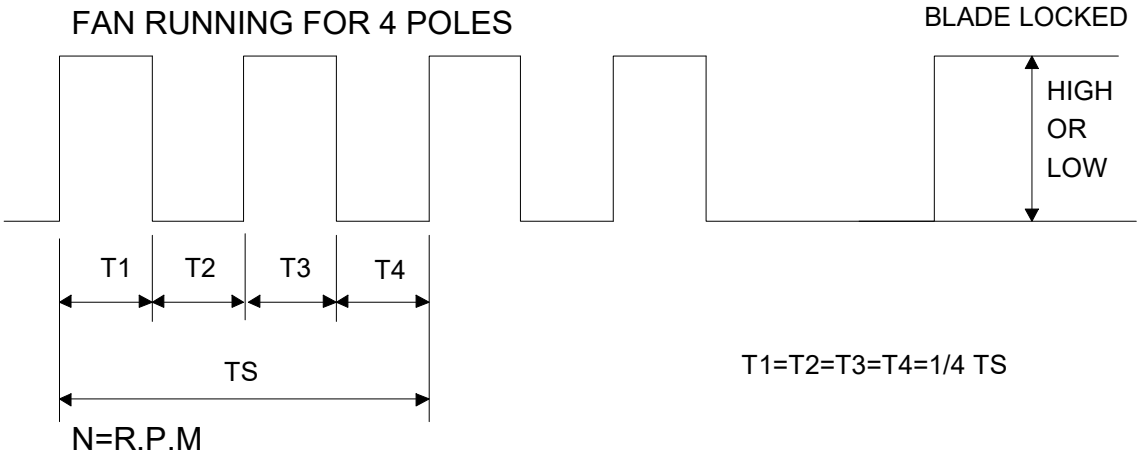
$V_{FG}$= 5.0 TYP.(Vcc MAX.) Ic = 5mA MAX.

$V_{CE}$= 0.8V MAX. $R \geqq V_{FG}/Ic$

11-3. FREQUENCY GENERATOR WAVEFORM:




FAN RUNNING FOR 4 POLES




T1=T2=T3=T4=1/4 TS

N=R.P.M

TS=60/N(SEC)

*VFG IS ALWAYS HIGH OR LOW LEVEL AFTER BLADE LOCKED

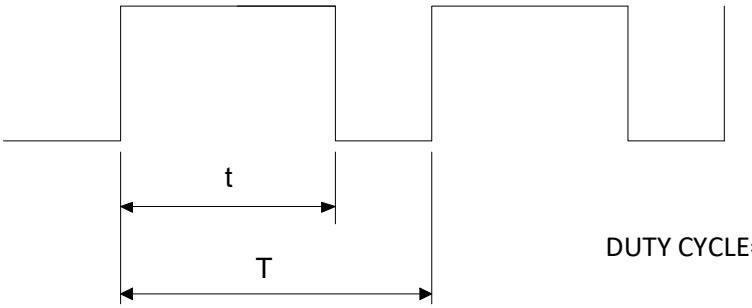
*4 POLES

PART NO:

DELTA MODEL: FFB0424EHN-CP0

12. PWM CONTROL SIGNAL:

12-1 SIGNAL VOLTAGE RANGE: 0~5.0VDC




HIGH SIGNAL: 5.0 VDC MAX. / 2.8 VDC MIN.

LOW SIGNAL: 0.8 VDC MAX. / 0 VDC MIN.

DUTY CYCLE= $\frac{t}{T}$ *100(%)

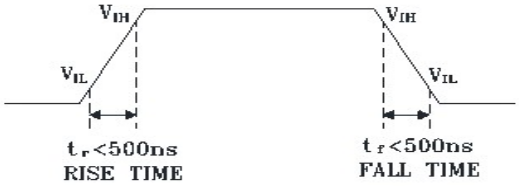
- THE PREFERRED OPERATING POINT FOR THE FAN IS 25KHZ.
- AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUN SPEED.
- AT 0% DUTY CYCLE, THE ROTOR WILL STOP.
- WITH CONTROL SIGNAL LEAD DISCONNECTED , THE FAN WILL SPIN AT MAXIMUN SPEED.

12-2 THE REQUIREMENT OF WAVEFORM QUALITY OF PWM SIGNAL

- THE RECOMMENDED PWM SIGNAL FROM SYSTEM IS TTL ($t_r$ =500ns, $t_f$ =500ns) , EVEN IF THE PWM LEAD OF FAN IS DISCONNECTED.
- THE MAXIMUM PERMISSIBLE OF WAVEFORM DISTORTION:

$V_{IH}$ : ($V_+$ - 0.5) * 90% RISE TIME : $t_r$ < 500ns

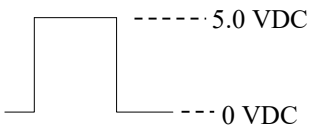
$V_{IL}$ : ($V_+$ - 0.5) * 10% FALL TIME : $t_f$ < 500ns




12-3 SPEED VS PWM CONTROL SIGNAL:
(AT 25°C, RATED VOLTAGE & PWM SIGNAL AS FOLLOW)

*PWM SIGNAL
PWM FREQUENCY = 25KHz

| DUTY CYCLE (%) | SPEED (R.P.M.) | CURRENT(A) (AVG.)★ |
|---|---|---|
| 100 | 13100±10% | 0.15 (MAX. 0.20) |
| 0 | 0 | 0.02 (MAX. 0.03) |




★AVG. IS THE AVERAGE VALUE DURING STEADY OPERATION, AND MAX. IS MAXIMUM AVERAGE VALUE INCLUDED PRODUCTION TOLERANCE. ABOUT THE PEAK VALUE, NEED TO USE OSCILLOSCOPE TO MEASURE.

• MIN. STARTED DUTY CYCLE(at 25°C, 24.0VDC): 30 %

WHEN THE FAN BLADE IS IN THE COMPETE STOP STATE AND THEN PROVIDE PWM TO START THE FAN IN ORDER TO ENSURE THAT THE FAN START-UP IS NORMAL FROM A DEAD STOP.

PART NO:

DELTA MODEL: FFB0424EHN-CP0

13. FAN CABLE ADDITIONAL PROCESS OUTSIDE DELTA

13-1. HANDLING：

13-1-1. DO NOT PRESS ROTOR OR PULL CABLE IN ANY PROCESS.

13-1-2. WEARING ELECTROSTATIC GLOVES BEFORE WORKING, MAKE SURE HOUSING ASSAMBLING MECHINE, WORKING TABLE WITH ELECTROSTATIC PROTECTION.

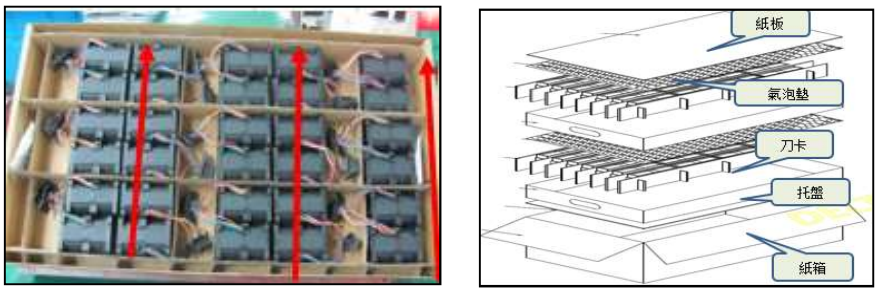
13-1-3. DO NOT WEAR OR DROP THE FAN DURING ALL PROCESS, PLEASE SCRAPE DROOPPED FAN TO AVOID BEARING DAMAGE.

13-2. TESTING：

13-2-1. MAKE SURE FAN SPEED AND FUNCTION WORKS WELL AFTER ASSAMBLY.


13-3. PACKING:

13-3-1. BE SURE OF FAN DERECTION AND HOUSING POSITION, CAN'T INTERFER CARTON OR POTTION OR OTHER MATERIAL.

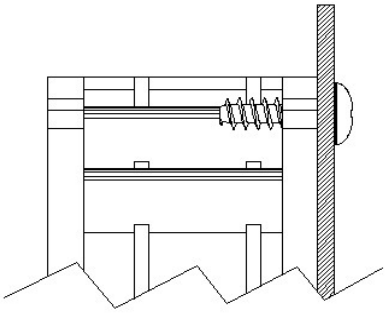



13-3-2. MAKE SURE DESICCANT, QUANTITY AND P/N IS CORRECT BEFORE PACKING.

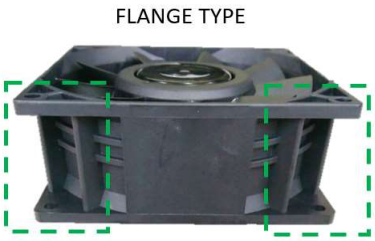
PART NO:

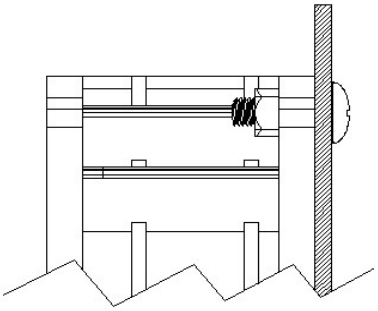
DELTA MODEL: FFB0424EHN-CP0

## 14. SCREW SPECIFICATION:

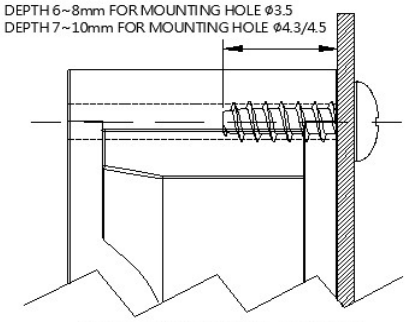


SELF-TAPPING SCREW
FLANGE MOUNTING DRAWING

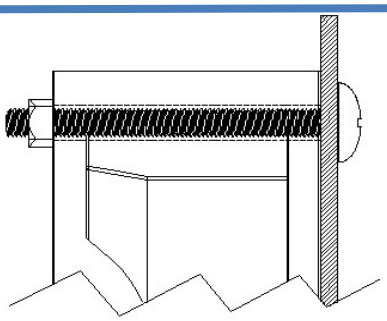


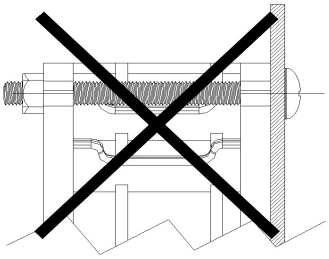
MECHANICAL SCREW
FLANGE MOUNTING DRAWING




SELF-TAPPING SCREW
RIB MOUNTING DRAWING

MECHANICAL SCREW
RIB MOUNTING DRAWING



MECHANICAL SCREW
FLANGE MOUNTING DRAWING

NOTE:

1.SELF-TAPPING SCREW ACCORDING TO JIS B 1122 TYPE 2

2.EACH SCREW HOLE CAN ONLY TIGHTENED ONCE WHEN USING SELF-TAPPING SCREW

3.IF IT WAS SLIPPAGE OR BREAK WHEN TIGHTENED SELF-TAPPING SCREW,
THEN CAN USING LOWER TORQUE THAN WE RECOMMENDED IN TABLE A .

TABLE A: MOUNTING HOLE WITH RECOMMENDED SCREW

* FOLLOW JIS B 1007

| FAN TYPE | | MOUNTING HOLE DIAMETER | SCREW TYPE | SCREW SPEC. | SCREW OUTER DIMENSION. (mm) | | RECOMMENDED MAX. TORQUE (kgf-cm) | |
|---|---|---|---|---|---|---|---|---|
| | | | | | MAXIMUM | MINIMUM | FLANGE TYPE | RIB TYPE |
| ☐ | FLANGE | Φ3.2 | SELF-TAPPING | ST3.5*1.3 | 3.53 | 3.35 | 4.5 | 5.5 |
| ☐ | RIB | | MECHANICAL | M3.0x0.5 | 2.98 | 2.88 | 4.5 | 7.5 |
| ☐ | FLANGE | Φ3.5 | SELF-TAPPING | ST4.0x1.41 | 4 | 3.85 | 5.5 | |
| ☑ | RIB | | MECHANICAL | M3.0x0.5 | 2.98 | 2.88 | 4.5 | |
| ☐ | FLANGE | Φ4.3 | SELF-TAPPING | *ST4.8x1.6 | 4.8 | 4.62 | 5.5 | |
| ☐ | RIB | | MECHANICAL | M4x0.7 | 3.97 | 3.84 | 4.5 | |
| ☐ | FLANGE | Φ4.5 | SELF-TAPPING | *ST5.0x1.59 | 5 | 4.85 | 5.5 | |
| | | | SELF-TAPPING | *ST4.8x1.6 | 4.8 | 4.62 | 5.5 | |
| ☐ | RIB | | MECHANICAL | M4x0.7 | 3.97 | 3.84 | 4.5 | |

# Application Notice

1. Delta will not guarantee the performance of the products if the application condition falls outside the parameters set forth in the specification.
2. A written request should be submitted to Delta prior to approval if deviation from this specification is required.
3. Please exercise caution when handling fans. Damage may be caused when pressure is applied to the impeller, if the fans are handled by the lead wires, or if the fan was hard-dropped to the production floor.
4. Except as pertains to some special designs, there is no guarantee that the products will be free from any such safety problems or failures as caused by the introduction of powder, droplets of water or encroachment of insect into the hub.
5. The above-mentioned conditions are representative of some unique examples and 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. Positive (+) and Negative (-). Damage may be caused to the fans if connection is with reverse polarity, if there is no foolproof method to protect against such error specifically mentioned in this spec.
7. Delta fans without special protection are not suitable where any corrosive fluids are introduced to their environment.
8. Please ensure all fans are stored according to the storage temperature limits specified. Do not store fans in a high humidity environment. We highly recommend performance testing is conducted before shipping, if the fans have been stored over 6 months.
9. Not all fans are provided with the Lock Rotor Protection feature. If you impair the rotation of the impeller for the fans that do not have this function, the performance of those fans will lead to failure.
10. Please be cautious when mounting the fan. Incorrect mounting of fans may cause excess resonance, vibration and subsequent noise.
11. It is important to consider safety when testing the fans. A suitable fan guard should be fitted to the fan to guard against any potential for personal injury.
12. Except where specifically stated, all tests are carried out at room (ambient) temperature and relative humidity conditions of 25°C, 65% RH. The test value is only for fan performance itself.
13. Be certain to connect an " 4.7μF or greater" capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.
14. Be sure that the machine is well grounded before doing crimping terminal of cable wire in order to avoid any impact due to an unexpected abnormal voltage to the fan .

# Mouser Electronics

Authorized Distributor

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Delta Electronics:

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