

DELTA ELECTRONICS, INC.
 252, SHANG YING ROAD, KUEI SAN
 TAOYUAN HSIEN 333, TAIWAN, R. O. C.

TEL : 886-(0)3-3591968
 FAX : 886-(0)3-3591991

SPECIFICATION FOR APPROVAL

Customer:

Description:	DC FAN		
Customer P/N:		REV:	
Delta Model NO.:	FFB0612HHE-F00		
Sample Rev:	01	Issue NO:	
Sample Issue Date:	JUN.27.2005.	Quantity:	

1. SCOPE:

THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN. THE FAN MOTOR IS WITH TWO PHASES AND FOUR POLES.

2. CHARACTERS:

ITEM	DESCRIPTION
RATED VOLTAGE	12 VDC
OPERATION VOLTAGE	4.5 - 13.8 VDC
INPUT CURRENT	0.23 (MAX. 0.34) A
INPUT POWER	2.76 (MAX. 4.08) W
SPEED	5000 R.P.M. (REF.)
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	0.870 (MIN. 0.780) M ³ /MIN. 30.72 (MIN. 27.55) CFM
MAX. AIR PRESSURE (AT ZERO AIRFLOW)	9.87 (MIN. 8.00) mmH ₂ O 0.388 (MIN. 0.315) inchH ₂ O
ACOUSTICAL NOISE (AVG.)	40.5 (MAX. 44.5) dB-A
INSULATION TYPE	UL: CLASS A

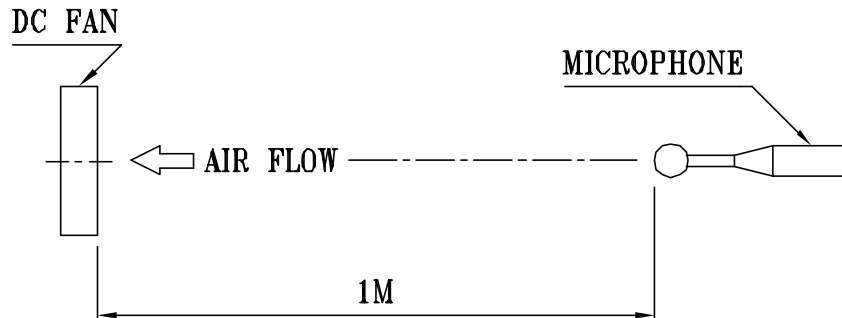
(continued)

PART NO:

DELTA MODEL: FFB0612HHE-F00

INSULATION STRENGTH	10 MEG OHM MIN. AT 500 VDC (BETWEEN FRAME AND (+) TERMINAL)
DIELECTRIC STRENGTH	5 mA MAX. AT 500 VAC 60 Hz ONE MINUTE, (BETWEEN FRAME AND (+) TERMINAL)
EXTERNAL COVER	OPEN TYPE
LIFE EXPECTANCE	70,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
OVER CURRENT SHUT DOWN	THE CURRENT WILL SHUT DOWN WHEN LOCKING ROTOR.
LEAD WIRE	UL 1007 -F- AWG #24 BLACK WIRE NEGATIVE(-) RED WIRE POSITIVE(+) BLUE WIRE FREQUENCY(-F00)

- NOTES: 1. ALL READINGS ARE MEASURED AFTER STABLY WARMING UP THROUGH 10 MINUTES.
2. THE VALUES WRITTEN IN PARENS , (), ARE LIMITED SPEC.
3. ACOUSTICAL NOISE MEASURING CONDITION:



NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN ANECHOIC CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE.

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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 ----- 106 GRAMS

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 POSITIVE AND NEGATIVE LEADS.

6. RE OZONE DEPLETING SUBSTANCES:

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

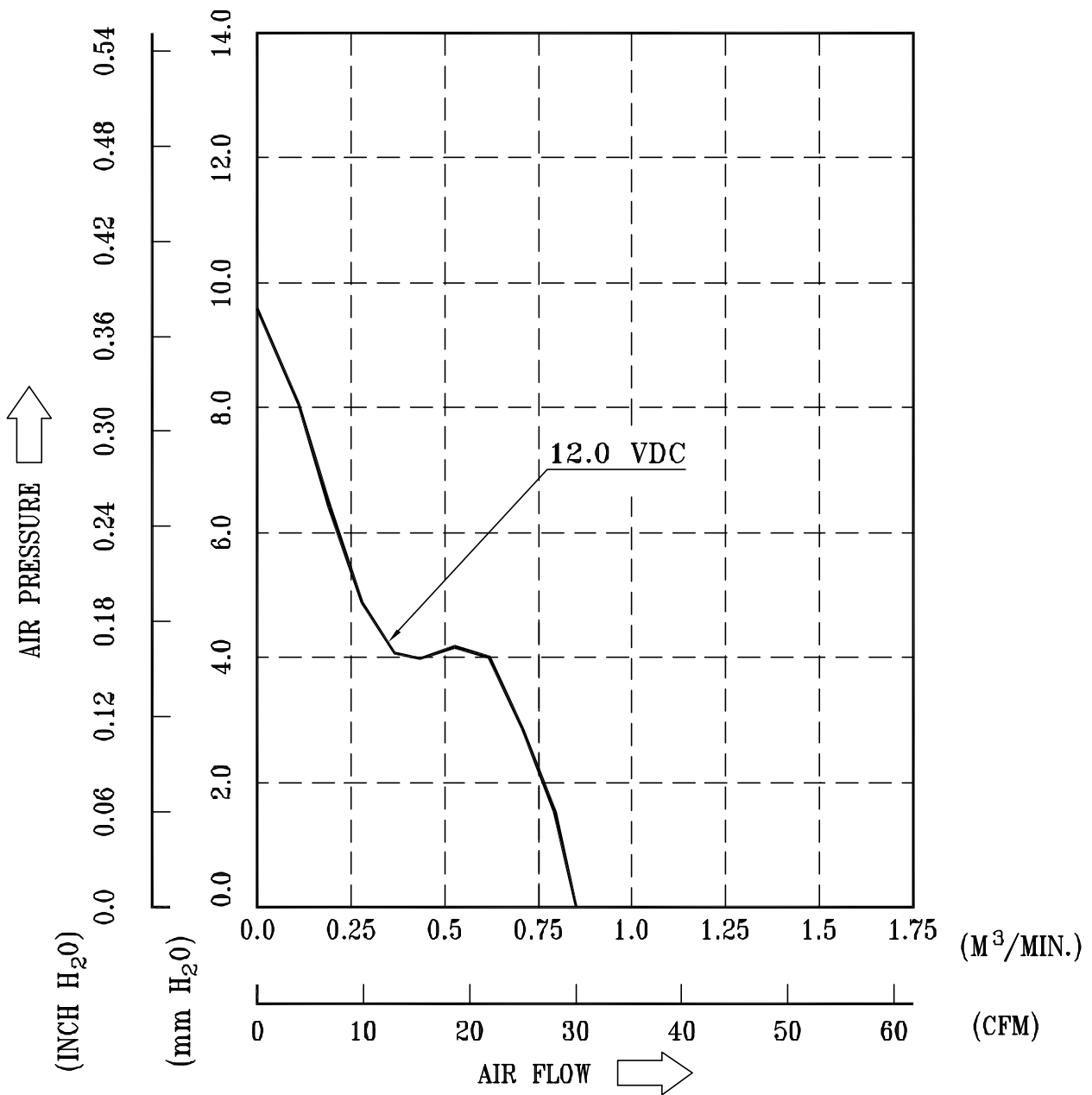
7. PRODUCTION LOCATION

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

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9. P & Q CURVE:



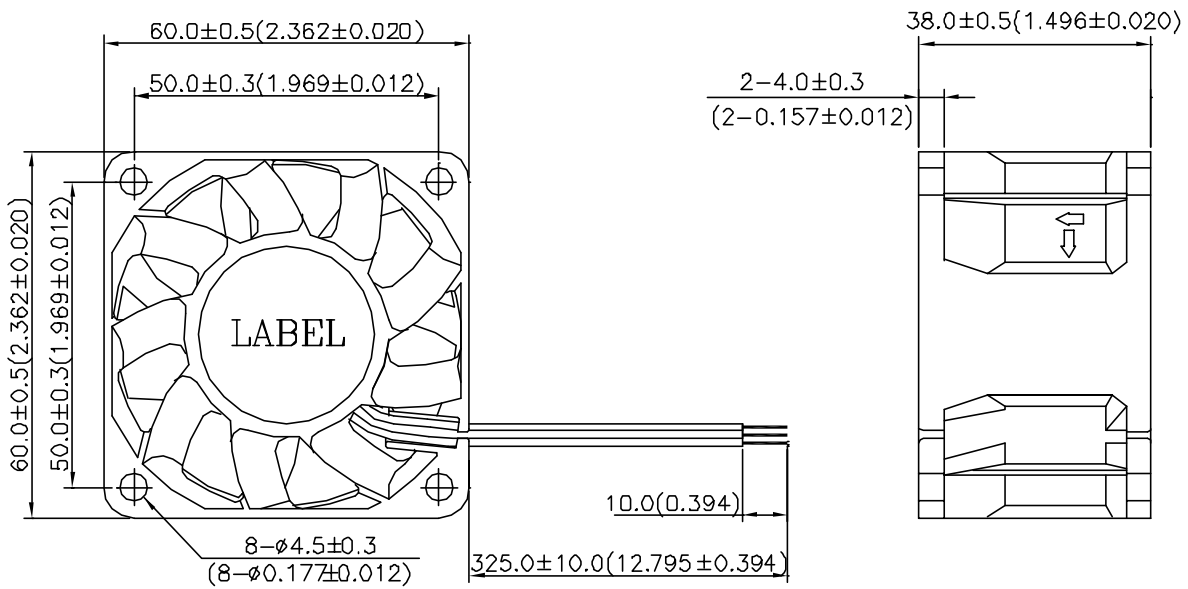
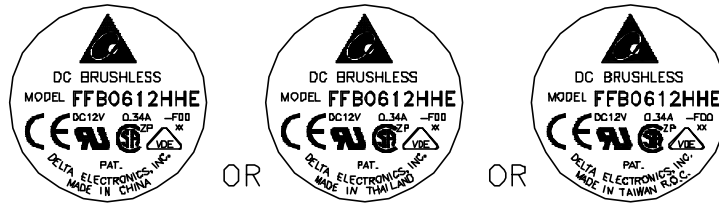
* TEST CONDITION: INPUT VOLTAGE ----- OPERATION VOLTAGE
TEMPERATURE ----- ROOM TEMPERATURE
HUMIDITY ----- 65%RH

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10. DIMENSION DRAWING:

LABEL:



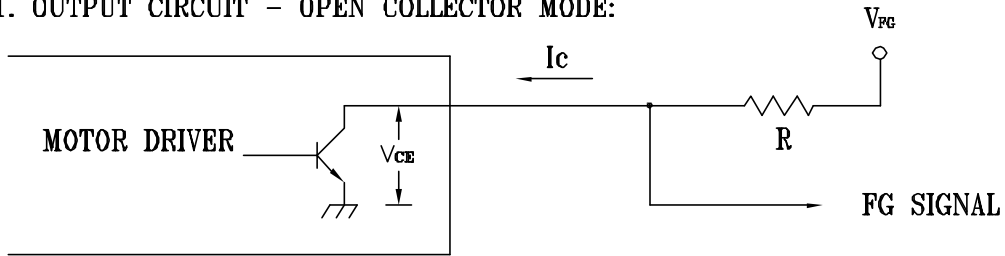
UNIT: mm (INCH)

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11. FREQUENCY GENERATOR (FG) SIGNAL:

1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



CAUTION:

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

2. SPECIFICATION:

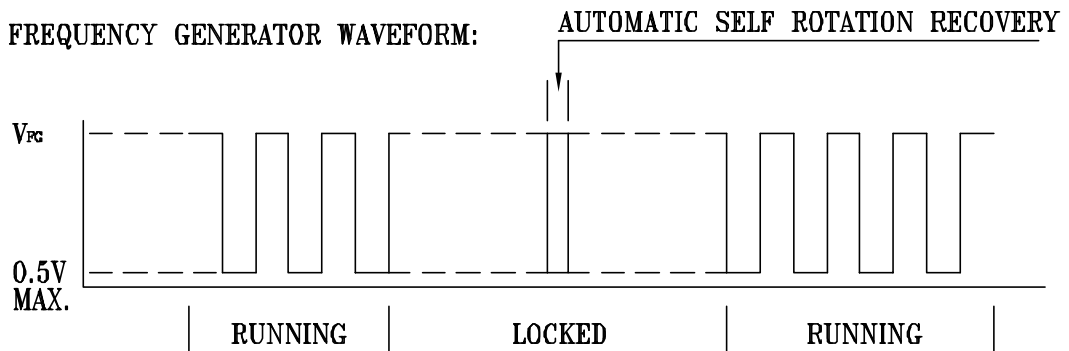
$V_{ce} (sat) = 0.5V \text{ MAX.}$

$V_{FG} = 13.8VDC \text{ MAX.}$

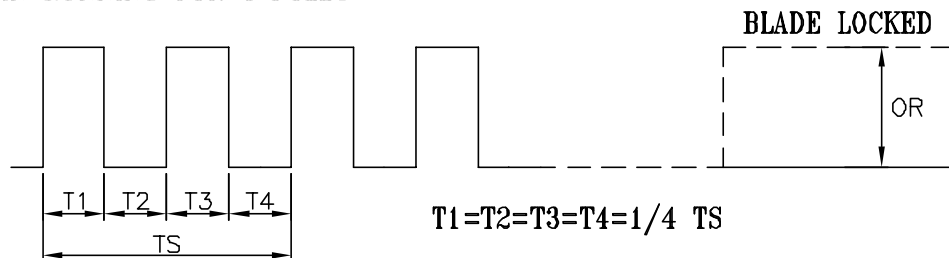
$I_c = 5mA \text{ MAX.}$

$R \geq V_{FG} / I_c$

3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES



$N = \text{R.P.M}$

$TS = 60/N(\text{SEC})$

*VOLTAGE LEVEL AFTER BLADE LOCKED

*4 POLES

A00



Descriptions:

- 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 fans are 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, as there is no foolproof method to protect against such error.**
- 7. Delta fans 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 relative (ambient) temperature and humidity conditions of 25°C, 65%. The test value is only for fan performance itself.**
- 13. Be certain to connect an “over 4.7µF” capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.**

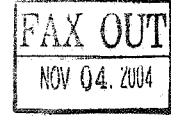


UL International Services Ltd.
Taiwan Branch

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NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

November 3, 2004



Mr. Ken Hsieh
 Delta Electronics Inc
 14th Fl, 266 2nd Wen-Hwa Rd, Sec 1
 Linkou, Taipei Hsien 244 Taiwan
 Fax number: (03)359-1991

Reference: File E132003 Project 04CA41096
 Product: USR - UL Investigation DC Component Fans, Models BFB1012VH-3F16(Y), FFC1212D(Y), AFB1524(X)G(Y), AFB1548(X)G(Y) and FFB0612(Z)E(Y) where (X) may be HH, H, M or L; (Y) may be xxxxx, where x may be A through Z, 0 through 9, "-" or blank ; (Z) may be GH, EH, SH, VH or HH.

Dear Mr. Hsieh,

Any information and documentation provided to you involving UL Mark services are provided on behalf of Underwriters Laboratories Inc.

UL's investigation of your product has been completed under the above project number and the subject products were determined to comply with the applicable requirements.

This letter temporarily supplements the UL Follow-Up Services Procedure and serves as authorization to apply the UL Recognized Marking and/or Recognized Component Mark only at the factory under UL's Follow-Up Service Program to the above products, which are constructed as described below:

Identical to the above models, which were submitted to UL for this investigation. The UL Records covering the product will be in the Follow-Up Services Procedure, File E132003, Volume 1, Sec. 11, 27, 30 and 61 respectively.

To provide the manufacturer with the intended authorization to use the UL Mark, the addressee must send a copy of this Notice and all attached material to each manufacturing location as currently authorized in File E132003, Volume 1.

This authorization is effective from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the product are now being prepared and will be sent to the indicated manufacturing locations in the near future. Please note that Follow-Up Services Procedures are sent to the manufacturers only unless the Applicant specifically requests this document.

Products that bear the UL Mark shall be identical to those that were evaluated by UL and found to comply with UL's requirements. If changes in construction are discovered, appropriate action will be taken for products not in conformance with UL's requirements and continued use of the UL Mark may be withdrawn.

Sincerely,

Jamie Yu
 Conformity Assessment Spec I
 UL International Services, Taiwan Branch
 Tel: 02-2896-7790
 Fax: 02-2891-7644
 E-mail: Jamie.Yu@tw.ul.com

Reviewed by:

Simon Lin
 Project Engineer
 UL International Services, Taiwan Branch
 E-mail: Simon.Lin@tw.ul.com



Statement of Compliance

Report No.: LR 91949-25
Project No: LR 91949C-161
Date: Sep. 20, 2004

Issued from: Delta Electronics, Inc.

Address: No. 31-1, Shien Pam Road, Kuei Shan Ind. Zone, Taoyuan, Taiwan, R.O.C.

Subject: Components DC Fan FFB0612HHE/VHE/SHE/EHE, FFB0612GHE

(Optional suffixes A-Z, 0-9, & blank may be added)

The subject equipment has been evaluated in accordance with CSA's Category Certification program and has been found to comply with the following requirements.

C22.2 No. 0-M91 – General Requirements – Canadian Electrical Code, Part II
CSA Standard C22.2 No. 113-M1984 – Fan and Ventilators
Technical Information Letter G-37B

By the authority of CSA, this equipment is immediately to bear the CSA mark.

In accordance with the Category Certification Procedure, the evaluation and testing of this equipment is subject to final validation by CSA.

Issued by



Ken Hsieh
Safety Engineer
CPBG QE

cc: CSA Pacific/Central/Eastern Region Office