

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 BLOWER | |
| Customer P/N: | | REV: |
| Delta Model NO.: | BFB1012VH-F00 | |
| Sample Rev: | 01 | Issue NO: |
| Sample Issue Date: | MAY.03.2004. | Quantity: |

1. SCOPE:

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

2. CHARACTERS:

| ITEM | DESCRIPTION |
|--|--|
| RATED VOLTAGE | 12 VDC |
| OPERATION VOLTAGE | 5.5 - 13.2 VDC |
| INPUT CURRENT | 1.42 (MAX. 2.70) A |
| INPUT POWER | 17.04 (MAX. 32.40) W |
| SPEED | 5000 R.P.M. (REF.) |
| MAX. AIR FLOW (AT ZERO STATIC PRESSURE) | 1.011 { MIN. 0.911 } M ³ /MIN. 35.73 { MIN. 32.16 } CFM |
| MAX. AIR PRESSURE (AT ZERO AIRFLOW) | 51.40 { MIN. 41.63 } mmH ₂ O 2.025 { MIN. 1.640 } inchH ₂ O |
| ACOUSTICAL NOISE (AVG.) | 58.0 (MAX. 61.3) dB-A |
| INSULATION TYPE | UL: CLASS A |

(continued)

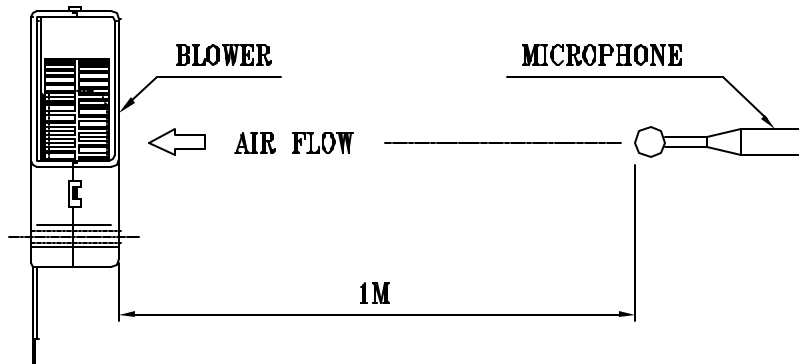
PART NO:

DELTA MODEL:

BFB1012VH-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 | 50,000 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 |
| INSULATION TYPE | UL: CLASS A |
| 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.

PART NO:

DELTA MODEL: BFB1012VH-F00

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 _____ 160 ±10 GRAMS

4. ENVIRONMENTAL:

- 4-1. OPERATING TEMPERATURE _____ -10 TO +60 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.

PART NO:

DELTA MODEL:

BFB1012VH-F00

B. BASIC RELIABILITY REQUIREMENT:

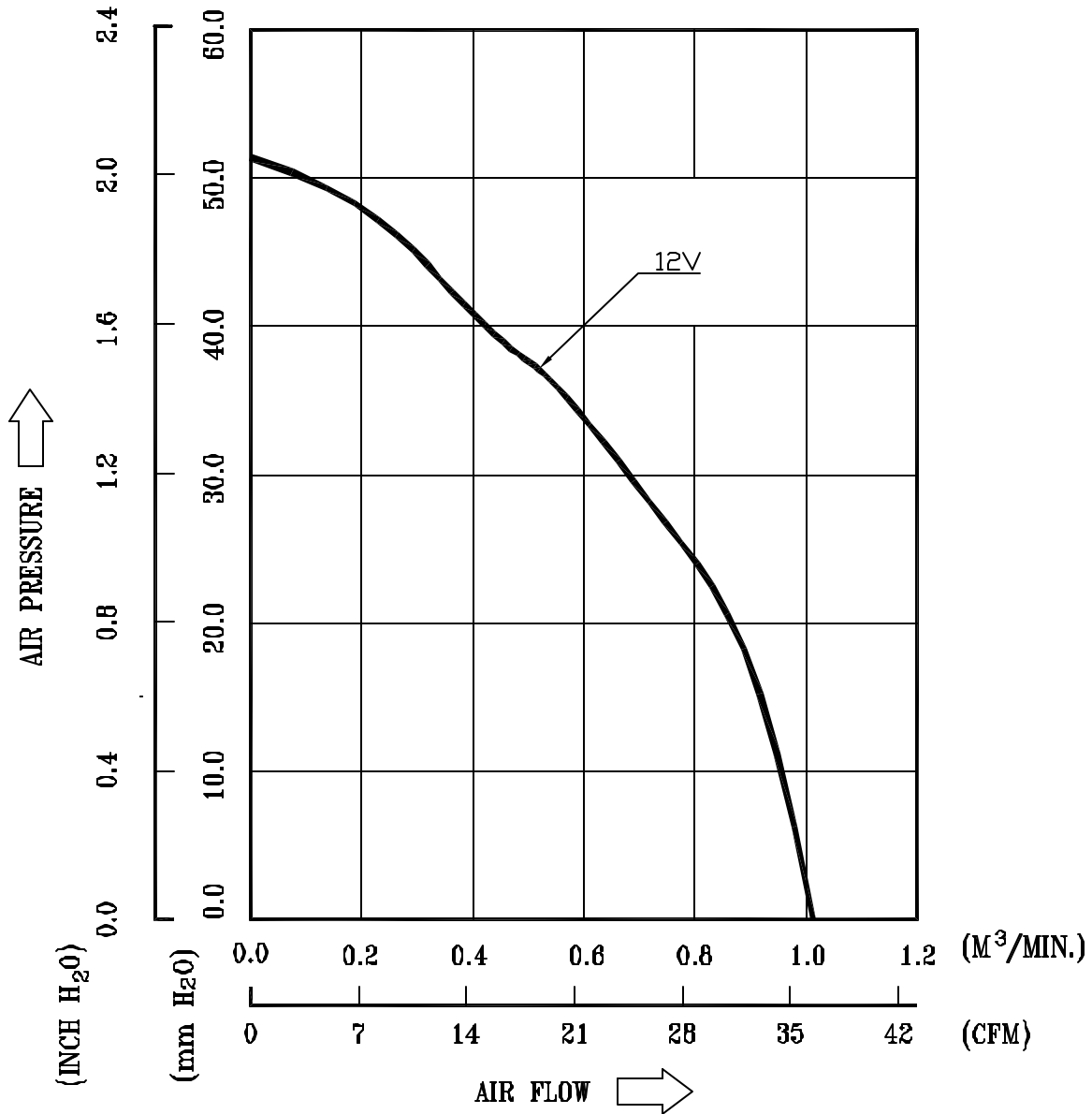
- 8-1. THERMAL CYCLING LOW TEMPERATURE: -40°C
HIGH TEMPERATURE: +80°C
SOAK TIME: 30 MINUTES
TRANSITION TIME < 5 MINUTES
DUTY CYCLES: 5
- 8-2. HUMIDITY EXPOSURE TEMPERATURE: +25°C ~ +65°C
HUMIDITY: 90-98% RH @ +65°C
FOR 4 HOURS/CYCLE
POWER: NON-OPERATING
TEST TIME: 168 HOURS
- 8-3. VIBRATION TEMPERATURE: +25°C
ORIENTATION: X, Y, Z
POWER: NON-OPERATING
VIBRATION LEVEL: OVERALL gRMS=3.2
- | FREQUENCY(Hz) | PSD(G ² /Hz) |
|---------------|-------------------------|
| 10 | 0.040 |
| 20 | 0.100 |
| 40 | 0.100 |
| 800 | 0.002 |
| 1000 | 0.002 |
- TEST TIME: 2 HOURS ON EACH ORIENTATION
- 8-4. MECHANICAL SHOCK TEMPERATURE: +20°C
ORIENTATION: X, Y, Z
POWER: NON-OPERATING
ACCELERATION: 20 G MIN.
PULSE: 11 ms HALF-SINE WAVE
NUMBER OF SHOCKS: 5 SHOCKS
FOR EACH DIRECTION
- 8-5. LIFE TEMPERATURE: MAX , OPERATING TEMPERATURE
POWER: OPERATING
DURATION: 1000 HOURS MIN.

PART NO:

DELTA MODEL:

BFB1012VH-F00

9. P & Q CURVE:



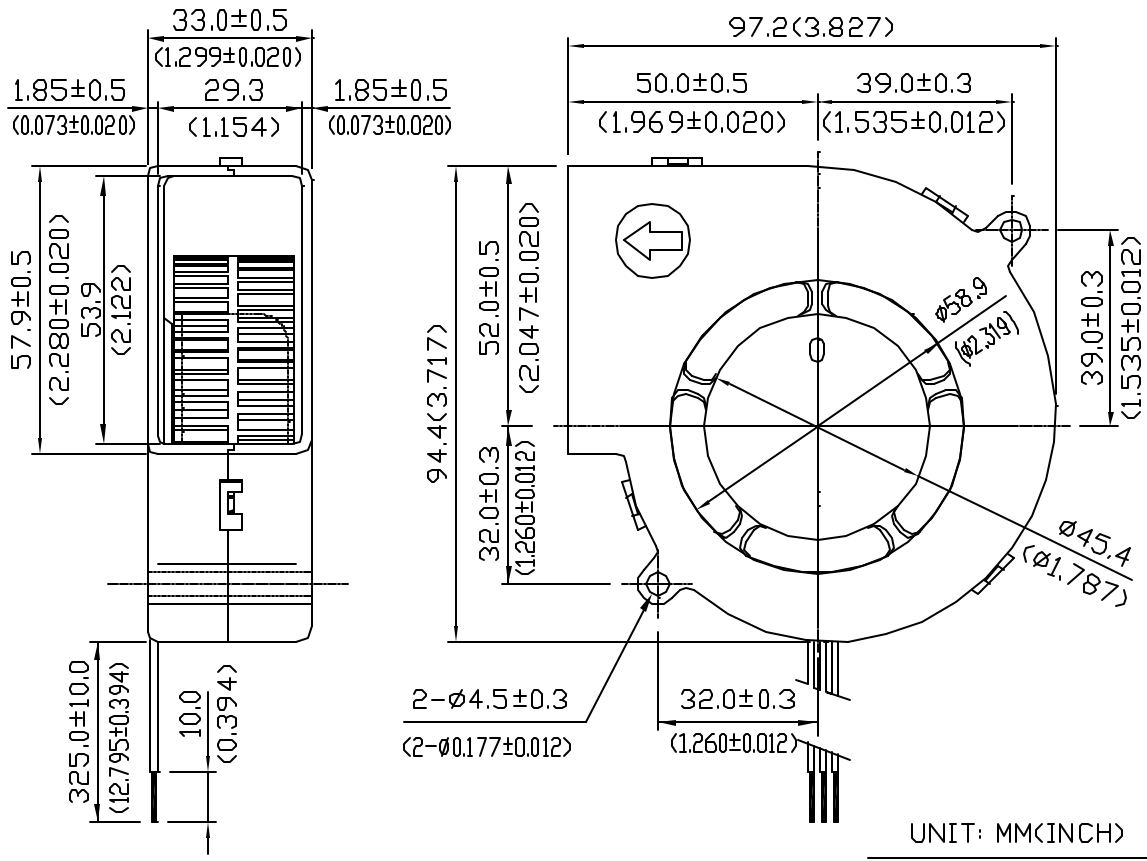
* TEST CONDITION: INPUT VOLTAGE ——— OPERATION VOLTAGE
TEMPERATURE ——— ROOM TEMPERATURE
HUMIDITY ——— 65%RH

PART NO:

DELTA MODEL: BFB1012VH-F00

10. DIMENSION DRAWING:

LABEL:

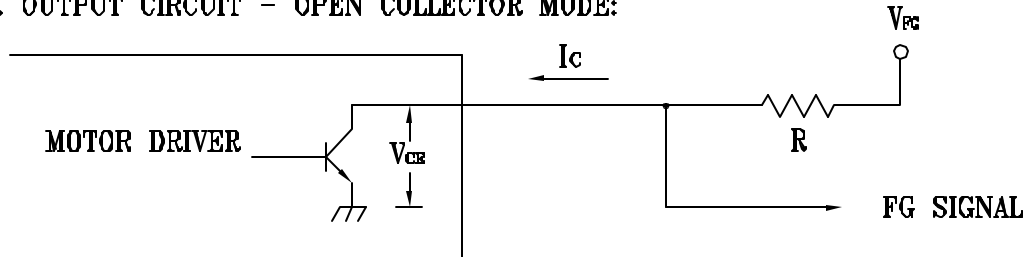


PART NO:

DELTA MODEL: BFB1012VH-F00

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:

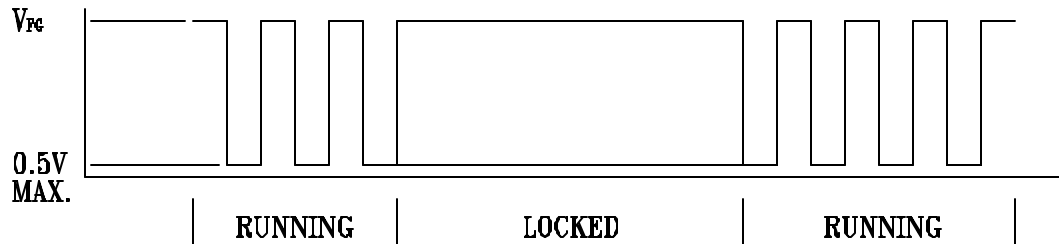
$V_{ce}(\text{sat}) = 0.5V \text{ MAX.}$

$V_{FE} = 45VDC \text{ MAX.}$

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

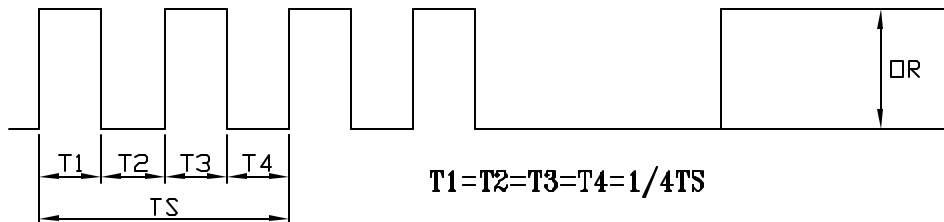
$R \geq V_{FG} / I_c$

3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES

BLADE LOCKED



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

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

*VOLTAGE LEVEL AFTER BLADE LOCKED

*4 POLES



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.**

VDE Prüf- und Zertifizierungsinstitut Gutachten mit Fertigungsüberwachung

Ausweis-Nr. / Blatt /
Licence No. page
128374 6

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
Delta Electronics Inc., 186 Ruey Kuang Road, NEIHU TAIPEI (114), TAIWAN

Aktenzeichen / *File ref.*
1164100-2611-0003 / 31147 / F131 / DO

letzte Änderung / *updated* Datum / *Date*
2003-05-28 2000-05-26

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Gutachtens mit Fertigungsüberwachung Nr. 128374.
This supplement is only valid in conjunction with page 1 of the Certificate of Conformity with factory surveillance No. 128374.

| | |
|-------------------------|---------|
| AFB0924LD/MD/HD/HHD/VHD | DC 24V |
| AUB0924LD/MD/HD/HHD/VHD | DC 24V |
| ASB0924LD/MD/HD/HHD/VHD | DC 24V |
| BFC0848D | DC 48V |
| AFC0512AA/BB | DC 12V |
| AFC0612AB/BB | DC 12V |
| EFC1748DG-S41P | DC 42V |
| BFB1012 VH | DC 12V |
| AFB0712HD/HHD/VHD | DC 12V |
| AFB0724HD/HHD/VHD | DC 24V |
| EFC1748DG | DC 48V |
| FFB1212HH/VH/SH/EH | DC 12V |
| FFB1224HH/VH/SH/EH | DC 24V |
| FFB1248HH/VH/SH/EH | DC 48V |
| GFB0412SHE | DC 12V |
| GFB0612HHG/VHG/SHG | DC 12V |
| GFB0912HHG/VHG/SHG | DC 12V |
| GFB0624HHG/VHG | DC 24V |
| GFB0924HHG/VHG | DC 24V |
| GFB0948HHG/VHG | DC 48V |
| KFB0412HA-S12W | DC 12V |
| BFB05512MA/HA/HHA | DC 12V |
| FFB1424HHG/VHG/SHG | DC 24V |
| FFB1448HHG/VHG/SHG | DC 48V |
| EFC1212DF | DC 12V |
| EFC1224DF | DC 24V |
| EFC1248DF | DC 48V |
| EFC1212D | DC 12V |
| EFC1224D | DC 24V |
| EFC1248D | DC 48V |
| AFC1212D | DC 12V |
| AFC1224D | DC 24V |
| AFC1248D | DC 48V |
| FFC0848CE | DC 48V |
| FFC0912CE | DC 12V |
| EFB0812LB/MB/HB/HHB | DC 12V |
| EFB0824LB/MB/HB/HHB | DC 24V |
| KFB1748HHT | DC 48V |
| FFB0412SHN | DC 12V |
| KFB1348LT/MT/HT | DC 48 V |

Fortsetzung siehe Blatt 7 /
continued on page 7



UL International Services Ltd. - Taiwan Branch

香港商優力安全測驗有限公司台灣分公司

| | |
|---------------------------------|------------------------|
| 4th Fl., 260 Da-Yeh Rd., Beitou | 112 台北市北投區 |
| Taipei City, Taiwan 112 | 大業路 260 號 4 樓 |
| Phone: 02-2896-7790 | 電話 : 02-2896-7790 |
| Fax: 02-2891-7644 | 傳真 : 02-2891-7644 |
| e-mail: ul.tw@tw.ul.com | 電子郵件 : ul.tw@tw.ul.com |



NOTICE OF AUTHORIZATION TO APPLY THE UL MARK

TAIWAN OFFICE - November 18, 2002

TO : Delta Electronics Inc.
14th Fl 266 2nd Wen-Hwa Rd Sec 1 Linkou
Taipei Hsien Taiwan 244
Attention: Mr. Roger Lu
Our Reference: File E132003 Project 02NK96435
Product: DC FAN, Model BFB1012VH.

Gentlemen:

This letter is sent on behalf of Underwriters Laboratories Inc. pursuant to the Corporate Services Agreement between UL International Services Ltd. - Taiwan Branch and UL.

UL's Investigation of your products 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 Services Program to the subject products which are constructed as described below:

Similar to products covered in UL Follow-Up Services Procedure, File E132003, Volume 1, Section 11.

To provide the manufacturer with the intended authorization to use the UL Marks, 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 for 90 days only from the date of this Notice and only for products at the indicated manufacturing locations. Records in the Follow-Up Services Procedure covering the products 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.

Very truly yours,

Nick Ou Yang / JY
Nick Ou Yang (Ext.62230)
Associate Project Engineer
Conformity Assessment Services, 3000ATPI

Reviewed by:

George Wang
George Wang(Ext.62139)
Engineering Group Leader
Conformity Assessment Services, 3000ATPI



A subsidiary of
Underwriters Laboratories Inc.®

An independent,
not-for-profit organization
testing for public safety.



Statement of Compliance

Project No: LR 91949C - 63
Date: Nov. 18, 2002

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

Subject: Components DC Fans BFB1012VH
(Optional suffixes "STD", "F00" and "R00" 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:

Roger Lu
Safety Engineer
CPBG QE

cc: CSA Pacific/Central/Eastern Region Office

D:\ccpfan\state-compliance\bfb1012vh