SPECIFICATION FOR APPROVAL

Customer. DPC
Description. DC FAN
Part No. REV.
Delta Model No. QFR0812SH-CX13 REV. 01
Sample Issue No.
Sample Issue Date. DEC-17-2012

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

APPROVED BY :

DATE:

Delta Electronics, Inc.
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Shi Jie Town, Dong Guan City.
Guangdong Province, China. P. R. C.
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STATEMENT OF DEVIATION

****

☑ NONE

☐ DESCRIPTION :

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SPECIFICATION FOR APPROVAL

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Customer:	DPC		
Description:	DC FAN		
Customer P/N:		REV:	
Delta Model NO.:	QFR0812SH-CX13	Safety Delta Model NO.:	QFR0812SH
Sample Rev:	01	Issue NO:	
Sample Issue Date:	DEC-17-2012	Quantity:	

1. SCOPE:
   THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE DC BRUSHLESS AXIAL FLOW FAN. THE FAN MOTOR IS WITH SINGLE PHASE AND FOUR POLES.

2. CHARACTERISTICS:

ITEM	DESCRIPTION
RATED VOLTAGE	12VDC
OPERATION VOLTAGE	5.0 - 13.2 VDC
INPUT CURRENT	0.33 (MAX. 0.40) A (SAFETY CURRENT 0.50A)
INPUT POWER	3.96 (MAX. 4.80) W
SPEED	4300 R.P.M. ± 10%
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	1.545(MIN. 1.390) M^3/MIN. 54.57 (MIN. 49.11) CFM
MAX. AIR PRESSURE (AT ZERO AIRFLOW)	8.400 (MIN. 7.560) mmH_2O 0.331 (MIN. 0.297) $inchH_2O$
ACOUSTICAL NOISE (AVG.)	41.2 (MAX. 45.2) dB-A
INSULATION TYPE	UL: CLASS A

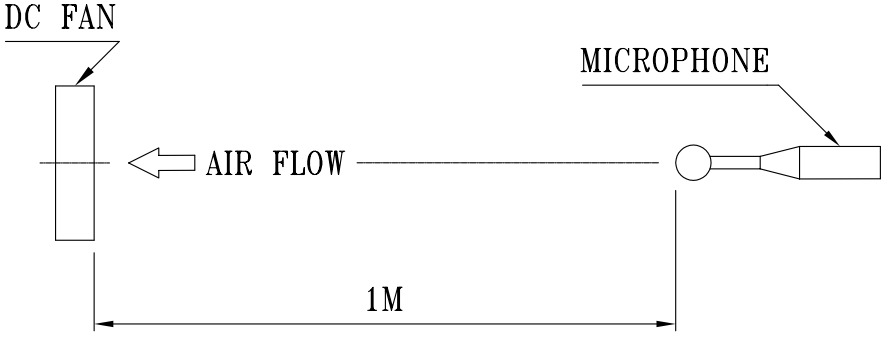
(continued)

PART NO:

DELTA MODEL: QFR0812SH-CX13

INSULATION STRENGTH	10 MEG OHM MIN. AT 500 VDC (BETWEEN FRAME AND (+) TERMINAL)
DIELECTRIC STRENGTH	5 mA MAX. AT 500 VAC 50/60 Hz ONE MINUTE, (BETWEEN FRAME AND (+) TERMINAL)
EXTERNAL COVER	OPEN TYPE
LIFE EXPECTANCE (AT LABEL VOLTAGE)	70,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
LEAD WIRE	UL 1007 -F- AWG #24 BLACK WIRE NEGATIVE(-) RED WIRE POSITIVE(+) BLUE WIRE (FOO) YELLOW WIRE (PWM)

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 ANECHOIC CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT A DISTANCE OF ONE METER FROM THE FAN INTAKE.

PART NO:

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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	88 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.

8. 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: +25°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

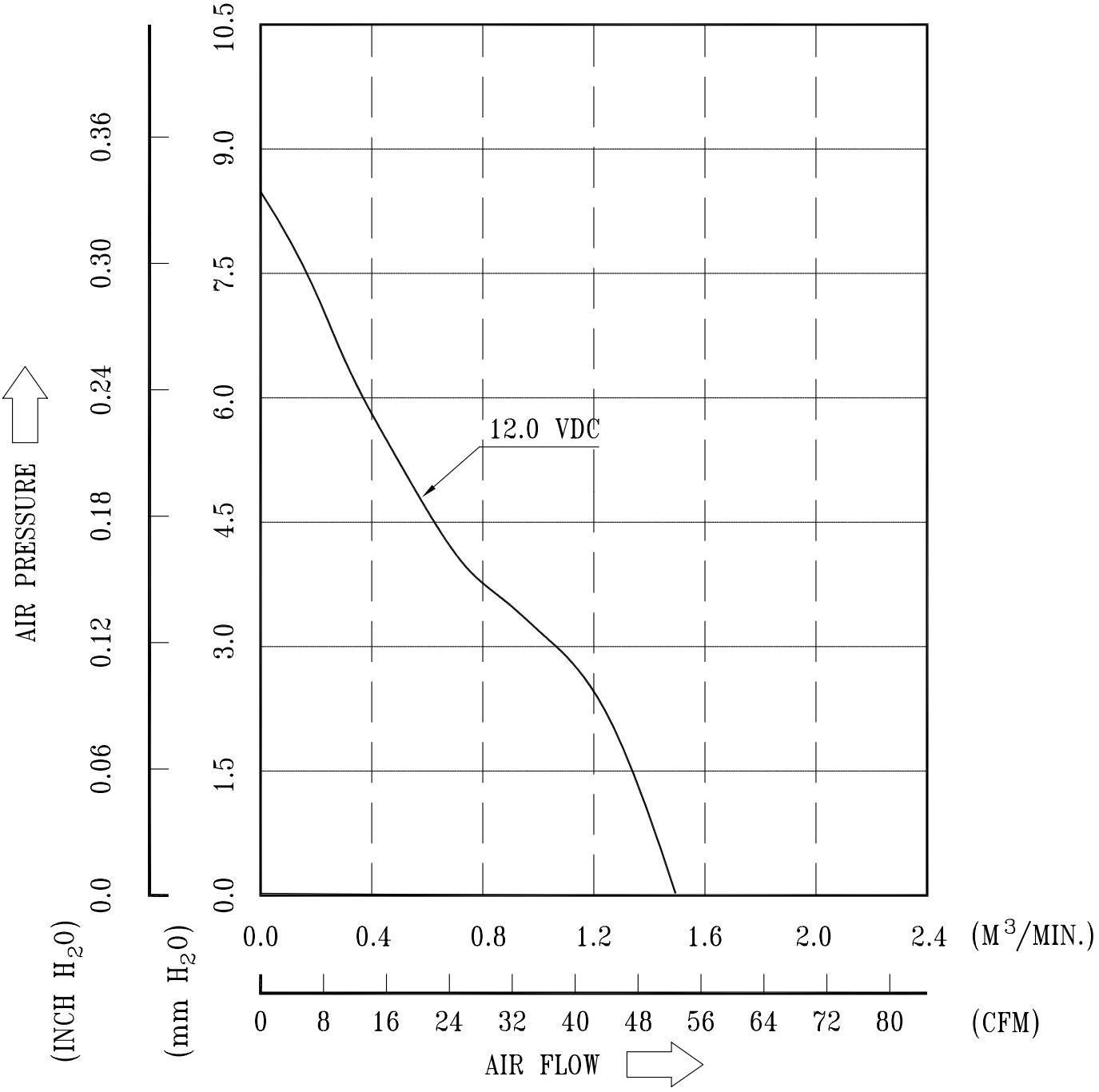
8-5. LIFE

TEMPERATURE: MAX , OPERATING TEMPERATURE
POWER: OPERATING
DURATION: 1000 HOURS MIN.

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9. P & Q CURVE:



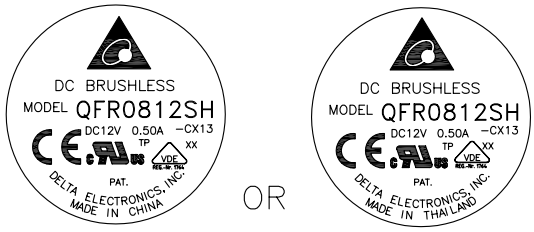
* TEST CONDITION: INPUT VOLTAGE ——— OPERATION VOLTAGE
TEMPERATURE ——— ROOM TEMPERATURE
HUMIDITY ——— 65%RH

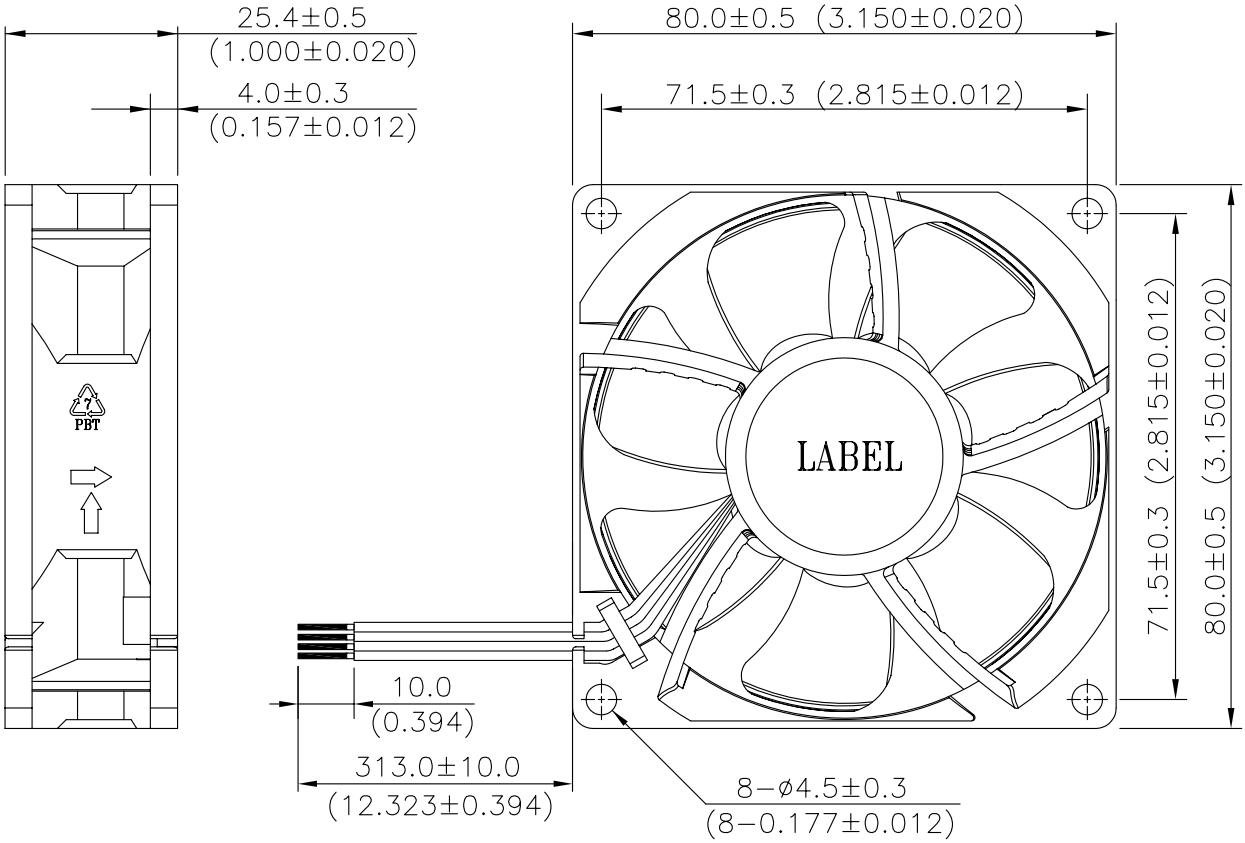
PART NO:

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10. DIMENSION DRAWING:

LABEL:





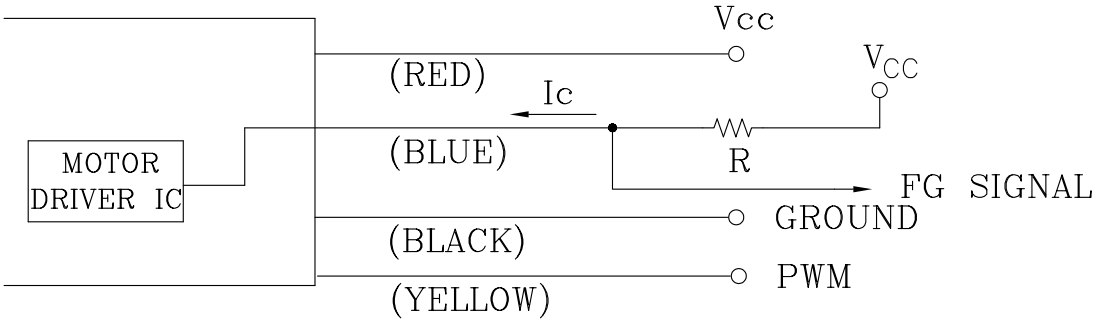
UNIT: MM(INCH)

NOTES:

1. LEAD WIRE UL 1007 -F- AWG #24
   - RED WIRE -----(+)
   - BLACK WIRE -----(-)
   - BLUE WIRE -----(FOO)
   - YELLOW WIRE -----(PWM)
2. THIS PRODUCT IS RoHS COMPLIANT.

11. FREQUENCY GENERATOR (FG) SIGNAL:

11-1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



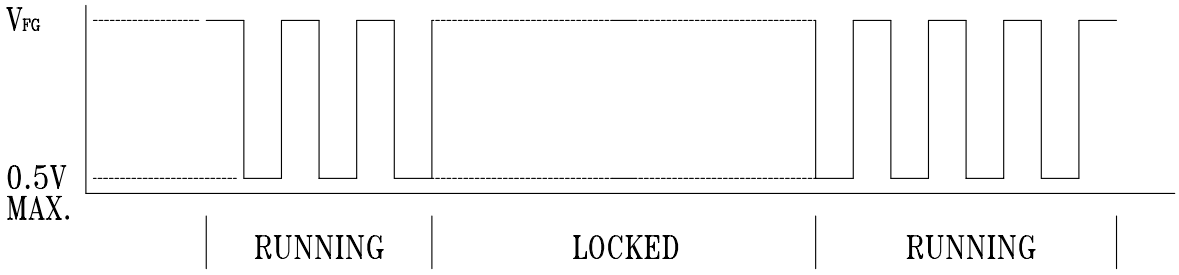
CAUTION: THE FG SIGNAL LEAD WIRE MUST BE KEPT AWAY FROM "+" LEAD WIRE & "−" LEAD WIRE.

11-2. SPECIFICATION:

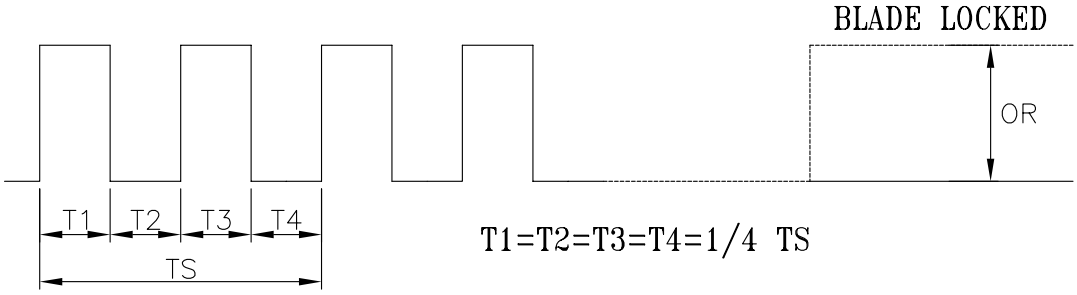
V_{CC}= 13.2V MAX. Ic = 5mA MAX.

V_{CE}= 0.5V MAX. R ≥ V_{CC} /Ic

11-3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES



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

N=R.P.M

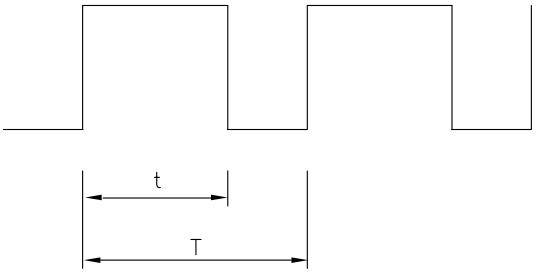
TS=60/N(SEC)

*VOLTAGE LEVEL AFTER BLADE LOCKED

*4 POLES

12. PWM CONTROL SIGNAL:

SIGNAL VOLTAGE RANGE: 0~16VDC



HIGH SIGNAL: 16 VDC MAX. 2.8 VDC MIN.

LOW SIGNAL: 0.8 VDC MAX. 0 VDC MIN.

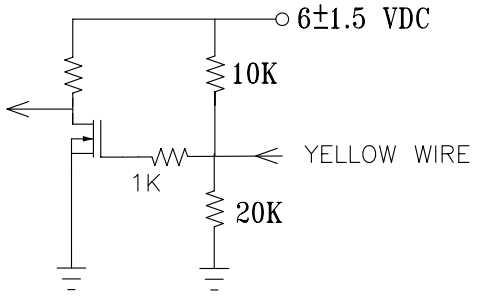
DUTY CYCLE= $\frac{t}{T}$ *100(%)

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

13. SPEED VS PWM CONTROL SIGNAL: (AT RATED VOLTAGE & PWM FREQUENCY=25KHZ)

DUTY CYCLE (%)	SPEED R.P.M.	CURRENT (A) TYP.
100	4300 ± 10%	0.33
50	2250 ± 10%	0.09
0	0	0.02

14. PWM CONTROL LEAD WIRE INPUT IMPEDANCE:



14-1. THE FAN SPEED WILL DEFAULT TO MAXIMUM WHEN THE SPEED CONTROL INPUT IS LEFT UNCONNECTED.

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.

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DELTA Electronics:

PJT-12V40WBAA PMC-24V075W1AA PMT-48V75W2BA 02BEEG3H 06BEEG3G DSOL-1341-12
M55339/14-00306 15GENG3E ACS3-CNTB0600 AFB0624VH-A DSOL-0844-24 S24SP05012PDFA
AFB0724VH-AF00 PL01S4805A PM05S050A 06AN2 CTA4100A PFB1224UHEP0 30DPGS5C
AFL12AUHE-C DTC1000C FFB1224SHE ASB02505SHA-AY6B BFB1248GH-A FFB0912HHE
MDS-400APB24AA 03GEEG3E AFB0524HHD FFB0824SHE-F00 SK-1015-STD