SPECIFICATION FOR APPROVAL

Customer : STANDARD
Description : DC FAN
Customer Part No. _____ REV. : _____
Delta Model No. : THD0924HEP6 REV. : 06
Sample Issue No. : _____
Sample Issue Date : AUG.31.2022

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: STANDARD
CUSTOMER P/N:
DELTA MODEL: THD0924HEP6

REV.	DESCRIPTION	DRAWN	CHECKED			APPROVED	ISSUE DATE
			ME	EE	CE		
00	ISSUE SPEC.	陳俊華 07/20'21	陳俊華 07/20'21	陳漁宸 07/20'21	--	吳俊男 07/20'21	07/20'21
01	1. REVISED THE ACOUSTICAL NOISE FROM 65.5 (MAX. 68.5) dB-A TO 64.0 (MAX. 67.0) dB-A. 2. REVISED THE LABEL. 3. ADD THE STANDAR INTO CUSTOMER COLUMN.	陳俊華 11/18'21	陳俊華 11/18'21	陳漁宸 11/18'21	--	吳俊男 11/18'21	11/18'21
02	1. REVISED THE LABEL. 2. CHANGE THE LEAD WIRE FROM 300 TO 1400 MM, THE MATERIAL FROM UL3385 TO UL10368 AND THE WIRE COLOR.	陳俊華 12/07'21	陳俊華 12/07'21	陳漁宸 12/07'21	--	吳俊男 12/07'21	12/07'21
03	1. CHANGE THE LEAD WIRE FROM 1400mm TO 300 mm, THE MATERIAL FROM UL10368 TO UL3385 AND TH WIRE COLOR	陳俊華 12/15'21	陳俊華 12/15'21	陳漁宸 12/15'21	--	吳俊男 12/15'21	12/15'21
04	UPDATED THE LABEL FORMAT	陳俊華 01/14'22	陳俊華 01/14'22	陳漁宸 01/14'22	--	吳俊男 01/14'22	01/14'22
05	REVISED THE LABEL.	陳俊華 02/10'22	陳俊華 02/10'22	陳漁宸 02/10'22	--	吳俊男 02/10'22	02/10'22
06	MODIFY THE SPEC	陳俊華 08/31'22	陳俊華 08/31'22	陳漁宸 08/31'22	--	吳俊男 08/31'22	08/31'22

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STATEMENT OF DEVIATION

■ NONE

□ DESCRIPTION:

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TAOYUAN CITY 33341, TAIWAN FAX : 886-(0)3-3591991

Specification For Approval

Customer : STANDARD

Description : DC FAN

Customer P/N : rev. :

Delta model no. : THD0924HEP6 Delta Safety Model No.: THD0924HE

Sample revision. : 06 Issue no.:

Sample issue date : AUG.31.2022 Quantity :

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

2. CHARACTERS:

ITEM	DESCRIPTION
RATED VOLTAGE	24V
OPERATION VOLTAGE	21.6 - 26.4 VDC
INPUT CURRENT(AVG.) ★ (TEST UNDER FREE AIR)	1.15 (MAX. 1.38) A SAFETY CURRENT ON LABEL : 1.80 A
INPUT POWER(AVG.) ★ (TEST UNDER FREE AIR)	27.60 (MAX. 33.12) W
SPEED	10700±10% R.P.M.
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	4.121 (MIN. 3.709) M^3 /MIN. 145.540 (MIN. 130.986) CFM
MAX. AIR PRESSURE (AT ZERO AIRFLOW)	59.283 (MIN. 48.01) mmH_2O 2.334 (MIN. 1.890) inchH_2O
ACOUSTICAL NOISE (AVG.)	64.0 (MAX. 68.0) dB-A
INSULATION TYPE	UL: CLASS A
INGRESS PROTECTION	IP68
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)

★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)

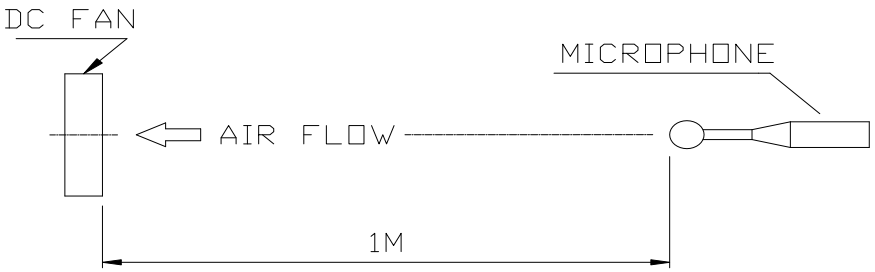
PART NO:

DELTA MODEL: THD0924HEP6

LIFE EXPECTANCE (L10) (AT LABEL VOLTAGE)	70,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
LOCK 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: THD0924HEP6

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---------- 255.0 GRAMS(REF.)

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4. ENVIRONMENTAL:

4-1. OPERATING TEMPERATURE---------- -10 TO +70 DEGREE C
4-2. STORAGE TEMPERATURE---------- -40 TO +70 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.

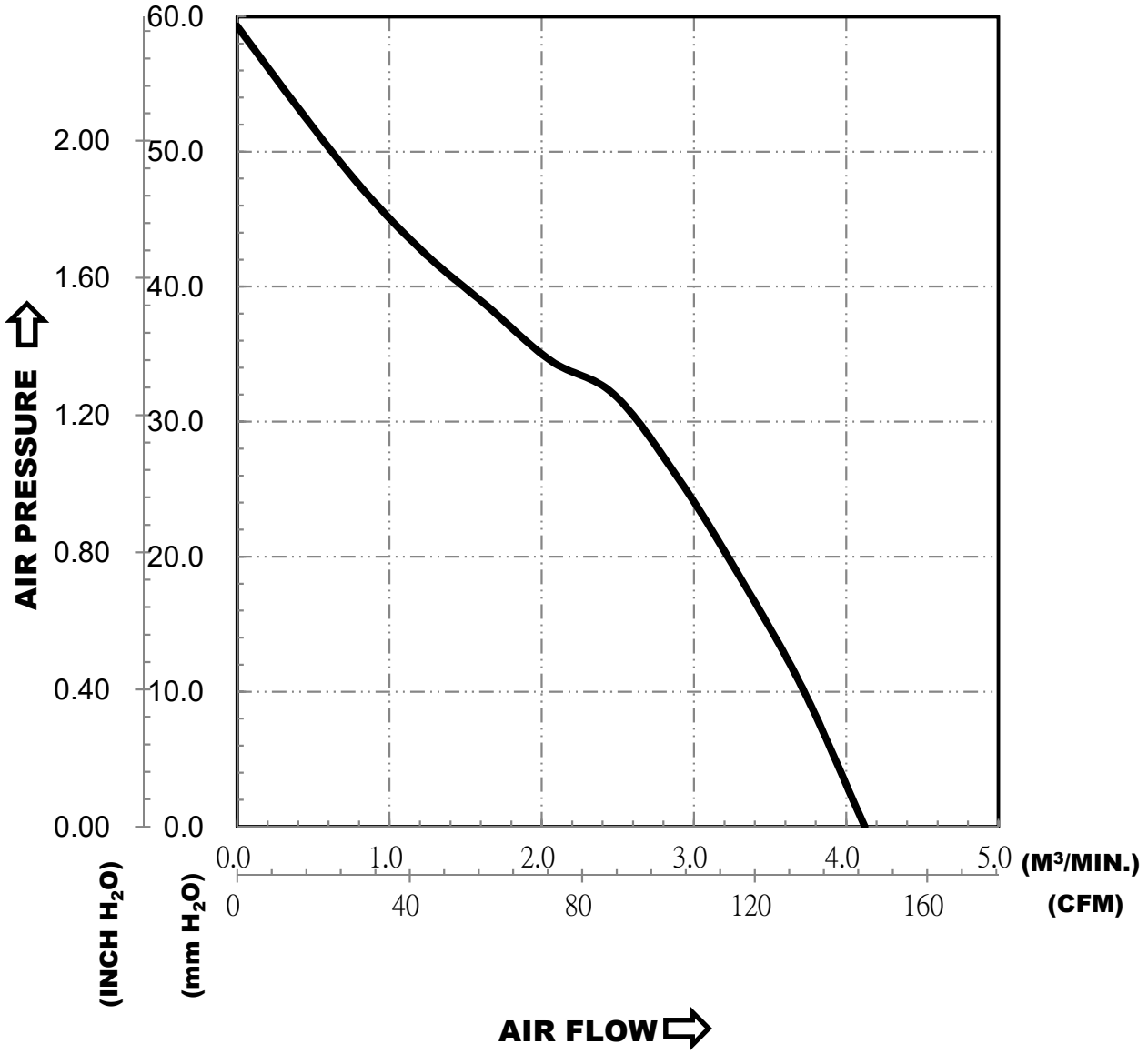
7. PRODUCTION LOCATION

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

PART NO:

DELTA MODEL: THD0924HEP6

8. P & Q CURVE:



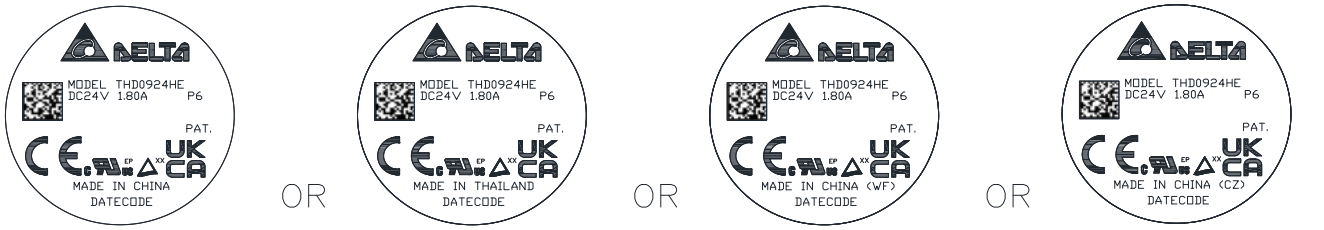
*TEST CONDITION: INPUT VOLTAGE-----OPERATION VOLTAGE
TEMPERATURE-----ROOM TEMPERATURE
HUMIDITY-----65%RH

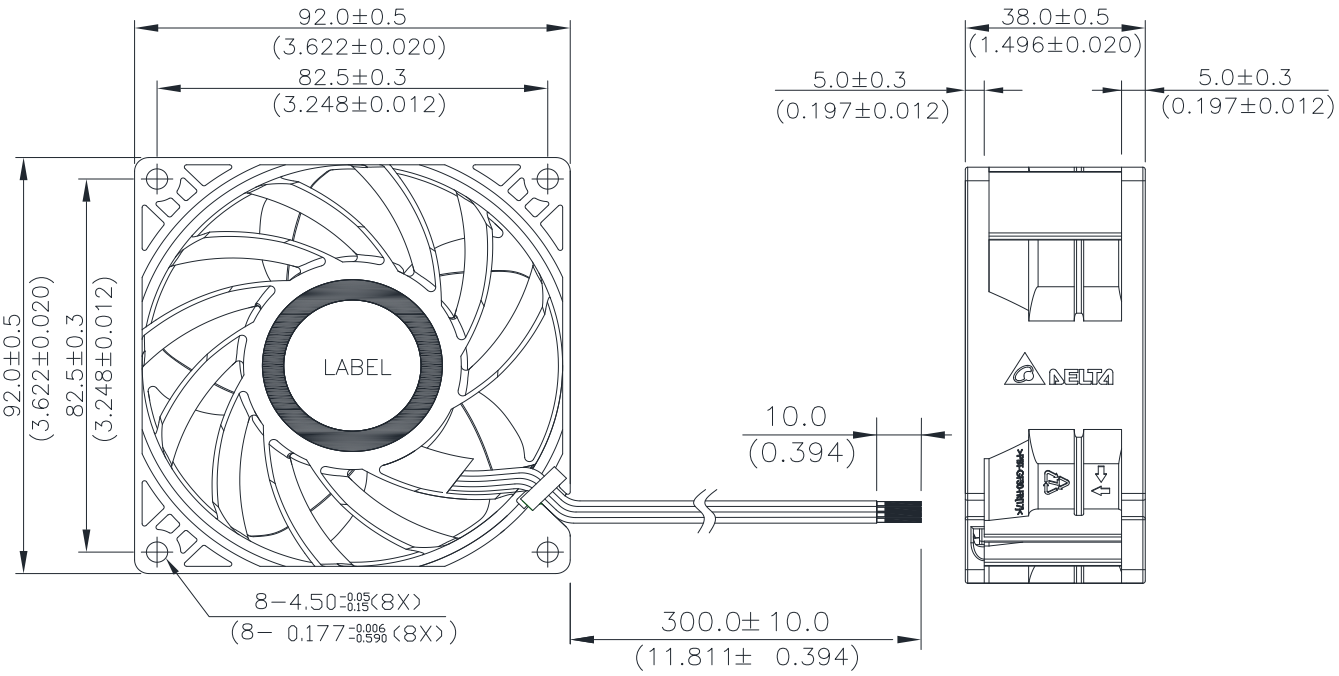
PART NO:

DELTA MODEL: THD0924HEP6

9. DIMENSION DRAWING:

LABEL:





NOTES:

1. LEAD WIRE: UL3385 AWG#26
   BLACK WIRE ---------- (-)
   RED WIRE ---------- (+)
   BLUE WIRE ---------- (F00)
   YELLOW WIRE ---------- (PWM)
2. THIS PRODUCT IS RoHS COMPLIANT

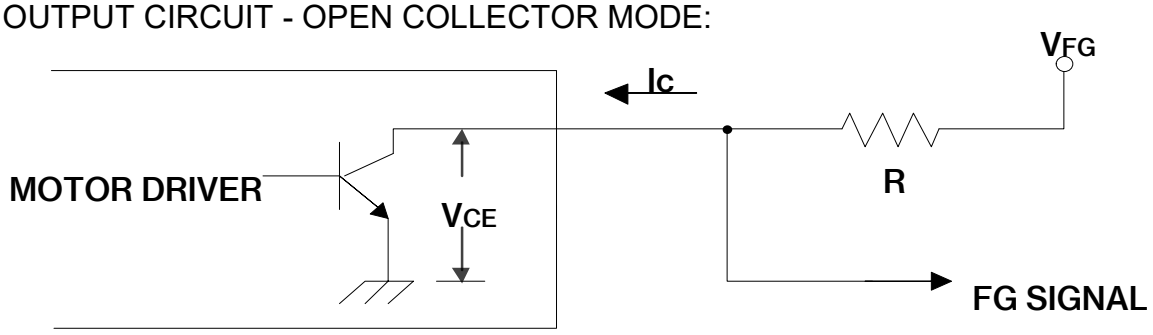
★ 3. RECOMMENDED OPERATING SEQUENCE
   FAN START : VCC ON --> PWM INPUT
   FAN STOP: PWM 0% DUTY --> VCC OFF

PART NO:

DELTA MODEL: THD0924HEP6

10. FREQUENCY GENERATOR (FG) SIGNAL:

10-1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



CAUTION:

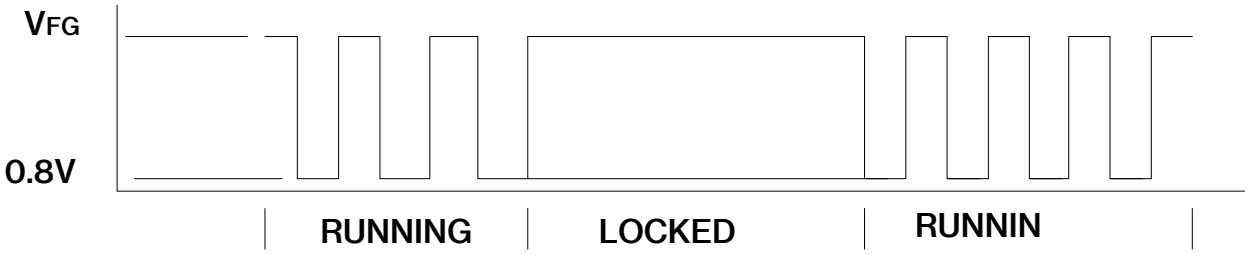
THE LEAD WIRE OF FG SIGNAL CAN NOT TOUCH THE LEAD WIRE OF POSITIVE OR NEGATIVE.

10-2. SPECIFICATION:

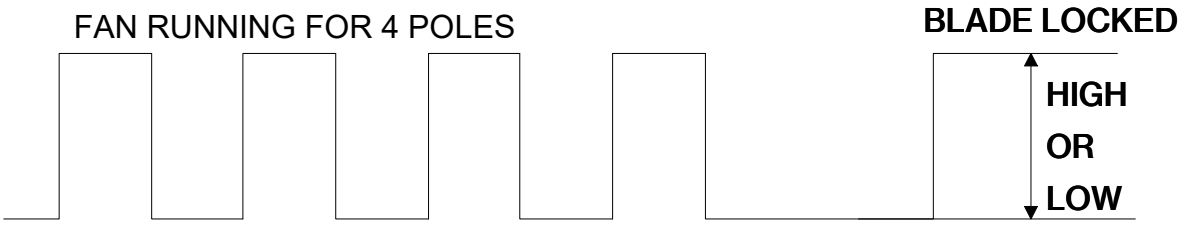
V_{FG}= 5.0 TYP.(Vcc MAX.) Ic = 5mA MAX.

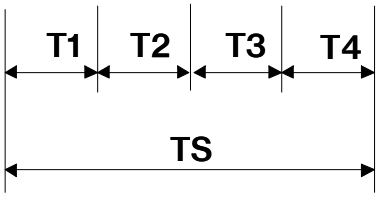
V_{CE}= 0.8V MAX. $R \geqq V_{FG}/Ic$

10-3. FREQUENCY GENERATOR WAVEFORM:



FAN RUNNING FOR 4 POLES





T1=T2=T3=T4=1/4

N=R.P.M

TS=60/N(SEC)

*VFG IS ALWAYS HIGH OR LOW LEVEL AFTER BLADE LOCKED

*4 POLES

PART NO:

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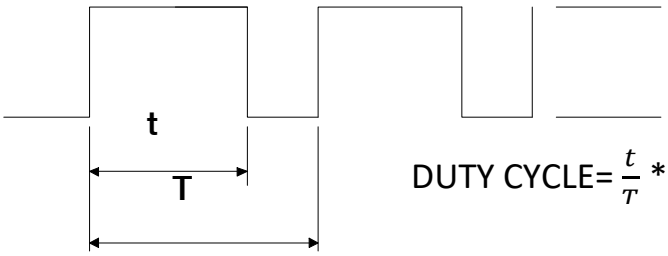
11. PWM CONTROL SIGNAL:

11-1 SIGNAL VOLTAGE RANGE: 0~15VDC



HIGH 15.0 VDC MAX.
2.8 VDC MIN.

LOW 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.

11-2 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:

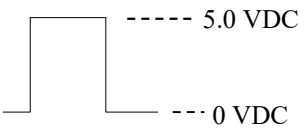
V_{IH} : (V_+ - 0.5) * 90% RISE TIME : t_r < 500ns

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

11-3 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	10700±10%	1.15 (MAX. 1.38)
0	0	0.02 (MAX. 0.03)



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- MIN. STARTED DUTY CYCLE(at 25°C, RATED VOLTAGE): 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.

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^{o}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.