



SPECIFICATION FOR APPROVED

Customer. STD

Description. EST FAN (Energy Saving Technology Fan)

Part No. _____ REV. _____

Delta Model No. AFL2224HW-00 REV. 00

Sample Issue No. _____

Sample Issue Date. MAR.11 2021

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

APPROVED BY:

DATE :

DELTA ELECTRONICS, INC.
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DELTA ELECTRONICS, INC.

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STATEMENT OF DEVIATION

NONE

DESCRIPTION :

SPECIFICATION FOR APPROVED

Customer: STD

Description: EST FAN (Energy Saving Technology Fan)

Customer P/N:

REV:

Delta Model NO.: AFL2224HW-00

Delta Safety Model No:

Sample Rev: 00

Issue NO:

Sample Issue Date: MAR.11 2021

Quantity:

1. SCOPE:

THIS SPECIFICATION DEFINES THE ELECTRICAL AND MECHANICAL CHARACTERISTICS OF THE AC TO DC BRUSHLESS AXIAL FLOW FAN.

2. CHARACTERS:

UNLESS SPECIFIED, ALL READINGS AND TESTS ARE BASED ON 25°C, 65% RH.

ITEM	DESCRIPTION
RATED VOLTAGE	24 VDC
OPERATION VOLTAGE	21.6 - 26.4 VDC
MIN. START VOLTAGE	21.6 VDC
RATED CURRENT (AVG.) (AT FREE AIR)	0.90 (MAX. 1.25) A
RATED POWER (AVG.) (AT FREE AIR)	21.6 (MAX. 30.0) W
RATED SPEED (MAX.)	2800 R.P.M.
MAX. AIR FLOW @2800RPM (AT ZERO STATIC PRESSURE)	10.72 M ³ /MIN. (TYP.) 378.6 CFM (TYP.)
MAX. AIR PRESSURE @2800RPM (AT FREE AIR)	16.83 mmH ₂ O (TYP.) 0.66 inchH ₂ O (TYP.)
ACOUSTICAL NOISE @2800RPM (1M)	60.0 (MAX. 65.0) dB(A)
INSULATION TYPE	UL: CLASS B

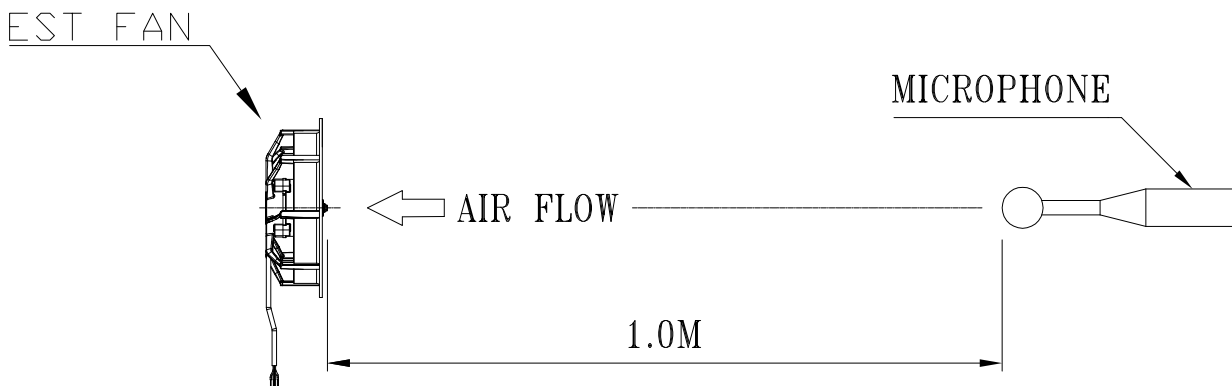
(continued)

PART NO:

DELTA MODEL: AFL2224HW-00

INSULATION STRENGTH	10 MEGA 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)
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE

- 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 PARENTHESES, (), 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 1.0M FROM THE FAN INTAKE.

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3. MECHANICAL:

- 3-1. DIMENSIONS — — — — — SEE DIMENSIONS DRAWING
- 3-2. FRAME — — — — — PLASTIC UL: 94HB
- 3-3. IMPELLER — — — — — PLASTIC UL: 94HB OR 94V-0
- 3-4. BEARING SYSTEM — — — — — 2 BALL BEARING
- 3-5. WEIGHT — — — — — 0.8 KILOGRAMS (REF.)
- 3-6. INGRESS PROTECTION LEVEL — — — — — IP-56
THE FAN IS TESTED A RATING OF IP56 UNDER IEC STANDARD 60529.
DETAILED TEST CONDITION PLEASE FIND IN DELTA TEST REPORT.

4. ENVIRONMENTAL:

- 4-1. OPERATING TEMPERATURE — — — — — -40 TO +60 DEGREE C
- 4-2. STORAGE TEMPERATURE — — — — — -40 TO +85 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
- 5-2. OVER CURRENT PROTECTION

6. RE OZONE DEPLETING SUBSTANCES:

- 6-1. NO CONTAINING PBBs, PBB0s, CFCs, PBBEs, PBDPEs AND HCFCs.

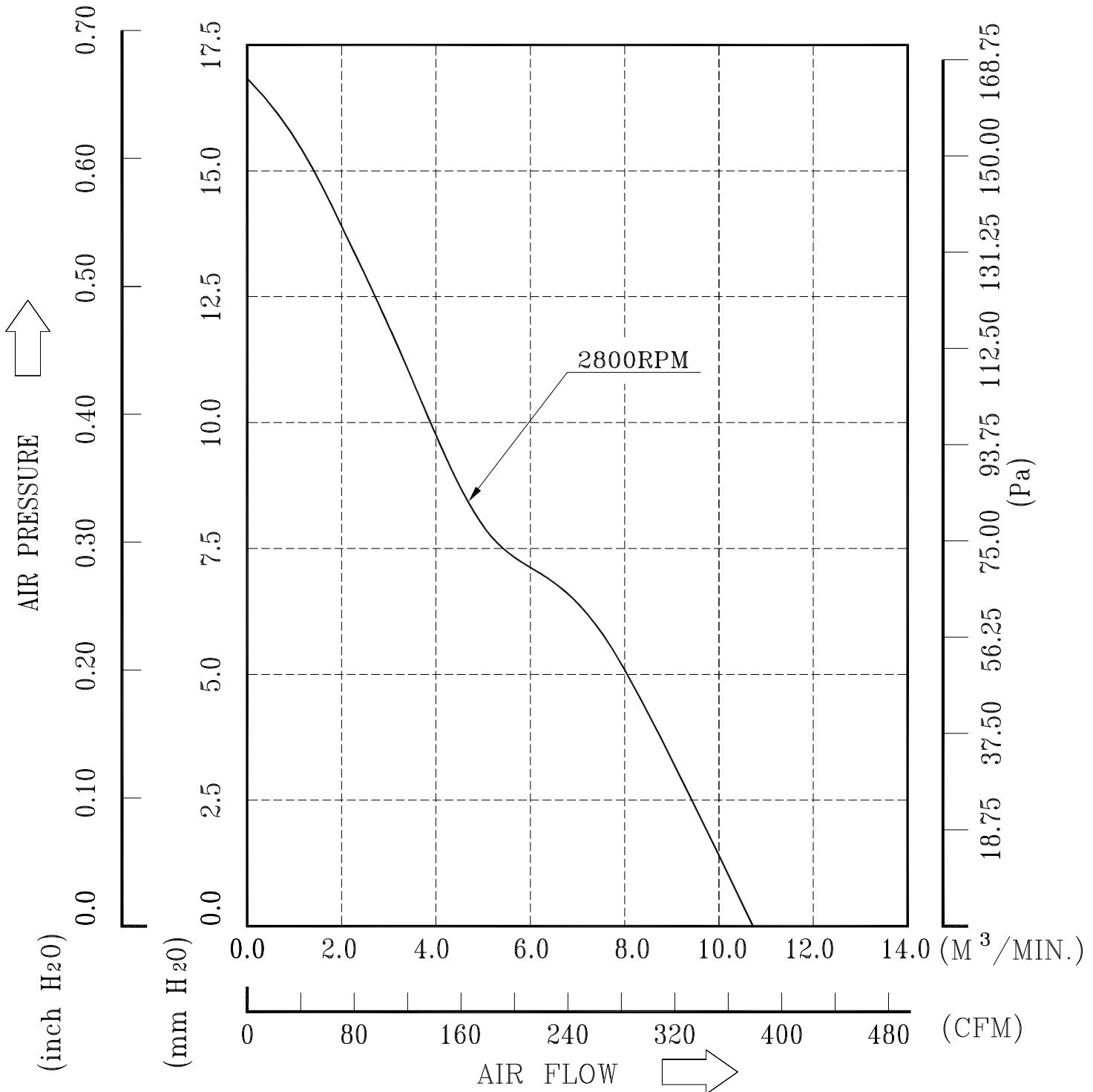
7. PRODUCTION LOCATION

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

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8. P & Q CURVE:

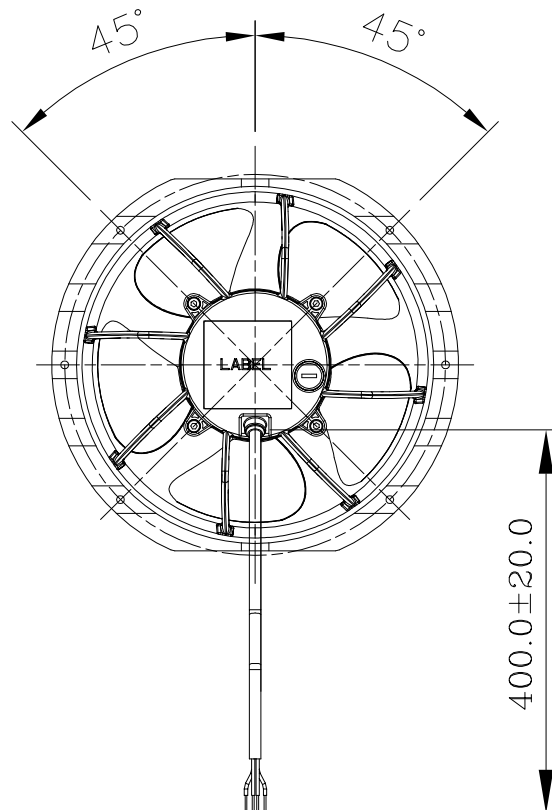
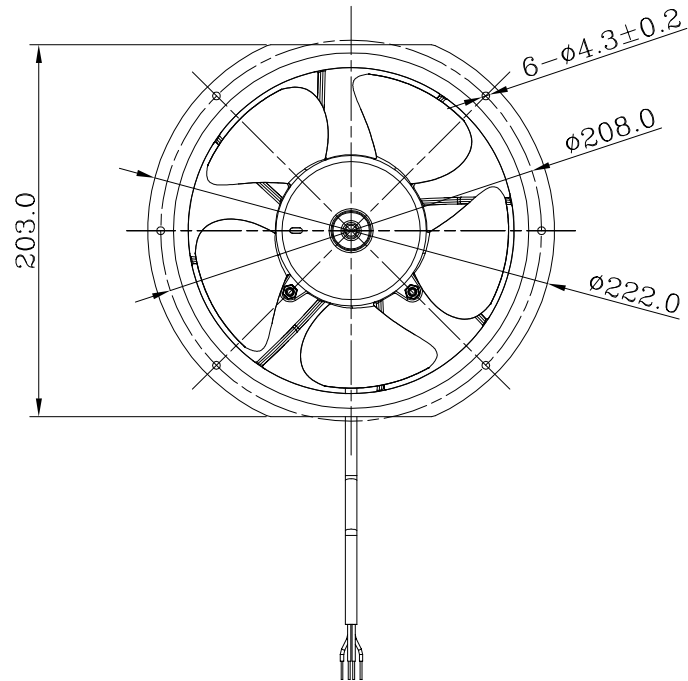


* TEST CONDITION: INPUT VOLTAGE ——— NOMINAL VOLTAGE
TEMPERATURE ——— ROOM TEMPERATURE
HUMIDITY ——— 65%RH

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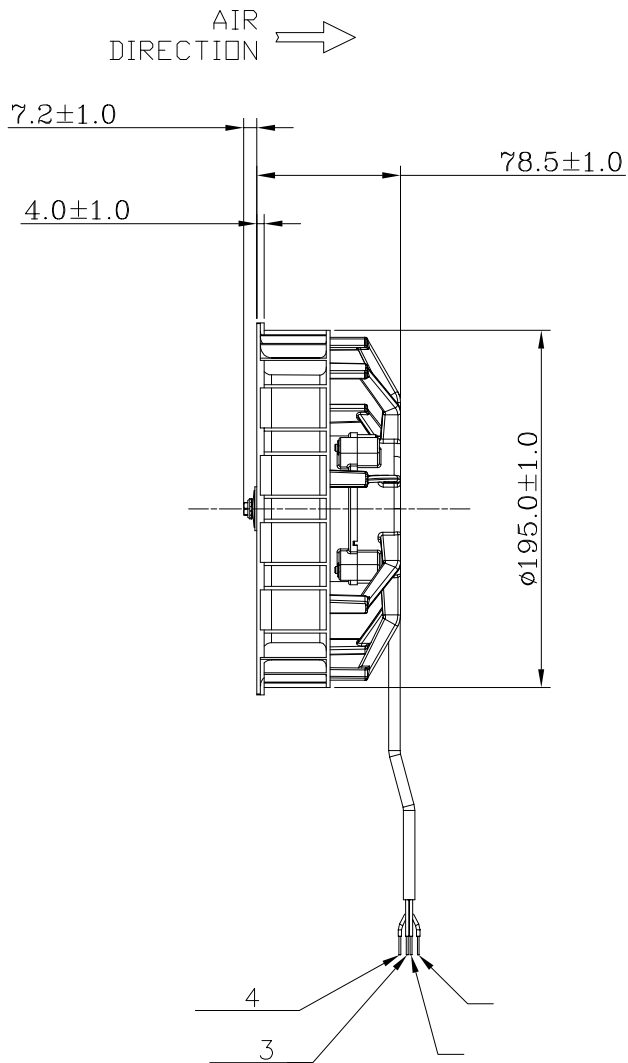
9. DIMENSION DRAWING:



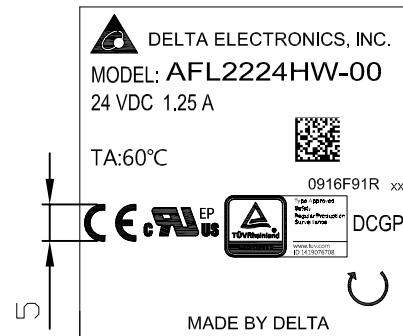
UNIT : mm

PART NO:

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LABEL:



UNIT : mm

NOTES:

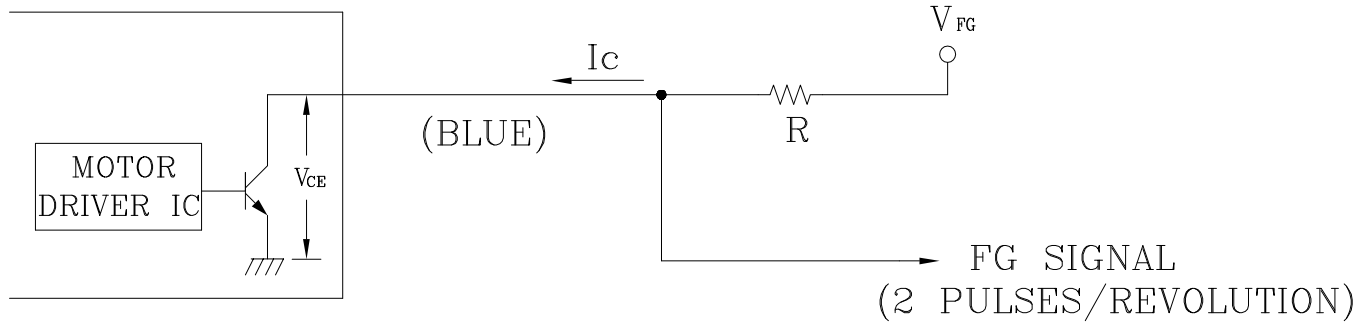
1. THIS PRODUCT IS RoHS COMPLIANT
2. UL 2464 20AWG/4C(80°C) -LF-
PIN1: RED WIRE (+)
PIN2: BLACK WIRE (-)
PIN3: YELLOW WIRE (PWM & VSP)
PIN4: BLUE WIRE (FG)
3. IMPELLER DIAMETER IS 172mm
4. FINGER GUARD USING SUGGESTION :
INTERNAL HEIGHT DIMENSION BETWEEN FINGER GUARD AND
TOP SURFACE OF FRAME MUST HAS 15 mm MINIMUM.

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10. FREQUENCY GENERATOR SIGNAL (FG):

10-1. OUTPUT CIRCUIT - OPEN COLLECTOR MODE:



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

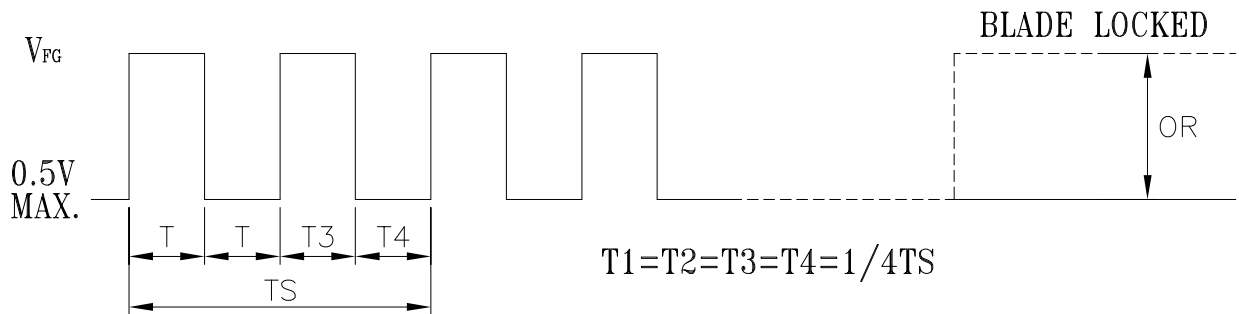
$$V_{FG} = V_{DD} \text{ MAX}$$

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

$$R \geq V_{FG} / I_c$$

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

10-2. FREQUENCY GENERATOR WAVEFORM:



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

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

*VOLTAGE LEVEL AFTER BLADE LOCKED

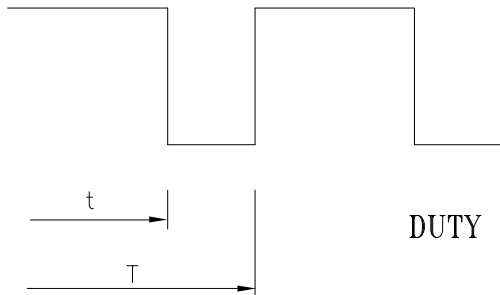
*FAN RUNNING FOR 4 POLES

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11. PWM CONTROL SIGNAL:

SIGNAL VOLTAGE RANGE: 0~5VDC



----- HIGH SIGNAL: 5 VDC MAX.
4.5 VDC MIN.
----- LOW SIGNAL: 0.8 VDC MAX.
0 VDC MIN.

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

THE FREQUENCY FOR CONTROL SIGNAL OF THE FAN SHALL BE ABLE TO ACCEPT 25KHZ.

AT 100% DUTY CYCLE, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
WITH CONTROL SIGNAL LEAD DISCONNECTED, THE FAN WILL SPIN AT MAXIMUM SPEED.

AT 25KHZ 30% DUTY CYCLE, THE FAN WILL BE ABLE TO START FROM A DEAD STOP.

*CAUTION: THE PWM LEAD WIRE MUST BE KEPT AWAY FROM "+" LEAD WIRE.

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12. VOLTAGE OF CONTROL SPEED SIGNAL (VSP):

- THE VOLTAGE RANGE OF CONTROL SPEED SIGNAL SHALL BE ABLE TO ACCEPT FROM 0~3.5VDC.
- AT DC 3.5V, THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- AT DC 0V, THE ROTOR WILL STOP.
- WITH VSP LEAD WIRE DISCONNECTED, THE FAN WILL SPIN AT MAXIMUM SPEED.
- THE MINIMUM START VOLTAGE OF CONTROL SPEED SIGNAL IS 1.0 VDC.

*CAUTION: THE VSP LEAD WIRE MUST BE KEPT AWAY FROM "+" LEAD WIRE.

SPEED VS VOLTAGE CONTROL SIGNAL: (AT RATED VOLTAGE & 25°C)

VOLTAGE(V)	SPEED (R.P.M.)	CURRENT (A) (REF.)
3.5	2800 ± 10%	0.90
2.0	1800 ± 10%	0.32
1.0	1000 ± 10%	0.15
0	0	0



Application Notice

1. Delta will not guarantee the performance of the products if the application condition falls outside the parameters forth in the specification.
2. A written request should be Submitted to Delta prior to approval if deviation from the specification is required.
3. Please exercise caution when handling fans. Damage may be caused then 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 adainst 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 provide 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 cautions when mounting the fan. Incorrect mounting of fans may cause excess resonance, vibration and subsequent noise.
11. It is important to consider safety then 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 "4.7 μ F or greater "capacitor to the fan externally when the application calls for using multiple fans in parallel, to avoid any unstable power.