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SPECIFICATION FOR APPROVAL

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Customer:

Description: DC FAN

Customer P/N: REV:

Delta Model NO.: ASB0412MA-DD1K Delta safety model NO.:

Sample Rev: 07 Issue NO:

Sample Issue Date: Quantity:

1. SCOPE:

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

2. CHARACTERS:

*THE CHARACTERISTICS ON 13VDC ARE REFERENCES

ITEM	DESCRIPTION	
RATED VOLTAGE	12 VDC	*13 VDC
OPERATION VOLTAGE	10.8 - 13.8 VDC	10.8 - 13.8 VDC
INPUT CURRENT	0.04 (MAX. 0.08) A	0.06 (MAX. 0.10) A
	SAFETY CURRENT ON LABEL : 0.10A	
INPUT POWER	0.48 (MAX. 0.96) W	0.78 (MAX. 1.30) W
SPEED	5000±15% R.P.M.	5400±15% R.P.M.
MAX. AIR FLOW (AT ZERO STATIC PRESSURE)	0.153 (MIN. 0.125) M^3/MIN. 5.407 (MIN. 4.434) CFM	0.164 (MIN. 0.134) M^3/MIN. 5.785 (MIN. 4.744) CFM
MAX. AIR PRESSURE (AT ZERO AIRFLOW)	2.697 (MIN. 1.813) mmH_2O 0.106 (MIN. 0.071) $inchH_2O$	3.152 (MIN. 2.119) mmH_2O 0.124 (MIN. 0.083) $inchH_2O$
ACOUSTICAL NOISE (1M) (NOTE4)	20.5 (MAX. 24.5) dB-A	23.0 (MAX. 27.0) dB-A
INSULATION TYPE	UL: CLASS A	

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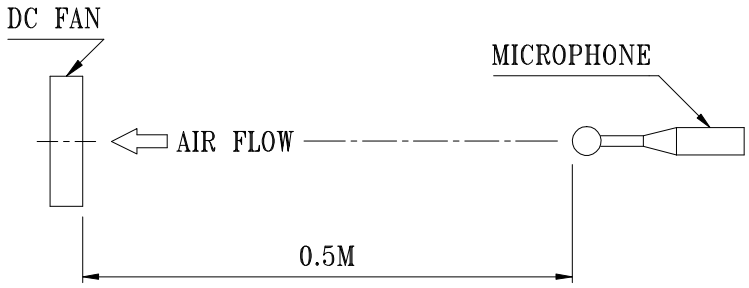
INSULATION STRENGTH	10 MEG OHM MIN. AT 500 VDC (BETWEEN FRAME AND (+) TERMINAL)
DIELECTRIC STRENGTH	5 mA MAX. AT 500 VAC 50/60 Hz ONE MINUTE, (BETWEEN FRAME AND (+) TERMINAL)
EXTERNAL COVER	OPEN TYPE
LIFE EXPECTANCE (L10) AT LABEL VOLTAGE	30,000 HOURS CONTINUOUS OPERATION AT 40 °C WITH 15 ~ 65 %RH.
ROTATION	CLOCKWISE VIEW FROM NAME PLATE SIDE
OVER CURRENT SHUT DOWN	THE CURRENT WILL SHUT DOWN WHEN LOCKING ROTOR
LEAD WIRE	UL 10368 AWG#28 RED WIRE NEGATIVE(+) BLACK WIRE POSITIVE(-) YELLOW WIRE SPEED CONTROL(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 SEMI-ANECHOIC CHAMBER WITH B & K SOUND LEVEL METER WITH MICROPHONE AT A DISTANCE OF 0.5M FROM THE FAN INTAKE. THE NOISE AT 1M SHOULD CALCULATED FROM THE VALUE MEASURED AT 0.5M.

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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 ---------- SLEEVE BEARING

3-5. WEIGHT ---------- 13.5 GRAMS (REF.)

4. ENVIRONMENTAL:

4-1. OPERATING TEMPERATURE ---------- -10 TO +85 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

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 .

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8. RELIABILITY:

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

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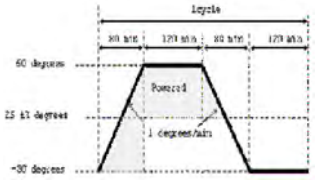
9. RELIABILITY(CUSTOMER REQUIREMENT):

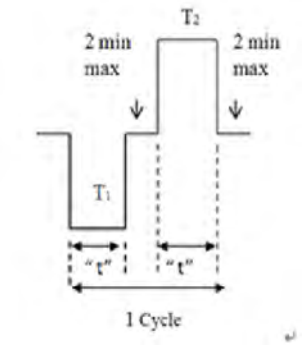
9-1. POWER THERMAL CYCLE

HUMIDITY: NEED MAINTAIN TAHT DO NOT LET FAN FREEZE
POWER: AT RATED VOLTAGE
1 CYCLE TIME: 6 HOUR 40 MINUTES
NUMBER OF CYCLE: 30
REFER TO BELOW FIGURE



9-2. THERMAL SHOCK RESISTANCE

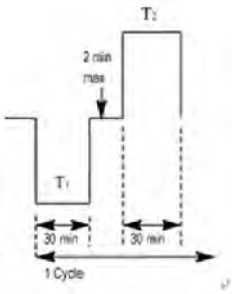
LOW TEMPERATURE: -40°C
HIGH TEMPERATURE: +85°C
SOAK TIME: 1 HOUR EACH TEMPERATURE
TRANSITION TIME < 2 MINUTES
POWER: NON-OPERATING
NUMBER OF CYCLE: 6
REFER TO BELOW FIGURE



9. RELIABILITY(CUSTOMER REQUIREMENT):

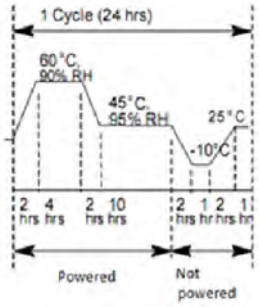
9-3. THERMAL SHOCK ENDURANCE

LOW TEMPERATURE: -40°C
HIGH TEMPERATURE: +85°C
SOAK TIME: 30 MINUTES EACH TEMPERATURE
TRANSITION TIME < 2 MINUTES
POWER: NON-OPERATING
NUMBER OF CYCLE: 500
REFER TO BELOW FIGURE



9-4. HUMIDITY TEMPERATURE CYCLING

ENVIRONMENT: AT NORMAL PRESSURE CONDITION
POWER AND TEST PROCESS FOLLOW BELOW FIGURE



9-5. VIBRATION

FREQUENCY(Hz)	ACCELERATION(M/S^2)
1. 5-15	10mm-p-p
2. 15-25	44.1(4.5g)
3. 25-100	19.6(2g)
4. 100-200	4.9(0.5g)

1 CYCLE: 1 -> 4 UNDER GO 20MIN.
EACH DIRECTION(X, Y, Z) NEED 18 CYCLE

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9. RELIABILITY(CUSTOMER REQUIREMENT):

9-6. MECHANICAL SHOCK	1BOX FAN DROP ONTO CONCRETE OR STEEL SURFACE FROM 100CM HEIGHT. DROP SEQUENCY: 8 CORNERS -> 6 FACES
9-7. SUNSHINE ILLUMINATE	PLACE FAN AT 100°C FOR 5 HOURS POWER: NON-OPERATING
9-8. STORAGE DURATION	ENVIRONMENT: HUMIDITY: 85% RH @ 85°C POWER: AT RATED VOLTAGE TEST TIME: 1000 HOUR TO CHECK FANS ARE RUNNING ONE TIME EVERY DAY
9-9. HIGH TEMPERATURE LIFE	TEMPERATURE: 60°C POWER: AT RATED VOLTAGE TEST TIME: 1000 HOUR TO CHECK FANS ARE RUNNING ONE TIME EVERY DAY
9-10. NOISE TEST	NOISE PERFORMANCE MUST MEET THE REQUIREMENT BELOW MICROPHONE AT ONE METER FROM THE FAN INTAKE POWER: AT RATED VOLTAGE

[Hz] HEV	Frequency Idle SPL [dB (A)]	[Hz] HEV	Frequency Idle SPL [dB (A)]
31.5	5.1	500	15.7
40	-0.5	630	15.1
50	-1.7	800	14.8
63	-1.7	1250	14.2
80	0.1	1600	12.3
100	5.5	2000	11.3
125	14.4	2500	10.3
160	18.1	3150	10
200	18.2	4000	9.7
250	17.5	5000	10.1
315	16.5	6300	11.5
400	15.8		

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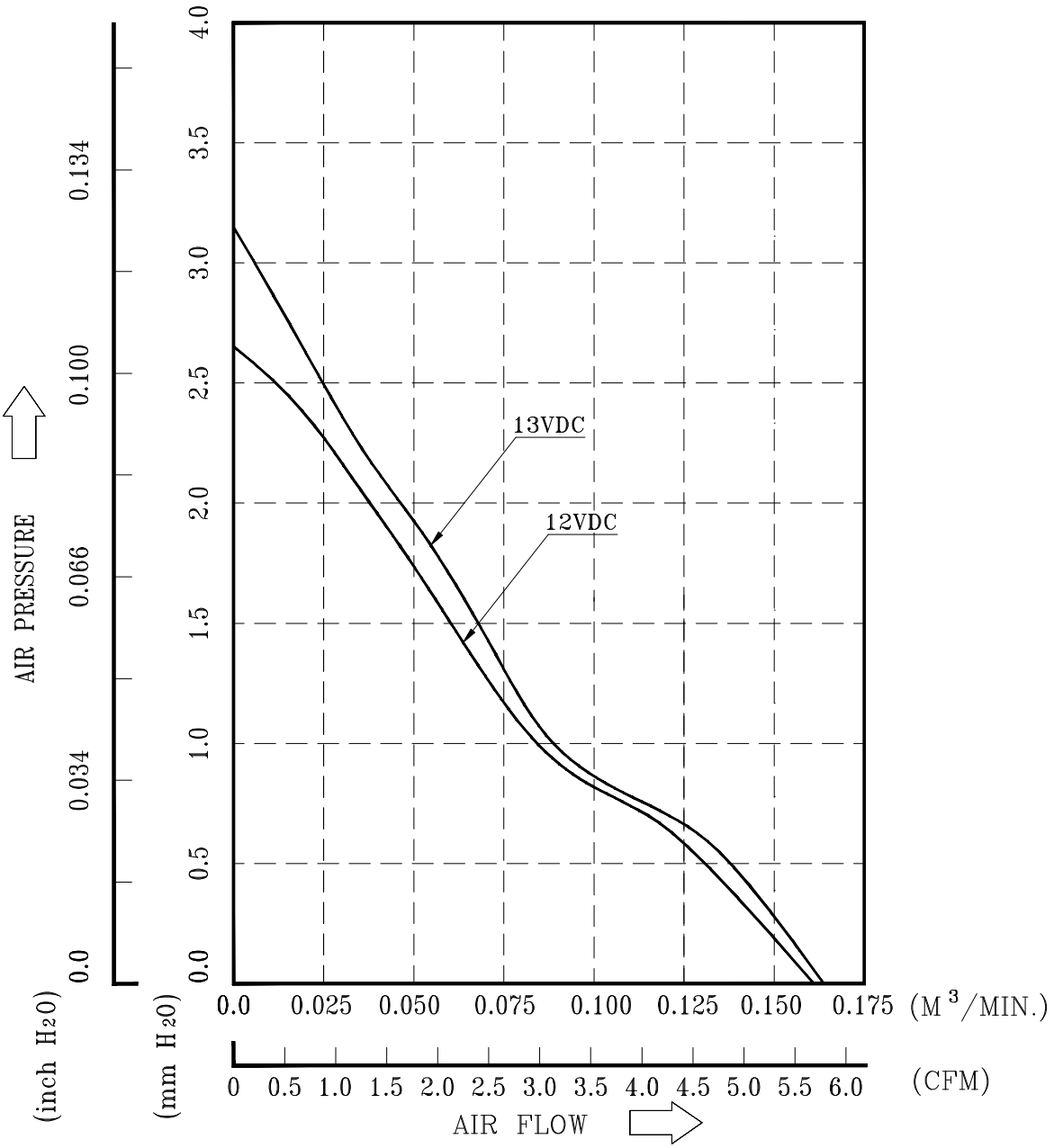
10. P & Q CURVE:



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

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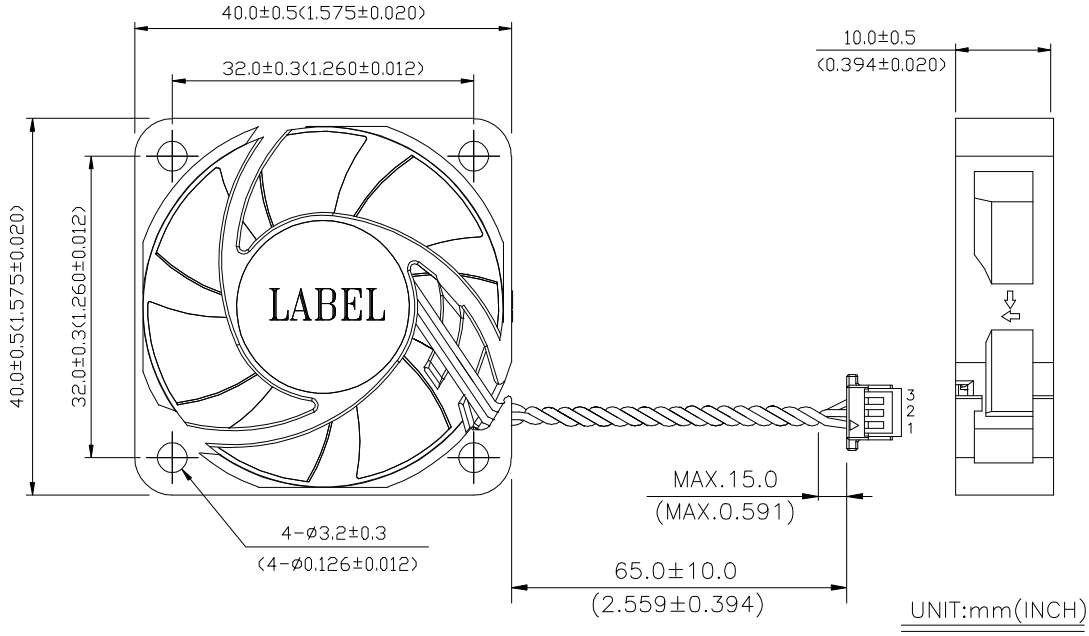
11. DIMENSION DRAWING:

LABEL:



NOTES:
1. THIS PRODUCT IS RoHS COMPLIANT
2. This product conforms to the provisions on the control of "Environmental Hazardous Substances" in "Alps Electric Co.,Ltd.,Green Procurement Standard"
3. UL 10368 AWG#28
   PIN1: RED WIRE (+)
   PIN2: BLACK WIRE (-)
   PIN3: YELLOW WIRE (PWM)
4. HOUSING: JST GHR-03V-S OR EQUIVALENT.
5. TERMINAL: JST SSHL-002T-P0.2 OR EQUIVALENT.

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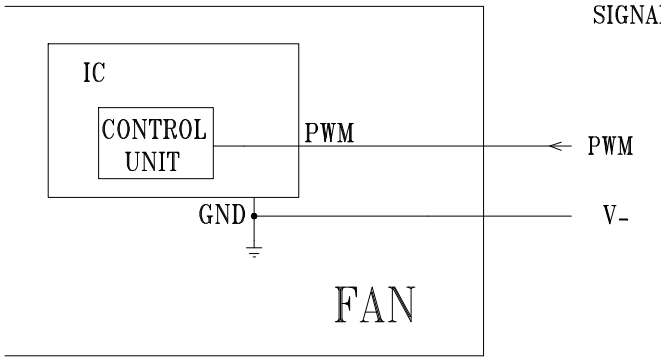
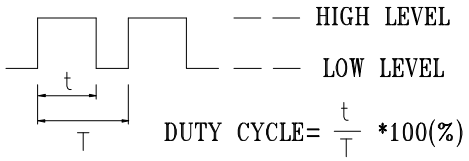
12.PWM CONTROL FUNCTION

12-1 PWM CONTROL INTERFACE



SIGNAL VOLTAGE RANGE: 0 ~ 7.0 VDC



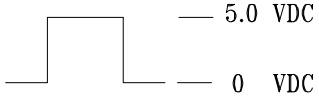
- HIGH LEVEL : 7.0 VDC max. / 2.7 VDC min.
- LOW LEVEL : 0.4 VDC max. / 0 VDC min.

- THE PREFERRED OPERATING FREQUENCY OF PWM SIGNAL IS 25K Hz.
- AT 100% DUTY CYCLE,THE ROTOR WILL SPIN AT MAXIMUM SPEED.
- AT 0% DUTY CYCLE,THE ROTOR WILL STOP SPIN.
- WHEN THE PWM CONTROL LEAD WIRE IS DISCONNECTED, THE ROTOR WILL SPIN AT MAXIMUM SPEED.

12-2.FAN CHARACTERISTICS

- FUNCTION GENERATOR TEST SIGNAL

PWM FREQUENCY = 25K Hz



DUTY CYCLE (%)	SPEED R.P.M. (REF.)	CURRENT (A) TYP.
100	5000±15%	0.04
0	0	0.01

- MIN. STARTED DUTY CYCLE(at 25°C, 12.0VDC):MAX. 30 %
  WHEN DUTY CYCLE IS SET FOR MORE THAN 30 %, THE FAN WILL BE ABLE TO START FROM A DEAD STOP.

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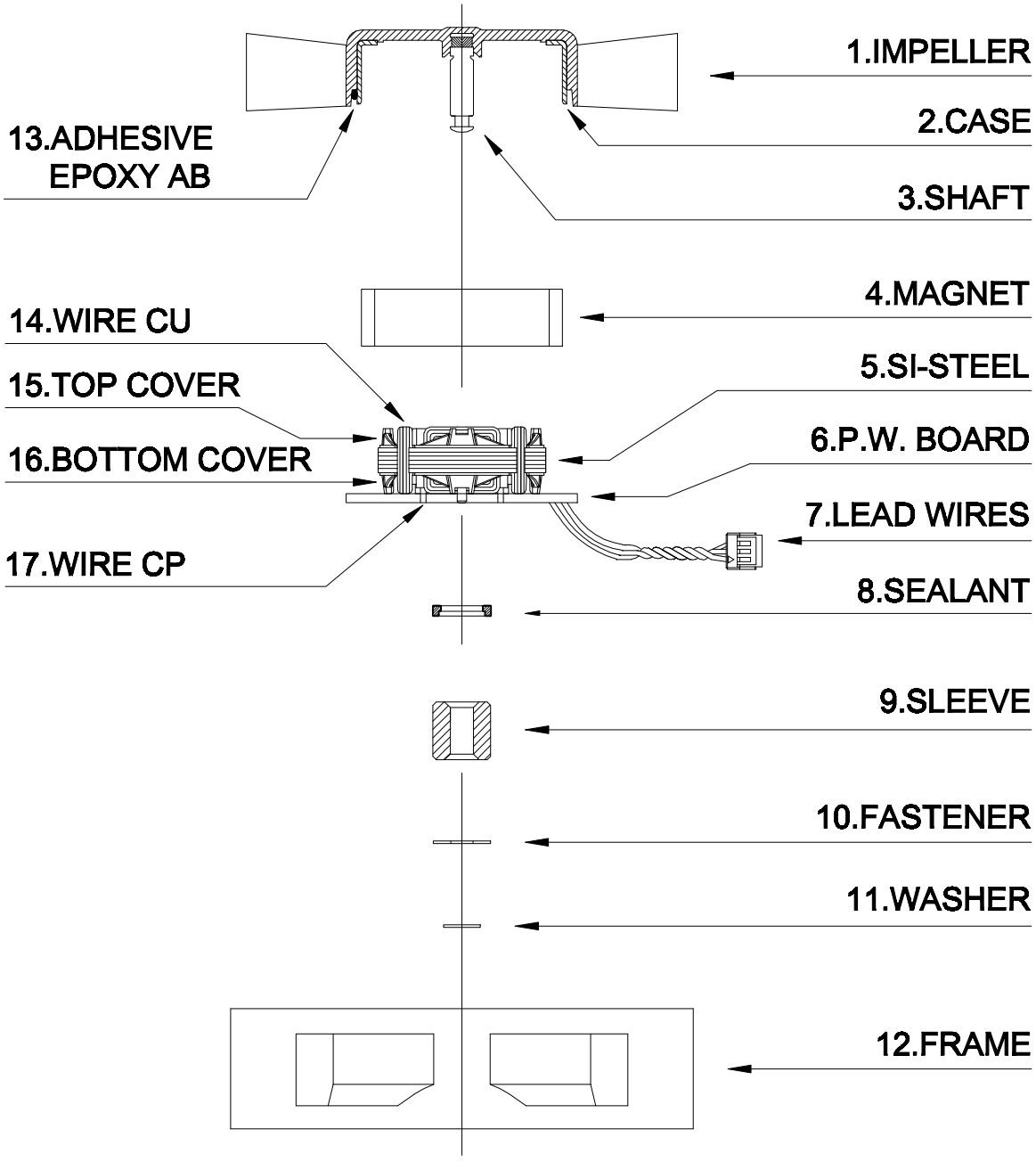
13.FAN CONSIST OF LIST



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.