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| Customer No.: | BA10033B12GP061 |
| AVC Model: | BA10033B12GP061 |

Rev. B

# SPECIFICATION FOR APPROVAL

## 1. SCOPE:

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

## 2. CHARACTERS:

(AT Ta=25°C)

| | ITEM | SPEC. | |
|---|---|---|---|
| 2-1. | RATED VOLTAGE | 12 | VDC |
| 2-2. | OPERATION VOLTAGE | 7.0 ~ 13.2 | VDC |
| 2-3. | RATEDT CURRENT (IN FREE AIR) | 3.0 ( 4.50 MAX.) | A (AVERAGE) |
| 2-4. | CURRENT ON LABEL | 4.50 A | |
| 2-5. | RATED POWER (IN FREE AIR) | 36.0 ( 54.0 MAX.) | W |
| 2-6. | SPEED (IN FREE AIR) | 6000±10% | R.P.M |
| 2-7. | SPEED CONTROL TYPE | PWM CONTROLLER | |
| 2-8. | SIGNAL OUTPUT | FREQUENCY GENERATOR (FG) | |
| 2-9. | MAX. AIR FLOW (AT ZERO STATIC PRESSURE) | 1.347 ( 1.212 MIN.)<br>47.60 ( 42.84 MIN.) | $M^3$/MIN<br>CFM |
| 2-10. | MAX. AIR PRESSURE (AT ZERO FLOW) | 83.60 ( 67.72 MIN.)<br>3.291 ( 2.666 MIN.) | mm-$H_2O$<br>inch-$H_2O$ |
| 2-11. | ACOUSTICAL NOISE | 65.6 ( 69.6 MAX.) | dB-A |

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2-12. INSULATION RESISTANCE —— 10 MEGA OHM MIN. AT 500 VDC
(BETWEEN FRAME AND (+) TERMINAL)

2-13. DIELECTRIC STRENGTH ——— 5 mA MAX. AT 500 VAC 60Hz ONE MINUTE,
(BETWEEN FRAME AND (+) TERMINAL)

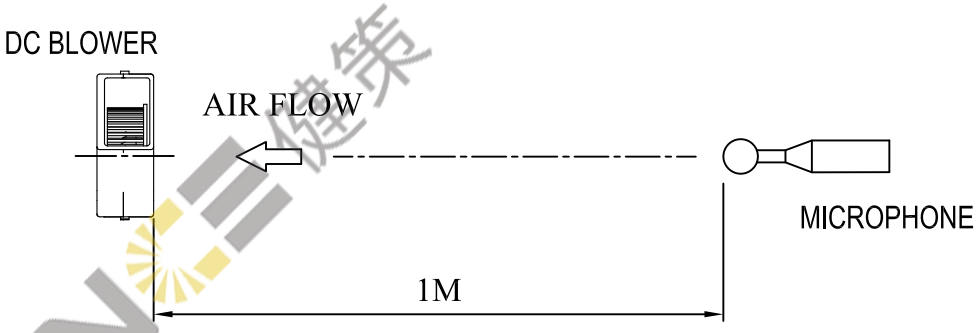
2-14. LIFE EXPECTANCE ———— 50,000 HOURS AT 45°C ROOM, AMBIENT 15%~60%RH

2-15. INSULATION CLASS ———— UL: CLASS A

NOTE:

A. THE VALUES WRITTEN IN PARENTHESIS, ( ), ARE LIMITED SPEC.

B. ACOUSTICAL NOISE MEASURING CONDITION:




NOISE IS MEASURED AT RATED VOLTAGE IN FREE AIR IN ACOUSTICAL CHAMBER WITH LARSON DAVIS TYPE 824S SOUND LEVEL METER.

C. THE AIR FLOW AND AIR PRESSURE MEASURED AT RATED VOLTAGE IN DOUBLE CHAMBER IS MEASURED ACCORDING TO AMCA STANDARD 210-85.

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## 3. MECHANICAL

3-1. DIMENSION ——— SEE DIMENSION DRAWING

3-2. FRAME ——— THERMOPLASTIC OF UL 94V-0

3-3. FAN BLADE ——— THERMOPLASTIC OF UL 94V-0

3-4. BEARING SYSTEM ——— TWO BALL BEARINGS

3-5. WEIGHT ——— 208 g

## 4. ENVIRONMENTAL

4-1. OPERATING TEMPERATURE ——— -10 TO +70 °C

4-2. STORAGE TEMPERATURE ——— -40 TO +75 °C

4-3. OPERATING HUMIDITY ——— 5 TO 90 % RH

4-4. STORAGE HUMIDITY ——— 5 TO 95 % RH

4-5. DROP TEST ———
IN MINIMUM PACKGING CONDITION FAN WITHSTAND EACH ONE DROP OF THREE FACES FROM 30cm DISTANCE HEIGHT ONTO 10mm THICKNESS OF WOODEN BOARD

4-6. VIBRATION TEST ———
SINEWAVE
DISPLACEMENT AMPLITUDE: 0.75 mm (EQUIVALENT 10G)
FREQUENCY RANGE: 10Hz - 55 Hz / 30 SEC. 55Hz - 10 Hz / 30 SEC.
LINEEAR SCANNING 120 CYCLE
ENDURANCE TIMER PER AXIS: 2 HOURS
ORIENTATION: X,Y,Z

4-7. SHOCK TEST ———
APPLY PEAK ACCELERATION 50G AND KEEP DURATION OF THE PLUSES FOR 11mS (HALF SINE WAVE)

4-8. RoHS COMPLIANCE ——— SEE RoHS STANDARD

## 5. PROTECTION

5-1. LOCKED ROTOR PROTECTION
IMPEDANCE OF MOTOR WINDING PROTECTS MOTOR FROM DAMAGE IN 72 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

5-3. HOT SWEP PROTECTION ———
THIS FAN HAS NO HOT SWAP FUNCTION.

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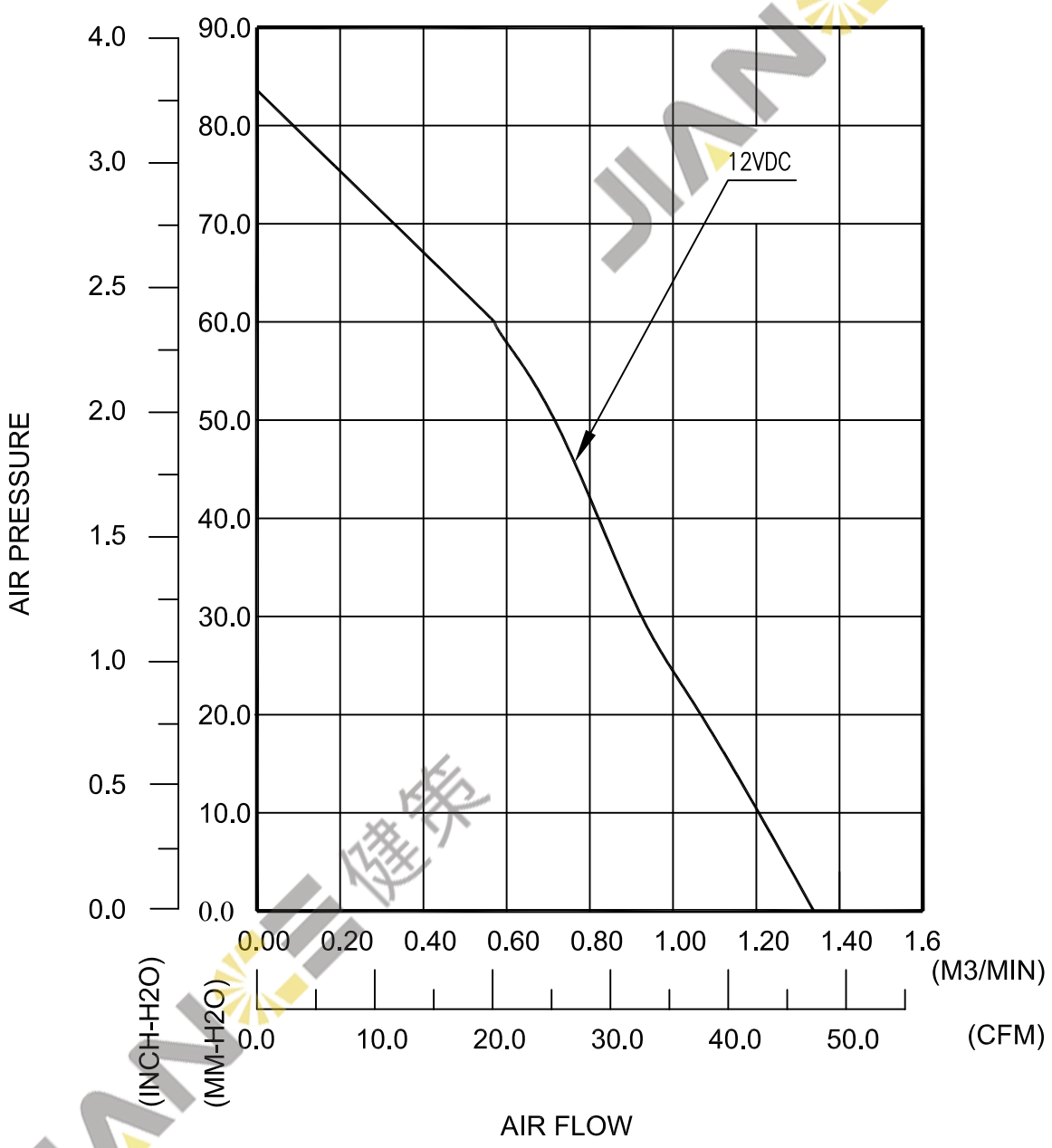
## 6. P & Q CURVE




* TEST CONDITION:

INPUT VOLTAGE ——— OPERATION VOLTAGE
TEMPERATURE ——— ROOM TEMPERATURE
HUMIDITY ——— 65%RH

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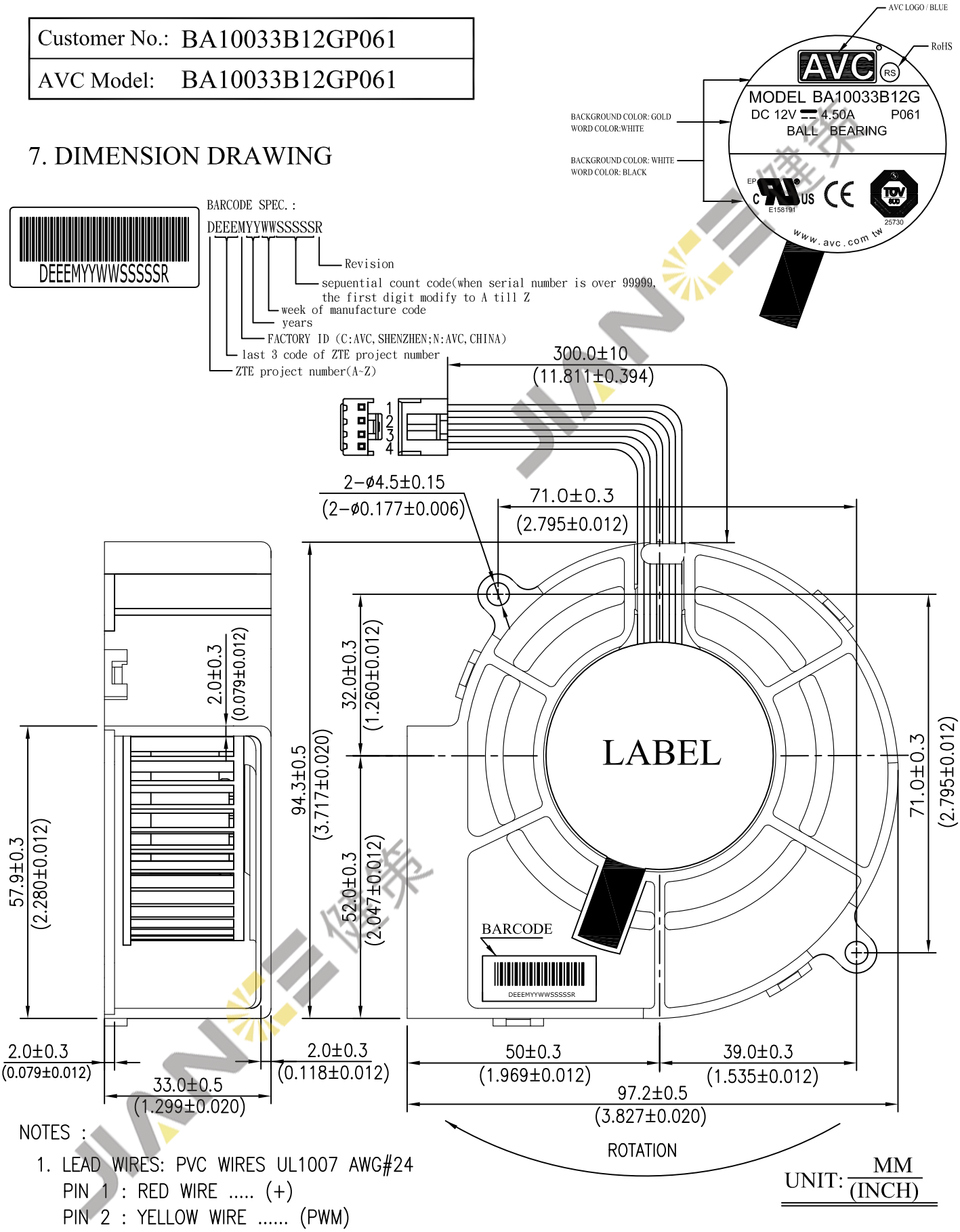
## 7. DIMENSION DRAWING




NOTES :

1. LEAD WIRES: PVC WIRES UL1007 AWG#24
   PIN 1 : RED WIRE ..... (+)
   PIN 2 : YELLOW WIRE ..... (PWM)
   PIN 3 : BLUE WIRE ..... (FG)
   PIN 4 : BLACK WIRE ..... (−)

2. CONNECTOR
   HOUSING : ECI 3960H−04 OR EQUIVALENT
   TERMINAL : ECI 39117 OR EQUIVALENT

UNIT: MM / (INCH)

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## 8. SPEED CONTROL FUNCTION

### 8-1. PWM SIGNAL DESCRIPTION :

1. CONTROL SIGNAL: PWM CONTROL
2. THE RANGE OF SIGNAL VOLTAGE: LOW LEVEL VOLTAGE: MIN.>-0.8V, MAX. <0.8V
   HIGH LEVEL VOLTAGE: MIN. >2.8V , MAX.<12V
3. THE FREQUENCY OF PWM SINGAL SHALL BE ABLE TO ACCEPT A 300HZ~60KHZ
4. INPUT IMPEDANCE : 10K OHM MIN.

### 8-2. FAN SPEED CONTROL DESCRIPTION

1. FAN INPUT VOLTAGE ( POSITIVE ) : 12VDC
2. PWM FREQUENCY : 25KHZ
3. THE FAN SPEED WILL SPIN AT MAXIMUM WHEN THE DUTY CYCLE IS 100%.
4. THE FAN SPEED WILL SPIN AT MINIMUM WHEN THE DUTY CYCLE IS 0%.
5. THE FAN SPEED WILL SPIN AT 0~6000 RPM WHEN THE DUTY CYCLE IS 0~100%.
6. THE FAN SPEED WILL SPIN AT MAXIMUM WHEN THE LEAD WIRE OF PWM SIGNAL DISCONNECTED.

### 8-3. PWM DUTY CYCLE VS. RPM (AT Ta=25°C)

| DUTY CYCLE (%) | R.P.M (REF.) | TYPICAL CURRENT(A) |
|---|---|---|
| 0 | 0 | 0.02 |
| 50 | 3400±10% | 0.80 |
| 100 | 6000±10% | 3.00 |

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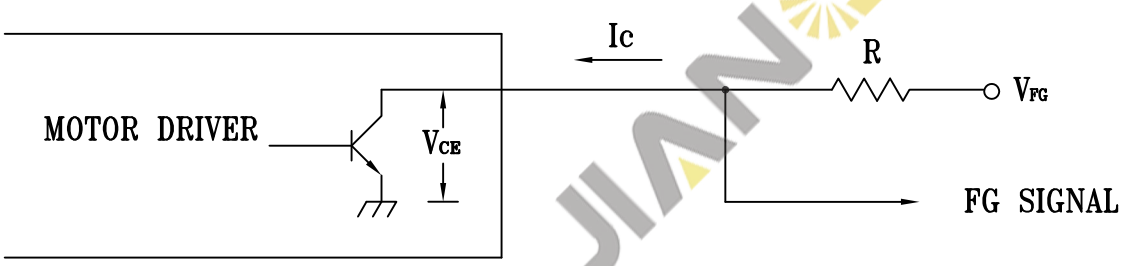
# 9. FREQUENCY GENERATOR (FG) SIGNAL

## 9-1. SCHEMATIC:




CAUTION:

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

## 9-2. SIGNAL SPECIFICATION:

OUTPUT TYPE: OPEN COLLECTOR

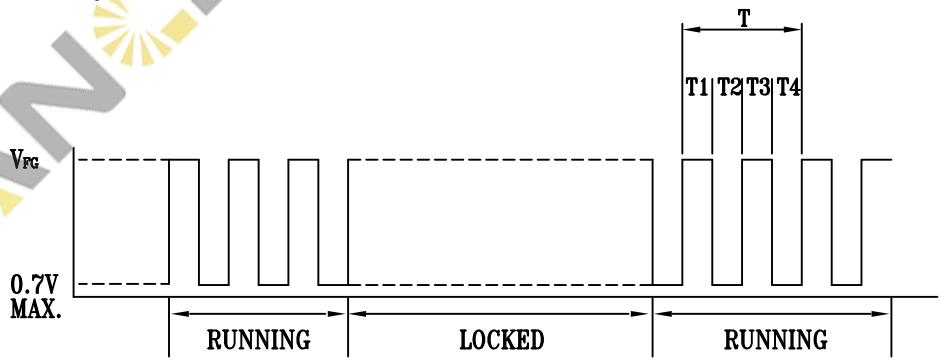
$V_{FG}$ MAXIMUM VOLTAGE = 13.2V

$I_C$ MAXIMUM CURRENT =5mA

LOW LEVEL VOLTAGE = 0.7V MAX.

$R \geq V_{FG} / I_C$

## 9-3. FREQUENCY GENERATOR WAVEFORM:



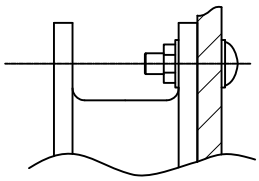

T=T1+T2+T3+T4=60/N (Sec)  N: SPEED (RPM)

# FAN INSTALLATION INSTRUCTIONS:

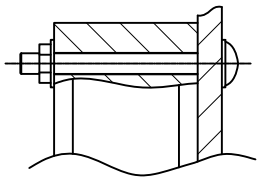
1. In case of using bolt-nut fasteners, the flatness of chassis mating surfaces should be kept below 0.1mm.
2. In case of using bolt-nut fasteners, this model was designed to be installed by fastening at either inlet or outlet flange only, figure(a). In cases of the bolt passing through rib type frame, figure(b), the torque to be applied to the nut must not exceed:

   2.1.1 Rib type frame: 7.5 kgf-cm [figure(d)]

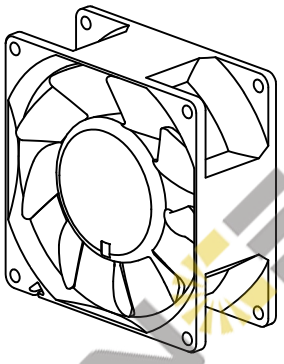
3. In case of using self-tapping screws, appropriate screws according to JIS B 1122 Type 2 should be used. The dimensional details of the self-tapping screws recommended are shown in Table(a). Each fastener hole should only be tightened once or slippage may occur. In addition, the torque to be applied to the self-tapping screws must not exceed the values stated in Table(a).
4. The countersunk part of fastener head should not interfere with the frame or there would be a risk of breakage [figure(e)]. Fastener head with flat inner surface, i.e. no countersunk, is recommended.



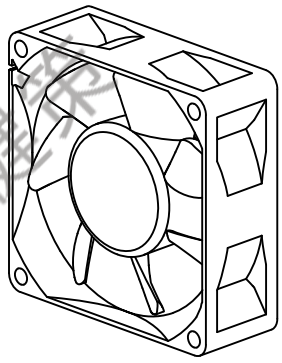
(a)



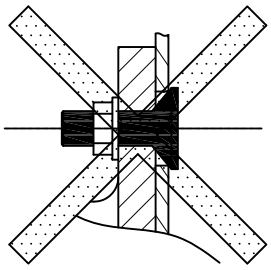
(b)



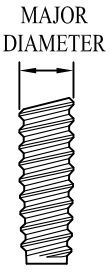
(c)



(d)



(e)




(f)

| MOUNTING HOLE DIAMETER | SCREW SPEC. | MAJOR DIAMETER [Fig.(f)] | | **RECOMMENDED MAX. TORQUE (kgf-cm) | |
|---|---|---|---|---|---|
| | | MAXIMUM | MINIMUM | FLANGE TYPE FRAME | RIB TYPE FRAME |
| ø3.5 | M4 X 1.41 | 4.0 | 3.85 | 4.5 | 7.5 |
| *ø4.3 | M4.8 X 1.59 | 4.8 | 4.65 | 5.5 | 7.5 |
| ø4.5 | M5 X 1.59 | 5.0 | 4.85 | 5.5 | 7.5 |

* Non JIS B 1122 spec.

** A lower torque than the recommended value should be used if slippage is observed.

TABLE (a)

## Description:

1. If the products are applied outside the parameters set in the specification, AVC is not responsible for the performance of the products.
2. Should customers request deviation from specification, they must first submit written request to AVC for approval.
3. Please use proper care when handling fans. Improper handling of the impeller, lead wires, or drop to the floor may lead to damage.
4. AVC will not guarantee that the products will be safe to use if there are problems caused by powder, water, and corrosive fluids.
5. Please double check on the correct polarity before connecting the fan to the power source.
6. Fans must not be stored in a high humidity environment. They should be stored according to the specified storage temperature limits. Fans must be tested again for performance before shipment if the fans are stored for more than 6 months.
7. Incorrect setting up of fans will very likely lead to excess vibration and acoustic noise.
8. During fan testing, we must take precautions against personal injury . Suitable fan guards must be fitted to the fans if needed.
9. Unless stated in specification, all fan performance tests are to be carried out at relative temperature and humidity conditions at 25℃, 65%.
10. When using multiple fans in parallel, please make sure to connect capacitor at least 4.7uF to avoid any unstable power.

# RoHS STANDARD

| HAZARDOUS SUBSTANCES | | ALLOWABLE CONTENT (wt%) | REMARK |
|---|---|---|---|
| HEAVY METALS | CADMIUM (Cd) AND ITS COMPOUNDS | < 0.01 wt%<br>( < 100 ppm ) | DIRECTIVE 2002/95/EC |
| | LEAD (Pb) AND ITS COMPOUNDS | < 0.1 wt%<br>( < 1000 ppm ) | DIRECTIVE 2002/95/EC |
| | MERCURY (Hg) AND ITS COMPOUNDS | < 0.1 wt%<br>( < 1000 ppm ) | DIRECTIVE 2002/95/EC |
| | HEXAVALENT CHROMIUM (CHROMIUM VI) ($Cr^{6+}$) AND ITS COMPOUNDS | < 0.1 wt%<br>( < 1000 ppm ) | DIRECTIVE 2002/95/EC |
| BROMINATED FLAME RETARDANTS | POLYBROMINATED BIPHENYLS (PBBs) | < 0.1 wt%<br>( < 1000 ppm ) | DIRECTIVE 2002/95/EC |
| | POLYBROMINATED DIPHENYL ETHERS (PBDEs) | < 0.1 wt%<br>( < 1000 ppm ) | DIRECTIVE 2002/95/EC |