



## **Specification For Approval**

Customer : \_\_\_\_\_  
Description : \_\_\_\_\_ EC FAN \_\_\_\_\_  
Customer Part No. : \_\_\_\_\_ Rev : \_\_\_\_\_  
Delta Model No. : \_\_\_\_\_ GTB050KUT34R E1 \_\_\_\_\_ Rev : X00  
Safety Model No. : \_\_\_\_\_ UL : GTB050KUT34R 、 TUV : MU150HA4FC1 \_\_\_\_\_  
Sample Issue No. : \_\_\_\_\_  
Sample Issue Date : \_\_\_\_\_ 08/27/2020 \_\_\_\_\_

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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## Electronically Commutated (EC) Fan

Centrifugal Fan

φ 505 x 337.5 mm



DELTA ELECTRONICS, INC.  
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### Technical features

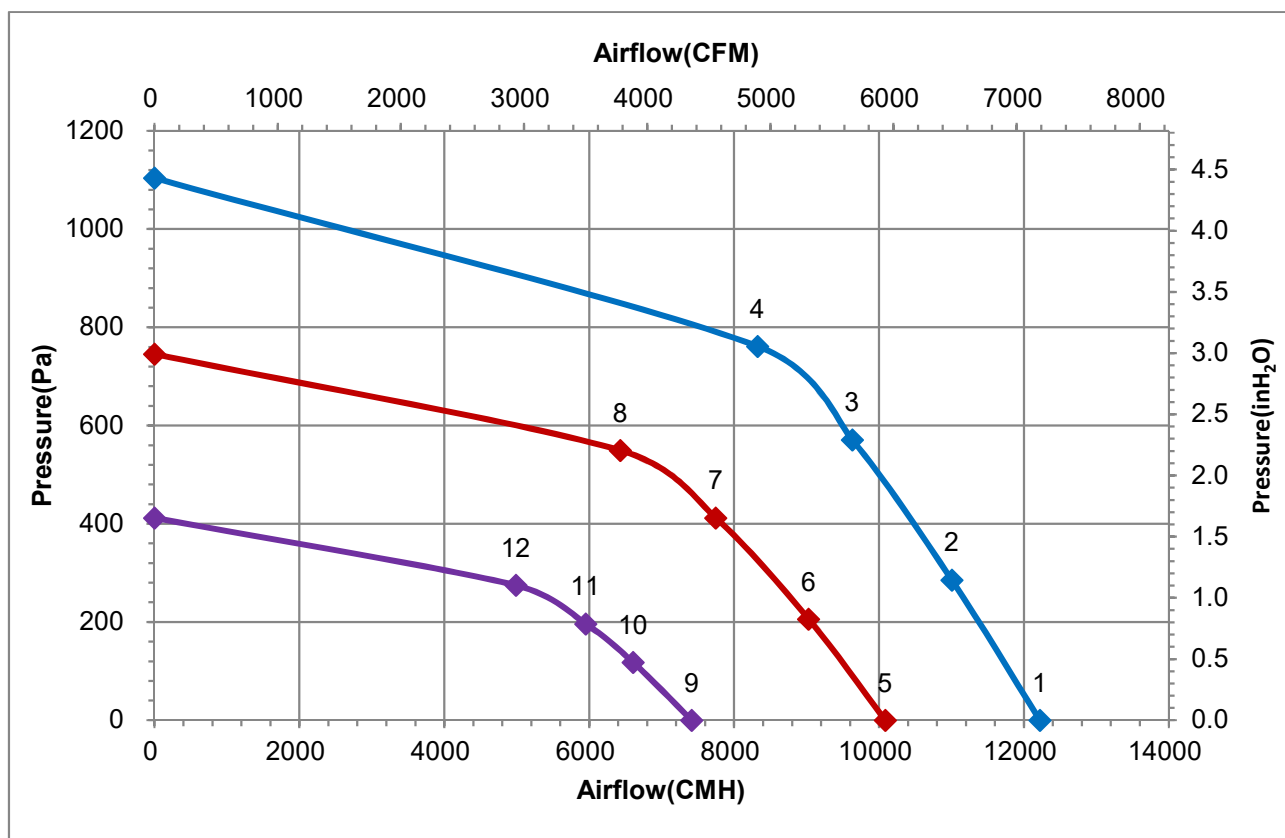
| Input Side                                                        |                       |
|-------------------------------------------------------------------|-----------------------|
| Nominal Voltage                                                   | 3~ 230/400Vac 50/60Hz |
| Input Source                                                      | 3~ 200Vac - 480Vac    |
| Power @ Free air                                                  | 2430 W                |
| Power @ Max. load                                                 | 3100 W                |
| Output Side                                                       |                       |
| Speed (RPM)                                                       | 1820                  |
| Qmax. (CMH / CFM)                                                 | 12221 / 7193          |
| Pmax. (Pa / inAq)                                                 | 1104 / 4.43           |
| Noise (dB-A) @ Qmax.                                              | 86.5                  |
| Functions                                                         |                       |
| Control input 0-10V <sub>DC</sub> / PWM / 4-20mA.                 |                       |
| Output +10V <sub>DC</sub> (±10%), max. 10mA.                      |                       |
| Control voltage output : 0-10V <sub>DC</sub> .                    |                       |
| RS485 control bus (MODBUS(V1.1) RTU / 8N1)                        |                       |
| Alarm relay, Locked rotor protection, Soft start.                 |                       |
| Speed telling, Frequency generator signal.                        |                       |
| Voltage / Current monitoring.                                     |                       |
| Over voltage protection 538V <sub>ac</sub> (±8V <sub>ac</sub> ).  |                       |
| Under voltage protection 170V <sub>ac</sub> (±8V <sub>ac</sub> ). |                       |

| Physical                    |                                    |
|-----------------------------|------------------------------------|
| Rotation Direction          | CW, Seen on rotor                  |
| Material (Impeller / Frame) | Aluminum sheet / Die-cast aluminum |
| Bearing system              | Ball bearings                      |
| Weight (kg)                 | 30                                 |
| Electrical leads            | Via terminal block                 |
| Environmental               |                                    |
| Operating temperature range | -25 ~ +60 °C                       |
| Storage temperature range   | -40 ~ +70 °C                       |
| Safety                      |                                    |
| Safety                      | UL , cUL , TUV                     |
| IP Level                    | IP54                               |
| EMC                         | EN61000-6-2/4                      |
| Protection class            | I                                  |
| Insulation class            | F                                  |
| Leakage current             | ≤ 3.5 mA                           |
| Motor protection            | Over temperature protected         |
| Life expectancy             | 60,000 hrs at 40 °C / 15 ~ 65 %RH  |

#### NOTE :

1. Delta reserves the right to change specifications and other product information without prior notice.

## P & Q curves



Measure data:

|    | P<br>[Pa] | Q<br>[CMH] | N<br>[R.P.M.] | P1<br>[W] | I<br>[A] | Lp<br>[dB(A)] |
|----|-----------|------------|---------------|-----------|----------|---------------|
| 1  | 0         | 12221      | 1820          | 2216      | 3.31     | 86.5          |
| 2  | 286       | 11005      | 1820          | 2650      | 3.96     |               |
| 3  | 571       | 9631       | 1820          | 2983      | 4.41     |               |
| 4  | 761       | 8324       | 1820          | 3100      | 4.59     |               |
| 5  | 0         | 10085      | 1500          | 1296      | 2.18     | 81.5          |
| 6  | 206       | 9028       | 1500          | 1533      | 2.53     |               |
| 7  | 412       | 7746       | 1500          | 1723      | 2.75     |               |
| 8  | 549       | 6431       | 1500          | 1754      | 2.79     |               |
| 9  | 0         | 7415       | 1100          | 570       | 1.00     | 73.5          |
| 10 | 118       | 6607       | 1100          | 666       | 1.18     |               |
| 11 | 196       | 5950       | 1100          | 727       | 1.29     |               |
| 12 | 275       | 4989       | 1100          | 752       | 1.33     |               |

### Test Condition :

- Input Voltage : Nominal Voltage (3~ 400Vac 50/60Hz)
- Temperature : Room Temperature
- Humidity : 65%RH
- Measured with inlet cone.
- Noise (Lp) is measured at a distance of one meter from the inlet side.

## Dimension drawing

Label :

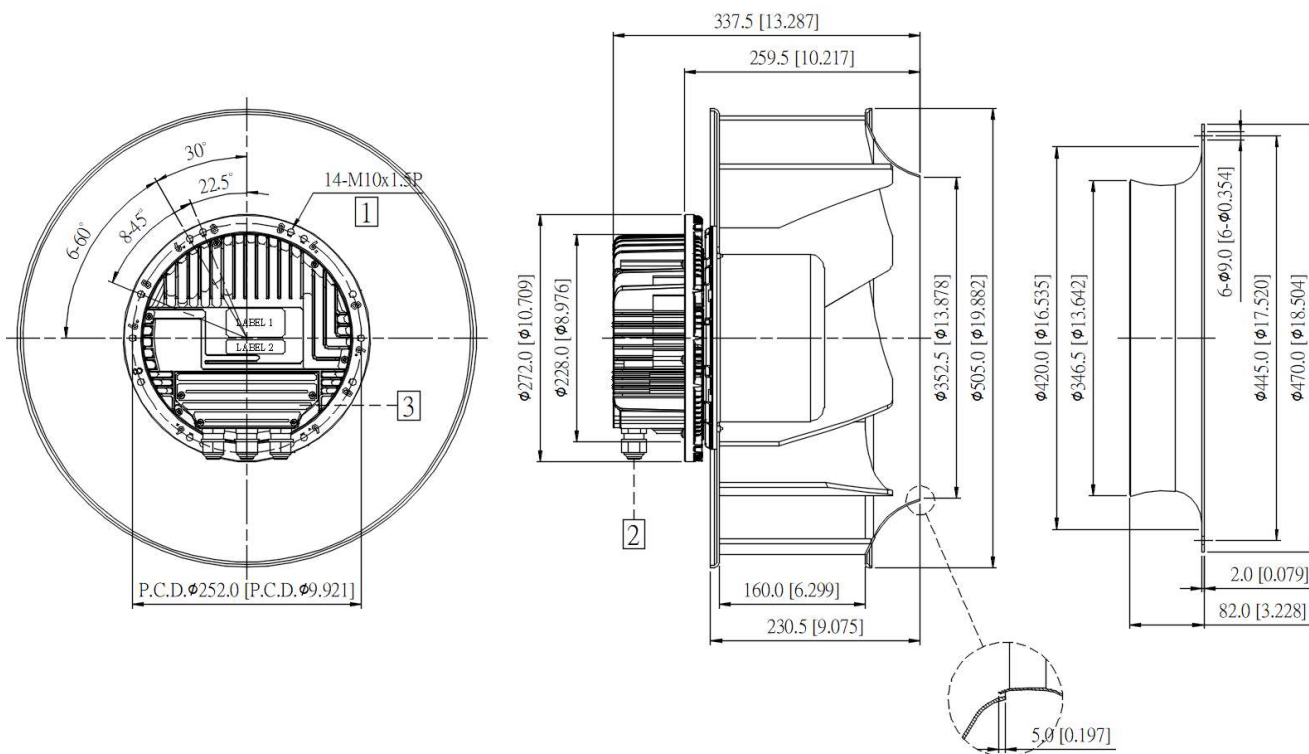


Label 1



Label 2

Fan :

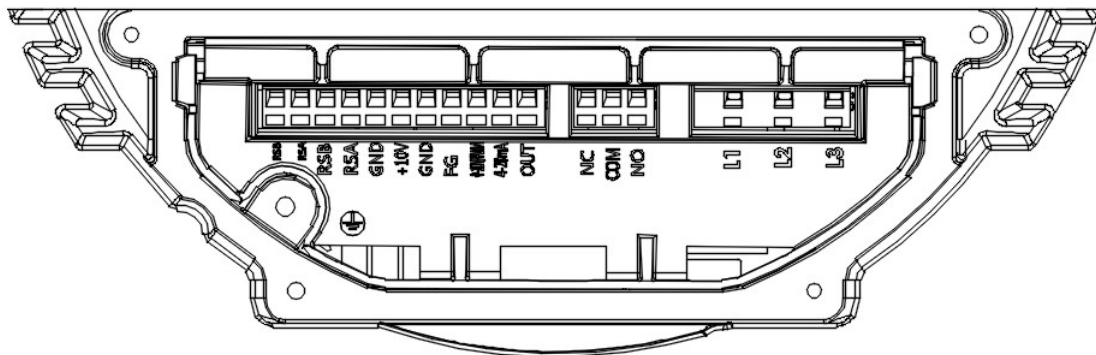


Note :

- 1 Depth of screw : 20 ~ 24mm.
- 2 Cable diameter :  $\phi 7.0$  ~  $\phi 12.7$ mm.
- 3 Open the cover and refer to definition of terminal block.

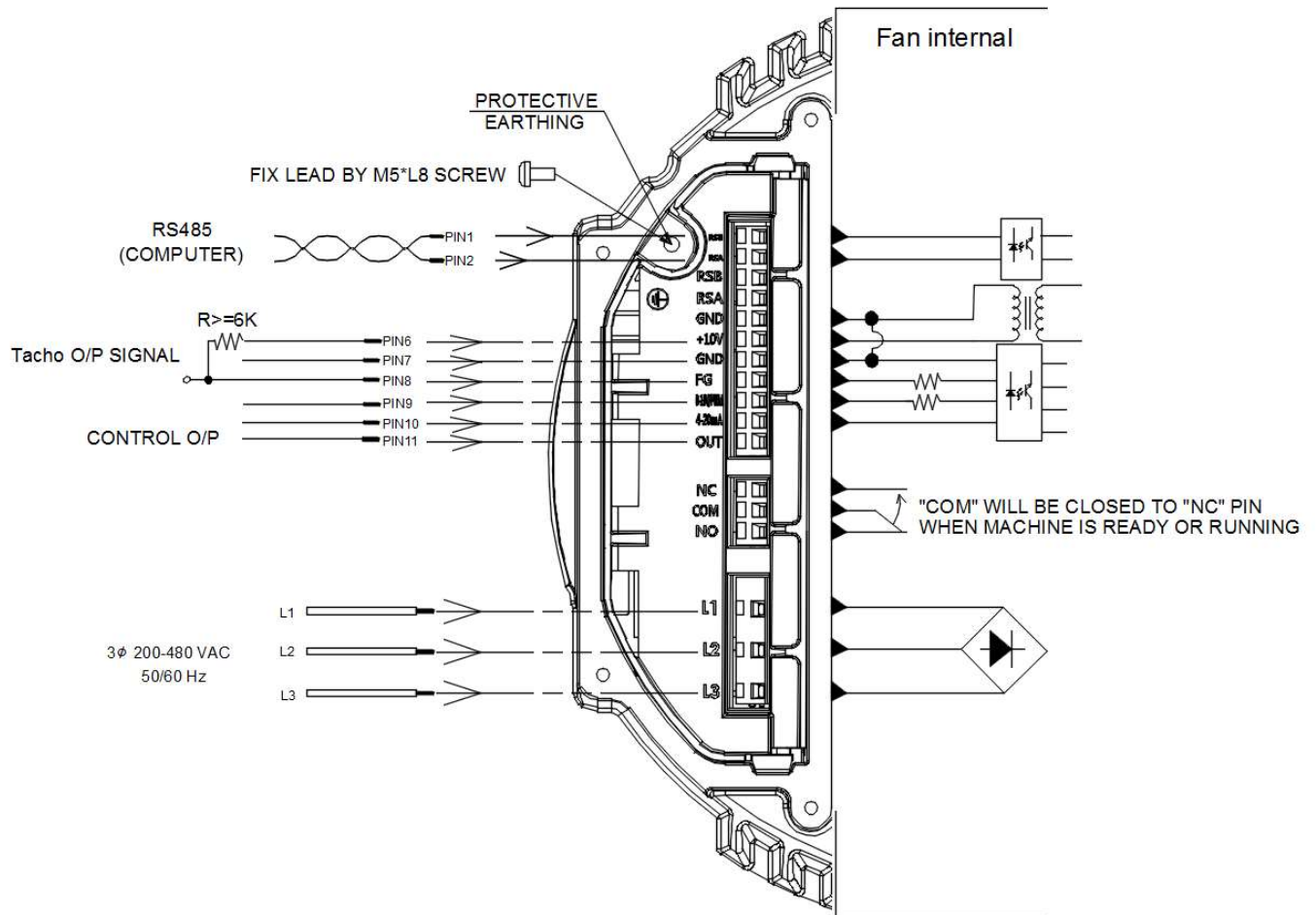
UNIT : mm[INCH]

## Definition of terminal block



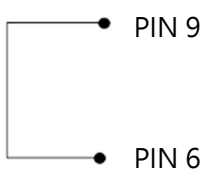
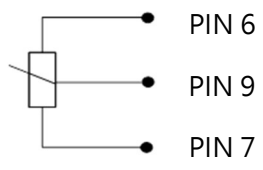
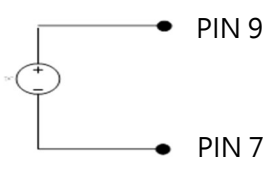
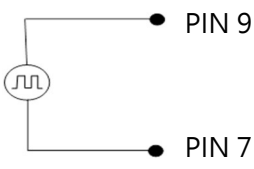
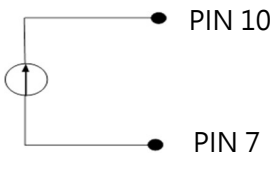
|        | Text      | Functions                                                      |
|--------|-----------|----------------------------------------------------------------|
| Power  | L1        | AC main (3~ 200-480VAC)                                        |
|        | L2        | AC main (3~ 200-480VAC)                                        |
|        | L3        | AC main (3~ 200-480VAC)                                        |
| Status | NC        | Alarm relay, open by failure                                   |
|        | COM       | Alarm relay, common (2A/250VAC)                                |
|        | NO        | Alarm relay, close by failure                                  |
| Signal | RSB       | RS485-B                                                        |
|        | RSA       | RS485-A                                                        |
|        | RSB       | RS485-B                                                        |
|        | RSA       | RS485-A                                                        |
|        | GND       | Ground                                                         |
|        | +10V      | +10V output, MAX 10mA<br>(For external potentiometer)          |
|        | GND       | Ground                                                         |
|        | FG        | Frequency generator (FG) signal                                |
|        | 0-10V/PWM | Speed control, input 0-10VDC                                   |
|        | 4-20mA    | Speed control, input 4-20mA                                    |
|        | OUT       | Control voltage output 0-10VDC<br>(For external potentiometer) |

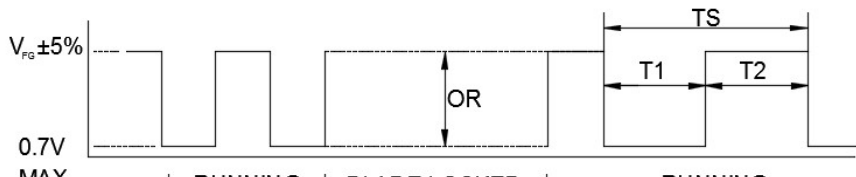
## Lead wire connection:



### Note :

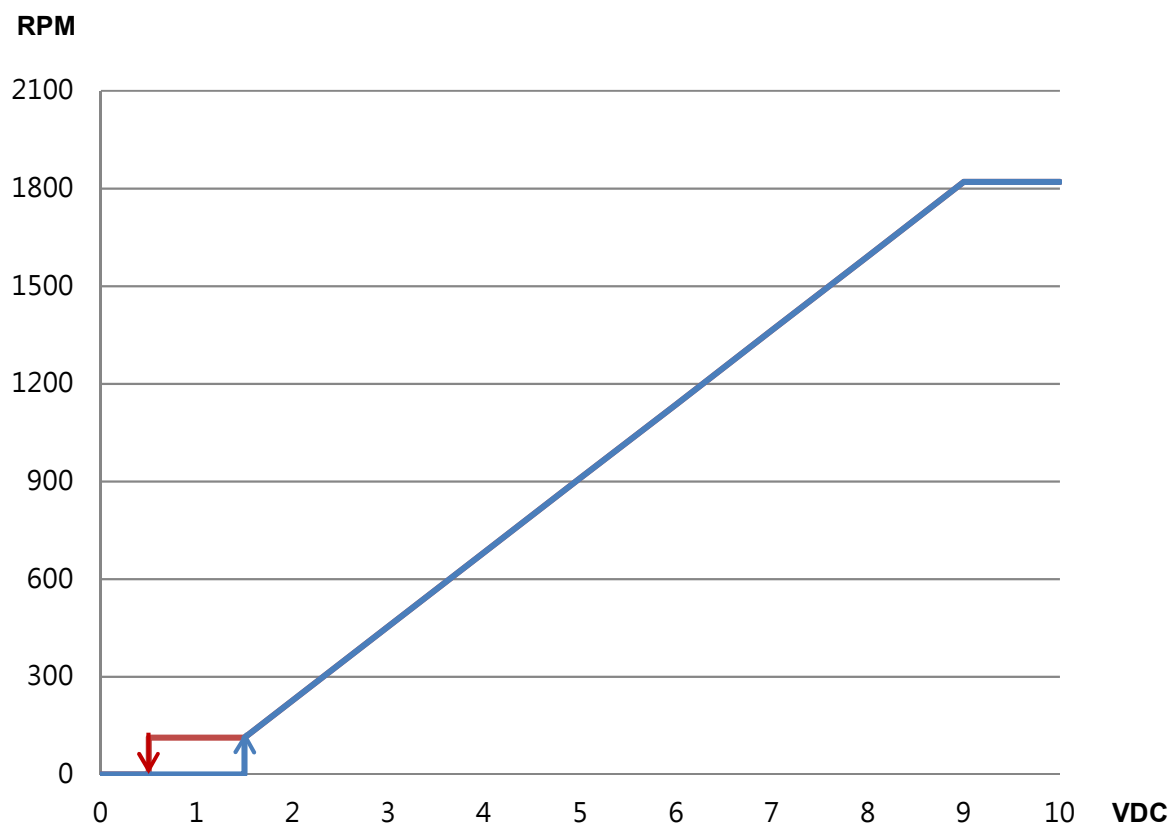
1. A MODBUS over serial line cable must be shielded. At one end of each cable its shield must be connected to protective ground.

| Speed setting                                                                                                                                      |                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Full Speed</b></p>                                          | <p><b>Short PIN6 &amp; PIN9</b><br/>Fan will run full speed.</p>                                                                                                                             |
| <p><b>Voltage Control</b></p>                                     | <p><b>Connector 1-10kΩ variable resistor</b><br/>Between +10VDC with GND and 0-10V/PWM<br/>Turn the variable resistor · can change the '0-10V/PWM' voltage (0...10V) °</p>                   |
| <p><b>Voltage Control B</b></p> <p>0-10V<br/>DC Source</p>       | <p><b>Use voltage source support 0~10VDC voltage</b><br/>DC+ : connector PIN9(+)<br/>DC - : connector PIN7(-)</p>                                                                            |
| <p><b>PWM Control</b></p> <p>PWM<br/>Generator</p>              | <p><b>PWM duty control</b><br/>PWM amplitude is 10VDC(+ -5%)<br/>Frequency Range is 100Hz...100kHz<br/>-PWM duty higher than 15%, fan start up °<br/>-PWM duty lower than 5%, fan stop °</p> |
| <p><b>Current Control</b></p> <p>4-20mA<br/>Current Source</p>  | <p><b>4~20mA Current Control</b><br/>Open 0-10V/PWM PIN<br/>- 4.5 mA → Fan Stop<br/>- 6.0 mA → Fan Start up<br/>- 19.5 mA → Maximum Speed</p>                                                |

| Signal function        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |         |                         |
|------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------------------------|
| RS485 control function | <b>RS485 control function</b><br>-Select the control mode of speed, fixed speed or fixed PWM duty<br>-Speed and power consumption feedback.<br>-Allow multiple FANs control and status patrol.<br>A MODBUS over serial line cable must be shielded. At one end of each cable its shield must be connected to protective ground.                                                                                                                                                                         |         |                         |
| Control O/P            | The analog signal level is the derivative of current control level.                                                                                                                                                                                                                                                                                                                                                                                                                                     |         |                         |
|                        | Current (mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         | Control O/P (VDC) (REF) |
|                        | 4.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | 0                       |
|                        | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | 1.60                    |
|                        | 14.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | 6.03                    |
|                        | 19.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | 9.19                    |
| Voltage/PWM control    | The speed comparison will control level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                         |
|                        | Voltage (V)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | PWM (%) | Speed (RPM)             |
|                        | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 0       | 0                       |
|                        | 1.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 15      | 137 ± 50 RPM            |
|                        | 6.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 60      | 1144 ± 8%               |
|                        | 9.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 95      | 1820 ± 5%               |
| Current control        | The speed comparison will control level.                                                                                                                                                                                                                                                                                                                                                                                                                                                                |         |                         |
|                        | Current (mA)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         | Speed (RPM))            |
|                        | 4.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | 0                       |
|                        | 6.3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |         | 137 ± 50 RPM            |
|                        | 14.0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | 1144 ± 8%               |
|                        | 19.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |         | 1820 ± 5%               |
| Alarm state            | NC and COM will OPEN; NO and COM will CLOSE.                                                                                                                                                                                                                                                                                                                                                                                                                                                            |         |                         |
| FG                     | <div><div><math>V_{CE(sat)} = 0.7V \text{ MAX.}</math><br/><math>I_C = 5mA \text{ MAX.}</math></div><div><math>V_{FG} = 30.0V \text{ MAX.}</math><br/><math>R \geq V_{FG} / I_C</math></div></div> <div>Frequency generator waveform</div> <div><div><div><math>N = \text{R.P.M}</math><br/><math>TS = 60/N(\text{SEC})</math></div><div>1 PULSE PER REVOLUTION<br/><math>T1 = T2 = 1/2 TS</math></div></div></div> |         |                         |



## Control Voltage VS. RPM Curve



Voltage (VDC), PWM duty ( % ), 4~20mA table

| Voltage  | 0 | 0.5 | 1   | 1.5 | 2   | 3   | 4    | 5  | 6    | 7    | 8    | 9  | 10  | VDC |
|----------|---|-----|-----|-----|-----|-----|------|----|------|------|------|----|-----|-----|
| PWM duty | 0 | 5   | 10  | 15  | 20  | 30  | 40   | 50 | 60   | 70   | 80   | 90 | 100 | %   |
| 4~20 mA  | 4 | 5   | 5.6 | 6   | 7.2 | 8.8 | 10.4 | 12 | 13.6 | 15.2 | 16.8 | 19 | 20  | mA  |