



## **Specification For Approval**

Customer : STD

Description : EC FAN

Customer Part No. : N/A Rev :     

Delta Model No. : GTW091PUU23E Rev : 01

Safety Model No. : EMBP5E5FHL

Sample Issue No. :     

Sample Issue Date : 10/05'22

Please send one copy of this specification back after  
you signed approval for production pre-arrangement

Approved by :                                     

Date :                                     

Delta Electronics, Inc.

No.252, Shangying Road, Guishan Industrial Zone,  
Taoyuan City, 33341, Taiwan

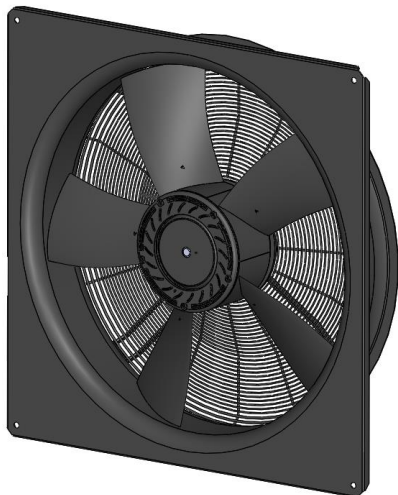
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## Electronically Commutated (EC) Fan

### Axial Fan

1070 x 1070 x 237 mm



**DELTA ELECTRONICS, INC.**  
**No.252, Shangying Road, Guishan**  
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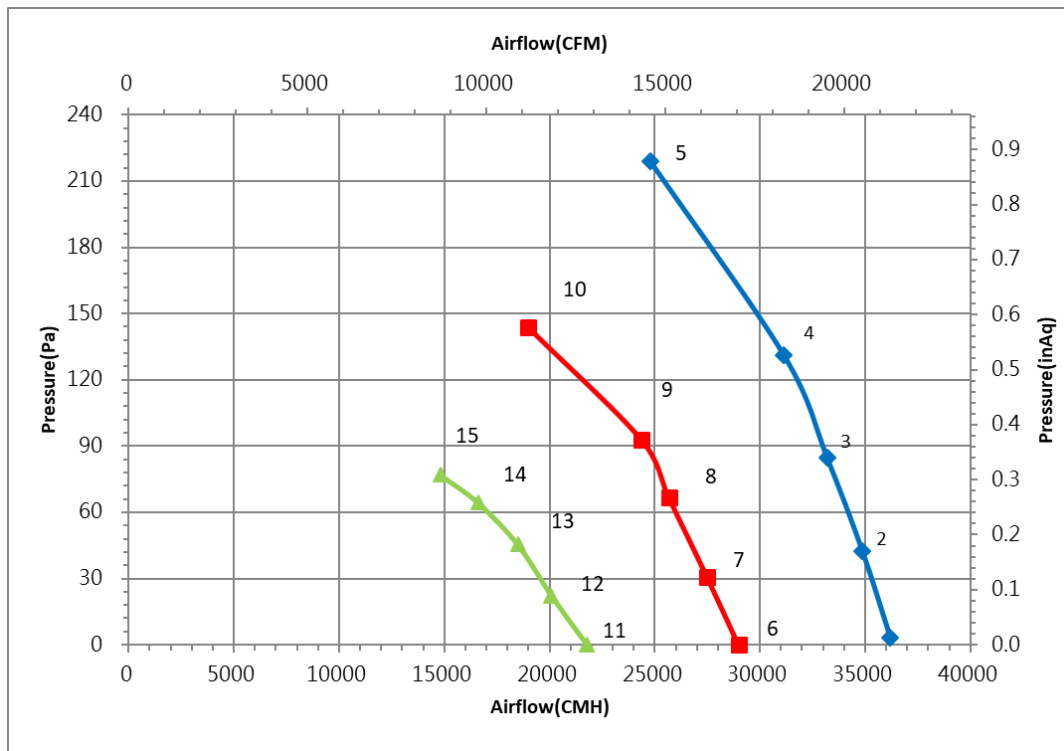
## Technical features

| Input Side                                        |                    |
|---------------------------------------------------|--------------------|
| Nominal Voltage                                   | 3~ 400Vac 50/60Hz  |
| Input Source                                      | 3~ 380Vac - 480Vac |
| Power @ Free air                                  | 2320 W             |
| Power @ Max. load                                 | 3100 W             |
| Output Side                                       |                    |
| Speed (RPM)                                       | 1100               |
| Qmax. (CMH / CFM)                                 | 36186 / 21286      |
| Pmax. (Pa / inAq)                                 | 219 / 0.88         |
| Noise (dB-A) @ Qmax                               | 86                 |
| Functions                                         |                    |
| Passive power factor correction                   |                    |
| Control input 0-10VDC / PWM                       |                    |
| Output +10VDC (±10%), max. 10mA.                  |                    |
| RS485 control bus (MODBUS (V1.3) RTU / 8N1)       |                    |
| Alarm relay, Locked rotor protection, Soft start. |                    |
| Voltage / Current monitoring.                     |                    |
|                                                   |                    |
|                                                   |                    |

| Physical                          |                                   |
|-----------------------------------|-----------------------------------|
| Rotation Direction                | CCW, seen on rotor                |
| Material (Impeller / Motor Frame) | Plastic / Cast iron               |
| Material (Walling / Fan Guard)    | Steel / Steel                     |
| Bearing system                    | Ball bearings                     |
| Weight (kg)                       | 57                                |
| Electrical leads                  | Via terminal block                |
| Environmental                     |                                   |
| Operating temperature range       | -25 ~ +60 °C                      |
| Storage temperature range         | -40 ~ +70 °C                      |
| Safety                            |                                   |
| Safety                            | UL, CE                            |
| IP Level                          | IP54                              |
| EMC                               | EN61000-6-2, EN61000-6-3          |
| Protection class                  | I                                 |
| Insulation class                  | F                                 |
| Leakage current                   | ≤ 3.5 mA                          |
| Motor protection                  | Over temperature protected        |
| Life expectance                   | 60,000 hrs at 40 °C / 15 ~ 65 %RH |

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

## P & Q curves (without fanguard condition)



### 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         | 36185.9    | 1100          | 2320      | 4.16     | 86            |
| 2  | 42.3      | 34862.0    | 1100          | 2514      | 4.40     |               |
| 3  | 84.6      | 33184.6    | 1100          | 2691      | 4.59     |               |
| 4  | 131.1     | 31128.3    | 1100          | 2867      | 4.79     |               |
| 5  | 219.1     | 24780      | 1100          | 3091      | 5.06     |               |
| 6  | 0.0       | 28982      | 880           | 1194      | 2.50     | 81            |
| 7  | 30.6      | 27492      | 880           | 1303      | 2.61     |               |
| 8  | 66.5      | 25678      | 880           | 1416      | 2.72     |               |
| 9  | 93.0      | 24349      | 880           | 1497      | 2.81     |               |
| 10 | 143.8     | 18981      | 880           | 1603      | 2.95     |               |
| 11 | 0.0       | 21778      | 660           | 523       | 1.49     | 74            |
| 12 | 22.1      | 20091      | 660           | 585       | 1.57     |               |
| 13 | 45.4      | 18497      | 660           | 634       | 1.64     |               |
| 14 | 64.4      | 16610      | 660           | 664       | 1.67     |               |
| 15 | 77.1      | 14808      | 660           | 687       | 1.70     |               |

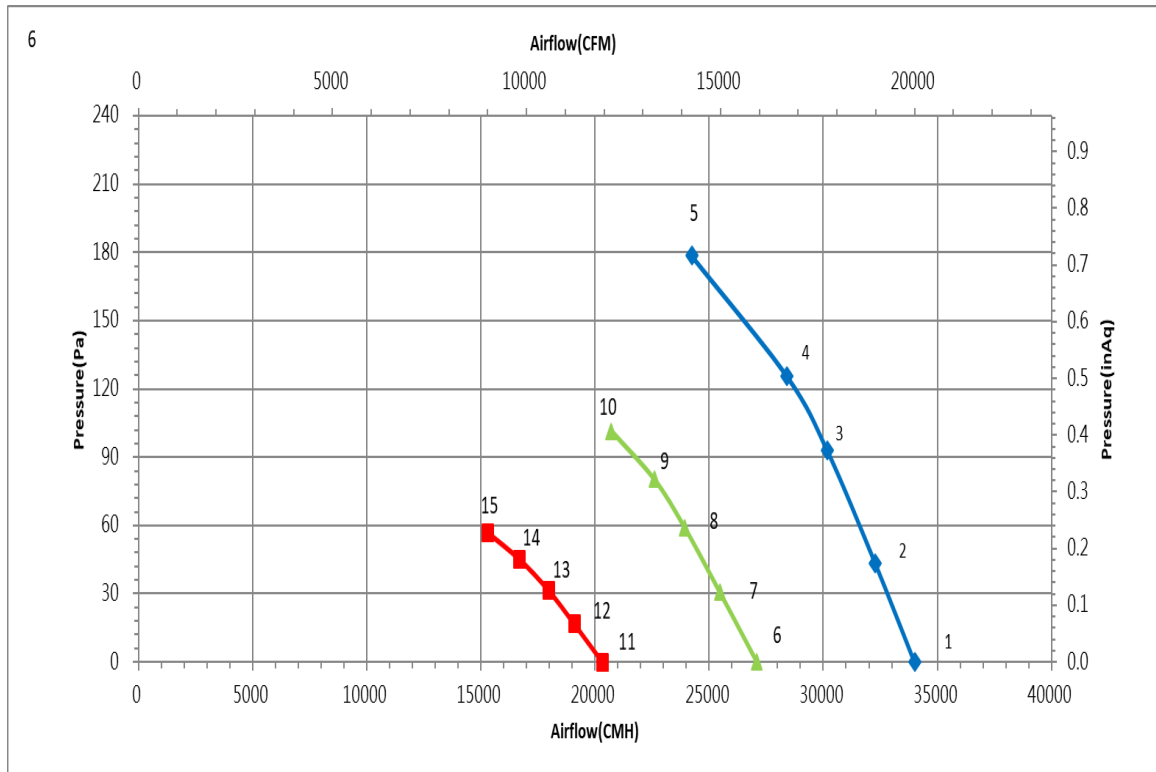
### Test Condition:

- Input Voltage: 3~400Vac
- Temperature : Room Temperature
- Humidity : 65%RH
- Noise (Lp) is measured at a distance of one meter from the inlet side.
- Testing method is compliance with ISO 3745

### ErP Directive:

|                  | Actual | 2015 |
|------------------|--------|------|
| Over all Eff (%) | 51.3   | 36.8 |
| Eff Grade N      | 54.6   | 40   |
| Power (kW)       | 3.09   |      |
| Air flow (CMH)   | 24780  |      |
| Pressure (Pa)    | 219    |      |
| Speed (RPM)      | 1100   |      |

## P & Q curves (with fanguard condition)



### Measure data:

|    | P<br>[Pa] | Q<br>[CMH] | N<br>[R.P.M.] | P1<br>[W] | I<br>[A] | Lp<br>[dB(A)] |
|----|-----------|------------|---------------|-----------|----------|---------------|
| 1  | 0.0       | 34000.1    | 1100          | 2578      | 4.45     | 86            |
| 2  | 43.3      | 32285.0    | 1100          | 2728      | 4.60     |               |
| 3  | 93.0      | 30184.1    | 1100          | 2895      | 4.79     |               |
| 4  | 125.8     | 28407.0    | 1100          | 3002      | 4.91     |               |
| 5  | 178.6     | 24246.9    | 1100          | 3078      | 5.01     |               |
| 6  | 0.0       | 27100      | 880           | 1319      | 2.63     | 81            |
| 7  | 30.6      | 25475      | 880           | 1409      | 2.72     |               |
| 8  | 59.1      | 23926      | 880           | 1479      | 2.79     |               |
| 9  | 80.2      | 22596      | 880           | 1529      | 2.84     |               |
| 10 | 101.4     | 20715      | 880           | 1565      | 2.87     |               |
| 11 | 0.0       | 20328      | 660           | 576       | 1.58     | 74            |
| 12 | 16.9      | 19085      | 660           | 612       | 1.64     |               |
| 13 | 31.6      | 17957      | 660           | 642       | 1.68     |               |
| 14 | 45.4      | 16678      | 660           | 664       | 1.71     |               |
| 15 | 57.0      | 15292      | 660           | 678       | 1.72     |               |

### Test Condition:

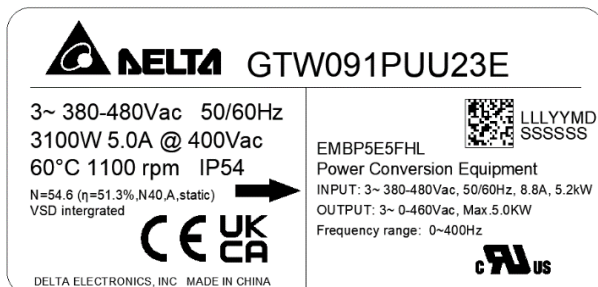
- Input Voltage: 3~400Vac
- Temperature : Room Temperature
- Humidity : 65%RH
- Noise (Lp) is measured at a distance of one meter from the inlet side.
- Testing method is compliance with ISO 3745

### ErP Directive:

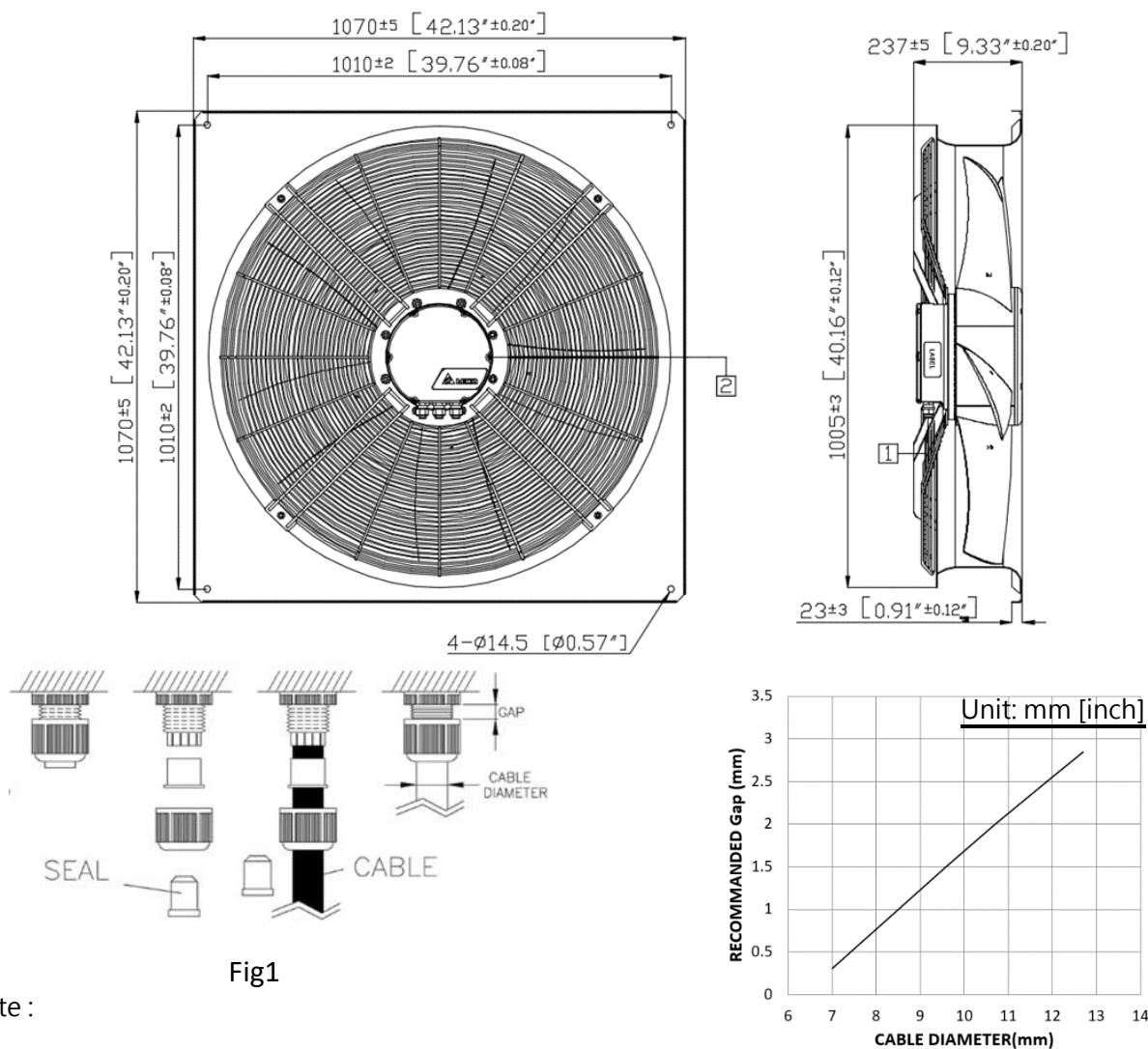
|                  | Actual | 2015 |
|------------------|--------|------|
| Over all Eff (%) | 41.1   | 36.8 |
| Eff Grade N      | 44.4   | 40   |
| Power (kW)       | 3.08   |      |
| Air flow (CMH)   | 24246  |      |
| Pressure (Pa)    | 176    |      |
| Speed (RPM)      | 1097   |      |

## Dimension drawing

Label :



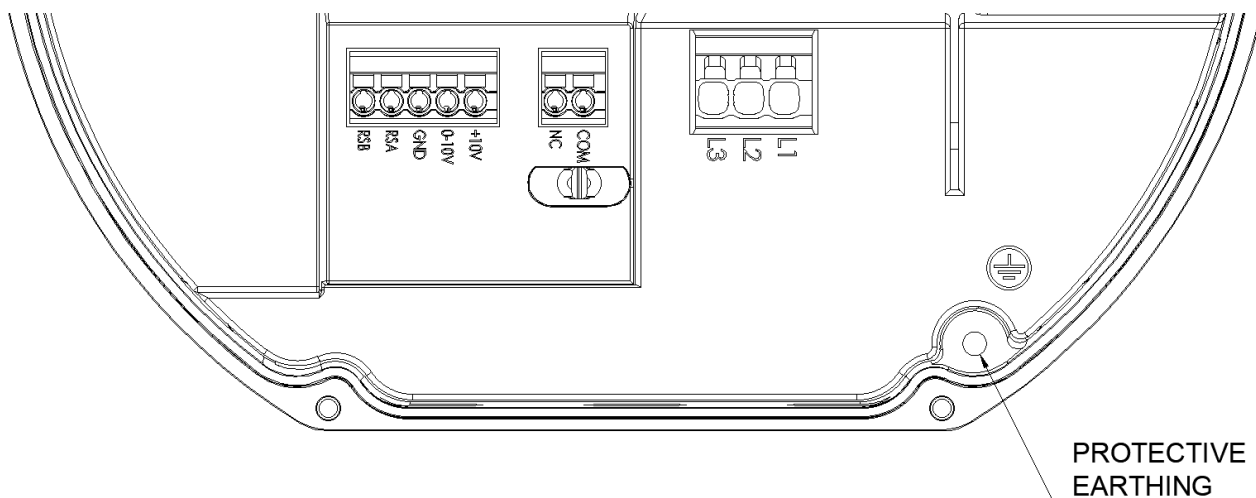
Fan :



Note :

- 1 Cable gland: M20xP1.5 (3 pcs), Material: Nylon, Cable Diameter:  $\phi$  7.0~  $\phi$  12.7mm  
Cable gland nut's gap refer Fig.1 & 2.
2. Open the cover and refer to definition of terminal block, screw tightening torque  $20\pm10\%$  kgf-cm.

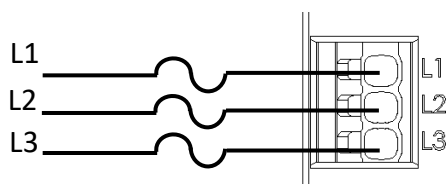
## Definition of terminal block



|        | Text  | Functions                                              |
|--------|-------|--------------------------------------------------------|
| Power  | L1    | AC main (3~ 380-480VAC)                                |
|        | L2    | AC main (3~ 380-480VAC)                                |
|        | L3    | AC main (3~ 380-480VAC)                                |
| Status | COM   | Alarm relay, common (2A/250VAC)                        |
|        | NC    | Alarm relay, open by failure                           |
| Signal | +10V  | 10VDC output, MAX 10mA<br>(For external potentiometer) |
|        | 0-10V | Speed control, input 0-10VDC                           |
|        | GND   | Ground                                                 |
|        | RSA   | RS485-A                                                |
|        | RSB   | RS485-B                                                |

### Wiring diagram

Input: 3-phase power



Branch Circuit Protector: 20A class CC fuse  
Fuse must be UL listed and CSA certified,  
or UL listed and cUL certified.

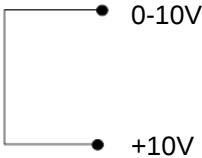
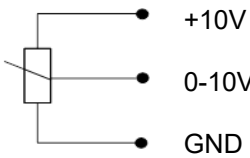
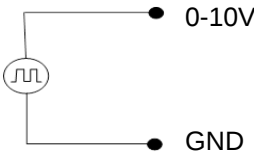
Overvoltage category - OVC II.

For use in Pollution Degree 2 Environment.

The drive is suitable for use in a circuit capable of delivering not more than 5000 rms symmetrical amperes, 480 volts maximum.

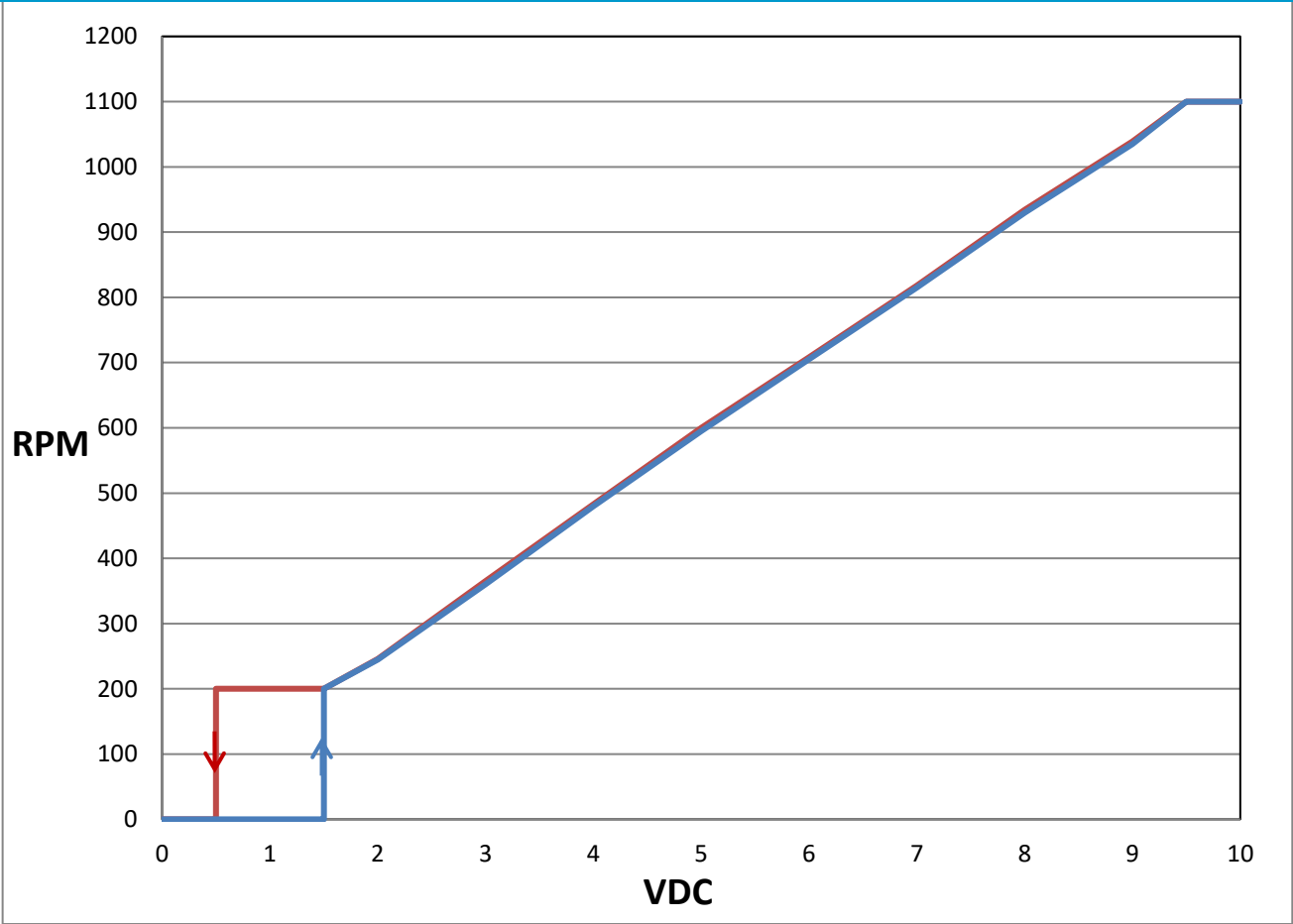
The power input wire shall be copper conductors rated 60/75°C.

## Function control:

| Speed setting                                                                                                                                |                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Full Speed</b></p>                                    | <p><b>Short 0-10V &amp; +10V</b><br/>Fan will run at full speed.</p>                                                                                                                        |
|                                                             | <p><b>Connector 1-10kΩ variable resistor</b><br/>Between +10V with GND and 0-10V<br/>Vary the variable resistance · to change the '(0-10V)' voltage (0...10V), then change FAN speed °</p>  |
| <p><b>Voltage Control</b></p> <p>0-10V<br/>DC Source</p>  | <p><b>Use voltage source supply 0~10V<sub>DC</sub> voltage</b><br/>DC+ : connect to (0-10V)(+)<br/>DC- : connect to GND (-)</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> |

| 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>Cable: A MODBUS over Serial Line Cable must be shielded. At one end of each cable its shield must be connected to protective ground. |  |         |              |
|                        | The speed comparison will control level                                                                                                                                                                                                                                                                                                |  |         |              |
| Voltage/PWM control    | Voltage (V)                                                                                                                                                                                                                                                                                                                            |  | PWM (%) | Speed (RPM)  |
|                        | 0                                                                                                                                                                                                                                                                                                                                      |  | 0       | 0            |
|                        | 1.5                                                                                                                                                                                                                                                                                                                                    |  | 15      | 200 ± 50 RPM |
|                        | 6.0                                                                                                                                                                                                                                                                                                                                    |  | 60      | 705 ± 8%     |
|                        | 9.5                                                                                                                                                                                                                                                                                                                                    |  | 95      | 1100± 5%     |
|                        |                                                                                                                                                                                                                                                                                                                                        |  |         |              |
| Alarm state            | NC and COM will OPEN                                                                                                                                                                                                                                                                                                                   |  |         |              |

Control Voltage VS. RPM Curve



Voltage(VDC) , PWM duty ( % ) 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 | %   |