

# IP68 Protected DC Fan with PWM and Tach Output

## 04020VE-12Q/24Q (0-Type)

NMB

### General Specifications

**Motor Type:**

DC Brushless Motor

**Motor Protection:**

Auto Restart / Polarity Protection (Motor withstands reverse connection for positive and negative leads.)

**Insulation Resistance:**

10MΩ or over with a DC 500V Megger

**Dielectric Withstand Voltage:**

AC 500V 1min or AC 700V 1sec

**Allowable Ambient Temperature Range:**

-10°C ~ + 70°C (Operating)

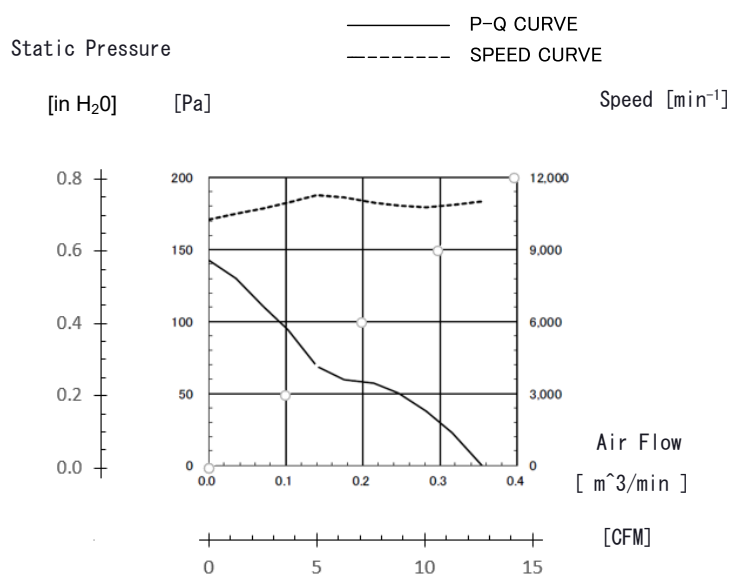
-40°C ~ + 70°C (Storage)

(non-condensing environment)



*\*For reference only. Please see fan outline for details*

### Characteristic Curves



### Features

- DC axial fan with outstanding P-Q performance, IP68 protection, PWM speed control, and tach output
- Vertically integrated manufacturing, with key components made in-house
- IP68 with highest level of protection from water/dust ingress
- Outfitted with NMB precision machined stainless steel ball bearings for long life
- Ideal for applications such as EV chargers, PV inverters, telecom cabinets, Bi-Directional chargers and many other outdoor applications

### Life Expectancy L10

40,000 Hours at 60 Celsius

*\*Fan life expectation is based on free air operation at 60°C, rated voltage, and indoor benign lab environment*

*\*1: Values in Free Air*

### Specifications

MODEL	Rating Voltage (V)	Operating Voltage (V)	Current		Input Power		Speed (min <sup>-1</sup> )*1	Max. Air Flow		Max. Static Pressure		Noise (dB)*1	Mass (g)
			Avg (A)*1	Max (A)*1	Avg (W)*1	Max (W)*1		(CFM)	(m <sup>3</sup> /min)	(in H <sub>2</sub> O)	(Pa)		
			(A)*1	(A)*1	(W)*1	(W)*1		(min <sup>-1</sup> )*1	(m <sup>3</sup> /min)	(in H <sub>2</sub> O)	(Pa)		
04020VE-12Q-CU-01	12	10.8 to 13.2	0.21	0.26	2.52	3.12	11,000	12.4	0.35	0.57	142	42	40
04020VE-24Q-CU-01	24	21.6 to 26.4	0.11	0.15	3.60	3.12	11,000	12.4	0.35	0.57	142	42	40

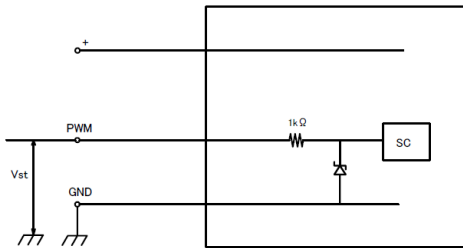
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## 04020VE-12Q/24Q (0-Type)



### PWM Specifications

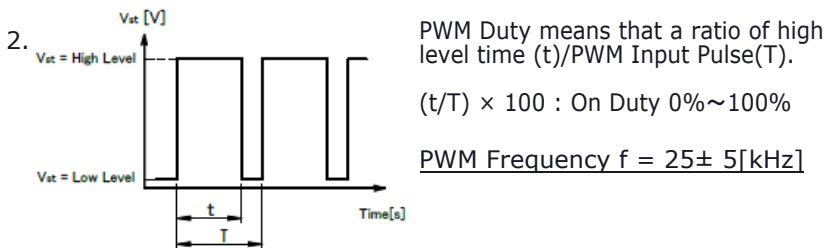
#### Connection



#### 1. PWM Control

$V_{st}$  = Low Level (0V~0.4V) → Stop (On Duty 0%)  
 $V_{st}$  = High Level (3.3V~5.0V for 12 volt, 4.0V~5.0V for 24 volt) → Full Speed (On Duty 100%)

$V_{st}$  = Open → Full Speed

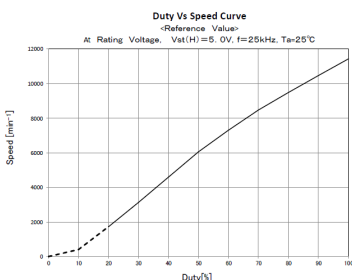


#### 3. The condition for PWM control are as follows

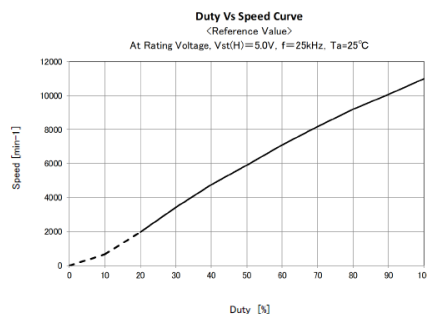
- Please install the fan in your system when inputting the PWM function. If the PWM duty is very low, or affected by external factors, the fan might not start up under your system conditions
- Run the fan at rated voltage only during PWM operation
- Please start the fan with duty cycle of 20% or more at 25kHz.[At rated voltage input, Ambient temperature 25°C]

### PWM Characteristic Curve

12 V



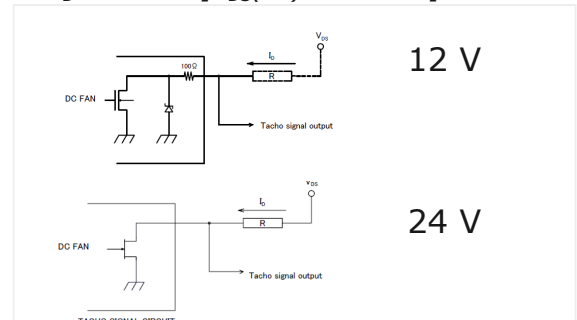
24 V



### TACHO Specifications

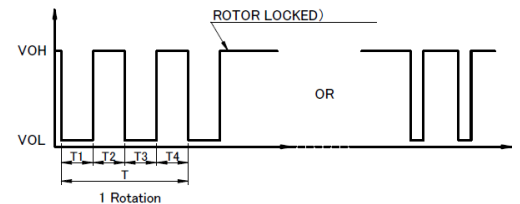
#### Tachometer Signal

1. Output Circuit: Open Drain
2. Specification  
 Absolute Maximum Ratings at  $T_a=25^\circ C$   
 $V_{DSmax}$ : +15V  
 $I_{Dmax}$ : 5mA [ $V_{DS}(sat)max=1.5V$ ] for 12V  
 $I_{Dmax}$ : 5mA [ $V_{DS}(on)max=1.5V$ ] for 24V

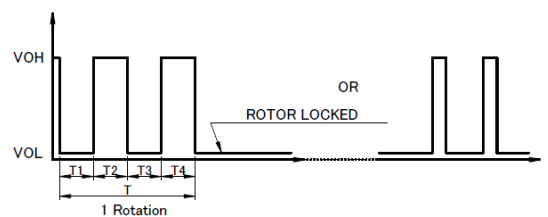


#### 3. Output Waveform: At Rated Voltage Output Signal Voltage

##### Case-1



##### Case-2



- 1) When the rotor is locked at VOH position of signal, signal stays at VOH position.
- 2) When the rotor is locked at VOL position of signal, signal stays at VOL position.
- 3)  $T=T1+T2+T3+T4=60/m=1$  rotation  
 $m$ : Fan Speed ( $min^{-1}$ )  
 Tacho Duty Cycle=50%±10%

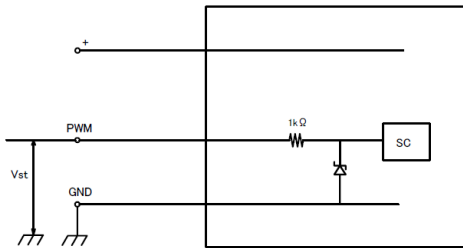
# IP68 Protected DC Fan with PWM and Tach Output

## 04020VE-12Q/24Q (0-Type)



### PWM Specifications

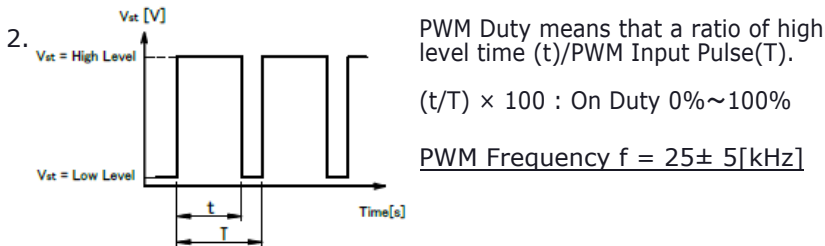
#### Connection



#### 1. PWM Control

Vst = Low Level (0V~0.4V) → Stop (On Duty 0%)  
 Vst = High Level (3.3V~5.0V for 12 volt, 4.0V~5.0V for 24 volt) → Full Speed (On Duty 100%)

Vst = Open → Full Speed

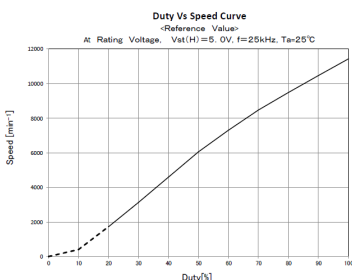


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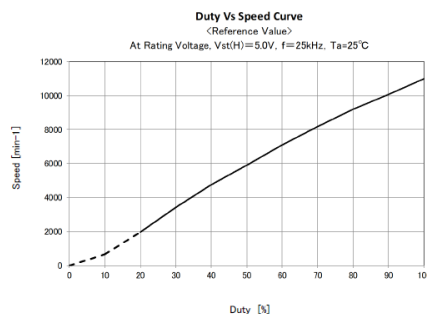
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- Run the fan at rated voltage only during PWM operation
- Please start the fan with duty cycle of 20% or more at 25kHz.[At rated voltage input, Ambient temperature 25°C]

### PWM Characteristic Curve

12 V



24 V

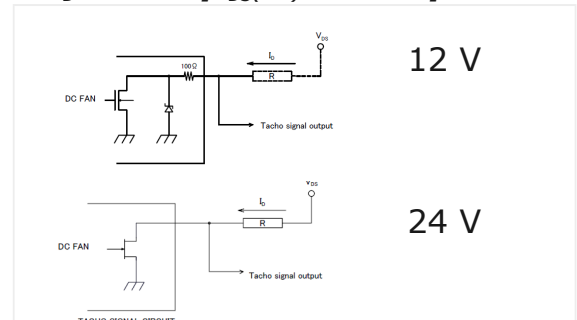


### TACHO Specifications

#### Tachometer Signal

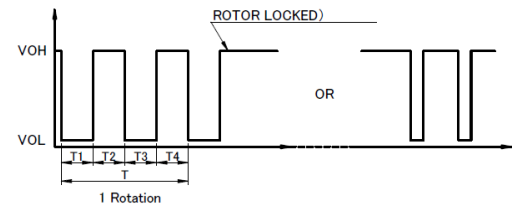
1. Output Circuit: Open Drain
2. Specification

Absolute Maximum Ratings at Ta=25°C  
 V<sub>DSmax</sub>: +15V  
 I<sub>Dmax</sub>: 5mA[V<sub>DS(sat)</sub>max=1.5V] for 12V  
 I<sub>Dmax</sub>: 5mA[V<sub>DS(on)</sub>max=1.5V] for 24V

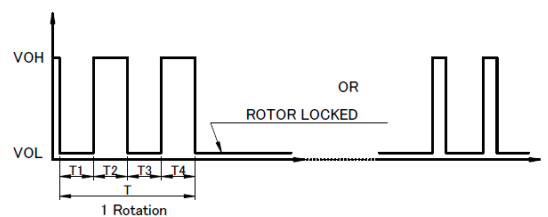


#### 3. Output Waveform: At Rated Voltage Output Signal Voltage

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##### Case-2



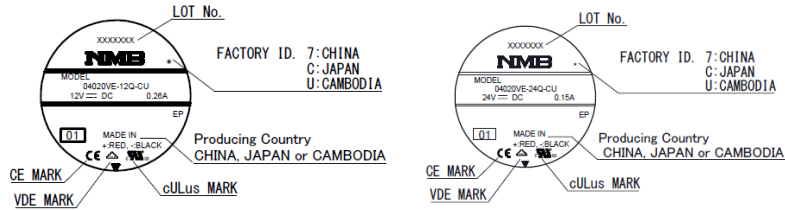
- 1) When the rotor is locked at VOH position of signal, signal stays at VOH position.
- 2) When the rotor is locked at VOL position of signal, signal stays at VOL position.
- 3)  $T = T1 + T2 + T3 + T4 = 60/m = 1$  rotation  
 m: Fan Speed (min<sup>-1</sup>)  
 Tacho Duty Cycle=50%±10%

# IP68 Protected DC Fan with PWM and Tach Output 04020VE-12Q/24Q (0-Type)

**NMB**

## Outlines

(Name Plate)



## Materials

**Casing:** Plastic (Black UL 94V-0)

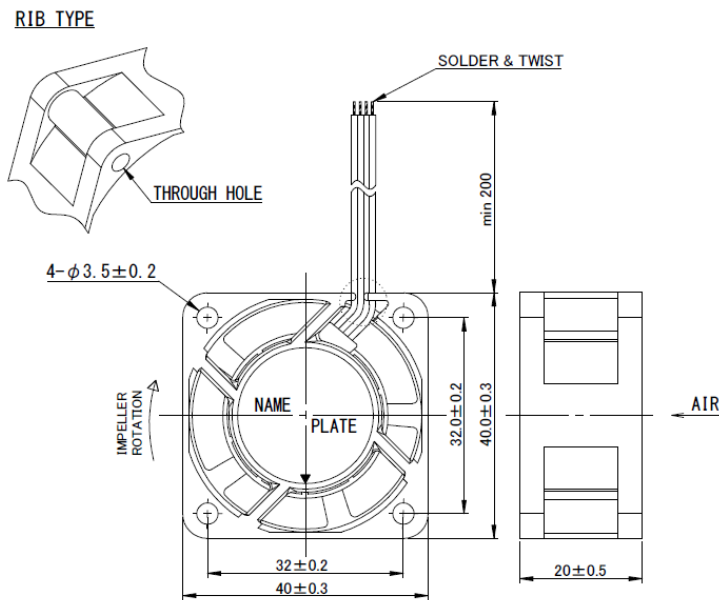
**Impeller:** Plastic (Black UL 94V-0)

**Bearing:** Stainless Steel Ball Bearing

**Lead Wire:** UL3385 AWG26 or  
UL3443 AWG26 or  
UL1430 AWG26 or  
equivalent for

Red (+)  
Black (-)  
White (Tach) Brown  
(PWM)

(Outline)



(Panel Out-line)

