IP68 Protected DC Fan with PWM and Tach Output
05020VE-12R/24R (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:
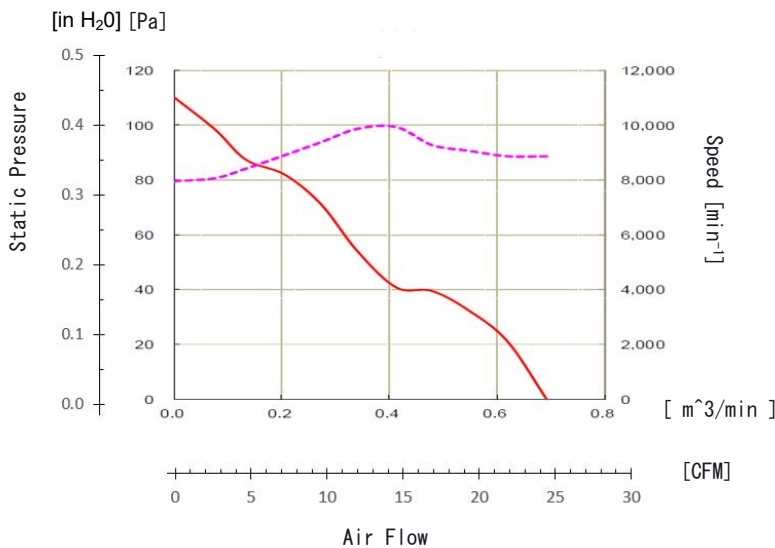-10˚C ~ + 85˚C (Operating)
-40˚C ~ + 85˚C (Storage)
(non-condensing environment)

For reference only. Please see fan outline for details

Characteristic Curves

————— P–Q CURVE
———————— SPEED CURVE

[in H$_2$0] [Pa]

Static Pressure

Speed [min^{-1}]

[m^3/min]

[CFM]

Air Flow

Features

- DC axial fan with outstanding P-Q performance, IP68 protection, PWM speed control, and tach output
- **High operational temperature of up to 85 Celsius**
- 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, energy storage, 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	Operating Voltage	Current		Input Power		Speed	Max. Air Flow		Max. Static Pressure		Noise	Mass
			Avg	Max	Avg	Max							
	(V)	(V)	(A)*1	(A)*1	(W)*1	(W)*1	(min^{-1})*1	(CFM)	(m³/min)	(in H$_2$O)	(Pa)	(dB)*1	(g)
05020VE-12R-CU-03	12	10.8 to 13.2	0.32	0.42	3.84	5.04	8,800	24.4	0.69	0.44	110	41.5	50
05020VE-24R-CU-01	24	21.6 to 26.4	0.15	0.19	3.60	4.56	8,800	24.4	0.69	0.44	110	41.5	50

MinebeaMitsumi
Passion to Create Value through Difference
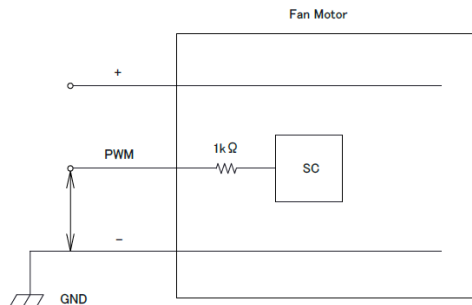
IP68 Protected DC Fan with PWM and Tach Output
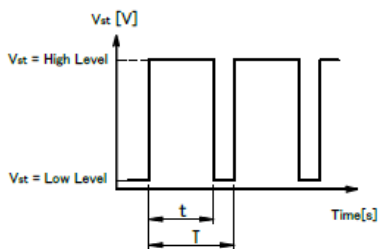# 05020VE-12R (0-Type)

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PWM Specifications

Connection

1. PWM Control
   Vst = Low Level (0V~0.4V) → Stop (On Duty 0%)
   Vst = High Level (4.0V~5.0V) → Full Speed (On Duty 100%)
   Vst = Open → Full Speed

2. PWM Duty & PWM Input Pulse

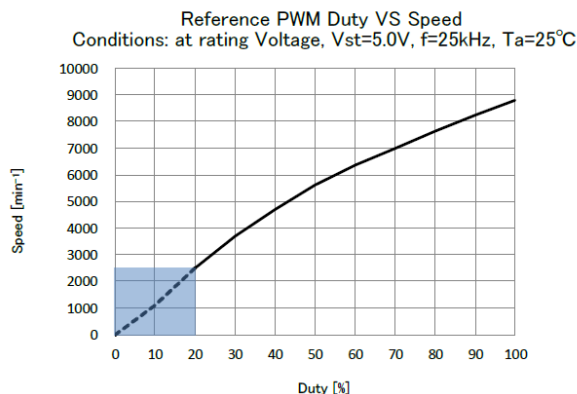PWM Duty means that a ratio of high level time (t)/PWM Input Pulse(T).

(t/T) × 100 : On Duty 0%~100%

PWM Frequency f = 25± 5[kHz]

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

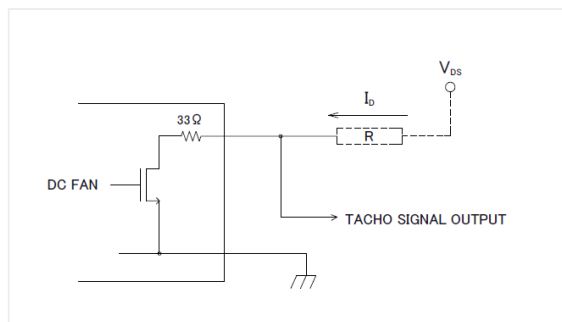· Please start the fan with duty cycle of 20% or more at 25kHz.[At rated voltage input, Ambient temperature 25℃]

PWM Characteristic Curve

Reference PWM Duty VS Speed
Conditions: at rating Voltage, Vst=5.0V, f=25kHz, Ta=25℃
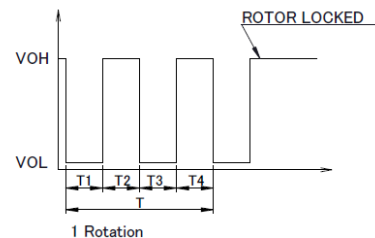
TACHO Specifications

Tachometer Signal
1. Output Circuit: Open Drain
2. Specification
   Absolute Maximum Ratings at Ta=25°C
   $V_{DS}max: +13.2V$
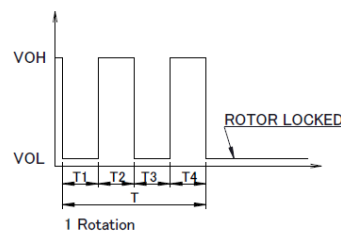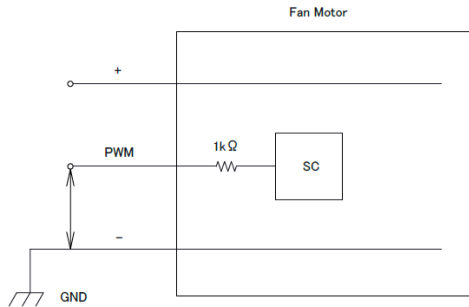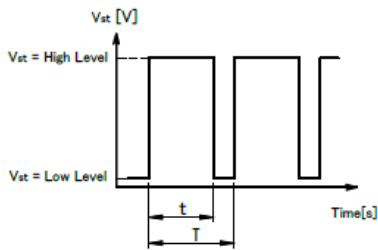 $I_D max: 5mA[V_{DS}(on)max=1.5V]$

3. Output Waveform: At Rated Voltage
   Output Signal Voltage

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%

For 12 V DC Model

PWM Specifications

Connection

Fan Motor
+
PWM — 1kΩ — SC
−
GND

1. PWM Control
   Vst = Low Level (0V~0.4V) → Stop (On Duty 0%)
   Vst = High Level (4.0V~5.0V) → Full Speed (On Duty 100%)
   Vst = Open → Full Speed

2. PWM Duty & PWM Input Pulse

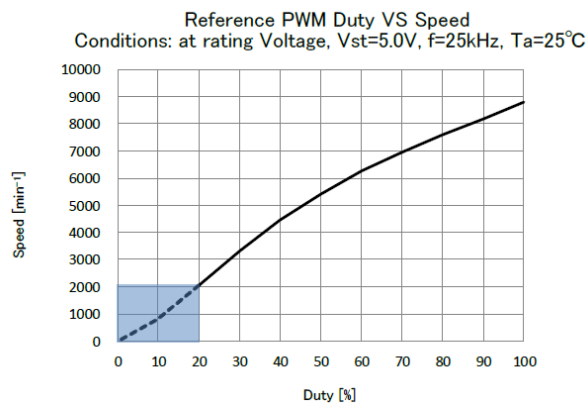PWM Duty means that a ratio of high level time (t)/PWM Input Pulse(T).

(t/T) × 100 : On Duty 0%~100%

PWM Frequency f = 25± 5[kHz]

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℃]
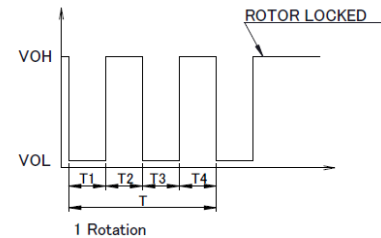
PWM Characteristic Curve

Reference PWM Duty VS Speed
Conditions: at rating Voltage, Vst=5.0V, f=25kHz, Ta=25℃

TACHO Specifications

Tachometer Signal
1. Output Circuit: Open Drain
2. Specification
   Absolute Maximum Ratings at Ta=25°C
   V_{DS}max: +26.4V
   $I_D$max: 5mA[V_{DS}(on)max=1.5V]
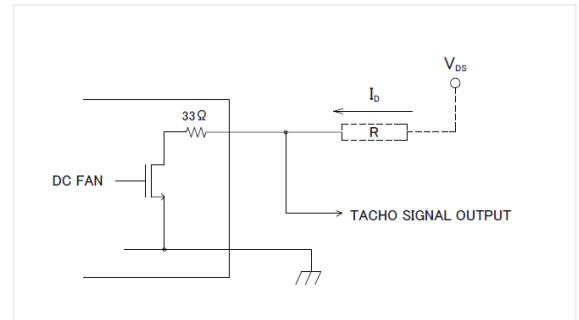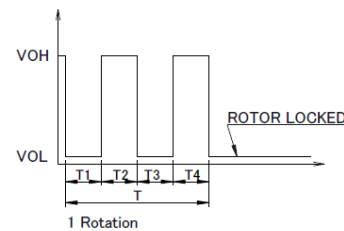

3. Output Waveform: At Rated Voltage
   Output Signal Voltage

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)
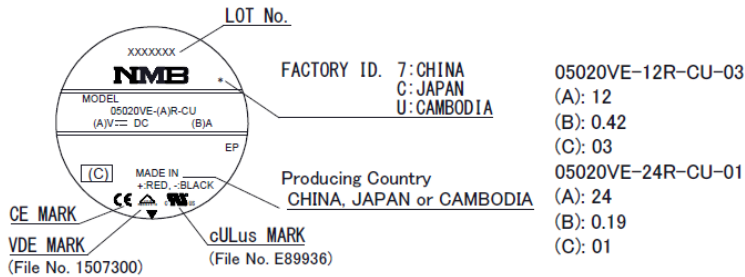
   Tacho Duty Cycle=50%±10%

For 24 V DC Model

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Outlines

（Name Plate）

Materials

Casing: Plastic (Black UL 94V-0)
Impeller: Plastic (Black UL 94V-0)
Bearing: Stainless Steel Ball Bearing
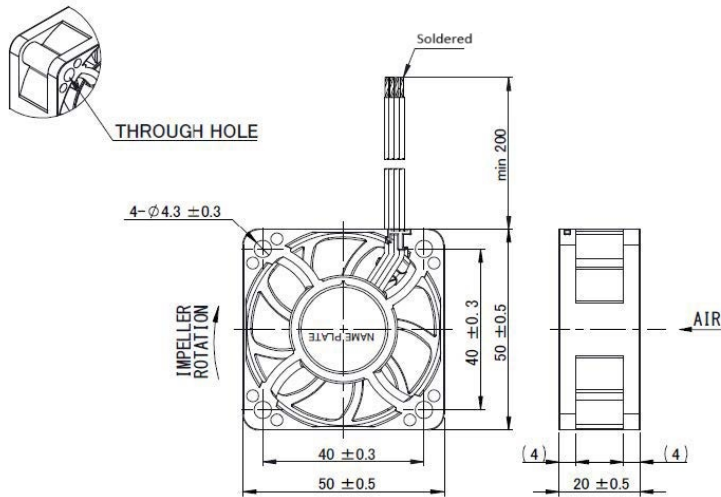**Lead Wire:** UL3443 AWG26
or equivalent for

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

（Outline）

（Panel Out-line）

Inlet Side

Outlet Side