

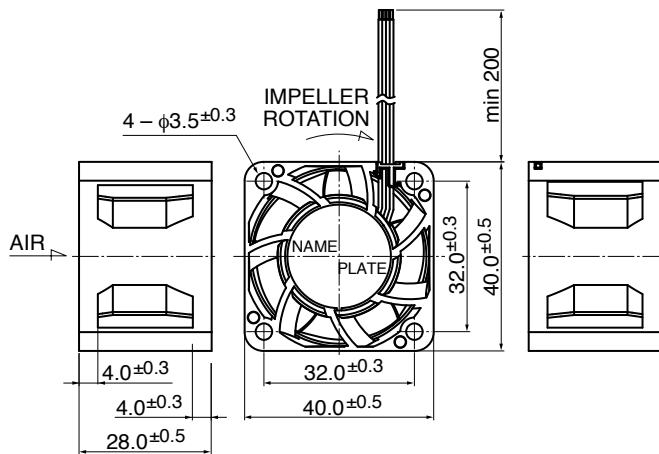
04028DA (1611FB)

DC Axial Fan

40[□]X28^L



Outline



* Outline is A (Rib) type.

General Specifications

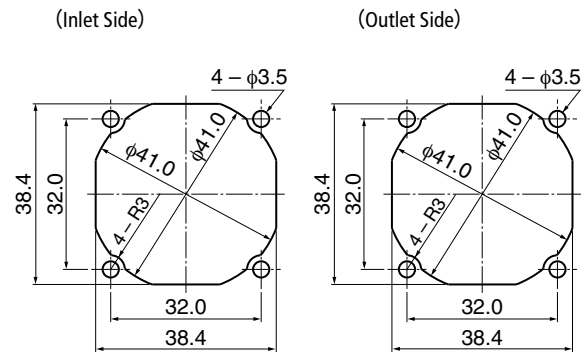
Motor Protection	Auto Restart / Polarity Protection
Insulation Resistance	10MΩ or over with a DC500V Megger
Dielectric Withstand Voltage	: AC700V 1s
Allowable Ambient Temperature Range	: -10°C ~ +70°C (Operating) -30°C ~ +70°C (Storage) non-condensing environment

Expected Life

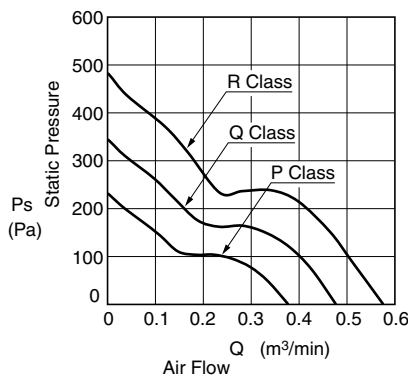
※ Failure Rate: 10% (L10 Life)

40°C 70,000 (Hours)

Panel Out-cuts



Characteristic Curves



Material

Casing	: Plastic (Black) UL94V-0
Impeller	: Plastic (Black) UL94V-0
Bearing	: Ball Bearing
Lead Wire	: UL10368 AWG26 + : Red, - : Black

Variable speed type is also available.
Please inquire regarding the other requirements.

Specifications

□ = Casing Form --- A: Rib Type, E: Flange Type

Model	Product No.	Rating Voltage	Operating Voltage	Current	Input Power	Speed	Max. Air Flow		Max. Static Pressure	Noise	Mass	
		(V)	(V)	(A)*1	(W)*1	(min ⁻¹)*1	(m ³ /min)*1	(CFM)*1	(Pa)	(In H ₂ O)	(dB)*1	(g)
04028DA-12P-□AF-	0	12	10.8 ~ 13.2	0.18	2.16	12000	0.37	13.1	230.0	0.92	45.0	53
04028DA-12Q-□AF-	0			0.29	3.48	15000	0.47	16.6	340.0	1.37	49.5	
04028DA-12R-□AF-	0			0.43	5.16	18000	0.57	20.1	480.0	1.93	54.5	

Rotation: Clockwise as seen from the label side
Airflow Outlet: Label side

*1: Average Values in Free Air

04028DA (H-Type Single Phase) 40[□]X28^L

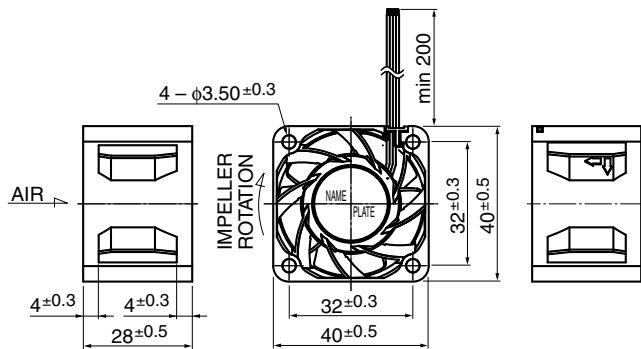
DC Axial Fan



General Specifications

Motor Protection	Auto Restart / Polarity Protection
Insulation Resistance	10MΩ or over with a DC500V Megger
Dielectric Withstand Voltage	: AC700V 1s
Allowable Ambient	: P, Q, R, S Class : -10°C ~ +70°C (Operating)
Temperature Range	-40°C ~ +70°C (Storage)
	non-condensing environment

Outline



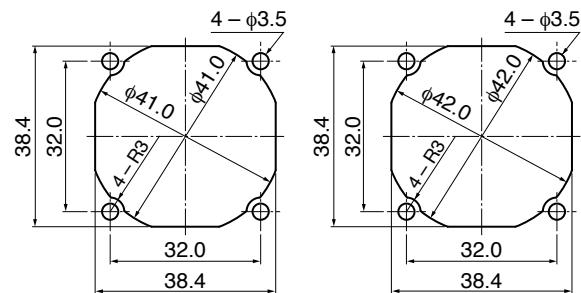
Expected Life ※ Failure Rate: 10% (L10 Life)

40°C 70,000 (Hours)

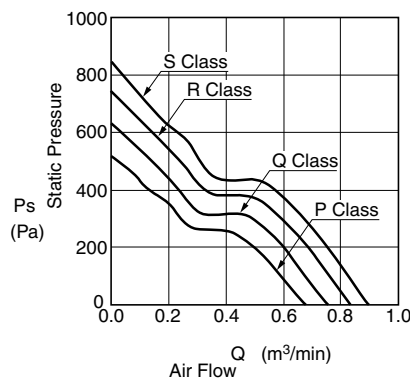
Panel Out-cuts

(Inlet Side)

(Outlet Side)



Characteristic Curves



Material

Casing	: Plastic (Black) UL94V-0
Impeller	: Plastic (Black) UL94V-0
Bearing	: Ball Bearing
Lead Wire	: UL10368 AWG26 + : Red, - : Black

Specifications

Model	Product No.	Rating Voltage	Operating Voltage	Current	Input Power	Speed	Max. Air Flow		Max. Static Pressure	Noise	Mass	
		(V)	(V)				(m³/min)*1	(CFM)*1				
04028DA-12P-AAH-	0	12	10.8 ~ 13.2	0.51	6.12	18000	0.68	24.0	518.0	2.08	58.0	49
04028DA-12Q-AAH-	0			0.66	7.92	20000	0.76	26.8	630.0	2.52	60.0	
04028DA-12R-AAH-	0			0.85	10.20	22000	0.84	29.7	745.0	2.99	62.0	
04028DA-12S-AAH-	0			1.08	12.96	23500	0.89	31.4	840.0	3.37	64.0	

Rotation: Clockwise as seen from the label side
Airflow Outlet: Label side

*1: Average Values in Free Air

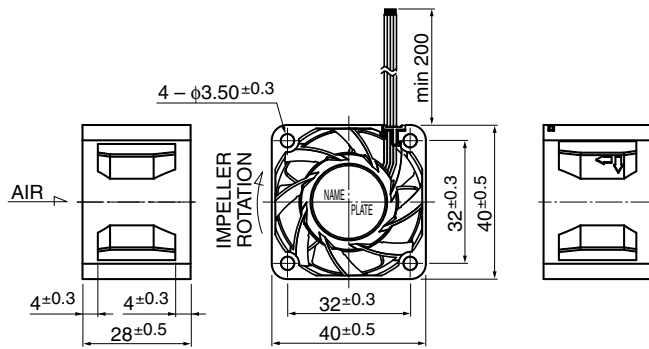
04028DA (H-Type Three Phase)

40[□]X28^L

DC Axial Fan



Outline



General Specifications

- Motor Protection : Auto Restart / Polarity Protection
- Insulation Resistance : 10MΩ or over with a DC500V Megger
- Dielectric Withstand Voltage : AC700V 1s
- Allowable Ambient : -10°C ~ + 60°C (Operating)
- Temperature Range : - 40°C ~ + 70°C (Storage)
- non-condensing environment

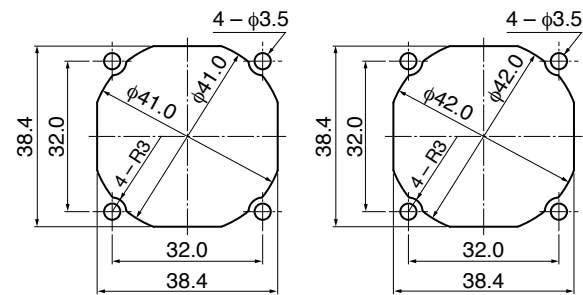
Expected Life ※ Failure Rate: 10% (L10 Life)

- 40°C 70,000 (Hours) (Target Value)
- 60°C 40,000 (Hours) (Target Value)

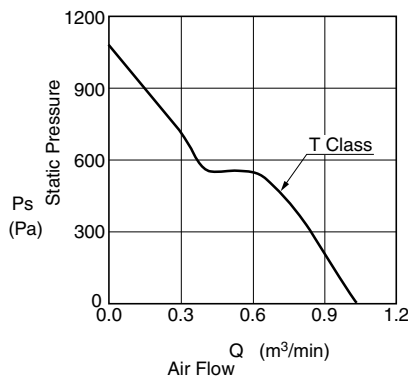
Panel Out-cuts

(Inlet Side)

(Outlet Side)



Characteristic Curves



Material

- Casing : Plastic (Black) UL94V-0
- Impeller : Plastic (Black) UL94V-0
- Bearing : Ball Bearing
- Lead Wire : UL10368 AWG26 + : Red, - : Black

Specifications

Model	Product No.	Rating Voltage	Operating Voltage	Current	Input Power	Speed	Max. Air Flow		Max. Static Pressure	Noise	Mass	
		(V)	(V)	(A)*1	(W)*1	(min ⁻¹)*1	(m ³ /min)*1	(CFM)*1	(Pa)*1	(In H ₂ O)*1	(dB)*1	(g)
04028DA-12T-AKH-	0	12	10.8 ~ 13.2	1.55	18.60	26500	1.02	36.0	1060.0	4.25	66.5	47

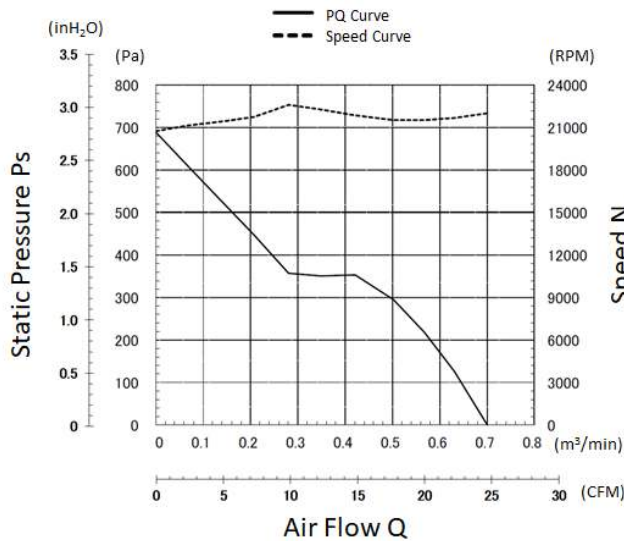
Rotation: Clockwise as seen from the label side
Airflow Outlet: Label side

*1: Average Values in Free Air

General Specifications

- Motor Type: DC Brushless Motor
- Motor Protection: Auto Restart/Polarity Protection
- Insulation Resistance: 10M Ω or over with a DC500V Megger
- Dielectric Withstand Voltage: AC 700V 1s or 500V 1min
- Allowable Ambient Temperature Range:
 - 10°C ~ +70°C (Operating)
 - 40°C ~ +70°C (Storage)
 - (non-condensing environment)

Characteristics Curves



PWM Benefits & Applications

PWM Benefits

- Increased Life Expectancy
- Energy Saving
- Lower Vibration
- Lower Noise
- Current Spike Prevention

PWM Applications

- Routers
- Switches
- Storage
- Data Centers
- Optical Repeaters
- Broadcast Equipment
- Inverters
- UPS
- Battery Chargers
- Fuel Cells
- Industrial Power Supplies
- Welders
- Plasma Cutters
- Instrumentation
- Test Equipment
- Enclosures and more

- Customized fan performances at multiple operating points.
- Peak efficiency resulting in lower total ownership costs.
- Cost effective and better reliability.

Life Expectancy L10

- 40°C 70,000 Hours
- 60°C 40,000 Hours

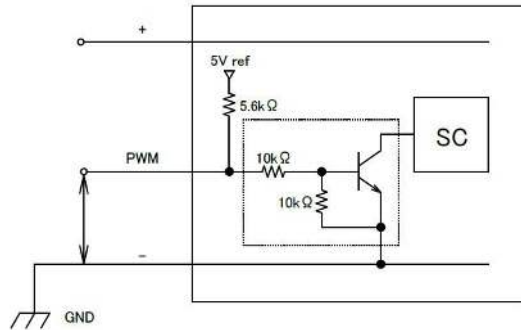
Specifications

MODEL	Rated Voltage	Operating Voltage	Current		Input Power		Speed	Max. Air Flow		Max. Static Pressure		Noise	Mass
	(V)	(V)	Avg	Max	Avg	Max		(CFM)	(m ³ /min)	(inH ₂ O)	(Pa)		
	(V)	(V)	(A) ^{*1}	(A) ^{*1}	(W) ^{*1}	(W) ^{*1}	(min ⁻¹) ^{*1}	(CFM)	(m ³ /min)	(inH ₂ O)	(Pa)	(dB) ^{*1}	(g)
04028DA-12S-AUF-AA	12	10.8 ~ 13.2	0.78	1.00	9.36	12.00	22000	24.7	0.70	2.75	685	58.5	55

*1: Values in Free Air

PWM Specifications

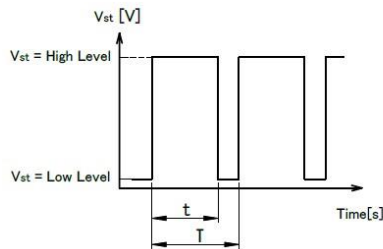
PWM CONTROL
● CONNECTION



1. PWM Control

V_{st} = Low Level (0V~0.4V)	→ Stop (On Duty 0%)
V_{st} = High Level (4.0V~5.0V)	→ Full Speed (On Duty 100%)
V_{st} = Open	→ Full Speed

2. PWM Duty & PWM Input Pulse



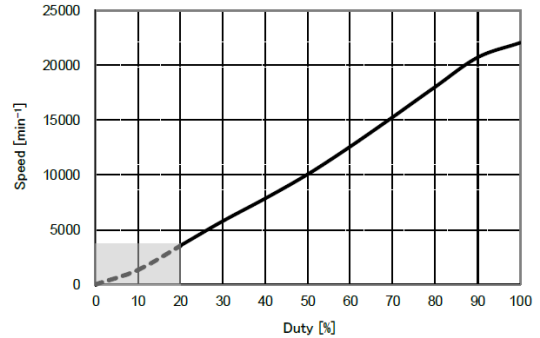
PWM Duty means that a ration of high level time (t)/PWM Input Pulse(T.)

$$(t/T) \times 100 : \text{On Duty } 0\% \sim 100\%$$

$$\text{PWM Frequency } f = 25[\text{kHz}]$$

PWM Characteristics Curve

Reference PWM Duty VS Speed
Conditions: at rating Voltage, $V_{st}=5.0V$, $f=25\text{kHz}$, $T_a=25^\circ\text{C}$



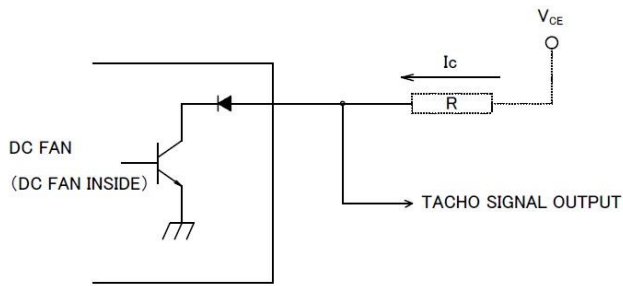
3. The condition for PWM control are as follows:

- When you use this under PWM control, always be sure the motor's operation under practical mounting state. Fan motor may not start up caused by PWM control at very low speed condition.
- To run at Rating Voltage.
- Please use the start with Duty 20% or more at 25kHz. [At rated voltage input, Ambient temperature 25°C]

TACHO Specifications

TACHO SIGNAL

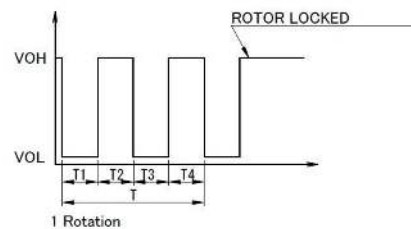
1. OUTPUT CIRCUIT : OPEN COLLECTOR)
2. SPECIFICATION
 $T_a=25^\circ\text{C}$
Absolute Maximum Ratings at $T_a=25^\circ\text{C}$
 V_{CE} max : +15V
 I_c max : 5mA [$V_{CE}(\text{sat})\text{max} = 1.5V$]



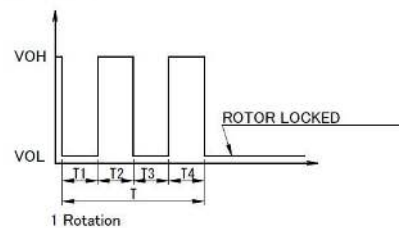
TACHO SIGNAL CIRCUIT

3. OUTPUT WAVEFORM) : AT RATED VOLTAGE OUTPUT SIGNAL VOLTAGE

3-1 Case-1

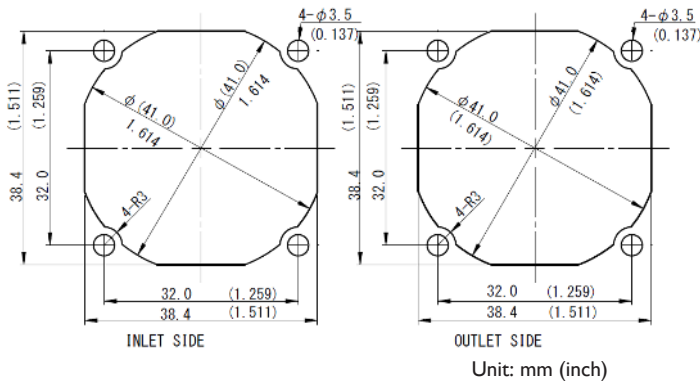


3-2 Case-2



- 1) When the rotor is locked at VOH position of signal, signal keeps VOH position.
- 2) When the rotor is locked at VOL position of signal, signal keeps VOL position.)
- 3) $T = T1 + T2 + T3 + T4 = 60 / m = 1 \text{ rotation}$
 $m : \text{min}^{-1}$
Tach Duty Cycle = $50\% \pm 10\%$

Panel Cut-Outs

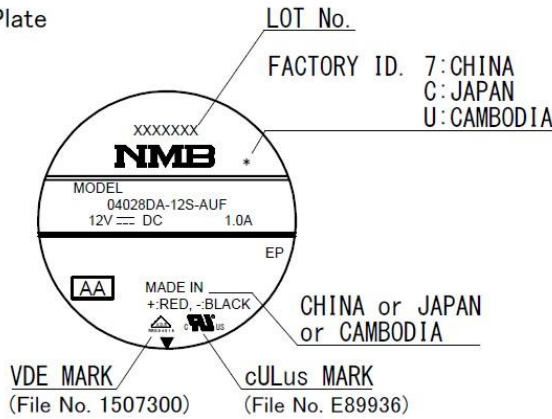


Materials

- Casing : Plastic (Black UL94V-0)
- Impeller : Plastic (Black UL94V-0)
- Bearing : Ball Bearing
- Lead Wire : UL10368 AWG26 or UL3443 AWG26
- (+) : Red (-) : Black
- PWM : Brown Tach : White

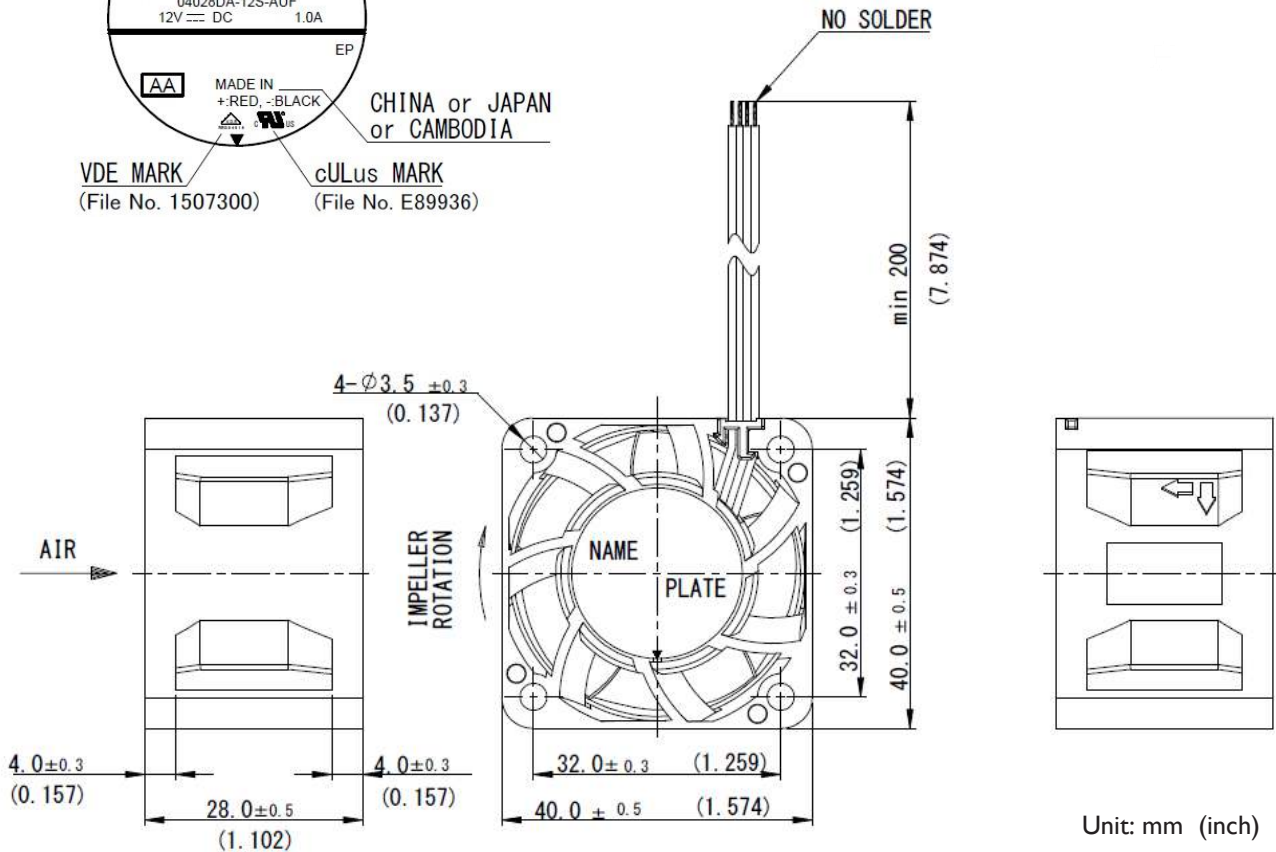
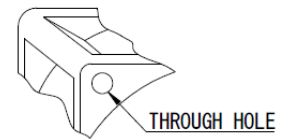
Outline

Name Plate



Outline

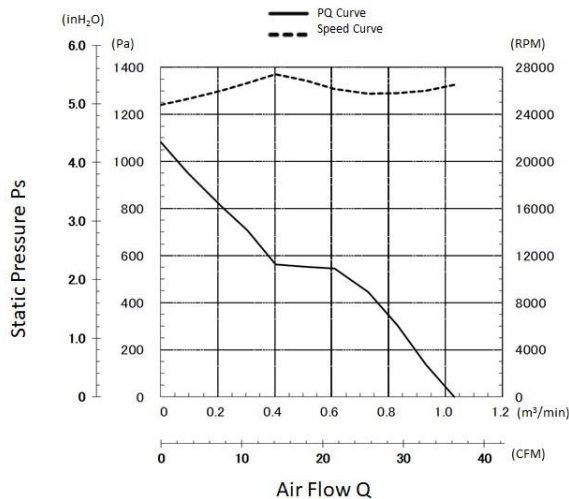
RIB TYPE



General Specifications

- Motor Type: DC Brushless Motor
- Motor Protection: Auto Restart/Polarity Protection
- Insulation Resistance: 10M Ω or over with a DC500V Megger
- Dielectric Withstand Voltage: AC 700V 1s or 500V 1min
- Allowable Ambient Temperature Range:
 - 10°C ~ +60°C (Operating)
 - 40°C ~ +70°C (Storage)
 - (non-condensing environment)

Characteristics Curves



PWM Benefits & Applications

PWM Benefits

- Increased Life Expectancy
- Energy Saving
- Lower Vibration
- Lower Noise
- Current Spike Prevention

PWM Applications

- Routers
- Switches
- Storage
- Data Centers
- Optical Repeaters
- Broadcast Equipment
- Inverters
- UPS
- Battery Chargers
- Fuel Cells
- Industrial Power Supplies
- Welders
- Plasma Cutters
- Instrumentation
- Test Equipment
- Enclosures and more

- Customized fan performances at multiple operating points.
- Peak efficiency resulting in lower total ownership costs.
- Cost effective and better reliability.

Life Expectancy L10

- 40°C 70,000 Hours
- 60°C 40,000 Hours

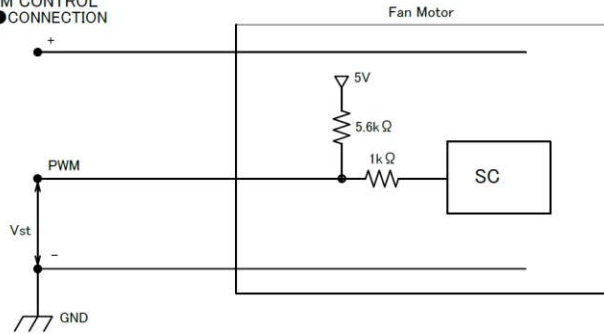
Specifications

MODEL	Rated Voltage	Operating Voltage	Current		Input Power		Speed	Max. Air Flow		Max. Static Pressure		Noise	Mass
	(V)	(V)	Avg	Max	Avg	Max		(CFM)	(m ³ /min)	(inH ₂ O)	(Pa)		
	(V)	(V)	(A) ^{*1}	(A) ^{*1}	(W) ^{*1}	(W) ^{*1}	(min ⁻¹) ^{*1}	(CFM)	(m ³ /min)	(inH ₂ O)	(Pa)	(dB) ^{*1}	(g)
04028DA-12T-AKH-AQ	12	10.8 ~ 13.2	1.55	1.95	18.60	23.40	26500	36.0	1.02	4.25	1060	66.5	47

04028DA-12T-AKH-AQ Replaces Part Number: 04028DA-12T-AK-H0
Fan specifications remain the same.

PWM Specifications

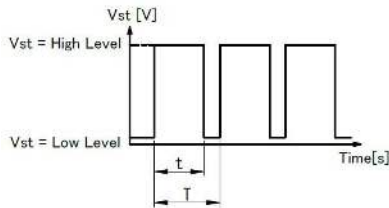
PWM CONTROL CONNECTION



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 ration of high level time (t)/PWM Input Pulse(T).

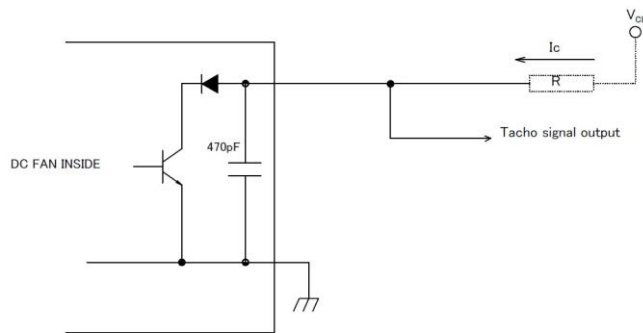
$$(t/T) \times 100 : \text{On Duty } 0\% \sim 100\%$$

PWM Frequency $f = 25[\text{kHz}]$

TACHO Specifications

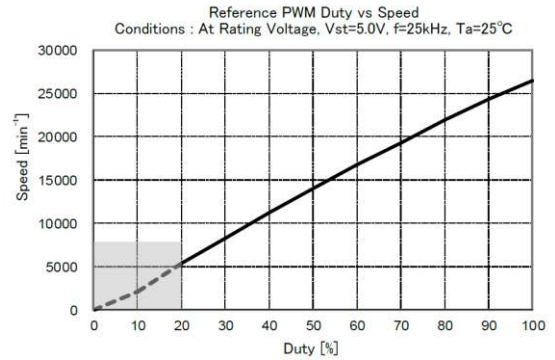
TACHO SIGNAL

1. OUTPUT CIRCUIT : OPEN COLLECTOR
2. SPECIFICATION
 - Ta=25°C
 - Absolute Maximum Rating at Ta=25°C
 - V_{CE} max : +15V
 - I_c max : 5mA [V_{CE(sat)}max = 1.5V]



TACHO SIGNAL CIRCUIT

PWM Characteristics Curve

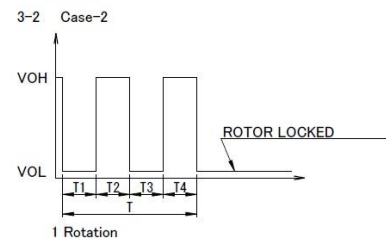
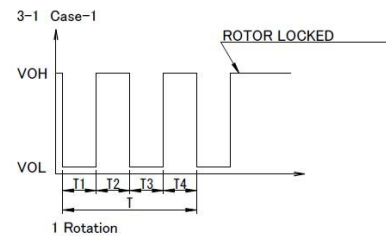


3. The condition for PWM control are as follows.

- When you use this under PWM control, always be sure the motor's operation under practical mounting state. Fan motor may not start up caused by PWM control at very low speed condition.
- To run at Rating Voltage
- Please use the start with Duty 20% or more at 25kHz. [At rated voltage input, Ambient temperature 25°C]

3. OUTPUT WAVEFORM : AT RATED VOLTAGE

OUTPUT SIGNAL VOLTAGE

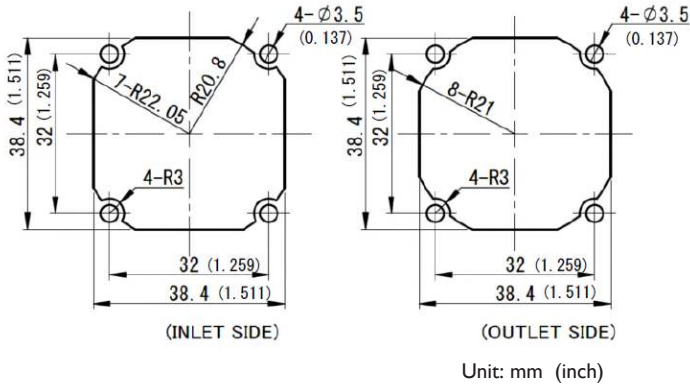


- 1) When the rotor is locked at V_{OH} position of signal, signal keeps V_{OH} position.
- 2) When the rotor is locked at V_{OL} position of signal, signal keeps V_{OL} position.
- 3) $T = T_1 + T_2 + T_3 + T_4 = 60 / m = 1 \text{ rotation}$

$$m : \text{min}^{-1}$$

Tach Duty Cycle = 50% ± 10%

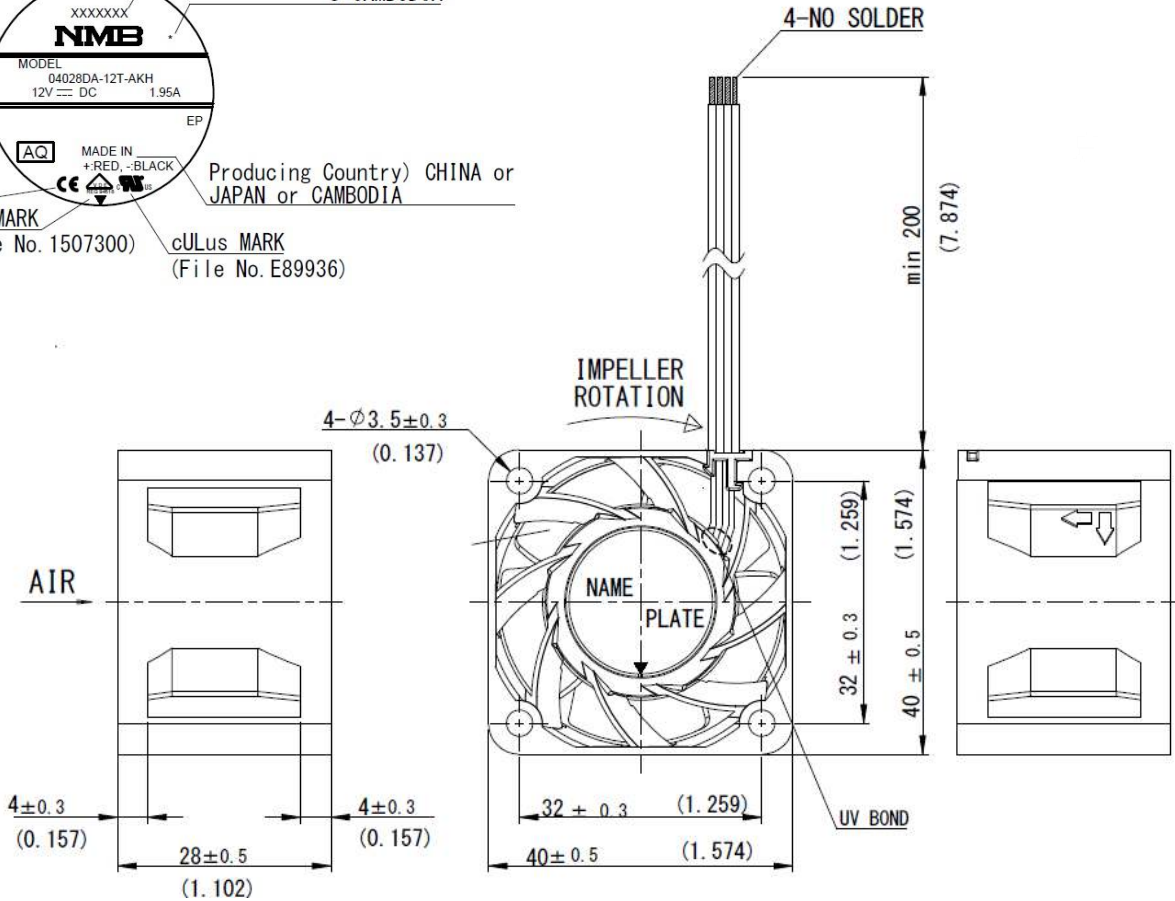
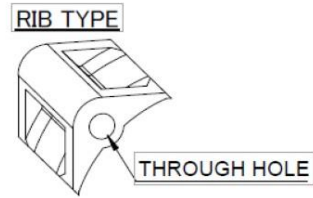
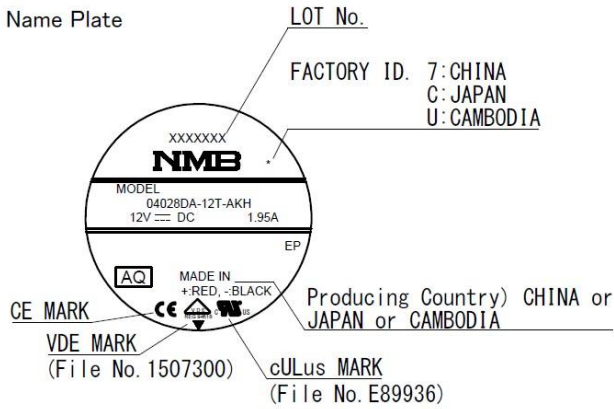
Panel Cut-Outs



Materials

- Casing : Plastic (Black UL94V-0)
- Impeller : Plastic (Black UL94V-0)
- Bearing : Ball Bearing
- Lead Wire : UL10368 AWG26
 - (+) : Red (-) : Black
 - PWM : Brown Tach : White

Outline



Unit: mm (inch)