04028DA (1611FB)

DC Axial Fan

40□X28L

General Specifications

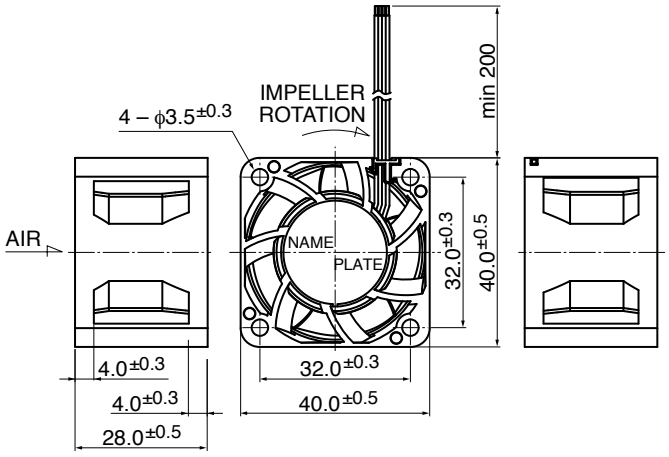
Motor Protection	Auto Restart / Polarity Protection
Insulation Resistance	10MΩ or over with a DC500V Megger
Dielectric Withstand Voltage	: AC700V 1s
Allowable Ambient Temperature Range	: −10℃ ～ +70℃ (Operating) −30℃ ～ +70℃ (Storage) non-condensing environment

Expected Life

※Failure Rate: 10% (L10 Life)

40℃ 70,000 (Hours)

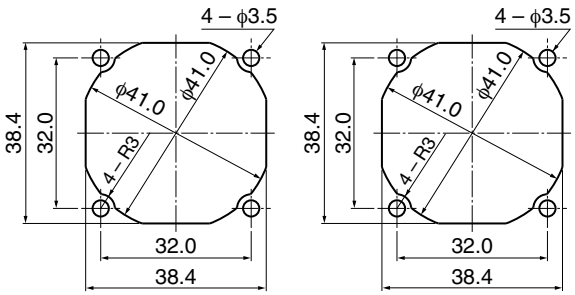
Outline



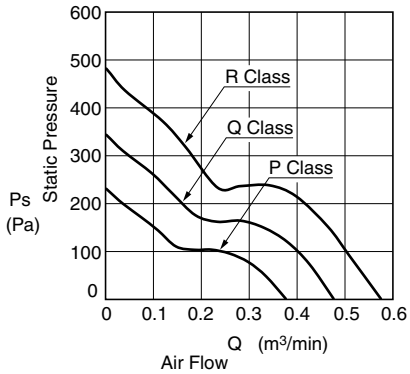
＊Outline is A (Rib) type.

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

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 (V)	Operating Voltage (V)	Current (A)*1	Input Power (W)*1	Speed (min⁻¹)*1	Max.Air Flow (m³/min)*1	Max.Air Flow (CFM)*1	Max. Static Pressure (Pa)	Max. Static Pressure (In H_2O)	Noise (dB)*1	Mass (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□X28L

DC Axial Fan

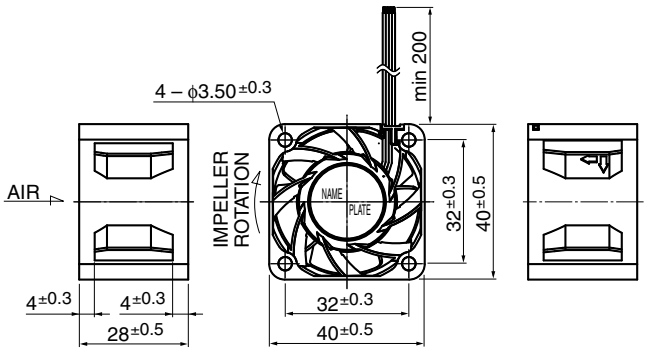
General Specifications

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

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

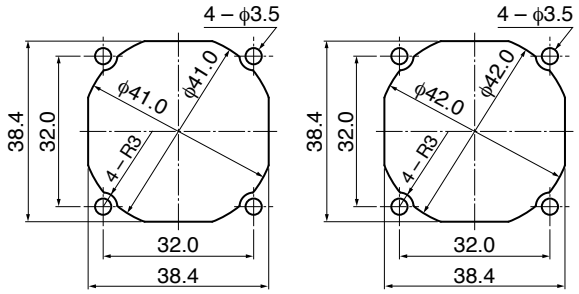
40℃ 70,000 (Hours)

Outline

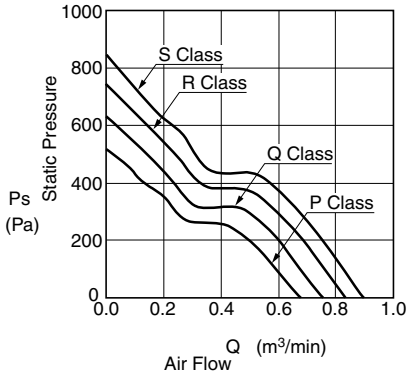


Panel Out-cuts

(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 (V)	Operating Voltage (V)	Current (A)*1	Input Power (W)*1	Speed (min-1)*1	Max.Air Flow (m3/min)*1	Max.Air Flow (CFM)*1	Max. Static Pressure (Pa)*1	Max. Static Pressure (In H2O)*1	Noise (dB)*1	Mass (g)
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□X28L

DC Axial Fan

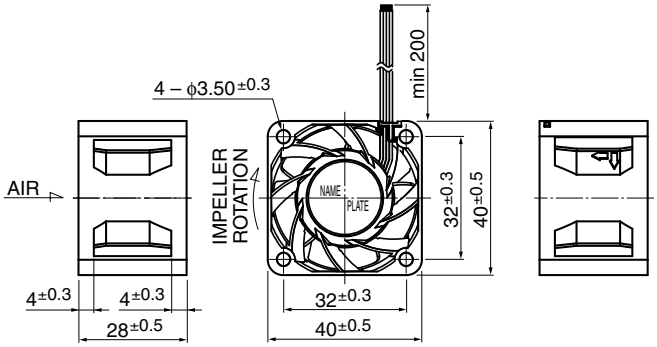
General Specifications

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

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

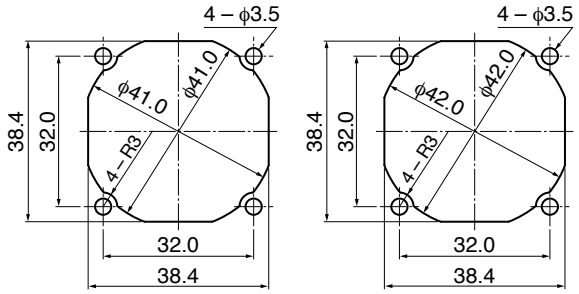
40℃ 70,000 (Hours) (Target Value)
60℃ 40,000 (Hours) (Target Value)

Outline

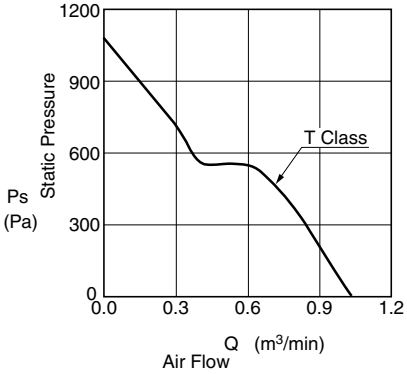


Panel Out-cuts

(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 (V)	Operating Voltage (V)	Current (A)*1	Input Power (W)*1	Speed (min⁻¹)*1	Max.Air Flow (m³/min)*1	Max.Air Flow (CFM)*1	Max. Static Pressure (Pa)*1	Max. Static Pressure (In H₂O)*1	Noise (dB)*1	Mass (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

PWM 04028DA-12S (40 X 28)

Pulse Width Modulation Axial Cooling Fan

General Specifications

Motor Type: DC Brushless Motor

Motor Protection: Auto Restart/Polarity Protection

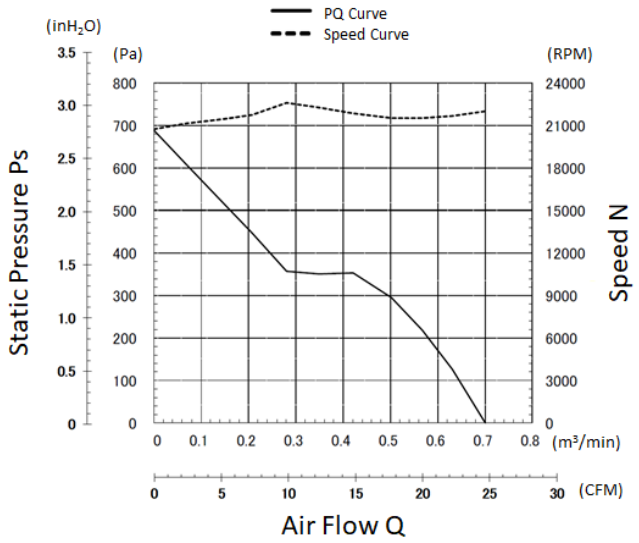
Insulation Resistance:
10M Ω or over with a DC500V Megger

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 (A)*1	Max (A)*1	Avg (W)*1	Max (W)*1	(min-1)*1	(CFM)	(m³/min)	(inH2O)	(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

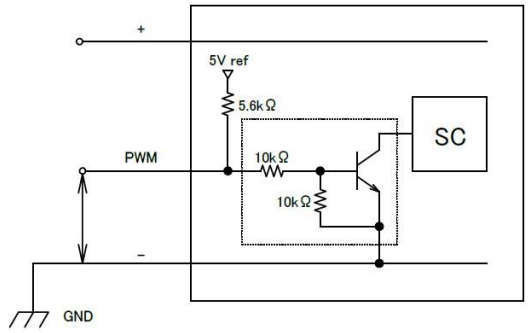
*1: Values in Free Air

MinebeaMitsumi
Passion to Create Value through Difference

PWM Specifications

PWM CONTROL

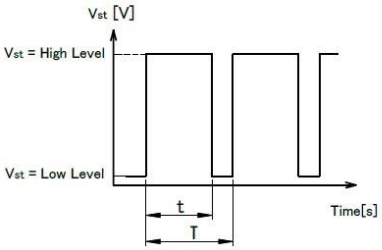
●CONNECTION



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



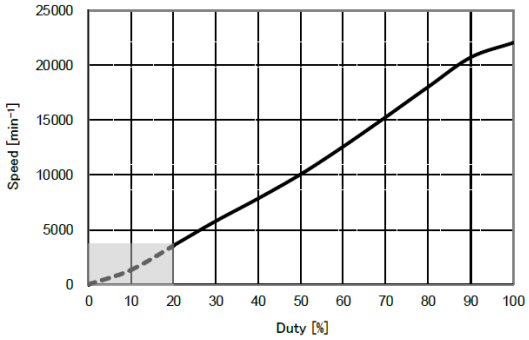
PWM Duty means that a ration of high level time (t)/PWM Input Pulse(T).)

(t/T) × 100 : On Duty 0% ～ 100%

PWM Frequency f = 25[kHz]

PWM Characteristics Curve

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



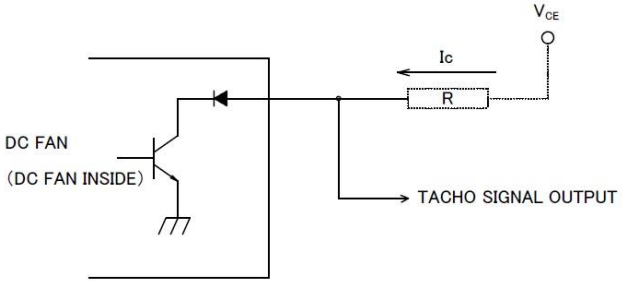
3. The condition for PWM control are as follows:

- 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℃]

TACHO Specifications

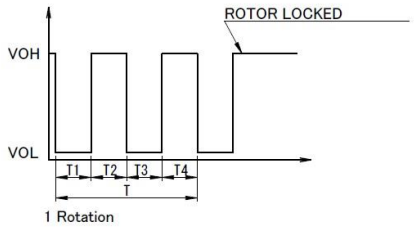
TACHO SIGNAL

1. OUTPUT CIRCUIT : OPEN COLLECTOR)
2. SPECIFICATION
   Ta=25℃
   Absolute Maximum Ratings at Ta=25℃
   V_{CE} max : +15V
   Ic max : 5mA [V_{CE}(sat)max = 1.5V]



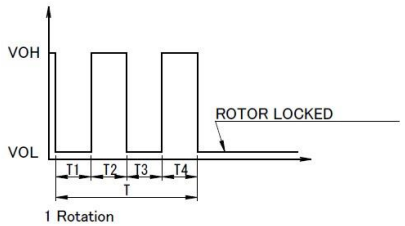
TACHO SIGNAL CIRCUIT

3. OUTPUT WAVEFORM) : AT RATED VOLTAGE
   OUTPUT SIGNAL VOLTAGE
   3-1 Case-1



1 Rotation

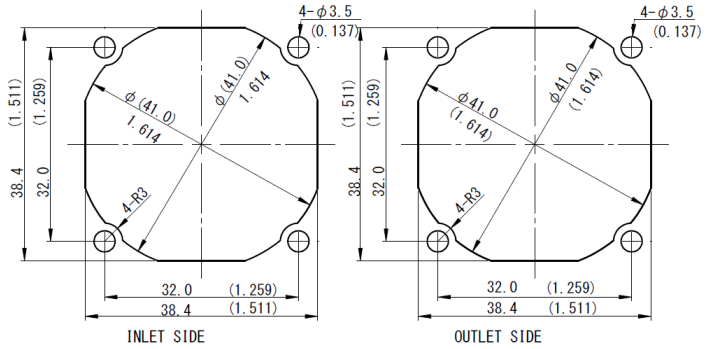
3-2 Case-2



1 Rotation

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 rotation
   m : min^{-1}
   Tach Duty Cycle=50%±10%

Panel Cut-Outs



Unit: mm (inch)

Materials

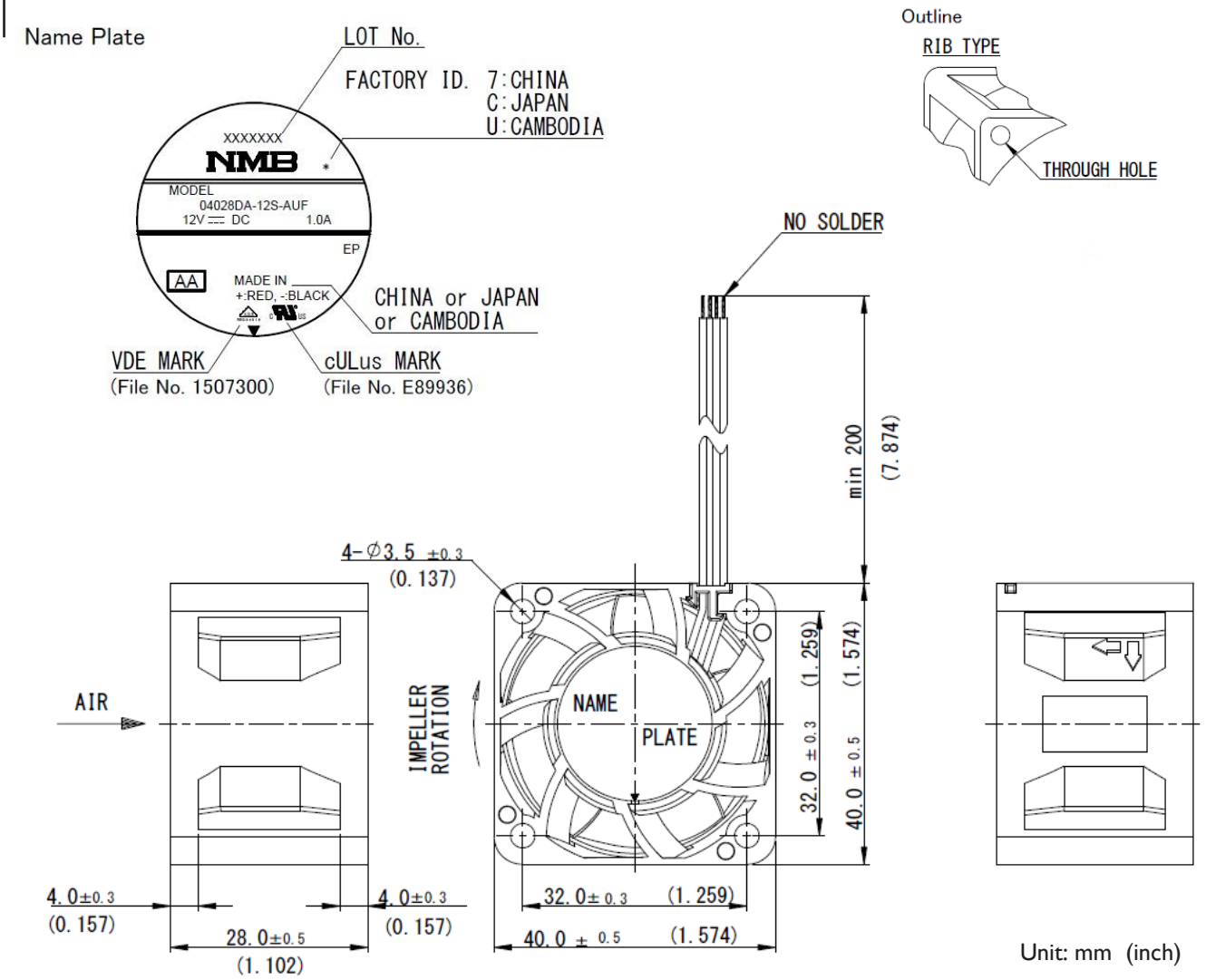
Casing : Plastic (Black UL94V-0)

Impeller : Plastic (Black UL94V-0)

Bearing : Ball Bearing

Lead Wire : UL10368 AWG26 or UL3443 AWG26
(+) : Red (-) : Black
PWM : Brown Tach : White

Outline



Unit: mm (inch)

General Specifications

Motor Type: DC Brushless Motor

Motor Protection: Auto Restart/Polarity Protection

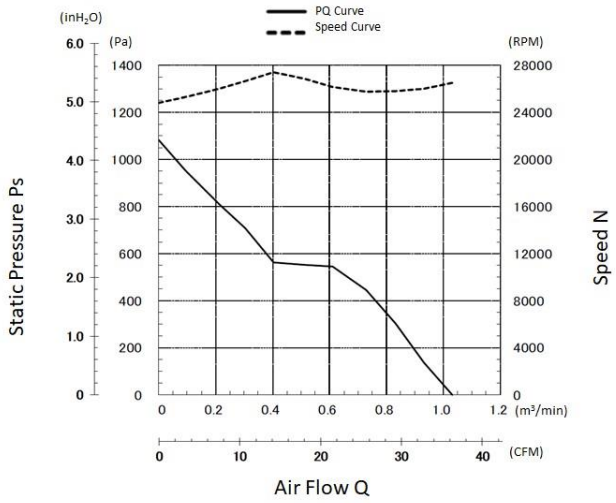
Insulation Resistance:
10M Ω or over with a DC500V Megger

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 (A)*1	Max (A)*1	Avg (W)*1	Max (W)*1	(min-1)*1	(CFM)	(m3/min)	(inH2O)	(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

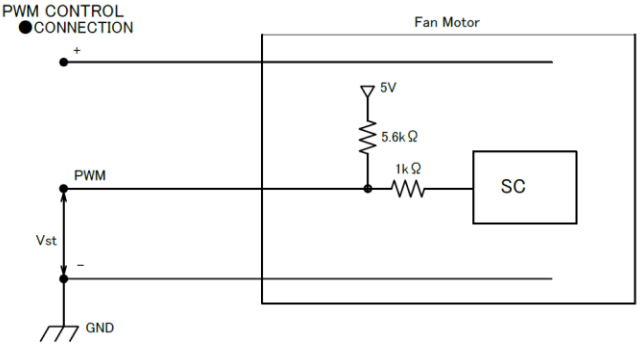
04028DA-12T-AKH-AQ Replaces Part Number: 04028DA-12T-AK-H0
Fan specifications remain the same.

*1: Values in Free Air

MinebeaMitsumi
Passion to Create Value through Difference

PWM Specifications

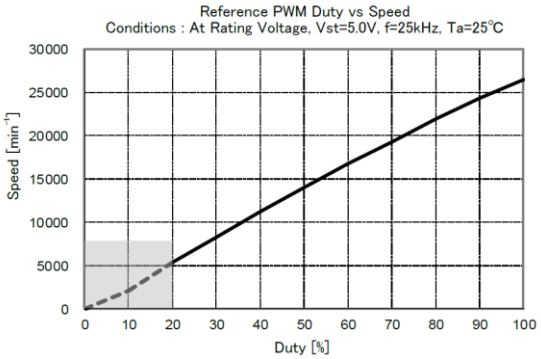
PWM CONTROL
●CONNECTION



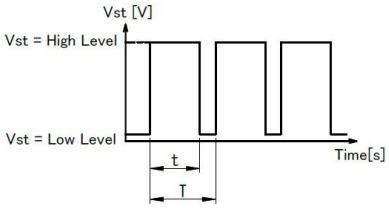
1. PWM Control

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

PWM Characteristics Curve



2. PWM Duty & PWM Input Pulse



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

(t/T) × 100 : On Duty 0% ～ 100%

PWM Frequency f = 25[kHz]

3. The condition for PWM control are as follows.

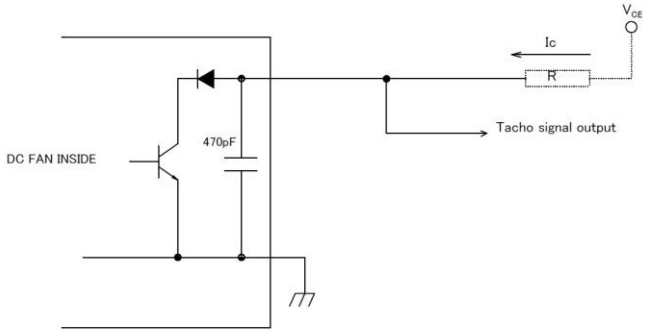
- When you use this under PWM control, always be sure the motor's operation under practical mounting state.
  Fan motor may not start up caused by PWM control at very low speed condition.
- To run at Rating Voltage
- Please use the start with Duty 20% or more at 25kHz.
  [At rated voltage input, Ambient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

TACHO Specifications

TACHO SIGNAL

1. OUTPUT CIRCUIT : OPEN COLLECTOR

2. SPECIFICATION
   Ta=25℃
   Absolute Maximum Rating at Ta=25℃
   V_{OE} max : +15V
   Ic max : 5mA [$V_{CE(sat)}$max = 1.5V]

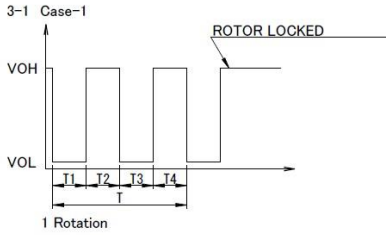


TACHO SIGNAL CIRCUIT

3. OUTPUT WAVEFORM : AT RATED VOLTAGE)

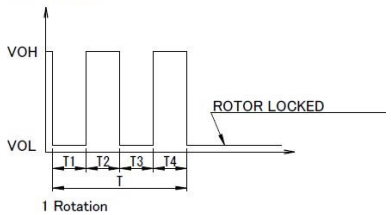
OUTPUT SIGNAL VOLTAGE

3-1 Case-1



1 Rotation

3-2 Case-2



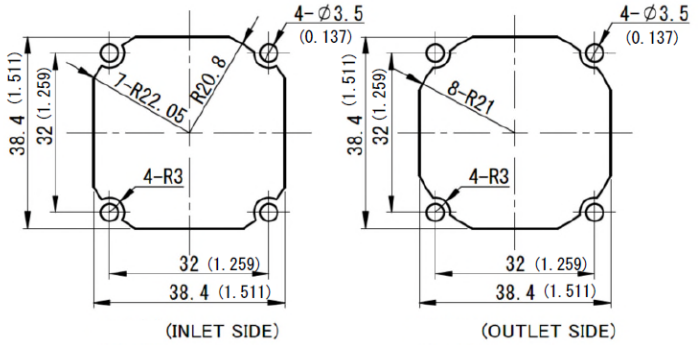
1 Rotation

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 rotation

m : min^{-1}

Tach Duty Cycle=50%±10%

Panel Cut-Outs



Unit: mm (inch)

Materials

Casing : Plastic (Black UL94V-0)

Impeller : Plastic (Black UL94V-0)

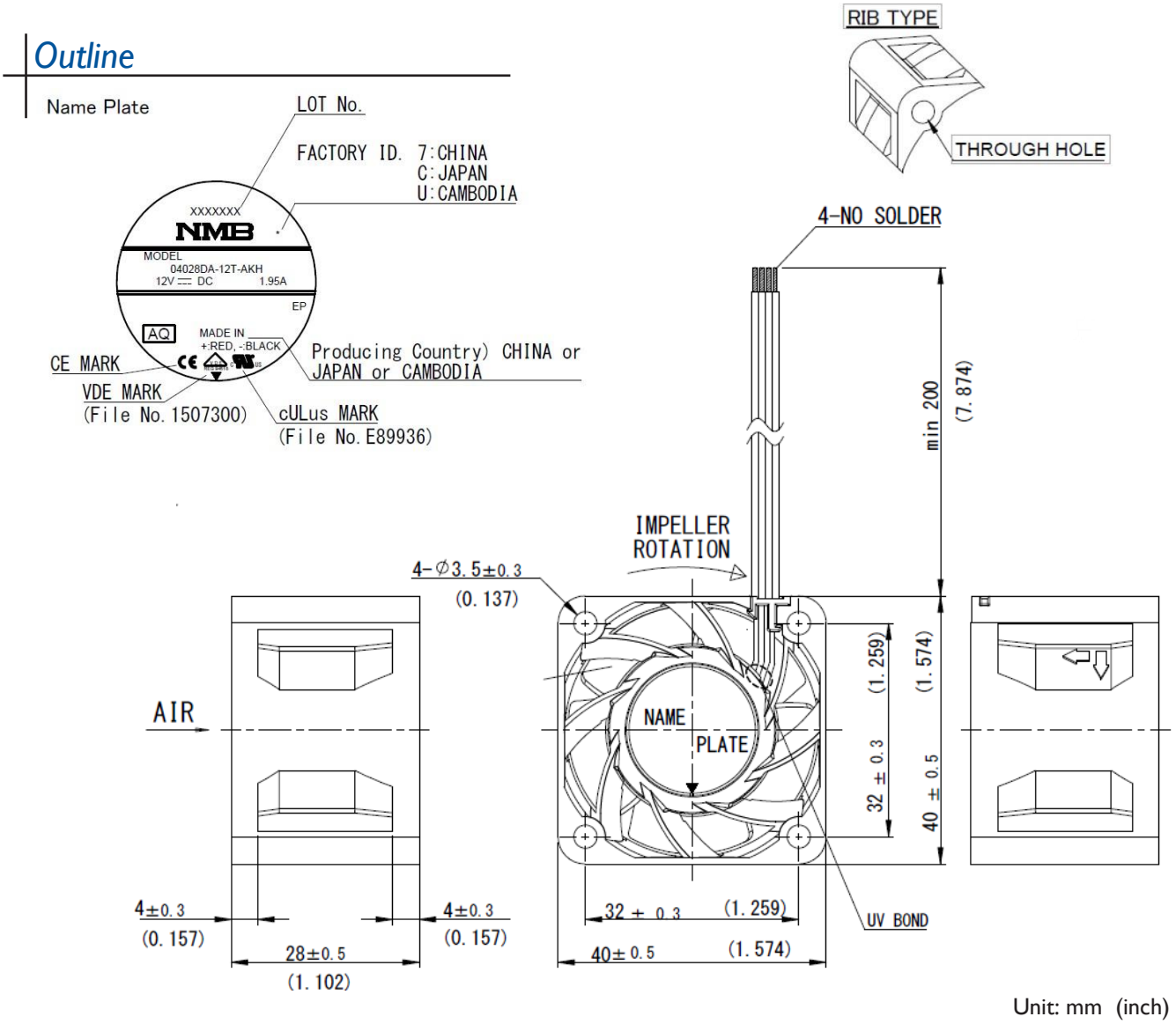
Bearing : Ball Bearing

Lead Wire : UL10368 AWG26

(+) : Red (-) : Black

PWM : Brown Tach : White

Outline



Unit: mm (inch)