# SPECIFICATION

MODEL
K-DC305-A24-40

Product description

K-DC305-A24-40 is an axial-flow fan used in cooling system and condensing system. The fan size is 12 inches and it is completely sealed.
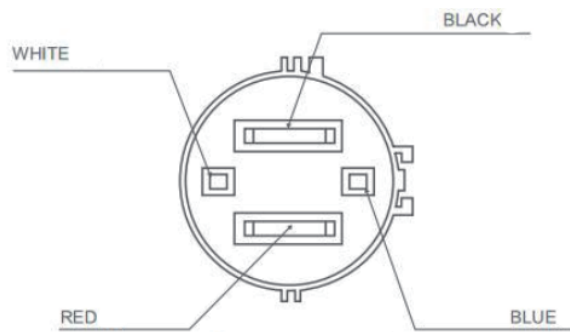
Unless otherwise specified, the parameters in this document are defined or tested under the following conditions.

1) Temperature: 20 ℃± 5 ℃

2) Voltage: DC26V ± 0.2V, measured value at connector end

Dimensions and interfaces

Unit:mm
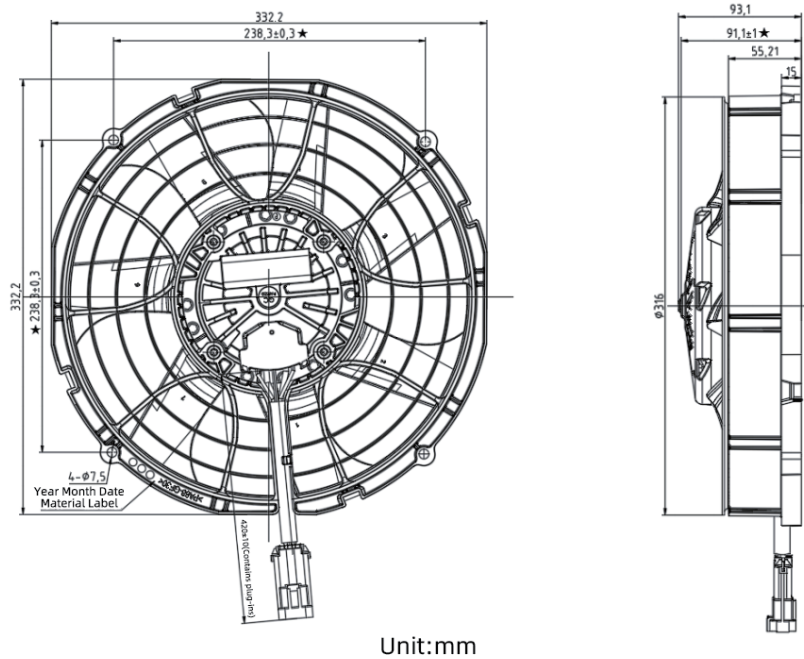
Connectors

Connector pin number definition

Connector: YAZAKI HYBRID (USCAR-2 compliant)					
Product number：7282-8497-90					
Id.No.	Pin No.	Color	Seal	Pin material	Wire harness
+D	1	Red	7158-3035	7114-3250	12AWG
-D	2	Black	7158-3035	7114-3250	12AWG
FO	3	White	7158-3030-50	7114-4102-02	20AWG
PWM/E	4	Blue	7158-3030-50	7114-4102-02	20AWG

Fan Performances

Fan Air Flow Curve
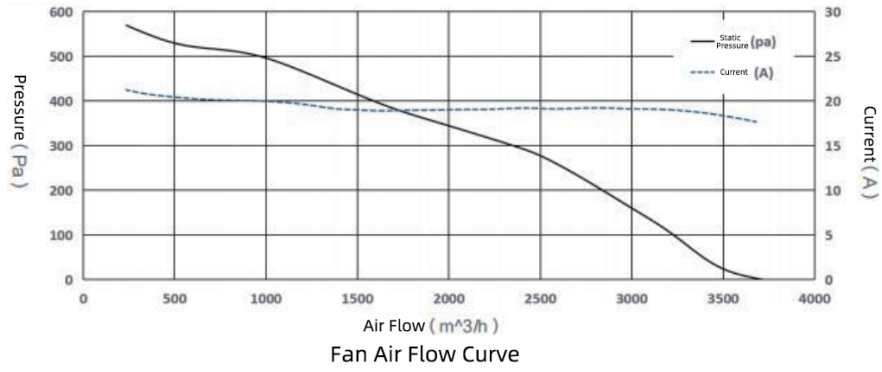
Speed

Fan Speed Range		
Item	Typical value	Unit
Min.speed	1025	RPM
Max.speed	4100	RPM

Noise

Fan Noise	
Noise	Distance between microphone and fan center
81dBA	1m±0.05m

Weight
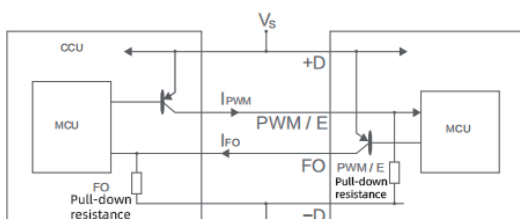
Fan Weight	
Fan weight	2.45kg

Hardware Function

Unless otherwise stated, the following are fan test conditions:
√ Temperature: 20℃±5℃
√ Voltage: 26.0 V ± 0.2 V (fan connector position)

PWM/E
FO
Brushless Motor
+D
−D
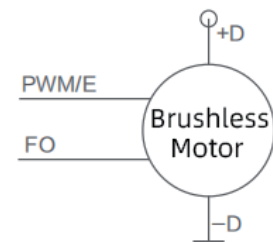
Driver block diagram

Interface driver circuit

The fan and the central control unit are connected by two unidirectional wires.
The PWM/E signal is generated by the switch inside the client CCU that pulls up to the positive pole of the power supply, and a pull-down resistor is added inside the fan.
The fault output signal is an active high signal generated by the fan.
There should be a resistor inside the CCU that pulls down to the negative side of the power supply.

The connection between the fan and the CCU.

PWM/E input signal

1）PWM/E input signal is high-level effective signal.

2）Duty cycle is equal to high-level time divided by period.
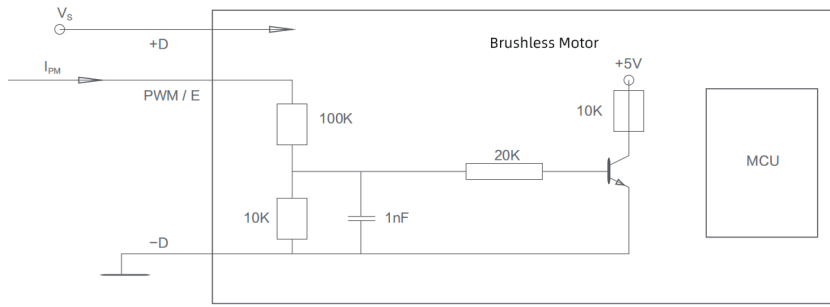
PWM/E signal input circuit diagram

3）when high-level time TH is greater than Twakeup, PWM signal will wake the fan from sleep mode.

4）when low-level effective time TL is greater than 10 seconds, the fan enters sleep mode.

$$D=T_H/T * 100[\%]$$
$$T=T_H+T_L$$
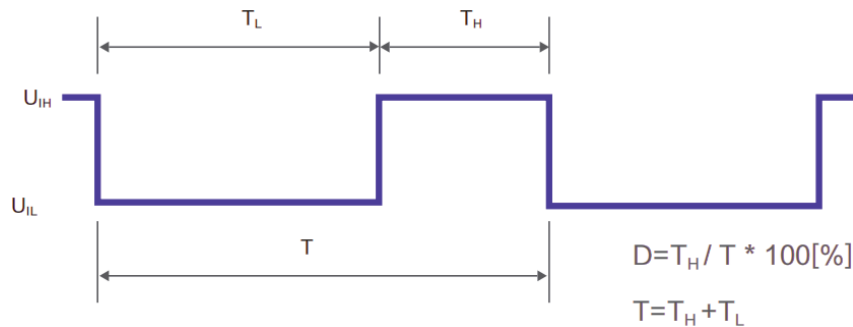
PWM signal duty cycle definition

PWM signal parameters					
Item	Min. value	Typical value	Max. value	Unit	
PWM signal frequency	100	120	1000	Hz	F_{PWM}
PWM signal duty cycle	0		100	%	D_{PWM}
PWM signal high level	8			V	
PWM signal low level			6	V	
PWM signal accuracy		1		%	
Current	0.2	0.3	0.5	mA	
Wake up pulse time	30			uS	T_{wakeup}

Fault output

Normally, the fan fault output port is low level, when any fault occurs, the port outputs high level.

| Item	Min. value	Typical value	Max. value	Unit	Code
FO active level	Vs-2		Vs	V	
FO current			50	mA	

Note: Vs represents the voltage of the fan power supply.

Software Functions

The fan has four working modes:

1. Normal mode 2. Sleep mode

3. Run mode 4. Diagnostic mode.

Fan working mode			
No.	Operation Mode	Consumption of Current	Fan Speed
1	Normal mode	< 100mA	0
2	Sleep mode	< 200uA	0
3	Running mode	Depends on the fan speed and load	
4	Diagnostic mode	< 100mA	0

Fan Speed
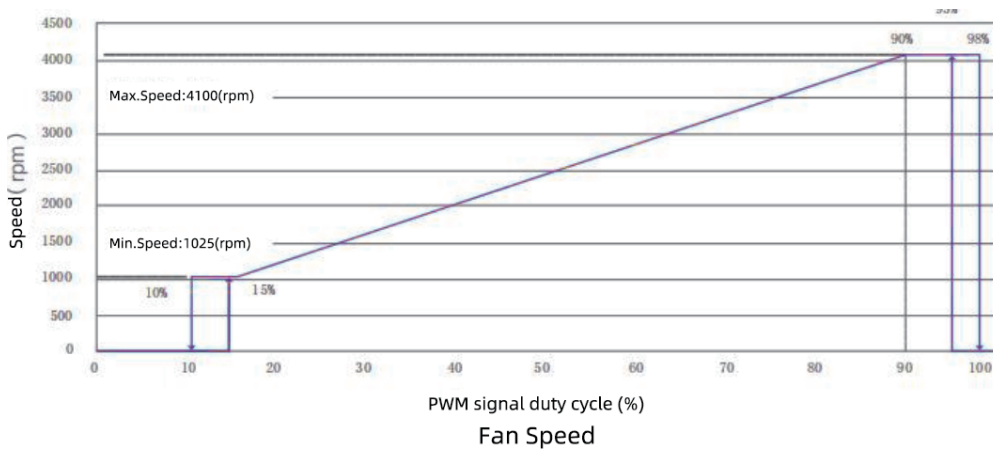
Diagnostic mode

The fan will stop or derate under the following conditions:

1.Overvoltage, low voltage 2. Overload

3. Blocked rotation 4. Overtemperature

Over/under voltage protection

When the power supply is lower than the low voltage protection value or greater than the voltage protection value (measured at the connector end), the fan will stop running.

Working voltage parameter table				
Item	Min. value	Typical value	Max. value	Unit
Rated Voltage		24		V
Input voltage	16		32	V
Max. speed voltage	26		32	V
Low voltage protection value		15.5		V
Overvoltage protection value		32.5		V

Overload protection: Two current limits are defined:

l_Limit 1: Alarm value. When the current exceeds this value, the fan will derate operation.

l_Limit 2: Danger value. When the current exceeds this value, the fan will stop running and try to restart within a certain time.

Blocked rotation protection: When the rotor is locked, the fan will stop running.

Overtemperature protection: Two temperature limits are defined:

T_Limit 1: 115℃ alarm value. When the temperature exceeds this value, the fan will derate operation.

T_Limit 2: 120℃ danger value. When the temperature exceeds this value, the fan will stop running.

T_Recover:108 ℃ recovery value. When the temperature is lower than the value, the fan restarts.
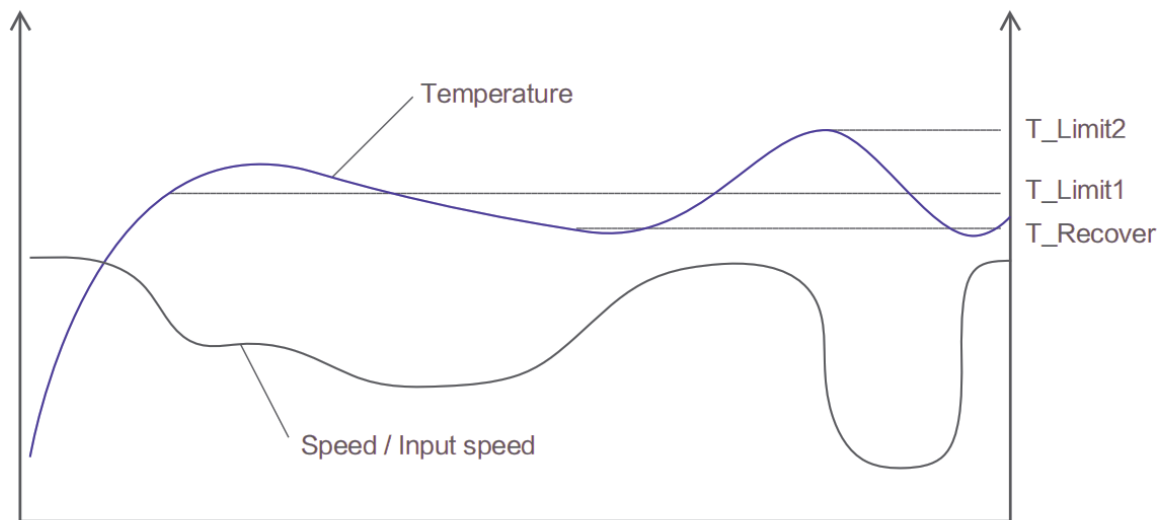
Temperature protection curve

Startup Time

Item	Min. value	Typical value	Max. value	Unit
Startup time (from 0 rpm to max.Speed)		16		S

Electrical performance

Back connection protection：In accordance with ISO16750-2,2010

Reverse polarity protection parameter table		
Item	Value	Unit
Back connection voltage	-27	V
Temperature	25	℃
Time	1	Minutes

Throw load protection
Compliant with IS016750-2,2010

Load dump protection parameter table			
Type of pulse：5a			
Item	Value	Unit	
Peak pulse voltage	173	V	
Power supply voltage	28	V	
Internal resistance	2	Ω	
Duration of pulse	400	ms	
Time of rise	5	ms	
Number of pulses	10		
Pulse time interval	60	S	

Performance of sealing

The fan is designed according to IP6K9K and IP68 protection levels.