SPECIFICATION

MODEL
K-DC305-A24-42F

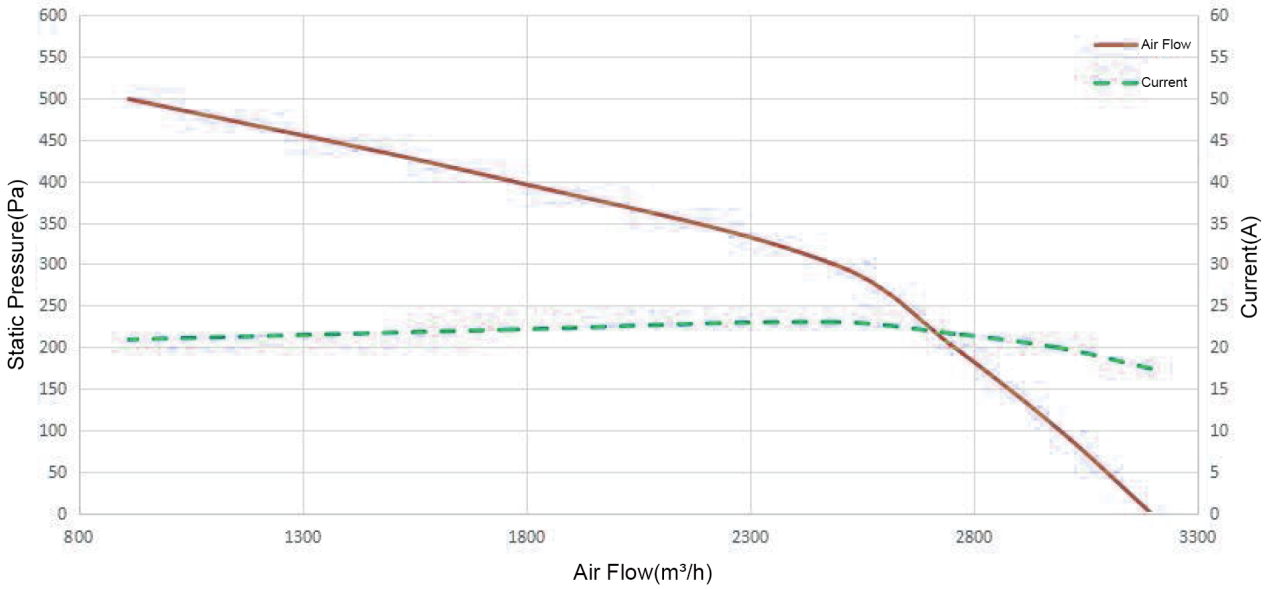
Model:K-DC305-A24-42F

1.Product Parameters

Max.Speed	RPM	4200
Min.Speed	RPM	1250
Noise level at max. speed	dBA	82-1m from the fan
Weight	Kg	2.6
Operating voltage range	V	16.0~32.0 Connector
Voltage at max. speed	V	26.0~32.0 Connector
Operating ambient temperature range	℃	-40~+120
When the maximum speed is 4200RPM, the fan overheat protection derating temperature	℃	85(1)
Storage temperature range	℃	-40~+125
Life	h	Up to 40000H (depending on the application environment)
Time from 0 rpm to full RPM	S	16(20℃)
Load shedding protection (pulse 5b)	V	65 Peak pulse voltage Us* - ISO16750-2:2010)
Reverse connection protection		ISO 16750-1 Class C - It will resume normal operation when properly connected

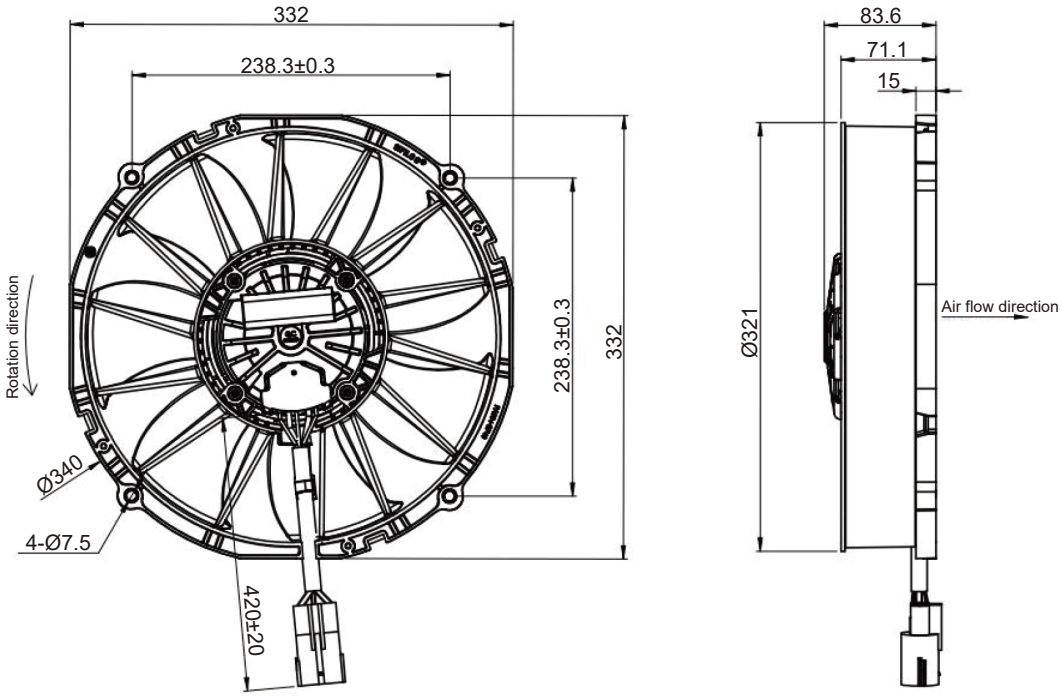
Remarks: (1) Due to the thermal inertia of the system, rapid temperature changes will not cause the fan to derate. Overload may lead to early derating.
(2)The noise value in the free suction state is for reference only, and does not represent the actual noise of the fan in the application, because the noise of the fan in the application will be affected by the water tank, wind hood, etc.

2.Air Volume Curve



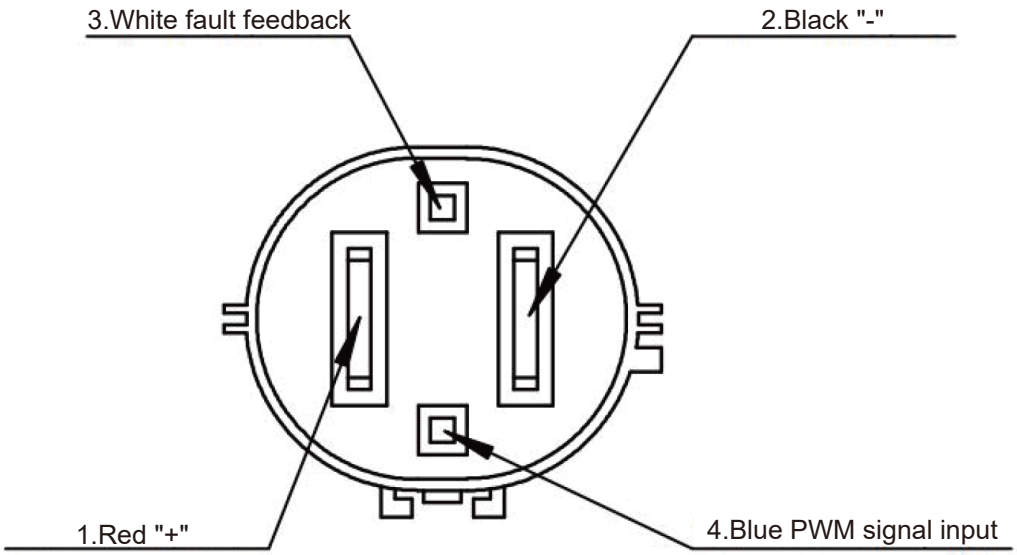
Voltage	Air density	Ambient temperature
26.0V (Connection)	1.16kg/m³	20℃±5℃

3.Product Drawing



All dimensions in the above figures are in mm. Use M6 bolts to fix the fan, and the nominal maximum tightening torque is 3(+1/0)Nm. The definition of the nominal tightening torque applies to new, clean and lubrication-free bolts.

4.Connector and Wiring Harness



Connector				
Identification	+D	-D	FO	PWM/E
Terminal Number	1	2	3	4
Wire harness color	Red	Black	White	Blue
Seal part number	7157-3580	7157-3580	7158-3030	7158-3030
Pin part number	7114-3251	7114-3251	7114-4102-02	7114-4102-02
Cross Section[mm^2]	4.0	4.0	0.5	0.5

Note: It is forbidden to directly lift the fan through the wire harness.

5.Standards and application requirements

Conform to		ECE Reg.10-04 and newer - Uniform provisions on vehicle approval for electromagnetic compatibility parties.
		2002/95/EC RoHS-Restriction of Hazardous Substances Directive.
		2000/53/EC and updates - End-of-life Vehicle (ELV) Directive.
IP rating		IP68 and IP6K9K
Allowable maximum power supply ripple factor	RMS	1%
Fuse		According to ISO8820 Part 3, specified fuses must be used in the circuit. Each fan should be equipped with a separate fuse.

6.Test Conditions

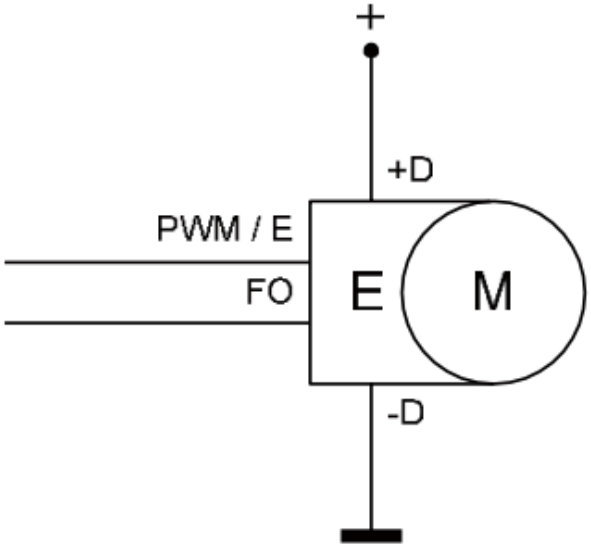
Unless otherwise stated, the following are the fan test conditions:

- T_{AMB} = 20°C±5°C and
- U_B= 26.0V±0.2V (Connector)

7.Hardware function parameters

7-1.Fan drive

The fan drive diagram is as follows:



E represents the entire circuit part, and M represents the motor. Drive stands for the integration of motors and circuits.

7-2.The function of each lead wire driven by the fan.

The circuit portion of the driver consists of four leads:

Power leads:

- Positive power supply: +D
- Negative pole of power supply: -D

Signal lead:

(1).Input: High-level active digital PWM input: PWM/E

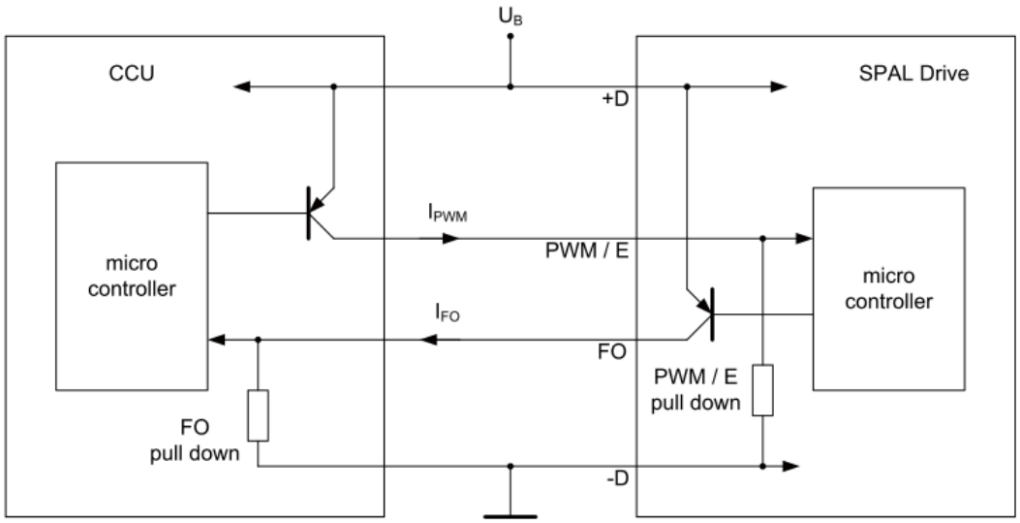
(2).Output: Active High Feedback Output: FO

The signal lead PWM/E is used to control the drive mode, that is, the control input.

The signal lead FO is used to feedback the running state of the motor.

8.Driver Interface

The drive interface is the wiring diagram of the CCU (customer controller) and the fan drive module, as shown in the figure below:



The circuit of the CCU and the circuit driven by the fan are connected through two unidirectional wire harnesses.

The PWM signal input to the PWM/E line comes from the CCU, and a pull-down resistor (PWM/E pull down) is added to the fan drive circuit to determine the recessive level.

This pull-down resistor is connected to the negative terminal of the input power supply: -D/GND.

The dominant (active) level of the input pin PWM/E is a high level, which is provided by the internal pnp transistor of the CCU when it is turned on (as shown in the figure above).

The output FO comes from the drive circuit of the fan, and a pull-down resistor (F0 pull down) is added to the circuit terminal of the CCU.

The dominant (active) level of the output pin FO is a high level, which is provided by driving the internal pnp transistor to conduct (as shown in the figure above).

9.Hardware Interface For Digital Control: PWM*/E* Leads

Input PWM/E activates the fan drive from static mode. Any PWM duty cycle will activate the fan drive as long as the input high level time exceeds T.ake..

It must be pointed out that the circuit activation level U.e. and the PWM threshold Uroa, Upym are independent of each other (see the table below)

Parameter	Min. Value	Typical value	Max. value	Unit	Code
PWM/E Frequency Range	50	100	1000	Hz	f_{PWM}
PWM/E Duty Cycle Range	0		100	%	Dc_{min} ..Dc_{max}
PWM High Level	10			V	U_{PWMH} 1)
PWM Low Level			5	V	U_{PWML}1)
PWM/E Resolution		1		%	Dc_{resol}
PWM*/E* Current	4.5	5	5.5	mA	I_{PWM}
PWM/E Wake-up pulse	30			μs	T_{wakeup}
PWM/E Active Pulse	10			V	U_{eact} 2)

PWM/E: Analog-Active High Digital PWM Input Parameter Table

1) The PWM threshold requires the operating temperature range of the circuit to be -40°C to 120°C;

2) The activation level U_{Eact} requires the operating temperature range of the circuit to be -40°C to 120°C.

10.Hardware Interface Parameters For Analog Control: Lead A

Parameter	Min. Value	Typical value	Max. value	Unit	Code
F0 High Level	U_B-3		U_B-3	V	U_{F0H}
F0 Low Level	0		3	V	U_{F0L}
F0 Current			50	mA	I_{F0}

11.Software Functions

11-1.Drive mode

There are four working modes for fan drive, the main difference is the difference in current consumption:

(1). Static mode

(2). Activation mode

(3). Operating mode

(4). Failure modes

The drive mode of the blower varies with the duty cycle of the control input pin PWM*/E*.

Drive Mode	Current consumption	Drive speed	FO
Static mode	<200 μA	0	Low Level
Activation mode	<40 mA	0	Low Level
Operating mode	Depends on required speed and load conditions	Depends on the duty cycle of the PWM signal	Low Level
Failure mode	<40 mA	Depending on fault/alarm	High Level

When the PWM*/E* receives a 0% duty cycle signal, the fan driver enters the static mode. The time for the fan driver to enter the static mode depends on the actual PWM base frequency and the number of samples for the plausibility check. After detecting that the PWM signal is low level, it needs to wait another 2 seconds before the driver enters the static mode.

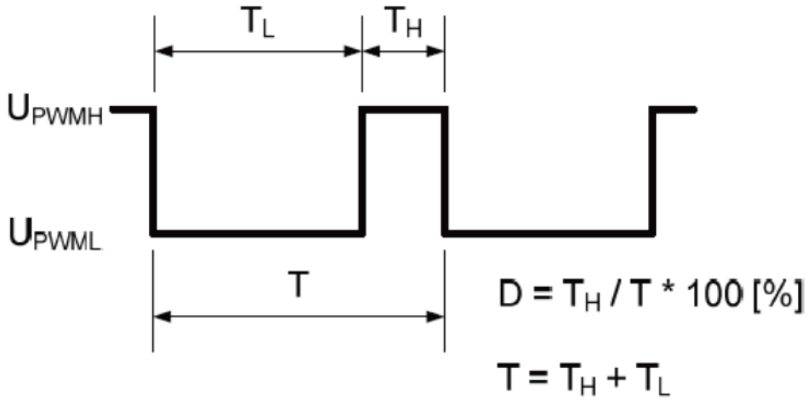
When the PWM duty cycle is any value from 0 (not including 0%) to 100%, and the conditions in are met, the fan driver will enter the active mode. When the duty cycle is 90% to 95%, the fan will work at full speed.

If the duty cycle of the PWM signal reaches the ratio required for the fan drive to operate, the fan drive will enter the run mode.

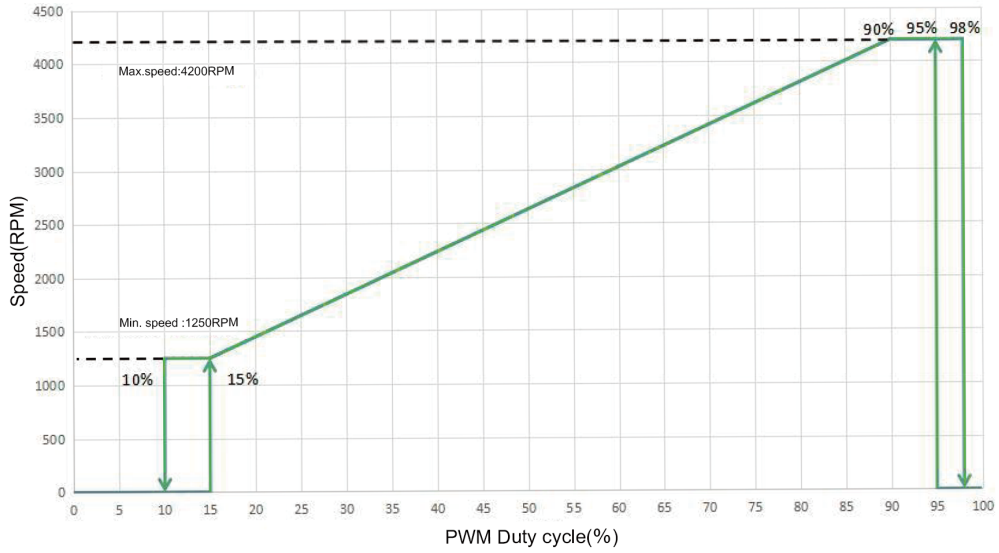
In the event of an operational failure, the fan drive will enter a failure mode.

11-2.Digital Control: Transfer Function PWM Input

The transfer function refers to the relationship between the driving speed and the duty cycle of the PWM signal received by the PWM*/E* signal line, and it is active at high level.



The duty cycle definition in the above figure is also called positive logic duty cycle.
Refer to the definition below:
- Continuous low level state is 0% duty cycle (recessive level);
- Continuous high state is 100% duty cycle (dominant level)
Based on the duty cycle definition, the PWM input transfer function is shown in the figure below.



11-3.Drive diagnosis mode
The signal output by FO is used to feedback whether the fan motor drive is in failure mode:
When the driver is in static mode, active mode and running mode, FO is at low level;
When encountering a failure mode, FO will be pulled up at a high level;
When the failure mode disappears, FO will be pulled down again at low level;
When encountering the following faults, the fan will enter the failure mode and stop working:

Failure Mode	Troubleshooting	Fault Feedback
Drive stalled	Once the fan block is detected, the following strategy will be implemented: the controller stops output, but no alarm, the controller tries to automatically start 10 times (continuous electric automatic restart), each interval of 10 seconds, 10 times, the motor will automatically stop. If you need to recover, it needs to manually power off and restart before running again.	High level
Drive overload	By detecting the current, once the drive overload is found, the fan will reduce the working speed.	Low level
Overcurrent	Once the current reaches the overcurrent threshold, the driver will stop working.	High level
Drive overheating	When the drive overheating is detected (drop temperature point), the fan will reduce the speed of working; when the maximum operating temperature point is exceeded, the drive will stop working.	High level (when the maximum operating temperature is exceeded)
Overvoltage/undervoltage	If the supply voltage is beyond the operating voltage range, the drive will stop operating.	High level
Internal failure	When an internal fault is found during the starting self-test, the drive will stop working.	High level

In any case, when the driver receives a valid PWM signal that requires the driver to run, the driver will try to recover from the failure.