# San Ace 60 9HVA type
## DC Fan

## Features

### High Static Pressure and High Airflow

This fan delivers a maximum static pressure of 2,000 Pa, and a maximum airflow of 2.39 $m^3$/min.
Compared to our current model,* the maximum static pressure has increased by approximately 1.14 times and the maximum airflow has increased by approximately 1.27 times.
This fan can efficiently cool high-density equipment, which is hard to ventilate.

### High Energy Efficiency and Low Noise

This fan delivers a power consumption of 33.6 W when the airflow is maximum. This means that the fan has a 1.27 times higher maximum airflow while maintaining the power consumption of the current model.*
The PWM control function enables the control of fan speed, contributing to quiet operation and energy saving.

* Current model: 60 × 60 × 38 mm *San Ace 60* 9HV type DC Fan (model no. 9HV0612P1J001).


## 60 × 60 × 38 mm

## Specifications

The models listed below **have ribs and pulse sensors with PWM control function.** For models without ribs, append "1" to the end of model numbers.

| Model no. | Rated voltage [V] | Operating voltage range [V] | PWM duty cycle* [%] | Rated current [A] | Rated input [W] | Rated speed [$min^{-1}$] | Max. airflow [$m^3$/min] | Max. airflow [CFM] | Max. static pressure [Pa] | Max. static pressure [inch$H_2O$] | SPL [dB(A)] | Operating temperature [°C] | Expected life [h] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9HVA0612P1J001 | 12 | 10.8 to 13.2 | 100 | 2.8 | 33.6 | 24800 | 2.39 | 84.3 | 2000 | 8.0 | 68 | -20 to +70 | 40000/60°C (70000/40°C) |
| | | | 20 | 0.11 | 1.32 | 5200 | 0.48 | 16.9 | 91 | 0.36 | 34 | | |

* PWM input frequency is 25 kHz. Models without specifications at 0% PWM duty cycle have zero fan speed at 0%.

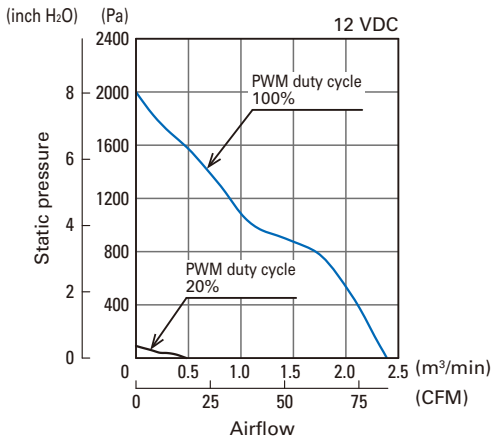
Models with the following sensor specifications are also available as options: Without sensor Lock sensor

## Common Specifications

- ☐ Material ····· Frame: Plastic (Flammability: UL 94V-0), Impeller: Plastic (Flammability: UL 94V-1)
- ☐ Expected life ····· Refer to specifications
  (L10 life: 90% survival rate for continuous operation in free air at 60˚C, rated voltage)
  Expected life at 40°C is for reference only.
- ☐ Motor protection function ····· Locked rotor burnout protection, Reverse polarity protection
- ☐ Dielectric strength ····· 50/60 Hz, 500 VAC, for 1 minute (between lead wire conductors and frame)
- ☐ Insulation resistance ····· 10 MΩ or more with a 500 VDC megger (between lead wire conductors and frame)
- ☐ Sound pressure level (SPL) ····· At 1 m away from the air inlet
- ☐ Operating temperature ····· Refer to specifications (Non-condensing)
- ☐ Storage temperature ····· -30 to +70°C (Non-condensing)
- ☐ Lead wire ····· ⊕ Red ⊖Black Sensor Yellow Control Brown
- ☐ Mass ····· 130 g

## Airflow - Static Pressure Characteristics

PWM duty cycle

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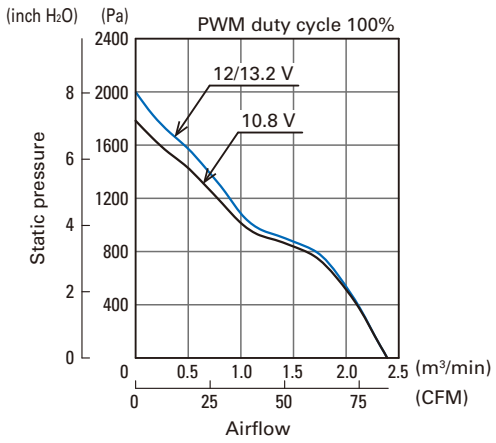
Operating voltage range

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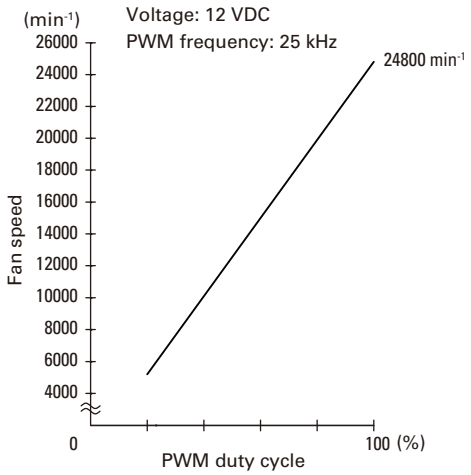
## PWM Duty - Speed Characteristics Example

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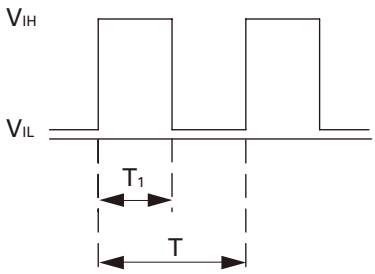
## PWM Input Signal Example

Input signal waveform




$V_{IH}$ = 4.75 to 5.25 V $V_{IL}$ = 0 to 0.4 V

PWM duty cycle (%) = $\frac{T_1}{T} \times 100$ PWM frequency 25 (kHz) = $\frac{1}{T}$

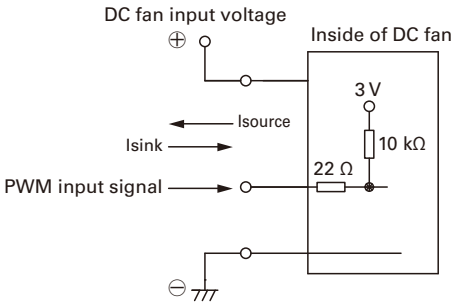
Current source (Isource) = 1.0 mA max. (when control voltage is 0 V)

Current sink (Isink) = 1.0 mA max. (when control voltage is 5.25 V)

Control terminal voltage = 5.25 V max. (when control terminal is open)

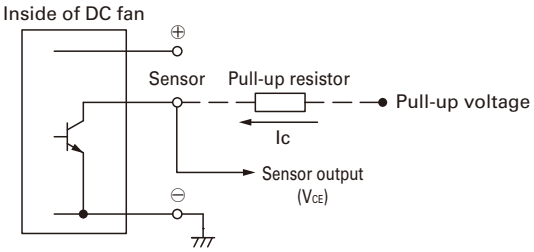
When the PWM control terminal is open,
the fan speed is the same as the speed at 100% PWM duty cycle.
Either a TTL input or open collector/drain input can be used for the PWM input signal.

## Example of Connection Schematic




## Specifications for Pulse Sensors

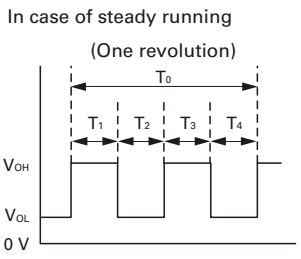
Output circuit: Open collector




$V_{CE}$ = +13.2 V max.
Ic=5 mA max. [$V_{OL}$=$V_{CE}$ (SAT)=0.6 V max.]

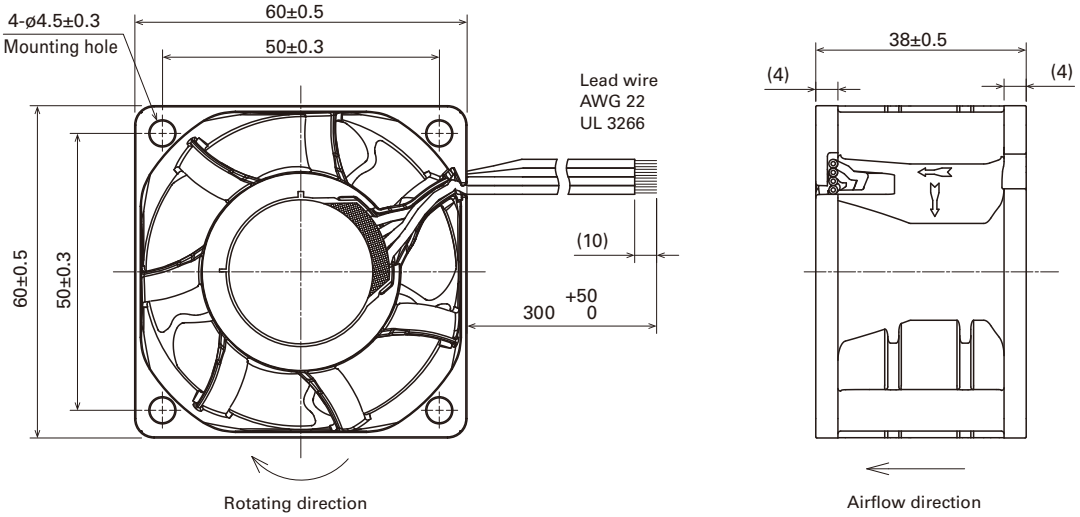
Output waveform (Need pull-up resistor)

In case of steady running

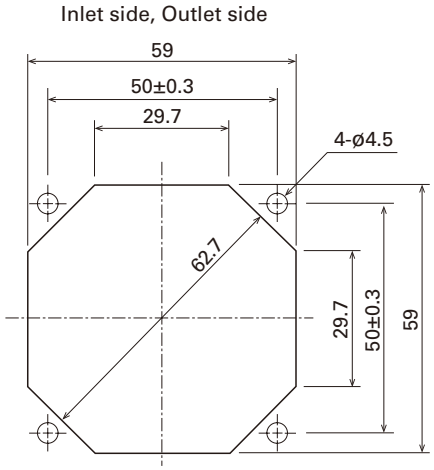



$T_{1\ to\ 4} \fallingdotseq$ (1/4) $T_0$
$T_{1\ to\ 4} \fallingdotseq$ (1/4) $T_0$=60/4N (s)
N=Fan speed ($min^{-1}$)

## Dimensions (unit: mm) (With ribs)




## Reference Dimensions of Mounting Holes and Vent Opening (unit: mm)




## Options

**Finger guards**

Model no.: 109-139E, 109-139H

**Resin finger guards**

Model no.: 109-1003G

**Resin filter kits**

Model no.: 109-1003F13 (13PPI), 109-1003F20 (20PPI),
109-1003F30 (30PPI), 109-1003F40 (40PPI)

## Notice

- Please read the "Safety Precautions" on our website before using the product.
- The products shown in this catalog are subject to Japanese Export Control Law. Diversion contrary to the law of exporting country is prohibited.
- For protecting fan bearings against electrolytic corrosion near strong electromagnetic noise sources, we provide effective countermeasures such as Electrolytic Corrosion Proof Fans and EMC guards. Contact us for details.

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