San Ace 60W 9WPA type
Splash Proof Fan

Features

High Airflow and High Static Pressure
This fan delivers a maximum airflow of 1.52 m³/min and a maximum static pressure of 357 Pa.
Compared with the current models, the maximum airflow has increased by 2 times and maximum static pressure has increased by 4 times.

Water and Dust Resistance
These fans have IP68-rated water and dust protection. They maintain stable operation even in harsh environments.

Low Noise and High Energy Efficiency
The PWM control function enables the control of fan speed, contributing to lowering noise and improving energy efficiency of devices.

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.

<table>
<thead>
<tr>
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</tr>
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<tbody>
<tr>
<td>9WPA0612P4G001</td>
<td>12</td>
<td>10.8 to 13.2</td>
<td>100</td>
<td>0.93</td>
<td>11.16</td>
<td>12000</td>
<td>1.52</td>
<td>53.7</td>
<td>357</td>
<td>1.44</td>
<td>20 to +70</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20</td>
<td>0.09</td>
<td>1.08</td>
<td>3500</td>
<td>0.41</td>
<td>14.5</td>
<td>31</td>
<td>0.13</td>
<td>22</td>
</tr>
</tbody>
</table>

| 9WPA0624P4G001 | 24                | 21.6 to 26.4               | 100                | 0.46              | 11.04           | 12000               | 1.52                | 53.7                   | 357          | 1.44                     | 20 to +70       |
|                |                   |                            | 20                 | 0.05              | 1.2             | 3500                | 0.41                | 14.5                   | 31           | 0.13                     | 22              |

* 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-0)
- Expected life: Refer to specifications
  (L10 life: 90% survival rate for continuous operation in indoor 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 (Sensor), Yellow (Control), Brown
- Mass: 110 g
- Ingress protection: IP68

High Airflow and High Static Pressure
This fan delivers a maximum airflow of 1.52 m³/min and a maximum static pressure of 357 Pa.
Compared with the current models,* the maximum airflow has increased by 2 times and maximum static pressure has increased by 4 times.

Water and Dust Resistance
These fans have IP68-rated water and dust protection. They maintain stable operation even in harsh environments.

Low Noise and High Energy Efficiency
The PWM control function enables the control of fan speed, contributing to lowering noise and improving energy efficiency of devices.

* Current models: San Ace 60 9WP type 60 × 60 × 25 mm DC Fan (model nos. 9WP0612G401, 9WP0624G401).

** The degree of protection (IP code) is defined by IEC 60529 (International Electrotechnical Commission).
IPX8 Requirements
When the power is off, the fan is submerged in water pressurized to the equivalent of 2 meters for 60 minutes. Then it’s run for 15 minutes at the rated voltage in free-air. During the test, there shall be no reduction in dielectric strength or fan characteristics.

60 × 60 × 25 mm
**Airflow - Static Pressure Characteristics**

- **PWM duty cycle**

![Graph showing airflow vs. static pressure for different PWM duty cycles](image1)

PWM duty cycle 100%

- **Operating voltage range**

![Graph showing airflow vs. static pressure for different operating voltages](image2)

- **PWM Duty - Speed Characteristics Example**

![Graph showing fan speed vs. PWM duty cycle](image3)

Voltage: 12/24 VDC

PWM frequency: 25 kHz

- **Specifications for Pulse Sensors**

![Diagram showing pulse sensor components and connections](image4)

- **Example of Connection Schematic**

![Schematic diagram for connection](image5)

- **Inside of fan Input voltage**

![Waveform diagram for input signal](image6)

- **PWM input signal**

![Diagram showing PWM input signal waveform](image7)

- **Control terminal voltage**

![Diagram showing control terminal voltage](image8)

- **Either TTL input, open collector or open drain can be used for PWM control input signal.**

- **Example of Connection Schematic**

![Diagram showing pulse sensor components and connections](image9)

- **Specifications for Pulse Sensors**

![Diagram showing pulse sensor components and connections](image10)

- **Example of Connection Schematic**

![Diagram showing pulse sensor components and connections](image11)

- **PWM Duty - Speed Characteristics Example**

![Graph showing fan speed vs. PWM duty cycle](image12)

Voltage: 12/24 VDC

PWM frequency: 25 kHz

- **Specifications for Pulse Sensors**

![Diagram showing pulse sensor components and connections](image13)

- **Example of Connection Schematic**

![Diagram showing pulse sensor components and connections](image14)

- **PWM Duty - Speed Characteristics Example**

![Graph showing fan speed vs. PWM duty cycle](image15)

Voltage: 12/24 VDC

PWM frequency: 25 kHz
### PWM Input Signal Example

**Input signal waveform**

- **$V_H$**
- **$V_L$**

- $V_{in} = 4.75$ to $5.25$ V  
  $V_L = 0$ to $0.4$ V
- PWM duty cycle (%) = \( \frac{T_1}{T} \times 100 \)
- PWM frequency 25 kHz = \( \frac{1}{T} \)

Current source ($I_{source}$) = 1 mA max. (when control voltage is 0 V)
Current sink ($I_{sink}$) = 1 mA max. (when control voltage is 5.25 V)
Control terminal voltage = 5.25 V max. (when control terminal is open)

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

### Example of Connection Schematic

![Connection Schematic Diagram]

### Specifications for Pulse Sensors

**Output circuit: Open collector**

- **Inside of fan**

**Rated voltage 12 V fan**

- $V_{CL} = 13.2$ V max.
- $I_c = 5$ mA max. ($V_{CL} = V_{CE}$ (SAT) = 0.8 V max.)

**Rated voltage 24 V fan**

- $V_{CL} = 26.4$ V max.
- $I_c = 5$ mA max. ($V_{CL} = V_{CE}$ (SAT) = 0.8 V max.)

**Output waveform (Need pull-up resistor)**

- In case of steady running
  - $T_{1u4} = \frac{1}{4} T_o$
  - $T_{1u4} = \frac{1}{4} T_s = 60/4N$ (s)
  - $N$ = Fan speed (min⁻¹)
**Dimensions** (unit: mm) (With ribs)

```
<table>
<thead>
<tr>
<th>Mounting hole</th>
<th>4Ø4.5±0.3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inlet side</td>
<td>60±0.5</td>
</tr>
<tr>
<td>Outlet side</td>
<td>50±0.3</td>
</tr>
<tr>
<td>Lead wire</td>
<td>300±0.3</td>
</tr>
<tr>
<td>AWG 26</td>
<td>+50</td>
</tr>
<tr>
<td>UL 1430</td>
<td>50</td>
</tr>
</tbody>
</table>
```

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

```
<table>
<thead>
<tr>
<th>Inlet side, Outlet side</th>
</tr>
</thead>
<tbody>
<tr>
<td>ø4.5±0.3</td>
</tr>
<tr>
<td>28.7</td>
</tr>
<tr>
<td>20.7</td>
</tr>
<tr>
<td>29.7</td>
</tr>
<tr>
<td>50±0.3</td>
</tr>
<tr>
<td>59</td>
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**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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