High Air Flow, High Static Pressure Splash Proof Fan “San Ace W”

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1. Introduction

There are increasing number of cases where electronic and electrical equipment are used at outdoors, such as information communications equipment and photovoltaic power system equipment that are used in the base stations for mobile phones. This outdoor equipment often demands splash proof performance about cooling fans.

This document introduces the features and abilities of the new model splash proof fan “San Ace W” Series newly developed for these types of outdoor equipment.

2. Background of the Development

For outdoor equipment including base stations for mobile phones, equipment is becoming higher performance, and along with this, insides of the devices are becoming higher heat generation and higher density.

There has been an increase in cases where customers have demanded even higher cooling performance for the “San Ace W” Series splash proof fans that Sanyo Denki has sold so far.

In this situation, three models of high air flow, high static pressure splash proof fans were newly developed: the “San Ace 80W” WV type (80 mm sq. , 38 mm thick), the “San Ace 120W” WV type (120 mm sq. , 38 mm thick), and the “San Ace 172W” WG type (172 mm dia. , 51 mm thick).

3. Product Features

The features of this new model are as follows: [1)]

(1) Dust proof and splash proof performance: Protection class IP55 (*1)
(2) High air flow and high static pressure
(3) PWM control function

The following indicates the features of a structure that has realized dust proof and splash proof for protection class IP55:

(1) Constructed with highly splash resistant materials to protect the electrically active parts (coils, circuit board)
(2) Magnetic materials increase the splash resistance compared to normal fans
(3) Anti-rust processing is applied to necessary parts

4. Product Overview

4.1 Appearance

Fig. 1 shows the appearance of the three developed models.

Fig. 1: “San Ace W” WV and WG types (appearance)

4.2 Dimensions

Fig. 2, Fig. 3, and Fig. 4 show the dimensions of the new products.

The “San Ace 80W” WV type (80 mm sq. , 38 mm thick) is a new product size for the splash proof fan “San Ace W” series.

4.3 Characteristics

4.3.1 General characteristics

Table 1 shows the general characteristics for the new model.

There are three types of products. The “San Ace 80W” WV type has H speed, the “San Ace 120W” WV type has J speed, and the “San Ace 172W” WG type has G speed.

The new models have the following expected life at 60 ˚C (survival rate of 90% with continuous operation at

the rated voltage under free air conditions and at normal humidity): 60,000 hours for the “San Ace 120W” WV type and 40,000 hours for the “San Ace 80W” WV type or the “San Ace 172W” WG type.

4.3.2 PWM control function and air flow versus static pressure characteristics

All three of the new models have a PWM control function that controls fan speed from an external source. By controlling speed of the fan depending on the heat generation of equipment instead of always using the fan at full speed, low power consumption and low SPL (Sound Pressure Level) can be realized.

Fig. 5, Fig. 6, and Fig. 7 show examples of the air flow versus static pressure at operating voltage and the PWM duty cycle for each new model.

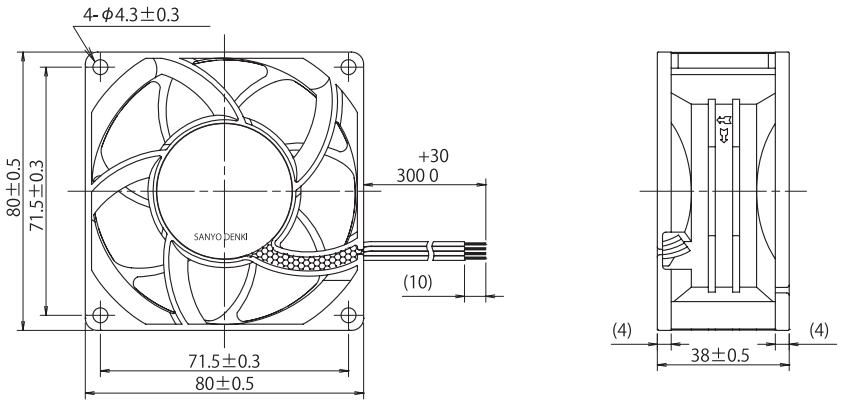


Fig. 2: “San Ace 80W” WV type dimensions (unit: mm)

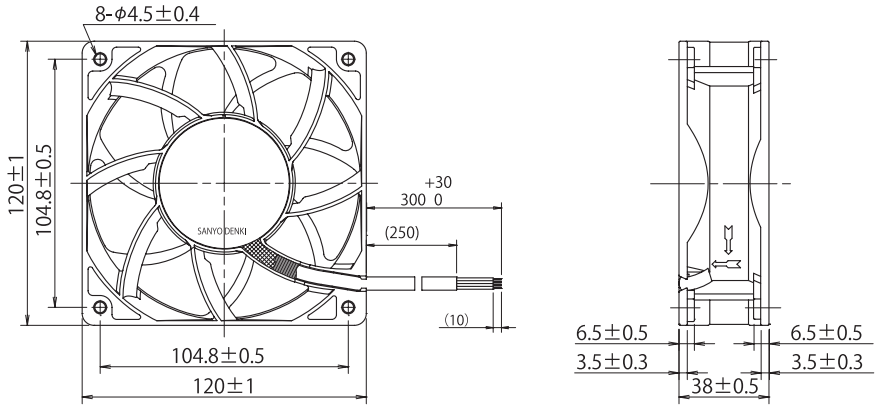


Fig. 3: “San Ace 120W” WV type dimensions (unit: mm)

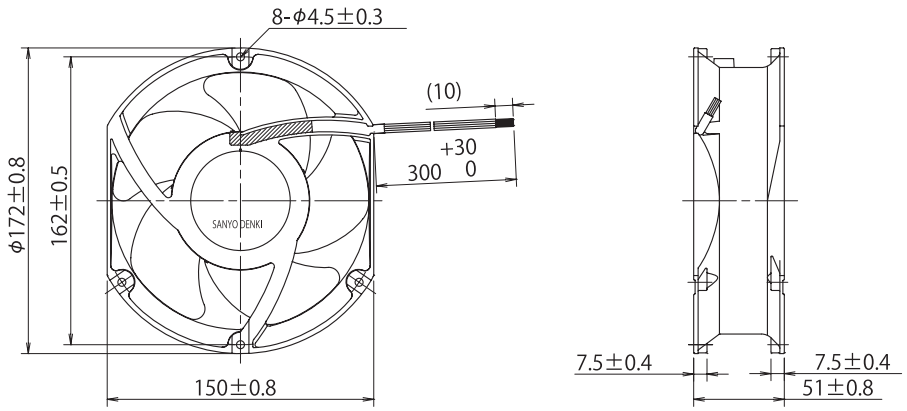


Fig. 4: “San Ace 172W” WG type dimensions (unit: mm)

Table 1: “San Ace W” WV and WG type general characteristics

Model No.	Rated voltage [V]	Operating voltage range [V]	PWM duty cycle*2 [%]	Rated current [A]	Rated input [W]	Rated speed [min^{-1}]	Max. Air Flow [m^3/min]	[CFM]	Max. Static Pressure [Pa]	[inchH$_2$O]	SPL [dB(A)]	Operating temperature [°C]	Expected life [h]
9WV0848P1H001	48	40.8 to 52.8	100	0.75	36	9700	3.7	131	440	1.77	63	-10 to 70	40,000
			0	0.15	7.2	4500	1.72	60.8	94.7	0.38	43		
9WV1248P1J001		40.8 to 55.2	100	0.65	31.2	6400	6.35	224	360	1.45	64		60,000
			0	0.06	2.88	1500	1.49	52.6	26.1	0.106	33		
9WG5748P5G001			100	2.91	140.0	8600	15.46	546	1000	4.02	78		40,000
			0	0.21	10.1	2000	3.59	127	75.1	0.30	40		

*2 Input PWM frequency: 25 kHz

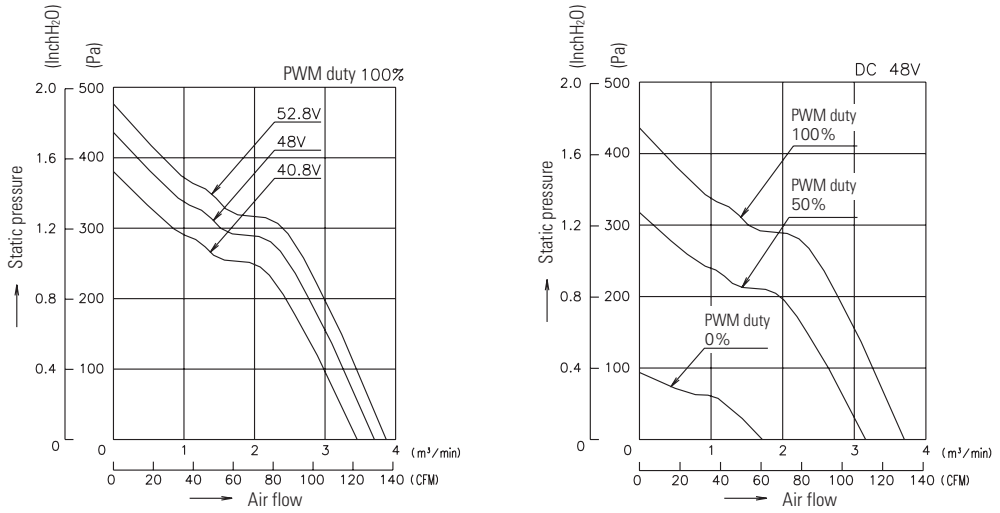


Fig. 5: “San Ace 80W” WV type air flow - static pressure characteristics (9WV0848P1H001)

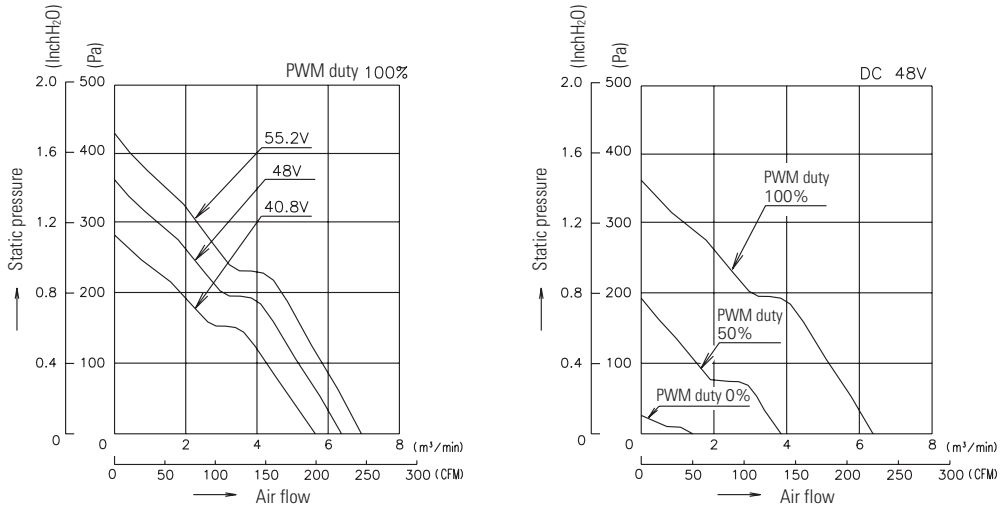


Fig. 6: “San Ace 120W” WV type air flow - static pressure characteristics (9WV1248P1J001)

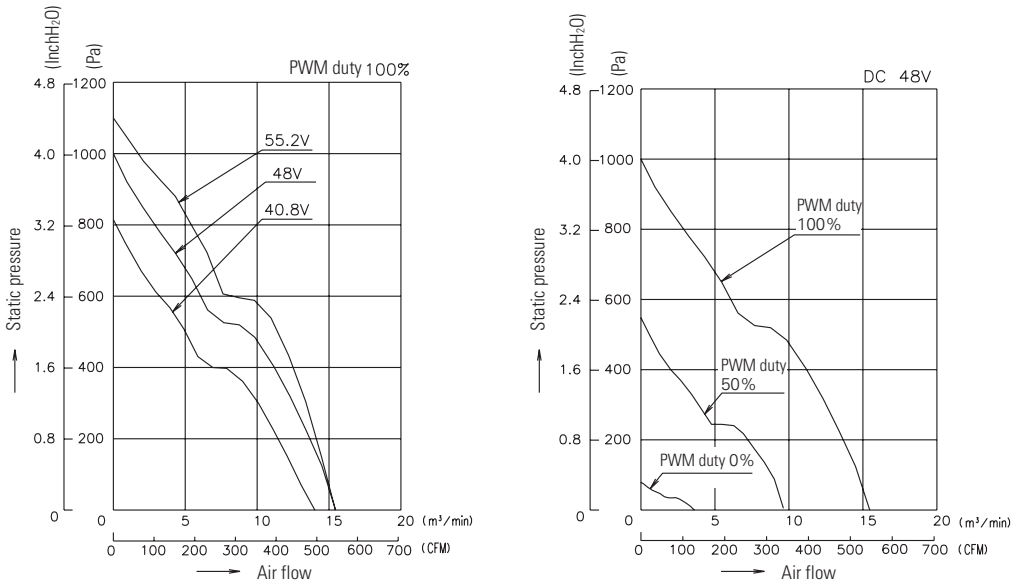


Fig. 7: "San Ace 172W" WG type air flow - static pressure characteristics (9WG5748P5G001)

5. Comparisons with Our Conventional Model

All three new models have realized higher air flow and higher static pressure compared to Sanyo Denki's conventional model.

Figs. 8, 9, and 10 show a comparison of the air flow versus static pressure characteristics between the new models and the Sanyo Denki conventional models, while Table 2 shows a comparison of the maximum air flow and maximum static pressure.

(The "San Ace 80W" WV type is compared with an 80 mm sq. , 25 mm thick model.)

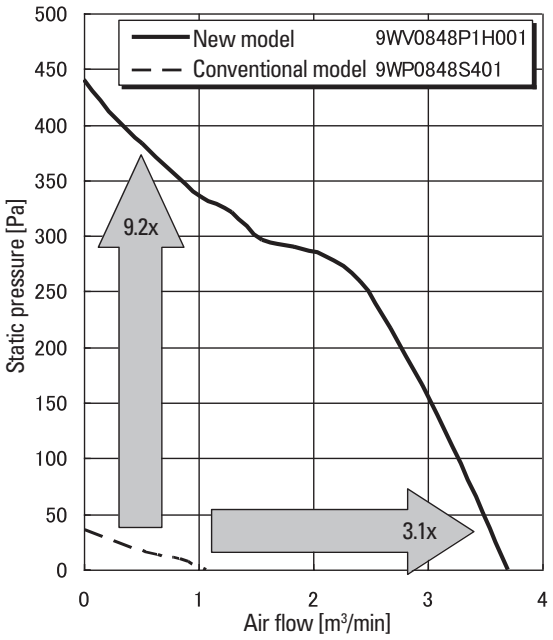


Fig. 8: Comparison of air flow versus static pressure characteristics with "San Ace 80W"

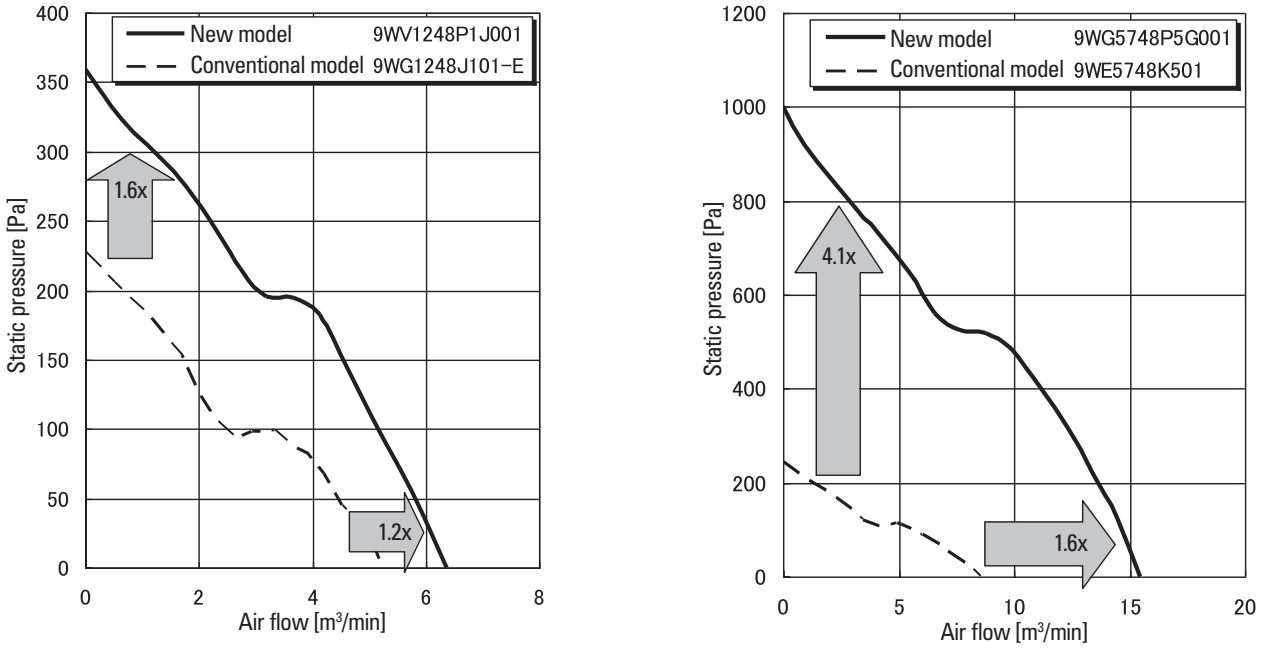


Fig. 9: Comparison of air flow versus static pressure characteristics with “San Ace 120W”

Table 2: Comparison of maximum air flow and maximum static pressure between the new and conventional models

Type	Model No.		Max. air flow [m³/min]		Max. static pressure [Pa]	
「San Ace 80W」 WV type	New model	**9WV0848P1H001**	3.7	3.1 x	440	9.2 x
	Conventional model	9WP0848S401	1.2		48	
「San Ace 120W」 WV type	New model	**9WV1248P1J001**	6.35	1.2 x	360	1.6 x
	Conventional model	9WG1248J101-E	5.1		230	
「San Ace 172W」 WG type	New model	**9WG5748P5G001**	15.46	1.8 x	1000	4.1 x
	Conventional model	9WE5748K501	8.5		243	

6. Conclusion

This document introduced some of the features and abilities of the three models of newly developed high air flow and high static pressure splash proof fans: the “San Ace 80W” WV type (80 mm sq. , 38 mm thick), the “San Ace 120W” WV type (120 mm sq. , 38 mm thick), and the “San Ace 172W” WG type (172 mm dia. , 51 mm thick).

These three new models realize increased air flow and static pressure compared to the Sanyo Denki conventional models, and we think that they can contribute to higher performance in outdoor equipment, which is expected to become even higher heat generation and higher density in future. Furthermore, by using the PWM control function, we think that they can contribute to lower power consumption and lower SPL in devices.

*1: This indicates the international protection code for the "San Ace W" series, which is defined in JIS (Japan Industrial Standards) C0920 "Degrees of protection provided by enclosures (IP Code)" or IEC (International Electrotechnical Commission) 60529 "DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP code)" .

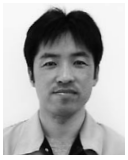
The IP code is defined as "a system that uses codes to indicate the class of protection for the outer framework against water ingression, foreign particle ingression, access to hazardous parts, or other additional items" .

For the format "IPXX", the first number indicates the class of protection for the outer framework foreign particle ingression and access to hazardous parts, while the second number the class of protection for the outer framework against water ingression.

First number - "5" : Dust protected (rotator that provides protection from dust)

Second number - "5" : Protected against water jets (rotator that protects the device from harmful effects of water that comes in from any direction)

Reference
(1) Akira Nakayama and Others: “Splash Proof Fan ‘San Ace 92W’ WP Type”
SANYO DENKI Technical Report Issue 24, pages 17-19
(2007-11)



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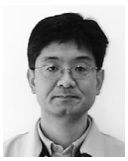

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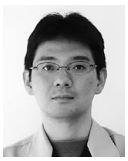

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