

Low Noise Centrifugal Blower "SCIROCCO ACE 127"

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1. Introduction

The development of ever more densely packed data processing equipment with higher performance and more compact design in recent years has resulted in increasing heat generated inside personal computers and other electronic equipment. These devices are normally cooled by forced cooling with axial flow fans as represented by our "SAN ACE" fans. The required elements of these fans are sufficient air flow for cooling and static pressure to conduct air through the device or equipment. The smaller and more densely the devices are built the greater the increase of the resistance to the air flowing through and the required static pressure must also increase in order to efficiently let the air through. Centrifugal blowers are known to generate higher static pressure, but they also produce more low noise at the same time as compared with axial vane fans. This calls for effective means to reduce the noise.

In view of such requirements, we have developed "SCIROCCO ACE 127," a low noise centrifugal blower capable of producing higher static pressure. The outline is described in the following section.

2. Background of Development

Our "SCIROCCO ACE" centrifugal Blower, 120 mm sq. x 32 mm thick, used to meet the prevailing demands for high static pressure fans. Noise was not much of a problem in situations where this type of high static pressure fans was used.

Recently, however, there are increasingly more demands for office equipment using devices that require high static pressure fans.

Given these demands we developed "SCIROCCO ACE 127" as a new type of low noise centrifugal blower to meet the needs of our customers.

3. Advantages and Main Features of "SCIROCCO ACE 127"

[Fig. 1](#) shows the outside view of "SCIROCCO ACE 127."

"SCIROCCO ACE 127" was developed by optimizing the design to reduce the low noise level using "SCIRO-CCO ACE," an existing model of the centrifugal blower, as a base. The advantageous features of this product are as follows:

(1)Low noise

The noise level has been lowered by 6dB under the maximum air volume condition relative to the H-speed model (rated rotating speed 2400 min^{-1}) of "SCIROCCO ACE."

(2)High static pressure

The maximum static pressure has been raised by 15% relative to the H-speed model (rated revolution 2400 min^{-1}) of "SCIROCCO ACE."

(3)Compatibility

Holes are provided so as to make the model compatible with "SCIROCCO ACE."

Table 1 General characteristics of "SCIROCCO ACE 127"

Model No.	109BJ12HA2	109BJ12MA2	109BJ24HA2	109BJ24MA2
Rated voltage (V)	12		24	
Operating voltage range (V)	10.2 to 13.8		20.4 to 27.6	
Rated current (A)	0.52	0.29	0.26	0.15
Rated input (W)	6.24	3.48	6.24	3.6
Rated rotating speed (min ⁻¹)	2,400	1,900	2,400	1,900
Maximum air volume (m ³ /min)	0.78	0.61	0.78	0.61
Maximum static pressure (Pa[mmH ₂ O])	205.8[21]	109.8[11.2]	205.8[21]	109.8[11.2]
Noise* (dB[A])	46	40	46	40
Mass (g)	290			

* At 1m from the intake surface of the fan

3.1 Dimensions

The dimensions of "SCIROCCO ACE 127" are indicated in [Fig. 2](#).

3.2 General Features

The general features of "SCIROCCO ACE 127" are indicated in Table 1 on the preceding page. In addition, the air volume versus static pressure characteristics are shown in [Fig. 3](#) below.

Please note that the noise level of "SCIROCCO ACE 127" was reduced by 6dB and the maximum static pressure raised by 15% as compared with "SCIROCCO ACE."

4. Noise Reduction Measures

A number of improvements have been made in "SCIROCCO ACE 127" by using existing "SCIROCCO ACE" as the base. Some of these improvements are described in the following paragraphs:

4.1 Case Size

The case has been expanded to enlarge the ventilated area so as to reduce the ventilation resistance.

4.2 Case Form

The geometry of the outlet scroll has been reviewed and partly modified to reduce the noise generated by the passage of air.

4.3 Wind Vane Improvement

[Fig. 4](#) shows the a comparison of the shapes of the wind vanes of "SCIROCCO ACE" and "SCIROCCO ACE 127." The number of vanes has been increased from 28 to

72, reducing the spaced intervals between the vanes and the air turbulence around the vanes. In addition, the geometry of the vanes has been completely reviewed and modified. The thickness of the vanes has also been reduced so as to reduce the vane drag in itself.

4.4 Boss Shape

The vane boss has been reshaped to reduce air resistance as well as the noise around the outlet scroll. [Fig. 5](#) shows the comparison of the shape of the bosses between "SCIROCCO ACE" and "SCIROCCO ACE 127."

With these improvements, noise reduction has been achieved at all frequencies in comparison with "SCIROCCO ACE." The distribution of frequencies is much flatter as shown in the diagram of [Fig. 6](#), eliminating sudden jarring increases of noise at certain frequencies.

5. Conclusion

This concludes the introduction of the newly developed "SCIROCCO ACE 127."

The miniaturization and structural integration of electronic equipment are expected to continue along with the increase of heat generation inside the equipment. We are confident that our silenced centrifugal blower, "SCIROCCO ACE 127," can timely contribute to cooling densely structured electronic devices and equipment.

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fig. 1 Outside view of "SCIROCCO ACE127"

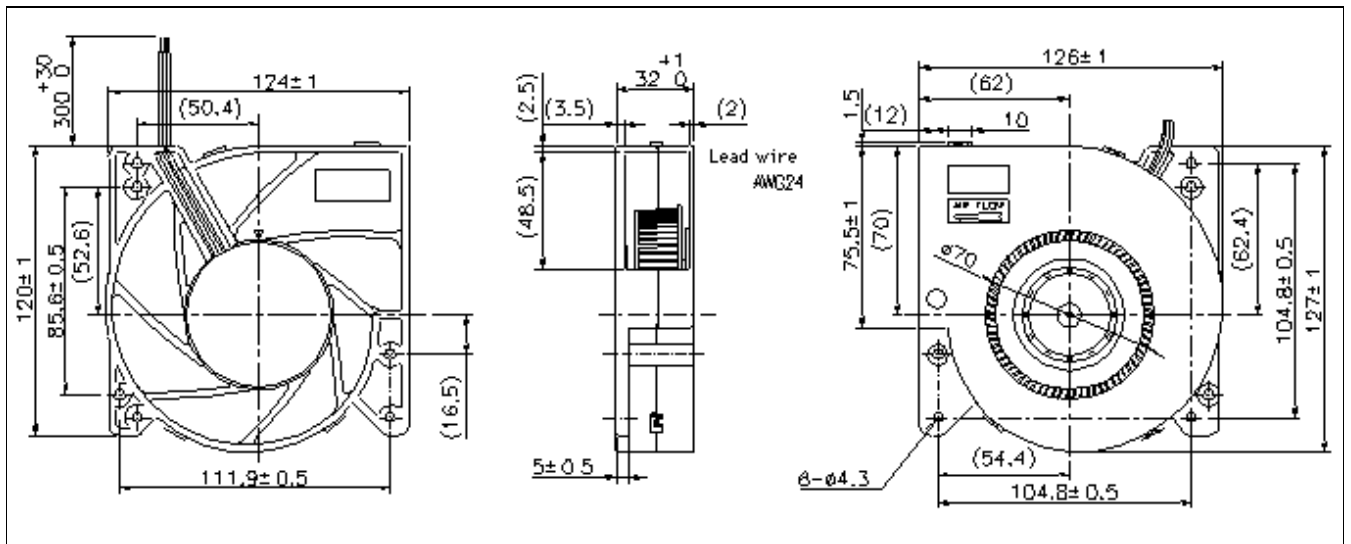


fig. 2 Dimensions

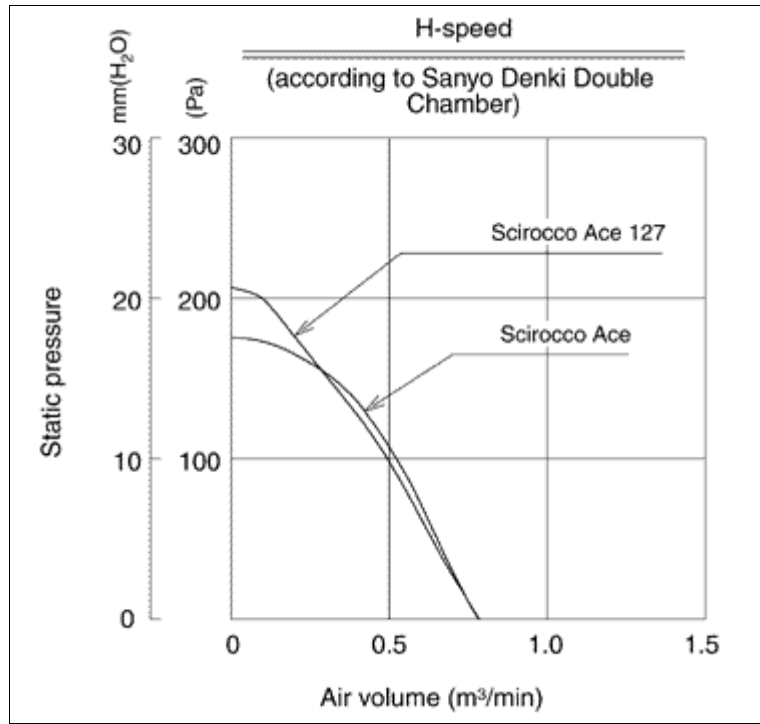


fig. 3 Air volume versus static pressure characteristics

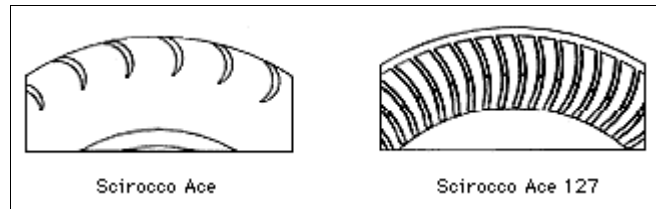


fig. 4 Vane Profile Comparison

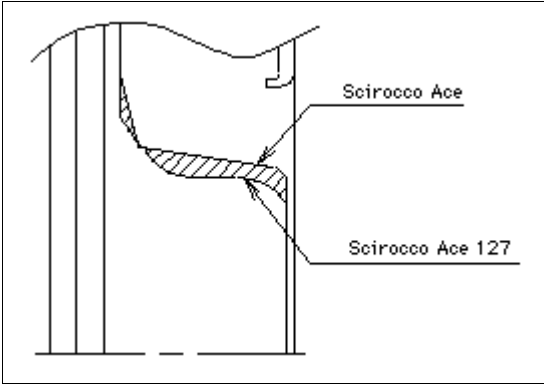


fig. 5 Comparison of the shape of the bosses

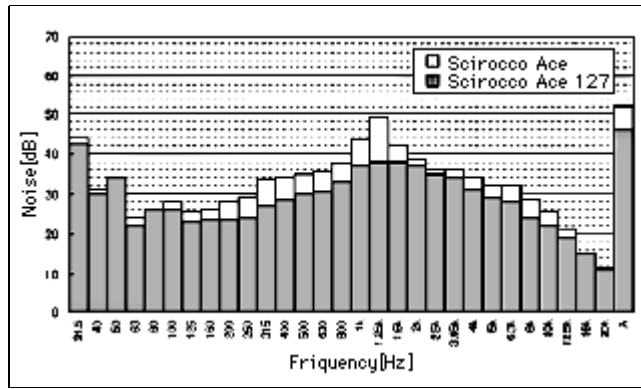


fig. 6 Noise frequency analysis