

# Cooling Systems Division

Hiromitsu Kuribayashi

As exemplified by ICT equipment, servers, storage, and industrial inverters, device performance is increasing and, as a result, so too is component density. Therefore, there are cases arising in which fans currently on the market have insufficient cooling performance, giving rise to a constant demand for fans with higher performance. SANYO DENKI responded to this trend in 2016 by developing and

launching fans with industry-leading\* performance and high reliability.

We also developed the PWM Controller by listening to our customers from across the globe and our original Airflow Tester. The PWM Controller is a product which can remotely control a fan's rotational speed. Meanwhile, the Airflow Tester is the industry's first portable measuring instrument that can easily measure the actual

system impedance and operating airflow of devices. Both of these products help to reduce equipment power consumption and acoustic noise. SANYO DENKI wishes to continue developing new technologies and products to realize even more of its customers' dreams.

Below is an overview of the products developed by SANYO DENKI Cooling Systems Div. in 2016.

## ■ High Static Pressure Fan

DC fan

### • 80 × 80 × 38 mm "San Ace 80" 9HVA type

SANYO DENKI has released the "San Ace 80" 9HVA type 80 × 80 × 38 mm high static pressure fan, which maintains a maximum airflow equivalent to our current model while improving maximum static pressure by approximately 35%. This industry-leading\* product achieves a maximum

airflow of 3.75 m<sup>3</sup>/min and maximum static pressure of 1,350 Pa. This is the optimal fan for cooling 2U-sized servers, storage, power supply units, and other devices with high component density. This product is already used in many devices.



## ■ High Airflow, High Static Pressure Counter Rotating Fan

DC fan

### • 92 × 92 × 76 mm "San Ace 92" 9CRA type

Fluid analysis was utilized to optimize impeller and frame shape, as well as front/back stage balance. SANYO DENKI has released the "San Ace 92" 9CRA type 92 × 92 × 76 mm Counter Rotating Fan which offers an industry-leading\* high static pressure

of 1,650 Pa and a maximum airflow 14% higher than two current model units operating in series. This fan is optimal for cooling 2U/3U servers, storage, ICT equipment, power supply units, and other high-performance devices.



## ■ Low Power Consumption Fan

DC fan

### • 120 × 120 × 25 mm “San Ace 120” 9GA type

SANYO DENKI has released the “San Ace 120” 9GA type 120 × 120 × 25 mm low power consumption fan, which achieves industry-leading\* low power consumption and high static pressure. This model boasts approximately 22% less power consumption and 63% higher maximum static pressure compared to the current model under the same airflow and static pressure conditions. The lineup consists of models with

rated voltages of 12 V, 24 V, and 48 V, and rotational speeds 6,400 min<sup>-1</sup> (G speed) and 5,400 min<sup>-1</sup> (S speed). This fan is ideal for various applications including medical equipment, measuring devices, PV inverters, industrial inverters, displays, and amusement devices. The details of this new product are introduced in the “New Products Introduction” of this Technical Report.



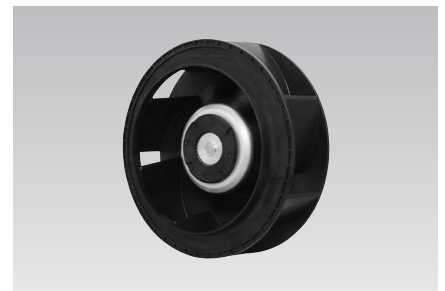
## ■ Centrifugal Fan

DC fan

### • ø175 × 69 mm “San Ace C175” 9TGA type

The “San Ace C175” 9TGA type ø175 × 69 mm Centrifugal Fan was developed for use in ICT equipment, large inverters, refrigeration units, dust collectors, and air conditioning units. It achieves industry-leading\* high airflow. With a maximum airflow of 17.6 m<sup>3</sup>/min and maximum static

pressure of 1,100 Pa, this product is ideal for applications which have high system impedance and thus require high airflow. The details of this new product are introduced in the “New Products Introduction” of this Technical Report.



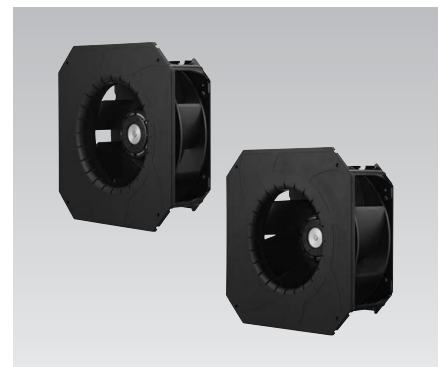
## ■ Bracket-mounted Centrifugal Fan

DC fan

- 270 × 270 × 99 mm “San Ace C270” 9B1TP type
- 270 × 270 × 119 mm “San Ace C270” 9B1TS type

SANYO DENKI has developed two models of Bracket-mounted Centrifugal Fans—the 270 × 270 × 99 mm “San Ace C270” 9B1TP type and the 270 × 270 × 119 mm “San Ace C270” 9B1TS type. Each model is integrated with an inlet nozzle. Since the fan and the inlet nozzle are integrated into one unit with the

bracket, there is no need to perform individual position adjustment when mounting to equipment, thus making it easy to work with. This fan is optimal for applications which require high airflow such as air purifiers, industrial fans, industrial air conditioners, inverters, ICT equipment, and heat exchangers.



## ■ Reversible Flow Fan

DC fan

- $\phi 92 \times 38$  mm “San Ace 92RF” 9RF type

The  $\phi 92 \times 38$  mm “San Ace 92RF” 9RF type was launched as an additional model of the Reversible Flow Fan series. It is the industry’s first reversible fan capable of fitting into a  $\phi 100$  mm household air vent. An innovative approach was taken when designing the impeller and frame shape to reduce the difference in PQ characteristics

and sound pressure level (SPL) when the fan operates in forward or reverse directions. This fan is optimal for applications requiring bi-directional air supply, such as household ventilation, drink vending machines, food display cabinets, and LED lighting.



## ■ PWM Controller

- “San Ace PWM Controller”

Many of our customers told us that they “wanted a device which would enable them to easily control fan airflow from the equipment side.” The “San Ace PWM Controller” was developed in response to this demand. By connecting this device onto a fan with PWM control function, it is possible to easily control rotational speed by varying the PWM duty cycle manually or in accordance with the temperature detected by a thermistor.

For example, sometimes it is necessary to gather data such as

component temperature, power consumption, or SPL while gradually changing fan rotational speed as a part of design verification in the product development process. We believe that the “San Ace PWM Controller” helps our customer’s development by making it easy to set the rotational speed to their liking. Or, since temperatures fluctuate when a device is in use, assembling this controller to mass production products will deliver added flexibility by offering various airflows to suit different circumstances.

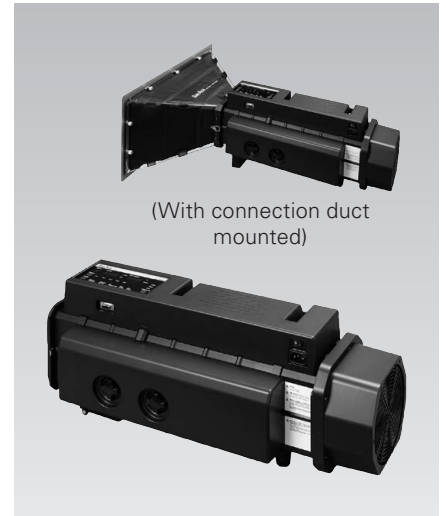


## ■ Airflow Tester

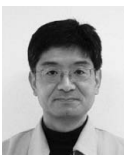
- “San Ace Airflow Tester”

Many of our customers told us that “it was difficult to select the optimal fan in product development process.” In response, we developed our original “San Ace Airflow Tester”, which is the first product in the industry to allow easy measurement of system impedance, operating airflow, and PQ characteristics. The “San Ace Airflow Tester” can measure airflow ranging from 0.20 to 8.00 m<sup>3</sup>/min, and static pressure from 0 to 1,000 Pa. The main unit of this compact and portable

device is light, weighing only around 6 kg. The “San Ace Airflow Tester” is a measuring instrument that can be used in the product development process so that customers can select the best fan. We also believe it is useful for optimizing the vent size and layout, component arrangement, and the structure of a device so that the fan will operate at the optimal operating point in terms of power consumption and acoustic noise.



\* Based on our own market research among centrifugal/axial DC fans of equal size, conducted at the time of release of each product.



### Hiromitsu Kuribayashi

Joined SANYO DENKI in 1996.  
Cooling Systems Div., Design Dept.  
Works on the development  
and design of cooling fans.