

# Cooling Systems

DC Axial Fans, Blowers & CPU Active Heatsinks

**SANYO DENKI**



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## Safety Precautions

Edition 2002 v1.0L, last updated 1 Mar 2002  
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Please contact the Public Relations Department of  
SANYO DENKI CO., LTD. should you have any  
questions relating to this catalog.

**SANYO DENKI**

A world leader in cooling fan technology, SANYO DENKI has continually set new standards in technology, quality, and reliability. In this catalogue of our latest standard range of DC fans and blowers, we present a wide selection of quality products that meet the demands for efficient electronic cooling at superb cost performance.

Our highly experienced design specialists are stationed at TECHNOLOGY CENTER, a R&D facility equipped with state-of-the-art engineering and testing equipment. Computer-aided development using the latest CAD supported computers, measuring and analyzing equipment, and an anechoic chamber for noise testing, ensure that optimal aerodynamic design and high mechanical precision are achieved during fan development.



FUJIYAMA WORKS, Ueda (Japan)  
Built 1990, Floor Space 82,821 sq.m, ISO 14001



TECHNOLOGY CENTER, Ueda (Japan)  
Built 1997, Floor Space 13,311 sq.m, ISO 14001

Our manufacturing plants are equipped with state-of-the-art equipment, computer integrated automated production lines, and zero-defect programmes to enable large scale production of high quality cost effective products.

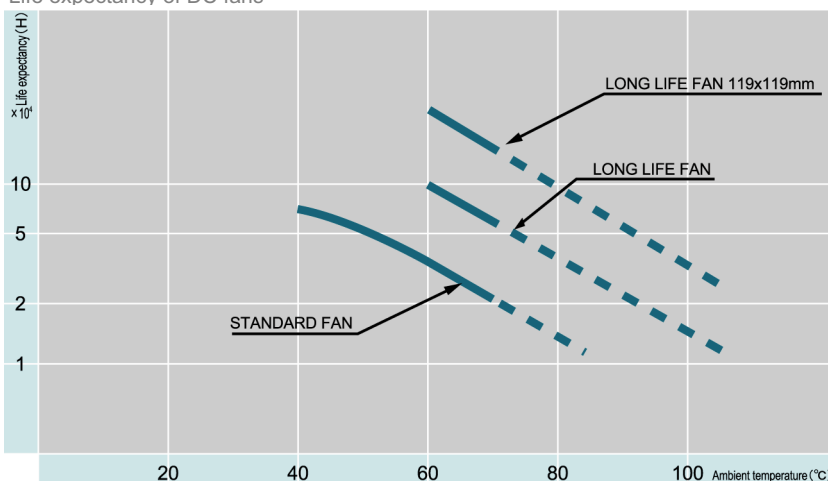


SANYO DENKI PHILIPPINES  
Subic, Philippines  
Built 2000  
Floor Space 10,800 sq.m  
ISO 9002

The bearing system plays a vital role in the service life and operating noise of fan motors. All SANYO DENKI fans come equipped with dual precision ball bearings, thus ensuring long reliable service life and quiet operation at high or low ambient temperatures.



Life expectancy of DC fans





Highly rated by users all over the world for its quality and reliability, our cooling products are used for cooling a wide variety of electronic devices such as personal computers and servers, electronic components in the telecommunications, information & networking, and industrial machinery industries. In recent years, a wide range of high performance low cost fans such as the SAN COOLER series have been developed specifically for manufacturing at SANYO DENKI PHILIPPINES.

Preservation of the global environment is a major concern of our business activities. All six factories in Japan have been awarded ISO 14001, with accreditation of our corporate headquarters due in 2002. Our cooling products are designed to utilize as little resources as possible by ensuring that they are small, lightweight and have long service lives. All products are also either UL, CSA and TÜV approved or in registration.



A worldwide network provides customers with easy access to sales, maintenance and technical expertise. Contact your nearest SANYO DENKI representative today to find out how we can help you achieve optimal cooling performance.

Click on links below for list of worldwide representatives and distributors



**North America**



**Europe**



**Asia**



### **SANYO DENKI EUROPE SA.**

Date of establishment: December 1988

Business operation:

Sales of stepping system, servo system and cooling fans

Paid-in capital: F.FR 1 million

Fiscal year-end: December

Number of employees: 14

Location: Paris, France

### **SANYO DENKI AMERICA, INC.**

Date of establishment: April 1995

Business operation:

Sales of cooling fans, stepping system and servo system

Paid-in capital: US\$ 2 million

Fiscal year-end: December

Number of employees: 55

Location: California, USA



### **SANYO DENKI PHILIPPINES, INC.**

Date of establishment:

February 2000

Business operation:

Production of cooling fans

Paid-in capital: PHP 160 million

Fiscal year-end: December

Number of employees: 295

Location:

The Subic Bay, Philippines



### **AUTOMATION INTELLIGENCE, INC.**

Date of establishment: December 1997

Business operation:

Development and sales of control system products and software

Paid-in capital: US\$ 1.9 million

Fiscal year-end: December

Number of employees: 29

Location: Georgia, USA



### **SANYO DENKI CO.,LTD.**

Date of establishment: August 1927

Business operation:

Development, manufacturing and sales of Cooling, Servo, Power and Control Systems

Paid-in capital: JPY 9.5 billion

Fiscal year-end: March

Number of employees: 1712

Location: Tokyo, Japan

**NEW**  
**San Ace 92 G-Type**  
**High Airflow Low Power Consumption 92x32mm DC Axial Fans**

- Brushless DC Motor with Plastic Fan Housing and Impeller
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Color-coded 300mm UL 1007 AWG 24 Leads (stripped and thinned ends)
- Pulse/Lock/Inverse Lock/Low Speed/Inverse Low Speed Sensor Options
- Operating Temperature: -10 °C to +60 °C (No Condensation)
- Storage Temperature: -30 °C to +70 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Mass: 170g



**92 x 92 x 32mm**

Click on Model No in red to view air performance curves

Airflow	Airflow	Static Pressure	Static Pressure	Nominal Voltage	Voltage Range	Sound Pressure	Power Input	Nominal Speed	Model No.
m <sup>3</sup> /min	CFM	Pa	inch/H <sub>2</sub> O	V	V	dB(A)	W	min <sup>-1</sup>	
2.50	88.3	115.0	0.46	12	10.2 - 13.8	44	6.96	4300	<b>9G0912A202</b>
2.00	70.7	77.0	0.31	12	10.2 - 13.8	38	4.56	3500	<b>9G0912S202</b>
1.60	56.2	51.0	0.205	12	10.2 - 13.8	32	2.76	2850	<b>9G0912H202</b>
1.20	42.4	27.0	0.108	12	10.2 - 13.8	25	1.56	2100	<b>9G0912M202</b>
2.50	88.3	115.0	0.46	12	20.4 - 27.6	44	7.20	4300	<b>9G0924A202</b>
2.00	70.7	77.0	0.31	24	20.4 - 27.6	38	4.56	3500	<b>9G0924S202</b>
1.60	56.2	51.0	0.205	24	20.4 - 27.6	32	2.88	2850	<b>9G0924H202</b>
1.20	42.4	27.0	0.108	24	20.4 - 27.6	25	1.92	2100	<b>9G0924M202</b>
2.50	88.3	115.0	0.46	48	40.8 - 55.2	44	7.68	4300	<b>9G0948A202</b>
2.00	70.7	77.0	0.31	48	40.8 - 55.2	38	5.28	3500	<b>9G0948S202</b>
1.60	56.2	51.0	0.205	48	40.8 - 55.2	32	3.84	2850	<b>9G0948H202</b>
1.20	42.4	27.0	0.108	48	40.8 - 55.2	25	2.40	2100	<b>9G0948M202</b>

Click to view dimensional drawings

- **Models without sensor**
- **Models with sensor**
- **Ribless models without sensor**
- **Ribless Models with sensor**

Notes: (1) Listed models are non-sensor types

(2) Airflow, power input, speed and noise ratings are at nominal voltage against zero static pressure.

(3) Static pressure ratings are at nominal voltage against zero air flow.

(4) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(5) Air performance curves show fan outputs with unobstructed inlets and outlets.

(6) UL, CSA and TÜV approvals under application

NEW

## San Ace MC Series

Slim Type Active Heatsink for Intel® Pentium® 4  $\mu$ PGA478 1.8-2.2GHz

- Brushless DC Motor with Plastics Frame/Impeller and Aluminium Copper Hybrid or All Aluminium Heatsink
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 178mm AWG 26 Lead  
+: Yellow (CN; Pin 2)    -: Black (CN; Pin 1)    Sensor: Green (CN; Pin 3)
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: 0 °C to +70 °C (No Condensation)
- Storage Temperature: -30 °C to +75 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Connector: Molex 22-01-3037 (P/N 2695-03RP)  
Contact: Molex P/N 5159PBT or Equivalent



Size	Thermal Resistance	Nominal Voltage	Voltage Range	Sound Pressure	Current	Nominal Speed	Model No.	Clip
mm	K/W	V	V	db(A)	A	min <sup>-1</sup>		
83.3x68.5x45.0	0.45	12	7.0 - 13.8	39	0.17	4800	109X9412S1016	109-1008
83.3x68.5x45.0	0.49	12	7.0 - 13.8	39	0.17	4800	109X9412S1116	109-1008

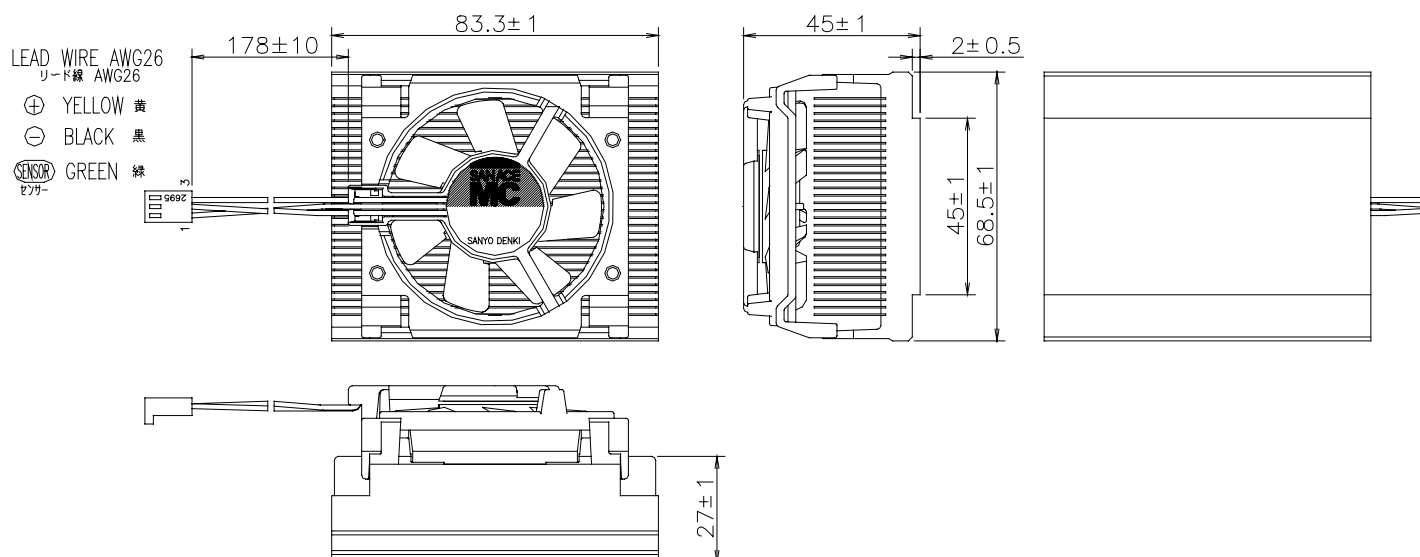
Notes: (1) 109X9412S1016 is equipped with an aluminium base copper fin heatsink

(2) 109X9412S1116 is equipped with an all aluminium heatsink

(3) Sound pressure levels are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(4) Intel® Pentium® is a registered trademark of Intel Corporation.

### Dimensions (109X9412S1016)



NEW

San Ace MC Series

High Performance Active Heatsink for Intel® Pentium®4 μPGA478 2.2 GHz

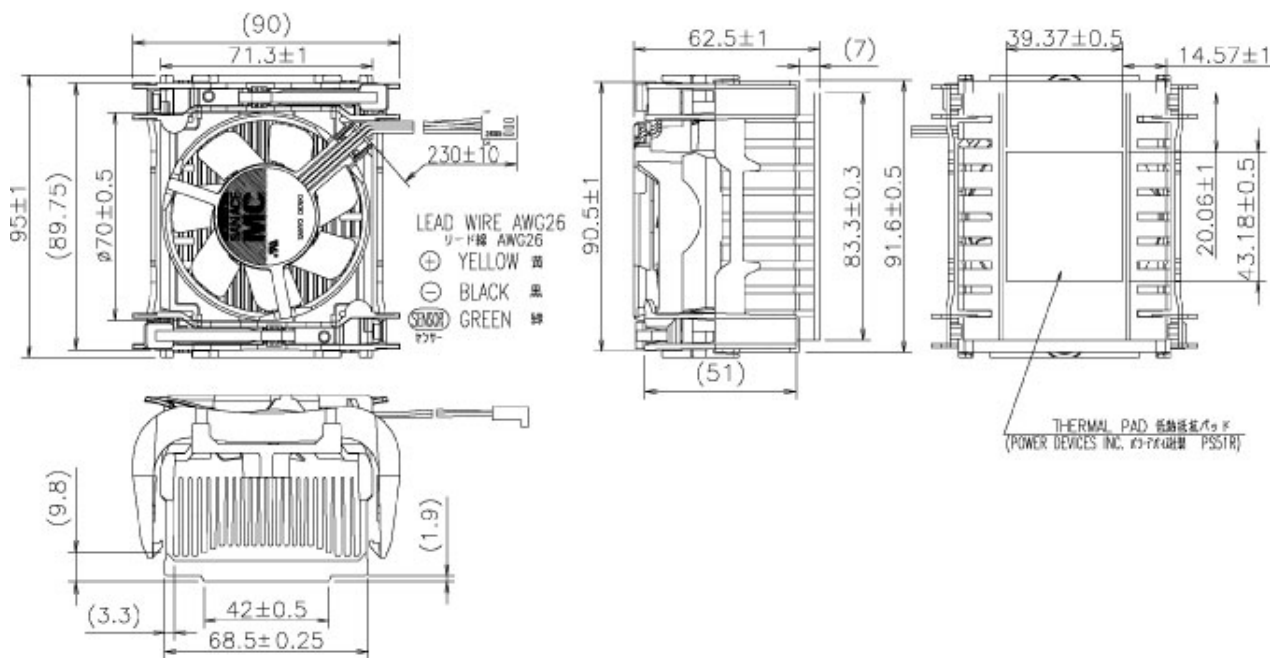
- Brushless DC Motor with Plastics Frame/Impeller and Aluminium Heatsink
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 230mm AWG 26 Lead
  - +: Yellow (CN; Pin 2)    -: Black (CN; Pin 1)    Sensor: Green (CN; Pin 3)
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: 0 °C to +60 °C (No Condensation)
- Storage Temperature: -30 °C to +70 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Connector: Molex 22-01-3037 (P/N 2695-03RP)  
Contact: Molex P/N 5159PBT or Equivalent



Size	Thermal Resistance	Nominal Voltage	Voltage Range	Sound Pressure	Current	Nominal Speed	Model No.	Clip
mm	K/W	V	V	db(A)	A	min <sup>-1</sup>		
95.0x71.3x62.5	0.49/0.42	12	9.0 - 13.8	26/39	0.21	3900	109X9812T0H016	Preattached
95.0x71.3x62.5	0.42	12	7.0 - 13.8	39	0.21	3900	109X9812H0016	Preattached

Notes: (1) Listed models are pulse sensor types.  
(2) \*109X9812T0H016 is a thermal speed control fan with variable speeds between 33 °C - 43 °C.  
(3) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.  
(4) Intel® Pentium® is a registered trademark of Intel Corporation.

Dimensions



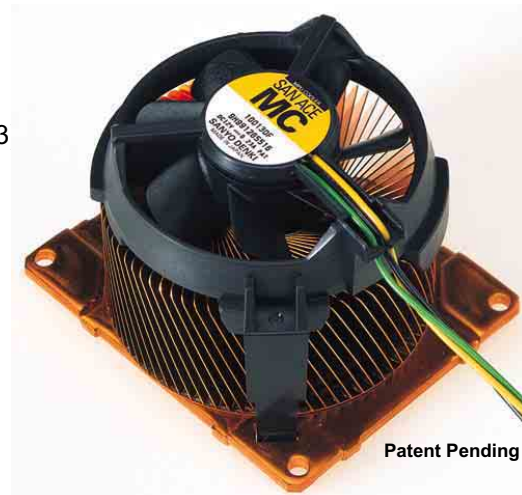


NEW

## San Ace MC-HX Series

Spiral Copper Active Heatsink for Intel® Pentium® 4 PGA423 &  $\mu$ PGA478 2.2GHz

- Brushless DC Motor with Plastics Frame/Impeller and Copper Heatsink
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 220mm AWG 26 Lead  
+: Yellow (CN; Pin 2)    -: Black (CN; Pin 1)    Sensor: Green (CN; Pin 3)
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: 0 °C to +70 °C (No Condensation)
- Storage Temperature: -30 °C to +75 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Connector: Molex 22-01-3037 (P/N 2695-03RP)  
Contact: Molex P/N 5159PBT or 2759T
- Mass: 410g



### Intel® Pentium® 4 $\mu$ PGA478 Compatible

Click on Model No in red to view dimensional drawings

- Up to 2.2 GHz

Size	Thermal Resistance	Nominal Voltage	Voltage Range	Sound Pressure	Current	Nominal Speed	Model No.	Clip
mm	K/W	V	V	db(A)	A	min <sup>-1</sup>		
83.3x68.5x54.5	0.37	12	9.0 - 13.8	39	0.23	5200	<b>9H9912G5516</b>	109-1007

### Intel® Pentium® 4 PGA423 Compatible

Click on Model No in red to view dimensional drawings

- Up to 2.2 GHz

Size	Thermal Resistance	Nominal Voltage	Voltage Range	Sound Pressure	Current	Nominal Speed	Model No.	Clip
mm	K/W	V	V	db(A)	A	min <sup>-1</sup>		
88.9x63.5x54.5	0.37	12	9.0 - 13.8	39	0.23	5200	<b>9H9912G5016</b>	-

Notes: (1) Listed models are pulse sensor types

(2) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(3) Intel® Pentium® 4 is a registered trademark of Intel Corporation.



NEW

## Dyna Ace Series

### 19" Rack Mountable Ø172 x 147 x 25mm DC Axial Fans

- Brushless DC Motor with Aluminium Fan Housing and Plastics Impeller
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 300mm AWG 24 Leads (stripped and thinned ends)  
(+ Red/ - Black)
- Pulse/Lock/Inverse Lock/Low Speed/Inverse Low Speed Sensor Options
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: -10 °C to +60 °C (No Condensation)
- Storage Temperature: -30 °C to +70 °C (No Condensation)
- Rotational Direction: CCW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Mass: 500 g



### Ø172 x 147 x 25mm

Click on Model No in red to view air performance curves

Airflow	Airflow	Static Pressure	Static Pressure	Nominal Voltage	Voltage Range	Sound Pressure	Power Input	Nominal Speed	Model No.
m <sup>3</sup> /min	CFM	Pa	inch/H <sub>2</sub> O	V	V	dB(A)	W	min <sup>-1</sup>	
5.20	183	86	0.35	12	10.8 - 13.8	51	18.0	2700	<a href="#">109E4712M402</a>
4.60	162	68	0.27	12	10.8 - 13.8	48	13.2	2400	<a href="#">109E4712L402</a>
6.40	226	130	0.52	24	20.4 - 27.6	57	28.8	3300	<a href="#">109E4724H402</a>
5.80	204	106	0.43	24	20.4 - 27.6	54	20.9	3000	<a href="#">109E4724F402</a>
5.20	183	86	0.35	24	20.4 - 27.6	51	15.6	2700	<a href="#">109E4724M402</a>
4.60	162	68	0.27	24	20.4 - 27.6	48	11.0	2400	<a href="#">109E4724L402</a>
6.80	240	146	0.59	48	40.8 - 55.2	58	31.2	3500	<a href="#">109E4748S402</a>
6.40	226	130	0.52	48	40.8 - 55.2	57	29.8	3300	<a href="#">109E4748H402</a>
5.80	204	106	0.43	48	40.8 - 55.2	54	20.6	3000	<a href="#">109E4748F402</a>
5.20	183	86	0.35	48	40.8 - 55.2	51	16.3	2700	<a href="#">109E4748M402</a>
4.60	162	68	0.27	48	40.8 - 55.2	48	13.0	2400	<a href="#">109E4748L402</a>

Click to view dimensional drawings

- [Models without sensor](#)
- [Models with sensor](#)

Notes: (1) Listed models are non-sensor types

(2) Airflow, power input, speed and noise ratings are at nominal voltage against zero static pressure.

(3) Static pressure ratings are at nominal voltage against zero air flow.

(4) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(5) Air performance curves show fan outputs with unobstructed inlets and outlets.

### San Ace 120L G Type

#### High Airflow 119 x 38mm Long Life Fan Motors

- Brushless DC Motor with Aluminium Fan Housing and Plastic Impeller
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 300mm AWG 24 Leads (stripped and thinned ends)
- Pulse/Lock/Inverse Lock/Low Speed/Inverse Low Speed Sensor Options
- Expected Service Life of 100,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: -10 °C to +60 °C (No Condensation)
- Storage Temperature: -30 °C to +70 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Mass: 370g



#### 119 x 119 x 38mm

Click on Model No in red to view air performance curves

Airflow	Airflow	Static Pressure	Static Pressure	Nominal Voltage	Voltage Range	Sound Pressure	Power Input	Nominal Speed	Model No.
m <sup>3</sup> /min	CFM	Pa	inch/H <sub>2</sub> O	V	V	dB(A)	W	min <sup>-1</sup>	
3.90	138	138.0	0.554	12	10.2 - 13.8	49	11.80	3600	<a href="#">9GL1212G102</a>
3.40	120	102.0	0.410	12	10.2 - 13.8	46	7.30	3100	<a href="#">9GL1212E102</a>
2.80	99	70.4	0.283	12	7.0 - 13.8	39	4.56	2600	<a href="#">9GL1212H102</a>
2.45	87	54.2	0.218	12	7.0 - 13.8	36	3.36	2280	<a href="#">9GL1212F102</a>
2.10	74	39.6	0.160	12	7.0 - 13.8	32	2.52	1950	<a href="#">9GL1212M102</a>
3.90	138	138.0	0.554	24	20.4 - 27.6	49	12.00	3600	<a href="#">9GL1224G102</a>
3.40	120	102.0	0.410	24	20.4 - 27.6	46	8.20	3100	<a href="#">9GL1224E102</a>
2.80	99	70.4	0.283	24	14.0 - 27.6	39	4.80	2600	<a href="#">9GL1224H102</a>
2.45	87	54.2	0.218	24	14.0 - 27.6	36	3.84	2280	<a href="#">9GL1224F102</a>
2.10	74	39.6	0.160	24	14.0 - 27.6	32	2.64	1950	<a href="#">9GL1224M102</a>
3.90	138	138.0	0.554	48	40.8 - 55.2	49	12.00	3600	<a href="#">9GL1248G102</a>
3.40	120	102.0	0.410	48	40.8 - 55.2	46	8.20	3100	<a href="#">9GL1248E102</a>
2.80	99	70.4	0.283	48	40.8 - 55.2	39	5.28	2600	<a href="#">9GL1248H102</a>
2.45	87	54.2	0.218	48	40.8 - 55.2	36	4.32	2280	<a href="#">9GL1248F102</a>
2.10	74	39.6	0.160	48	40.8 - 55.2	32	3.36	1950	<a href="#">9GL1248M102</a>

Click to view dimensional drawings

- **Models without sensor**
- **Models with sensor**

Notes: (1) Listed models are non-sensor types.

(2) Airflow, power input, speed and noise ratings are at nominal voltage against zero static pressure.

(3) Static pressure ratings are at nominal voltage against zero air flow.

(4) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(5) Air performance curves show fan outputs with unobstructed inlets and outlets.

(6) Ask our sales team for details of models with higher airflow performance than those shown above.

### San Ace MC

1U Compatible Active Heatsink for Intel® Pentium® III FC-PGA2 1.4 GHz/  
Intel® Celeron™ FC-PGA2 1.3 GHz

- Brushless DC Motor with Plastic Frame/Impeller and Aluminium Base Copper Fin Heatsink
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 176mm AWG 26 Leads with Molex Connector and Contact  
Connector: Molex 22-01-3037 (2695-03RP)  
Contact: Molex 5159PBT or 2759T
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: -10 °C to +70 °C (No Condensation)
- Storage Temperature: -30 °C to +75 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Thermal Contact: Power Devices Inc. (Type AS-J-17H-155)



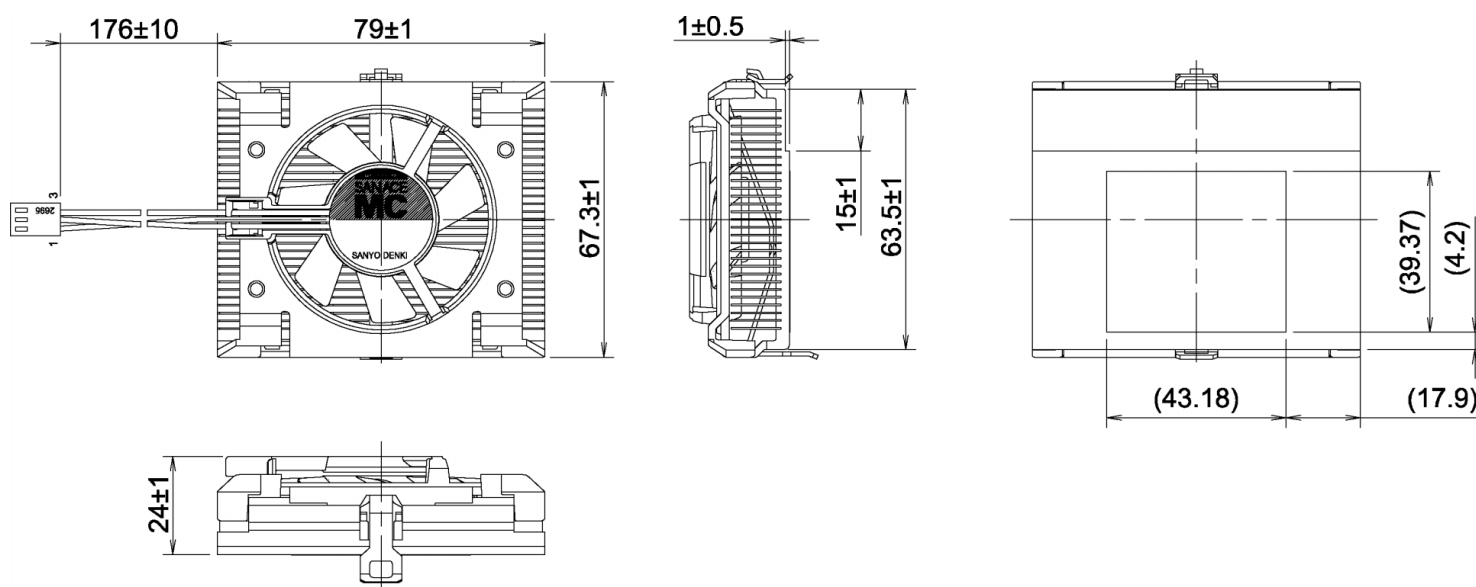
Size	Thermal Resistance	Nominal Voltage	Voltage Range	Sound Pressure	Current	Nominal Speed	Model No.	Clip
mm	K/W	V	V	db(A)	A	min <sup>-1</sup>		
79.0x67.3x24.0	0.63	12	7.0 - 13.8	42	0.22	6000	109X7412S4016	Preattached

Notes: (1) Listed model is pulse sensor type.

(2) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(3) Intel® Pentium® III is a registered trademark of Intel Corporation.

### Dimensions



### San Ace 120 G-Type

High Air Flow Low Power Consumption 119x25mm & 119x38mm DC Axial Fans

- Brushless DC Motor with Plastic Fan Housing and Impeller
- Permanently Lubricated Dual Ball Bearing System
- Current Limiting System with Reverse Polarity Protection
- Color-coded 300mm UL1007 AWG 24 Leads (stripped and thinned ends)
- Pulse/Lock/Inverse Lock/Low Speed/Inverse Low Speed Sensor Options
- Expected Service Life of 40,000 hours  
(90% survival rate at 60 °C, nominal voltage, continuous operation with unobstructed inlets and outlets )
- Operating Temperature: -10 °C to +60 °C (No Condensation)
- Storage Temperature: -30 °C to +70 °C (No Condensation)
- Rotational Direction: CW looking at label
- Dielectric Strength: 50/60 Hz, 500 VAC, one (1) minute  
(between lead conductor and frame)
- Mass: 240 - 330g



#### 119 x 119 x 25mm

Click on Model No in red to view air performance curves

Airflow	Airflow	Static Pressure	Static Pressure	Nominal Voltage	Voltage Range	Sound Pressure	Power Input	Nominal Speed	Model No.
m <sup>3</sup> /min	CFM	Pa	inch/H <sub>2</sub> O	V	V	dB(A)	W	min <sup>-1</sup>	
3.68	130	120	0.48	12	10.8 - 13.8	51	10.8	4100	<a href="#">9G1212G402</a>
3.25	115	98	0.39	12	10.8 - 13.8	48	6.96	3650	<a href="#">9G1212E402</a>
2.83	100	77	0.31	12	10.8 - 13.8	44	4.80	3150	<a href="#">9G1212A402</a>
2.50	88	64	0.26	12	10.8 - 13.8	40	3.72	2850	<a href="#">9G1212H402</a>
1.98	70	42	0.17	12	10.8 - 13.8	35	2.28	2250	<a href="#">9G1212F402</a>
1.66	58	31	0.12	12	10.8 - 13.8	29	1.68	1950	<a href="#">9G1212M402</a>
3.68	130	120	0.48	24	20.4 - 27.6	51	11.28	4100	<a href="#">9G1224G402</a>
3.25	115	98	0.39	24	20.4 - 27.6	48	8.88	3650	<a href="#">9G1224E402</a>
2.83	100	77	0.31	24	20.4 - 27.6	44	5.04	3150	<a href="#">9G1224A402</a>
2.50	88	64	0.26	24	20.4 - 27.6	40	4.08	2850	<a href="#">9G1224H402</a>
1.98	70	42	0.17	24	20.4 - 27.6	35	2.40	2250	<a href="#">9G1224F402</a>
1.66	58	31	0.12	24	20.4 - 27.6	29	1.92	1950	<a href="#">9G1224M402</a>
3.68	130	120	0.48	48	40.8 - 55.2	51	11.04	4100	<a href="#">9G1248G402</a>
3.25	115	98	0.39	48	40.8 - 55.2	48	7.68	3650	<a href="#">9G1248E402</a>
2.83	100	77	0.31	48	40.8 - 55.2	44	6.24	3150	<a href="#">9G1248A402</a>
2.50	88	64	0.26	48	40.8 - 55.2	40	4.80	2850	<a href="#">9G1248H402</a>
1.98	70	42	0.17	48	40.8 - 55.2	35	2.88	2250	<a href="#">9G1248F402</a>
1.66	58	31	0.12	48	40.8 - 55.2	29	2.40	1950	<a href="#">9G1248M402</a>



San Ace 120 G-Type

High Air Flow Low Power Consumption 119x25mm & 119x38mm DC Axial Fans

119 x 119 x 25mm

Click to view dimensional drawings

Models without sensor

Ribless models without sensor

Models with sensor

Ribless Models with sensor

119 x 119 x 38mm

Click on Model No in red to view air performance curves

Airflow	Airflow	Static Pressure	Static Pressure	Nominal Voltage	Voltage Range	Sound Pressure	Power Input	Nominal Speed	Model No.
m³/min	CFM	Pa	inch/H <sub>2</sub> O	V	V	dB(A)	W	min <sup>-1</sup>	
3.88	137	135.0	0.54	12	10.2 - 13.8	49	11.8	3600	9G1212G102
3.34	118	100.0	0.40	12	10.2 - 13.8	46	7.32	3100	9G1212E102
2.80	99	70.4	0.283	12	7.0 - 13.8	39	4.56	2600	9G1212H102
2.45	87	54.2	0.218	12	7.0 - 13.8	36	3.36	2280	9G1212F102
2.10	74	39.6	0.16	12	7.0 - 13.8	32	2.52	1950	9G1212M102
3.88	137	135.0	0.54	24	20.4 - 27.6	49	12.0	3600	9G1224G102
3.34	118	100.0	0.40	24	20.4 - 27.6	46	8.16	3100	9G1224E102
2.80	99	70.4	0.283	24	14.0 - 27.6	39	5.23	2600	9G1224H102
2.45	87	54.2	0.218	24	14.0 - 27.6	36	3.84	2280	9G1224F102
2.10	74	39.6	0.16	24	14.0 - 27.6	32	2.64	1950	9G1224M102
3.88	137	135.0	0.54	48	40.8 - 55.2	49	12.0	3600	9G1248G102
3.34	118	100.0	0.40	48	40.8 - 55.2	46	8.16	3100	9G1248E102
2.80	99	70.4	0.283	48	40.8 - 55.2	39	5.28	2600	9G1248H102
2.45	87	54.2	0.218	48	40.8 - 55.2	36	4.32	2280	9G1248F102
2.10	74	39.6	0.16	48	40.8 - 55.2	32	3.36	1950	9G1248M102

Click to view dimensional drawings

Models without sensor

Ribless models without sensor

Models with sensor

Ribless Models with sensor

Notes:

(1) Listed models are non-sensor types

(2) Airflow, power input, speed and noise ratings are at nominal voltage against zero static pressure.

(3) Static pressure ratings are at nominal voltage against zero air flow.

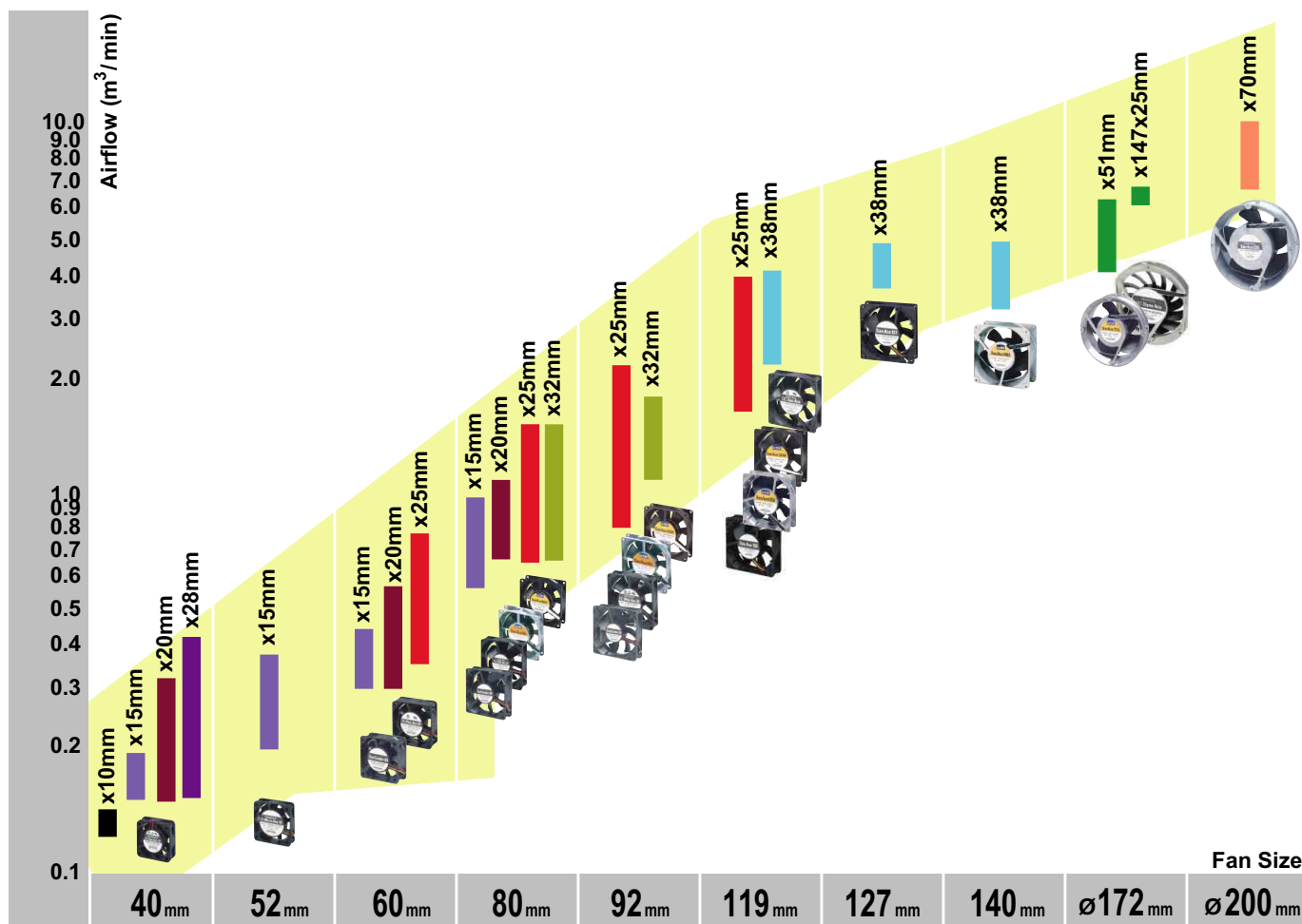
(4) Noise ratings are average values as measured from a point one (1) meter from intake of fan suspended in an anechoic chamber.

(5) Air performance curves show fan outputs with unobstructed inlets and outlets.

(6) Some model types are without UL, CSA and TÜV approvals.

### DC San Ace

High performance axial fans ranging from 40mm square to Ø200mm in 5, 12, 24 and 48 Vdc. Airflow from 3.18 to 369 CFM.



### San Cooler

New series of axial fans manufactured at SANYO DENKI PHILIPPINES. Comparable performance to DC SAN ACE with cost reductions from savings due to newly designed fan construction and lower manufacturing costs.

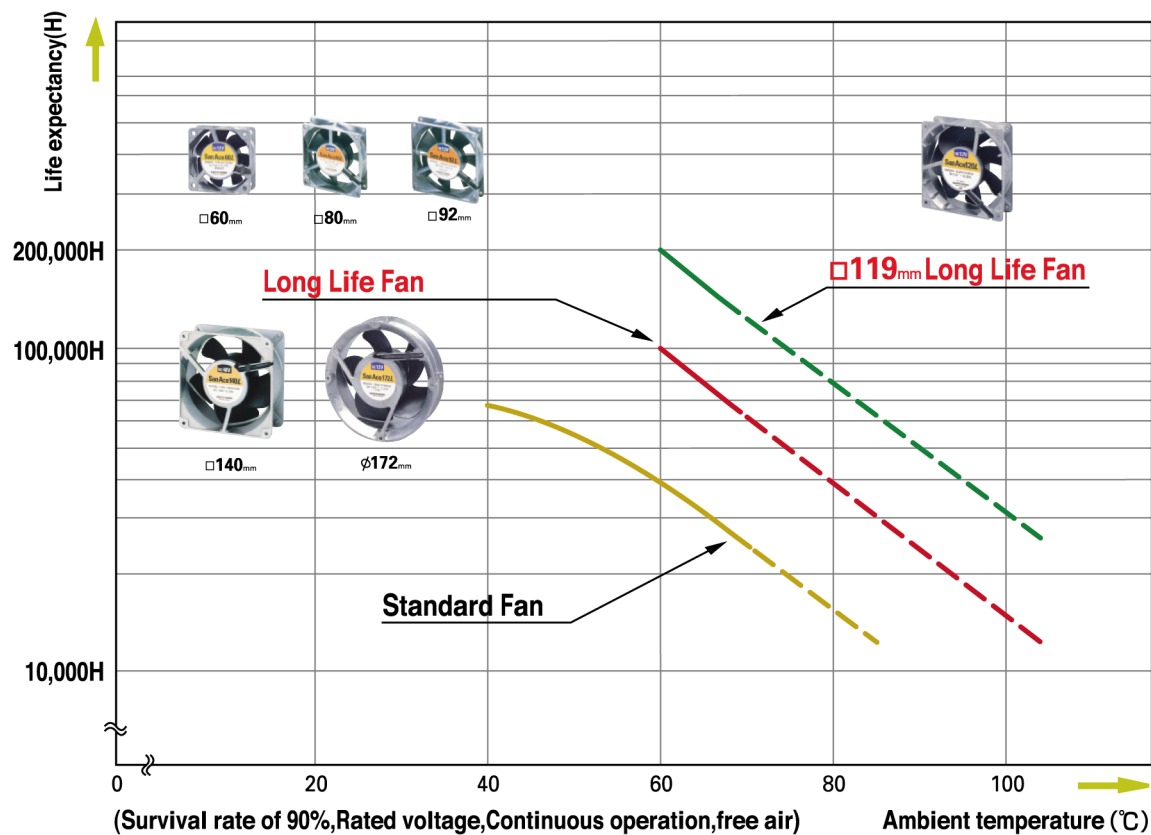
### Scirocco Ace

High performance centrifugal blowers in 4 sizes from 76mm to 160mm square at 12Vdc and 24Vdc. Airflow from 8.8 to 57.2 cfm.



Long Life Fans

Fans capable of 100,000 - 200,000 of maintenance-free continuous operation at 60°C.



Splash Proof Fans

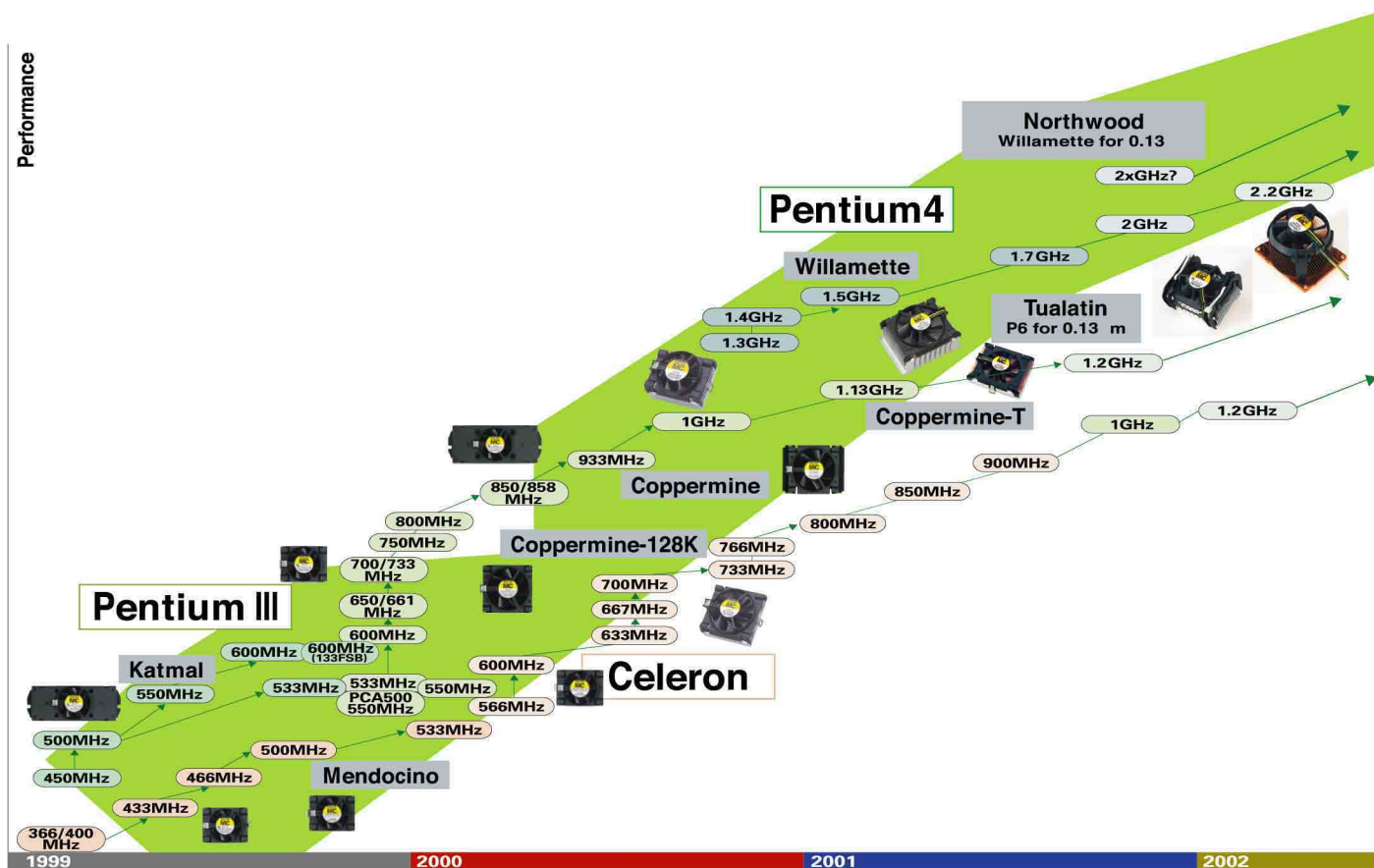
Wide range of IPX4 and IP55 rated water protected fans.



Size	60mm X 25mm	80mm X 25mm	92mm X 25mm	119mm X 38mm	140mm X 38mm	140mm X 51mm
Series						
W		IP55	IP55	IP55	IP55	IP55
WS		IPX4	IPX4	IPX4		
WA	Oil protected					
All	Humi-Seal 1A27					

### San Ace MC

Active heatsinks compatible with all the latest Intel® processors.



### Customizations and Options

A wide variety of customer-specified fans and options are available to help you achieve optimal cooling performance. Contact the nearest SANYO DENKI representative to discuss your cooling problem with our specialist staff.

- Custom fans
  - Customer-specified fans tailored to requirements
- Custom interconnections
  - Special lead types, lead lengths, sleeving, interconnections
- Thermal speed control and dual-speed fans
  - Intelligent temperature-dependent speed control and dual-speed fans to cool appliances at the required speed, thus reducing noise levels in all operational conditions
- Fan Accessories
  - Finger Guards, Filter Guards, Mounting Clips, etc.
- Alarm Sensors
  - Pulse sensor, Lock Sensor, Inverse Lock Sensor, Low Speed Sensor



## Lock Sensor

Lock sensors are used to detect if the fan motor is in operation or stopped.

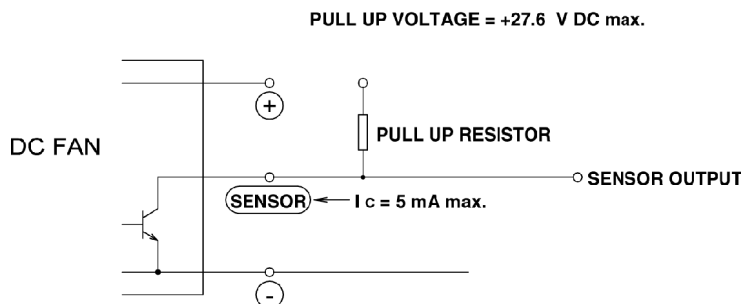
### Output Circuit

Open Collector

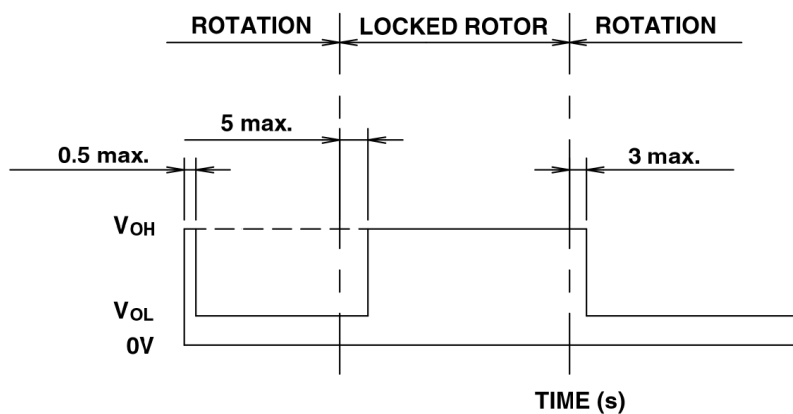
### Specifications

$V_{CE} = +27.6 \text{ V max.}$  ( $V_{CE}$  is +60V max for 48V rated fans)

$I_C = 5 \text{ mA max.}$  ( $V_{OL} = V_{CE(SAT)} = 0.6 \text{ V max.}$ )  
( $V_{CE(SAT)}$  is 0.4V for 48V rated fans)



### Output Waveform



Output reaches  $V_{OL}$  level within 0.5s of power on

## Inverse Lock Sensor

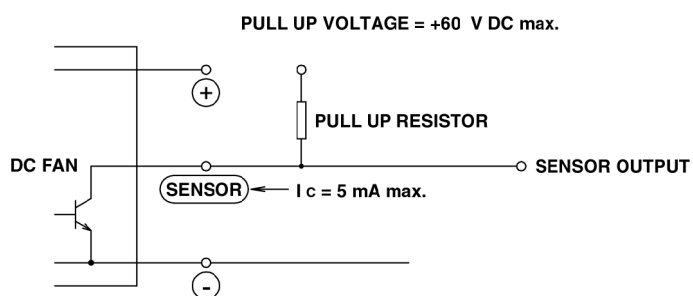
### Output Circuit

Open Collector

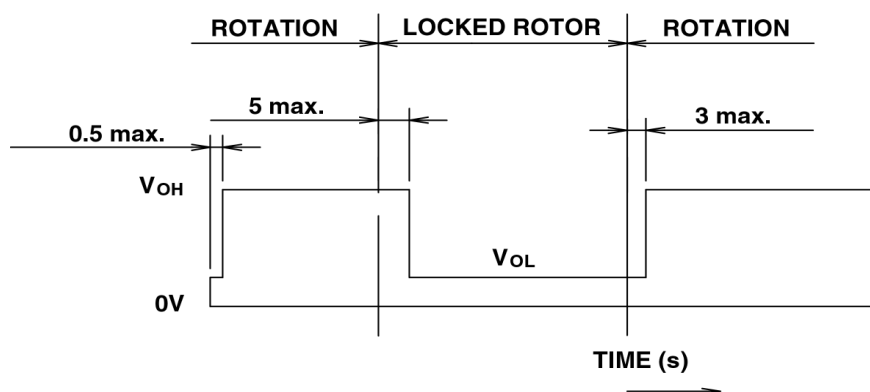
### Specifications

$V_{CE} = +60 \text{ V max.}$  ( $V_{CE}$  is +60V max for 48V rated fans)

$I_C = 5 \text{ mA max.}$  ( $V_{OL} = V_{CE(SAT)} = 0.4 \text{ V max.}$ )



### Output Waveform



Output reaches  $V_{OL}$  level within 0.5s of power on

### Low Speed Sensor

Low speed sensors output a signal when the rotational speed of the fan motor goes below the specified value. These sensors are used to detect declining cooling capability of fan motors.

**Output Circuit**  
Open Collector

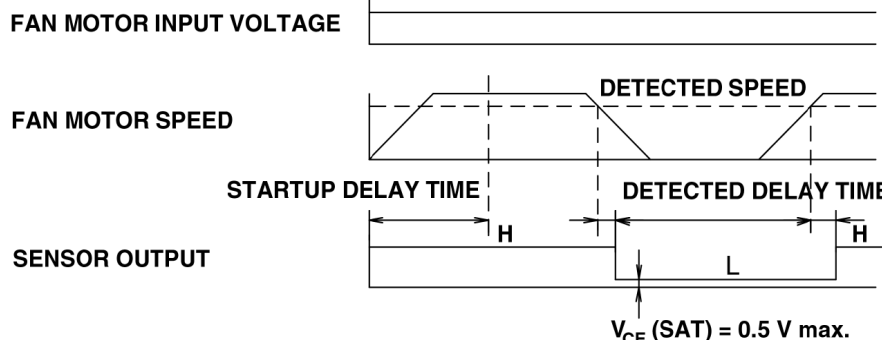
#### Specifications

$V_{CE} = +27.6 \text{ V max.}$  ( $V_{CE}$  is +60V max for 48V rated fans)

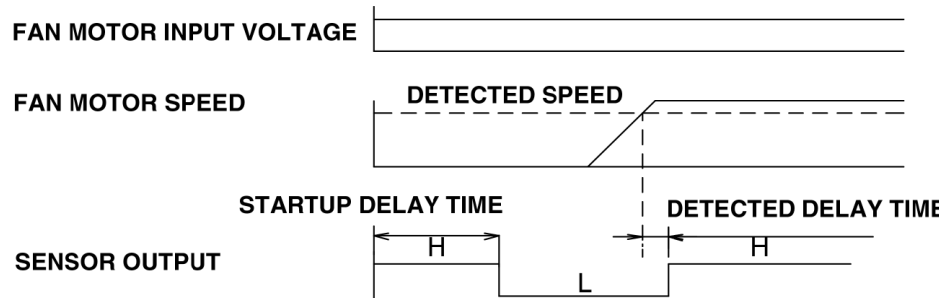
$I_C = 10 \text{ mA max.}$  ( $V_{OL} = V_{CE}(\text{SAT}) = 0.5 \text{ V max.}$ )

#### Sensor Sequence

■ Normal Operating Status



■ When fan blades are released after start-up delay time has elapsed (fan blades are to be kept locked during power-on)



### Pulse Sensor

Pulse sensors are used for detecting the rotational speed of the fan motor.

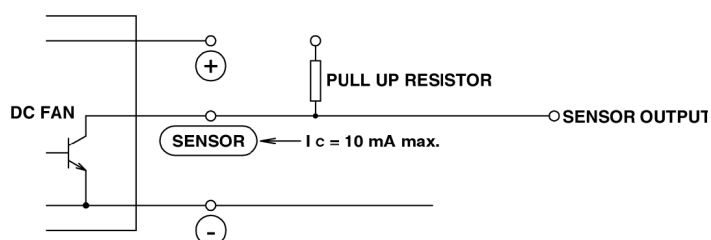
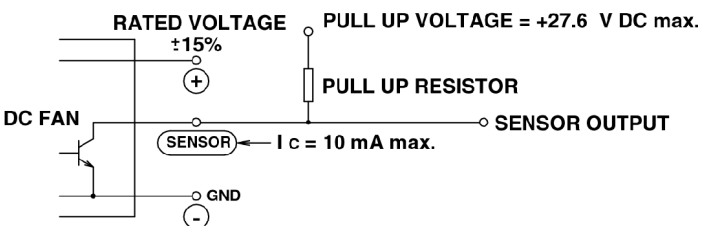
#### Output Circuit

Open Collector

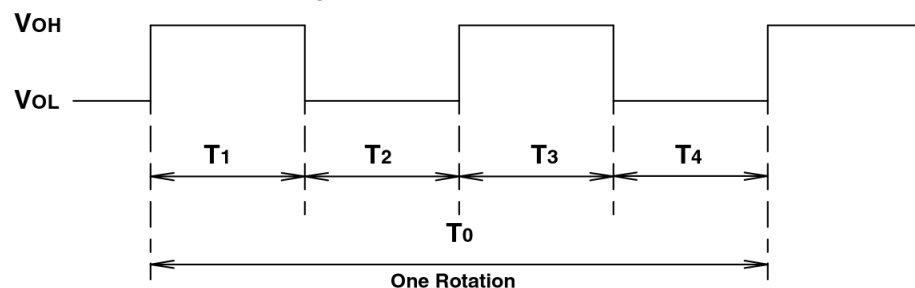
#### Specifications

$V_{CE} = +30 \text{ V max.}$  ( $V_{CE}$  is +60V max for 48V rated fans)

$I_C = 10 \text{ mA max.}$  ( $V_{CE}(\text{SAT}) = 0.4 \text{ V max.}$ )



#### Output Waveform (during normal operation)



$$T_{1-4} \doteq (1/4) T_0$$

$$T_{1-4} \doteq (1/4) T_0 = 60/4 \text{ N(s)}$$

$$N = \text{Fan Rotational Speed (min}^{-1}\text{)}$$

The following example is a guideline on to how to select an appropriate fan motor for cooling heat-producing equipment by forced air-cooling.

### Determine the Conditions of the Device to be Cooled

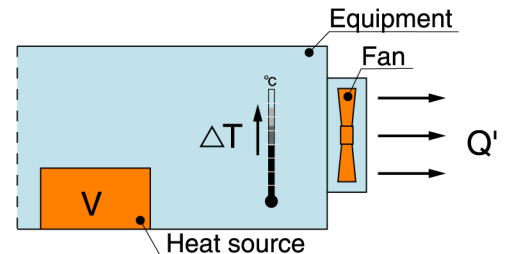
Determine the permissible temperature rise ( $\Delta T$ ), and the total heat generated inside the equipment (V).

#### ■ Example

V : Total generated heat = 100 Watt

$\Delta T$  : Permissible temperature rise = 15K\*

\* $\Delta T = 15K$ , for instance, signifies that the average airflow leaving the device may be only 15 C warmer than the ambient temperature.



### Calculate the Required Air Flow

Calculate the air flow required to satisfy the above conditions by using the formula\*\* below.

\*\*This formula assumes that heat is dissipated by cooling air coming from the fan motor only.

#### ■ Example (using V = 100 Watt, $\Delta T = 15K$ )

Q' : Operating air flow (m<sup>3</sup>/min.)

$$Q' = \frac{V}{20\Delta T} = \frac{100 \text{ W}}{20 \times 15K} \approx 0.33 \text{ m}^3/\text{min} \text{ (11.65 CFM)}$$

### Selecting the Fan Motor

The actual air flow when the fan motor is mounted onto the device can be determined from the air flow-static pressure characteristics curve of the fan motor and the pressure loss of the electronic device. However, since the pressure loss of the device cannot be determined without using a measuring instrument, a fan with a maximum airflow capacity of 1.5 to 2 times the operating air flow should be selected as a effective starting point for fan performance trials.

#### ■ Example (using Q' = 0.33 m<sup>3</sup>/min)

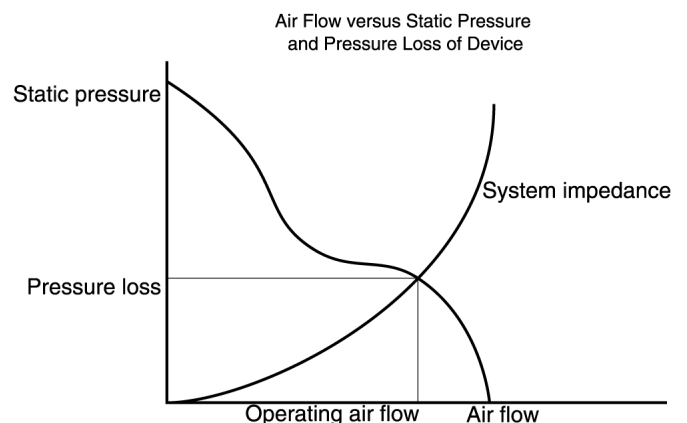
Q : Maximum air flow (m<sup>3</sup>/min.)

$$Q' = Q \times 2/3$$

$$Q = Q' \times 3/2 = 0.33 \times 3/2 \approx 0.5 \text{ m}^3/\text{min} \text{ (17.66 CFM)}$$

From the above calculations, fan motors having a maximum air flow of 0.5 m<sup>3</sup>/min or more should be selected as possible candidates for performance trials . A final choice should be made after taking into account the space requirements, noise level, economy and ambient conditions of the application.

In this example, a fan of 60mm square, 25mm thickness and 12V, which meets the required maximum air flow calculated above is DC San Ace 109R0612H402 (maximum air flow = 0.53m<sup>3</sup>/min.).



### Verifying the Selected Fan Motor

Calculate the temperature rise inside the device when 100 Watt of total generated heat is forcefully cooled by a 109R0612H402 fan motor.

#### ■ Example (using the above values)

$$Q' = Q \times 2/3 = 0.53 \times 2/3 \approx 0.353 \text{ m}^3/\text{min}$$

$$\Delta T = V/20Q' = 100(W)/20 \times 0.353 \text{ m}^3/\text{min} \approx 14.2K$$

Click on links in red for further details

\* Stated airflows are at nominal voltage against zero static pressure

## New Products

Description	Series
High Airflow Low Power Consumption 92x32mm DC Axial Fans	<a href="#">San Ace 92 G-Type</a>
Slim Type Active Heat Sink for Intel®Pentium® 4 µPGA478 1.8-2.2 GHz	<a href="#">San Ace MC</a>
High Performance Active Heat Sink for Intel®Pentium® 4 µPGA478 2.2 GHz	<a href="#">San Ace MC</a>
Spiral Copper Active Heat Sink for Intel®Pentium® 4 PGA423 & µPGA478 2.2 GHz	<a href="#">San Ace MC-HX</a>
19" Rack Mountable Ø172 x 147 x 25mm DC Axial Fans	<a href="#">Dyna Ace</a>
High Airflow 119x38mm Long Life Fans	<a href="#">San Ace 120L G-Type</a>
1U Compatible Active Heat Sink for Intel®Pentium® III FC-PGA2 1.4GHz	<a href="#">San Ace MC</a>
High Airflow Low Power Consumption 119x25mm & 119x38mm DC Axial Fans	<a href="#">San Ace 120 G-Type</a>

## DC Axial Fans

Edge Length (mm)	Thickness (mm)	Voltage (V)	Air Flow (cfm)	Series
40	10, 15, 20, 28	5, 12, 24	3.18 - 14.8	<a href="#">Fine Ace</a>
52	15	5, 12, 24	7.24 - 13.3	<a href="#">Micro Ace</a>
60	15, 20, 25	5, 12, 24, 48	7.40 - 37.0	<a href="#">Pico Ace</a>
80	15, 20, 25, 32	5, 12, 24, 48	14.8 - 55.0	<a href="#">Petit Ace</a>
92	25, 32	12, 24, 48	28.3 - 71.7	<a href="#">Mini Ace</a>
	32	12, 24, 48	42.4 - 88.3	<a href="#">NEW San Ace 92 G-Type</a>
119	25, 38	5, 12, 24, 48	43.1 - 102.4	<a href="#">San Ace</a>
	25, 38	12, 24, 48	58.0 - 137.0	<a href="#">NEW San Ace 120 G-Type</a>
127	38	12, 24, 48	132.0 - 170.0	<a href="#">San Ace 127</a>
140	38	12, 24, 48	116.0 - 159.0	<a href="#">San Ace 140</a>
Ø172	51, 150x51, <a href="#">NEW</a> 147x25	12, 24, 48	108.0 - 279.0	<a href="#">Dyna Ace</a>
Ø200	70	24, 48	290.0 - 369.0	<a href="#">San Ace 200</a>

## Splash Proof Fans

Edge Length (mm)	Thickness (mm)	Voltage (V)	Air Flow (cfm)	Series
80	25	12, 24, 48	22.3 - 39.2	<a href="#">Splash Proof Fan W-Type</a>
92	25	12, 24, 48	28.2 - 48.8	
119	38	12, 24, 48	79.0 - 106.0	
140	38, 51	12, 24, 48	116.5 - 208.3	
80	25	12, 24	23.0 - 33.2	<a href="#">Splash Proof Fan WS-Type</a>
92	25	12, 24	28.2 - 48.7	
119	38	12, 24, 48	77.7 - 102.4	



Click on links in red for further details

\* Stated airflows are at nominal voltage against zero static pressure

## Long Life Fans

Edge Length (mm)	Thickness (mm)	Voltage (V)	Air Flow (cfm)	Series
60	25	12, 24, 48	12.7 - 27.6	Long Life Fan
80	25	12, 24, 48	22.2 - 42.4	
92	25	12, 24, 48	28.2 - 58.0	
119	38	5, 12, 21, 24, 48	54.8 - 106.0	
140	38, 51	12, 24, 48	116.5 - 208.3	
Ø172	51, 150x51	12, 24, 48	148.3 - 226.0	Long Life Fan (Low Noise) <b>NEW San Ace 120L G Type</b>
119	38	12, 24, 48	77.7 - 102.4	
119	38	12, 24, 48	74.0 - 138.0	

## DC Centrifugal Blowers

Edge Length (mm)	Thickness (mm)	Voltage (V)	Air Flow (cfm)	Series
76	30	12, 24	12.7 - 27.6	Scirocco Ace
119	32	12, 24	18.2 - 27.5	
127	32	12, 24	21.5 - 32.0	
160	40	12, 24	44.5 - 57.2	

## CPU Active Heatsinks

CPU	Core Speed (MHz)	Series
Intel® Pentium®4 µPGA478/PGA423	up to 2200	San Ace MC
Intel® Pentium®III FC-PGA2/FC-PGA	500 - 1400	
Intel® Pentium®II SECC2	733 - 1000	
Intel® Celeron™ FC-PGA2/FC-PGA/PPGA	300 - 1300	
Intel® Pentium®Pro	All	
Intel® Pentium®	All	
Mobile CPU, PCI Card	All	<b>NEW San Ace MC-HX</b>
Intel® Pentium®4 µPGA478/PGA423	up to 2200	

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## San Cooler

Edge Length (mm)	Thickness (mm)	Voltage (V)	Air Flow (cfm)	Series
60	25	12, 24	12.7 - 27.6	San Cooler
80	25	12, 24	23.0 - 53.0	
92	25	12, 24	23.0 - 62.1	



# Safety Precautions

Failure to observe any of the precautions described below may cause minor to moderate injuries or damage to property.

- Do not use these products in medical-related or any other equipment that may have a potential effect on human lives.
- Do not use these products in equipment that may have a serious impact on society and the general public.
- Do not use these products in a vehicle, ship, or in any other environment that is exposed to vibration.
- Do not attempt to disassemble or modify the products. Disassembling or modifying the products will void the warranty, and may render the product dangerous.
- Never put your finger or any other part of your body into the product whilst it is in operation. Personal injury can be caused as a result.
- Never insert an object into the product. Damage can be caused to the product as a result.
- Always observe the operating conditions and environmental requirements as indicated in this catalog when operating the product.
- Consider implementing additional protection measures against damage to your equipment in the event of the product failing.
- Install and use the product internally in your equipment.
- Static electricity may cause damage to the product. Adequately protect against static electricity during installation.
- Install a fingerguard to prevent accidental injuries from occurring.

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