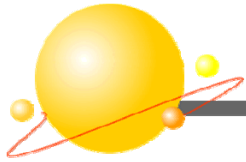


San Ace

Cooling Systems



Cooling Systems Product Range

Custom Product



DC Axial Fan



Blower Fan



CoolingSystems

CPU Cooler

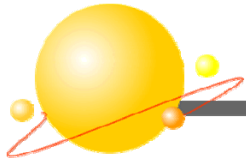


Centrifugal Fan



AC Axial Fan





San Ace : Product Concept

1) HIGH PERFORMANCE :

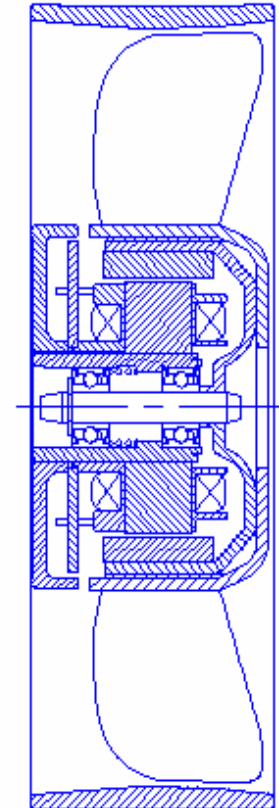
- High Airflow & High Static Pressure
- Low Power Consumption
- Low Noise
- Low vibrations
- Endurance Fans
- Long Life expectancy

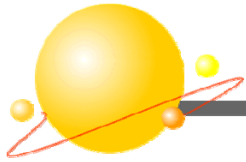
2) HIGH RELIABILITY :

- Constant performance throughout product's life
 - Select high reliable components (i.e. : double ball bearing)
 - Refine manufacturing process

3) HIGH QUALITY :

- Optimized performance against Design





DC Axial Fan

Standard & High Performance



Air Flow : 0.11 to 15.5 m³/min

□28 to □150 mm
Ø 172 & 200 mm

Counter Rotating Fan



Air Flow : 0.59 to 8.5 m³/min

□38 to □120 mm

Silent Fan



Air Flow : 0.4 to 2 m³/min

□60 to □120 mm

Low Vibration Fan



Air Flow : up to 0.9 m³/min

□40 mm

Splash Proof Fan



Air Flow : 0.53 to 8.1 m³/min

□60 to □140 mm
Ø 172 x 51 side cut

Oil Proof Fan



Air Flow : 0.26 to 3.34 m³/min

□40 to □120 mm

Long Life Fan



Air Flow : 0.16 to 6.4 m³/min

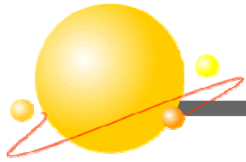
□60 to □140 mm

Thermally Speed Control Fan

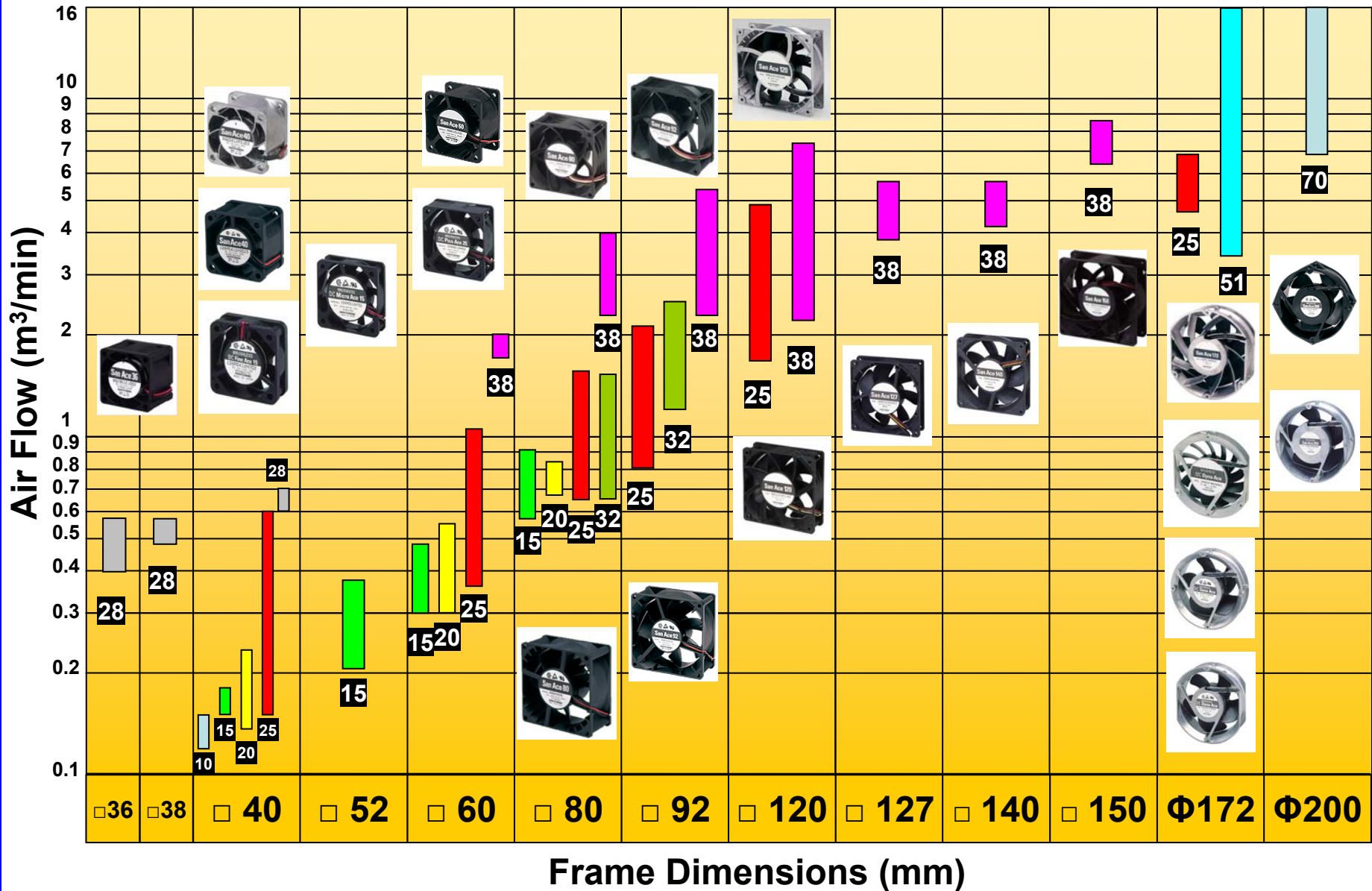


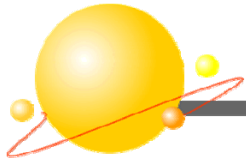
Air Flow : 0.13 to 2.9 m³/min

□52 to □120 mm



Standard & High Performance : Product Range



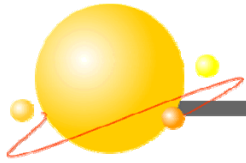


Standard & High Performance : Features

- All our fan motor use **double ball bearings**
- **Air flow** : 0.11 m³/min (4.2 CFM) to 14.7 m³/min (520 CFM)
- **Size** : 36 mm square size to 200 mm round size
- **Voltage** : 5 VDC to 48VDC
- **Life Expectancy** : 40000 or 60000 hours @ 60°C
- **Operating temperature** : - 10°C to + 70 °C
- Pulse, lock and low speed sensors available
- Models with **PWM** control available
- Various types available :
 - Standard Frame Type (9G, 109P),
 - Aluminium Frame (E),
 - Cost effective (9A), ...

Conversion table

1m ³ /min=35.31(CFM)
1CFM=0.0283m ³ /min
1m ³ /min=16.67ℓ/sec
1CFM=0.472ℓ/sec
1ℓ/sec=0.06m ³ /min

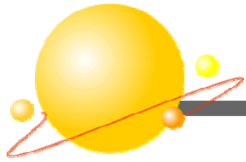


High Performance « GV type »

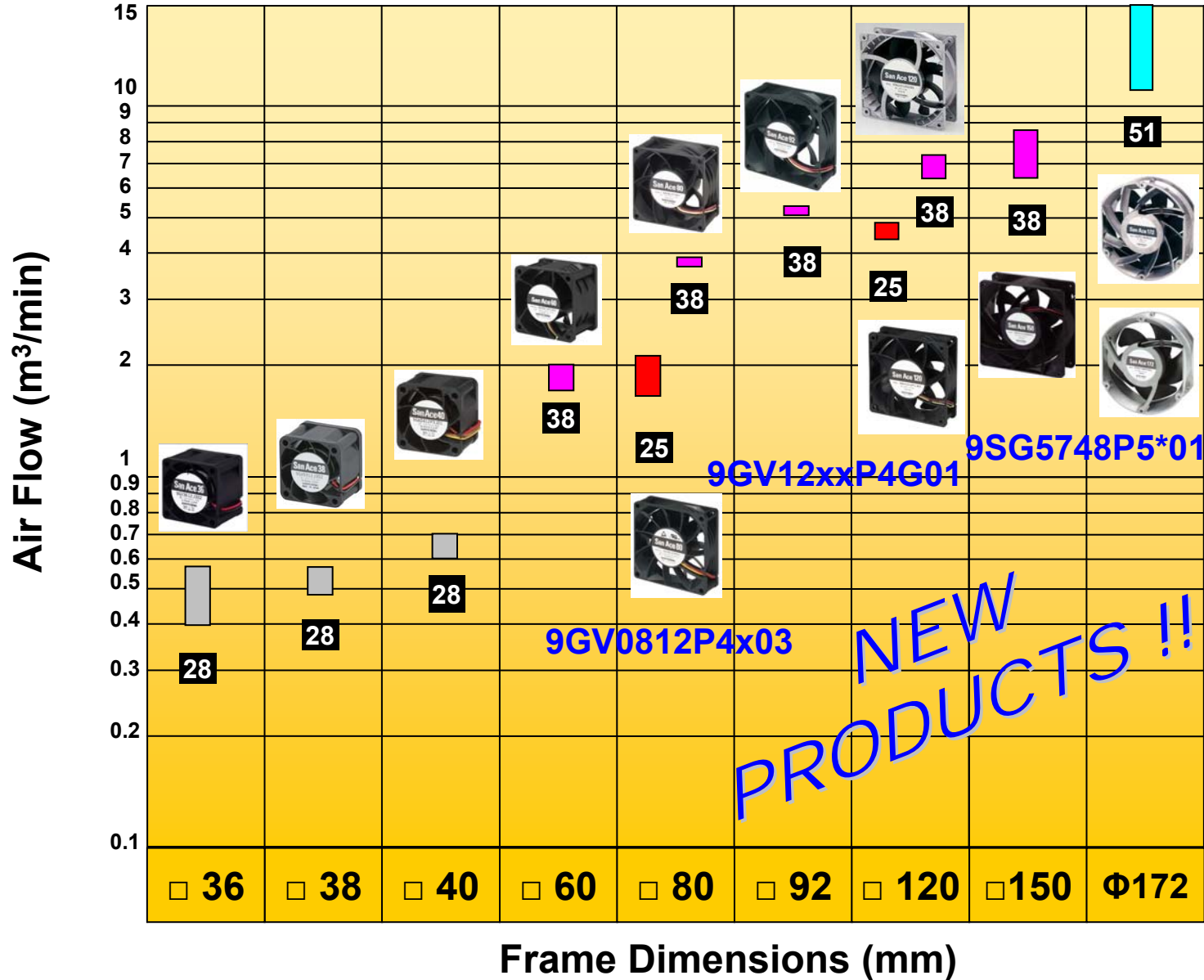


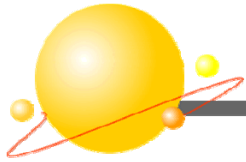
**« GV » Guide Vane
/ Static Blades**





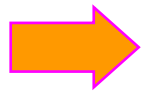
High Performance « GV & SG types » : Product Range



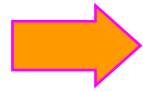


High Performance « GV type » : Design & Sales Points

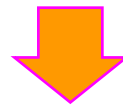
- Blade
- Frame
- Enhanced motor efficiency with newly designed motor



Characteristics improved around inflexion point
by development of optimum form for blade and frame



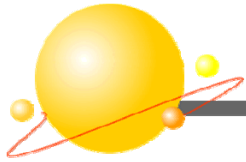
Low power consumption / High rotation speed available
(Refer to the next page)



Optimum for **cooling equipments of high system impedance**
with high density of components such as **server**, ...

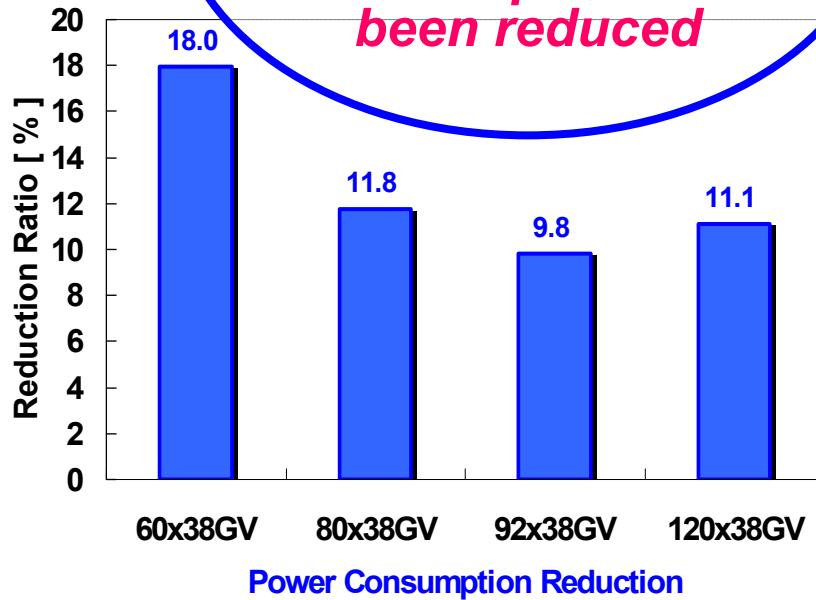
▪ Sales Points :

- ① Large air flow & High static pressure
- ② PWM Control → Lower power consumption / Lower noise

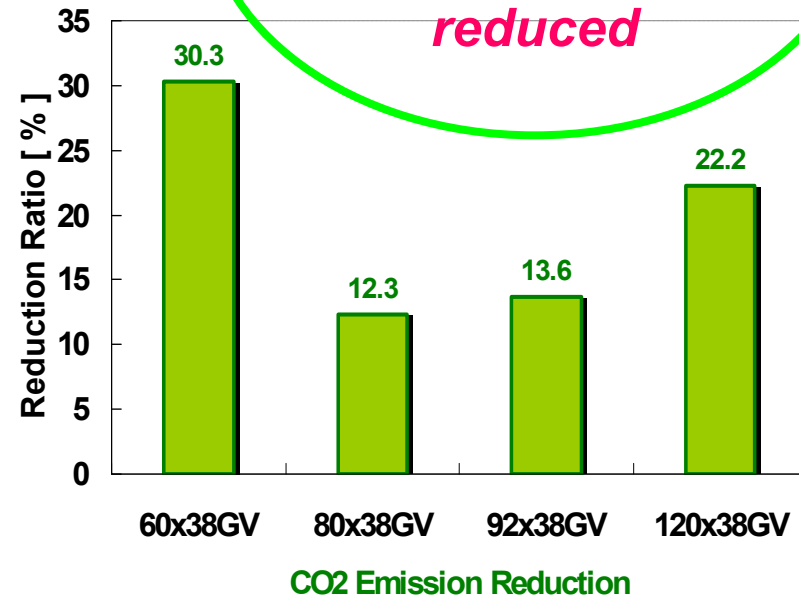


High Performance « GV type » : Design & Sales Points

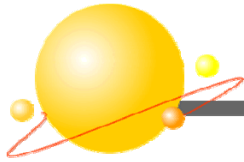
At same air flow with current fan
10 ~ 18 %
 Power consumption has been reduced



At same air flow with current fan
12 ~ 30 %
 CO2 emission has been reduced

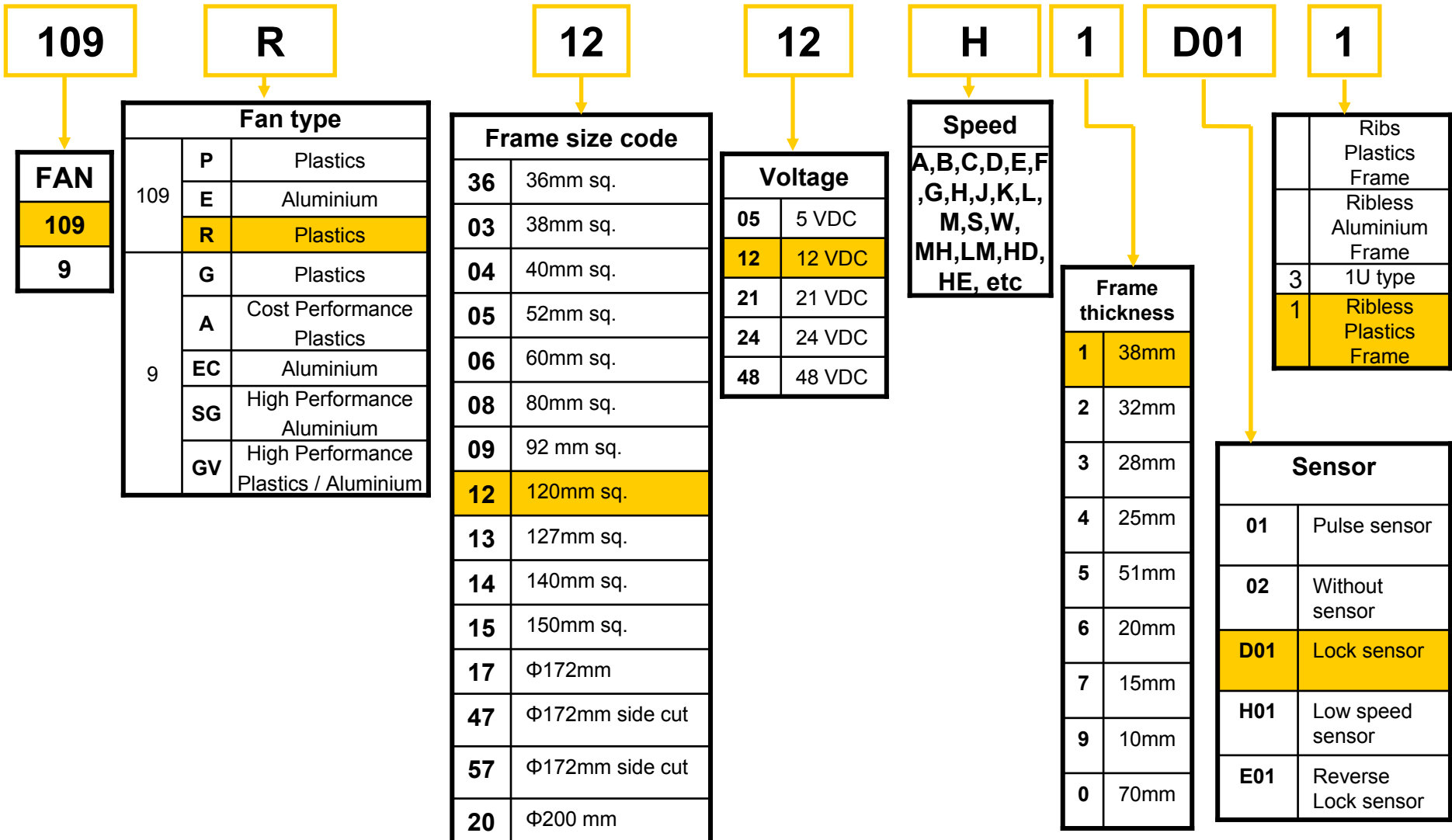


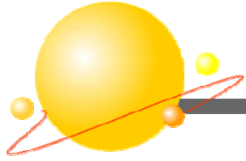
New Axial Fan series (GV type) achieves lower power consumption & lower CO2 emission by enhanced motor efficiency



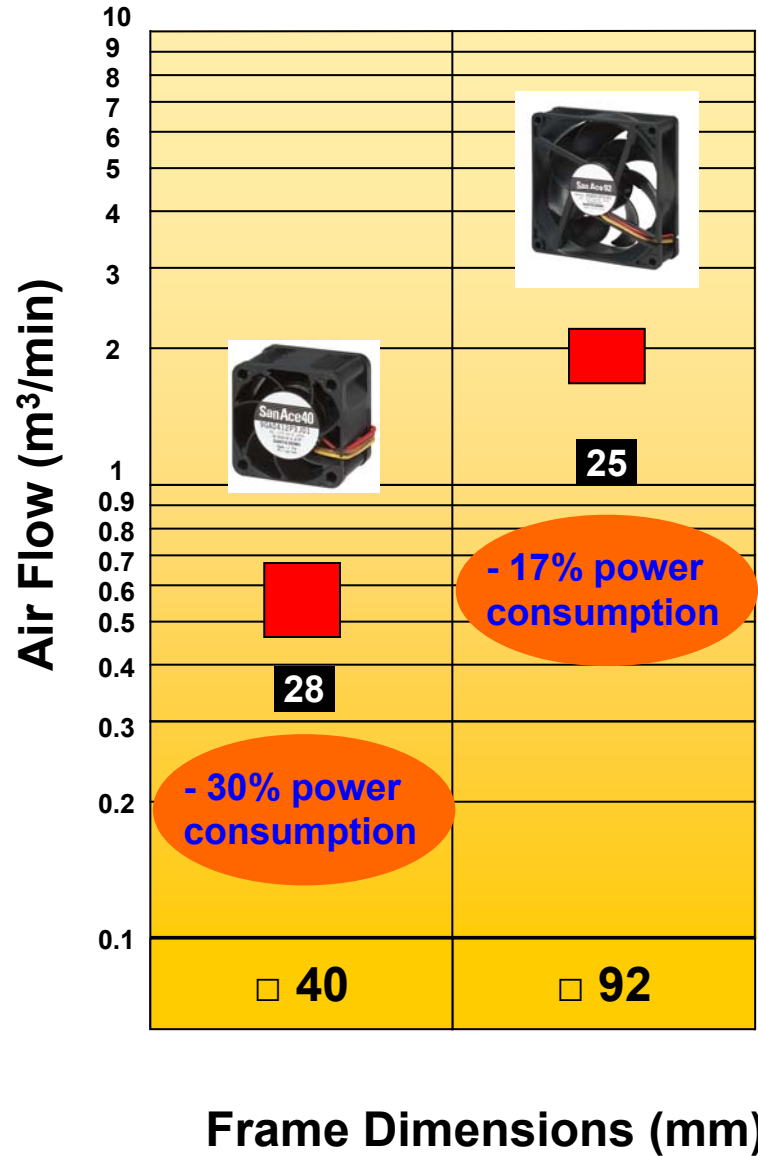
Standard & High Performance : How to read Model N°

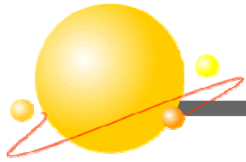
Example : 109R1212H1D01





Low Power Consumption Fan « GA type » : Product Range





Low vibration « GE » & « CRE » type

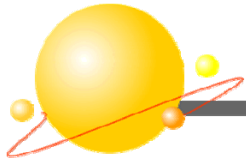


40sq x 28 GE

Low Vibrations with the same performance as “GV type”



40sq x 56 CRE



Low Vibration « GE » & « CRE » type : Design & Sales Points

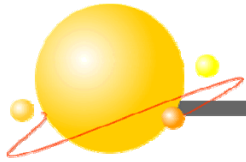
- **Design :**

Achieved reducing vibrations

- ① Used rigid materials, aluminum for the fan frame
- ② Pursued high accuracy parts and also enhanced the assembly of the mechanical devices
- ③ Improved rotor balanced

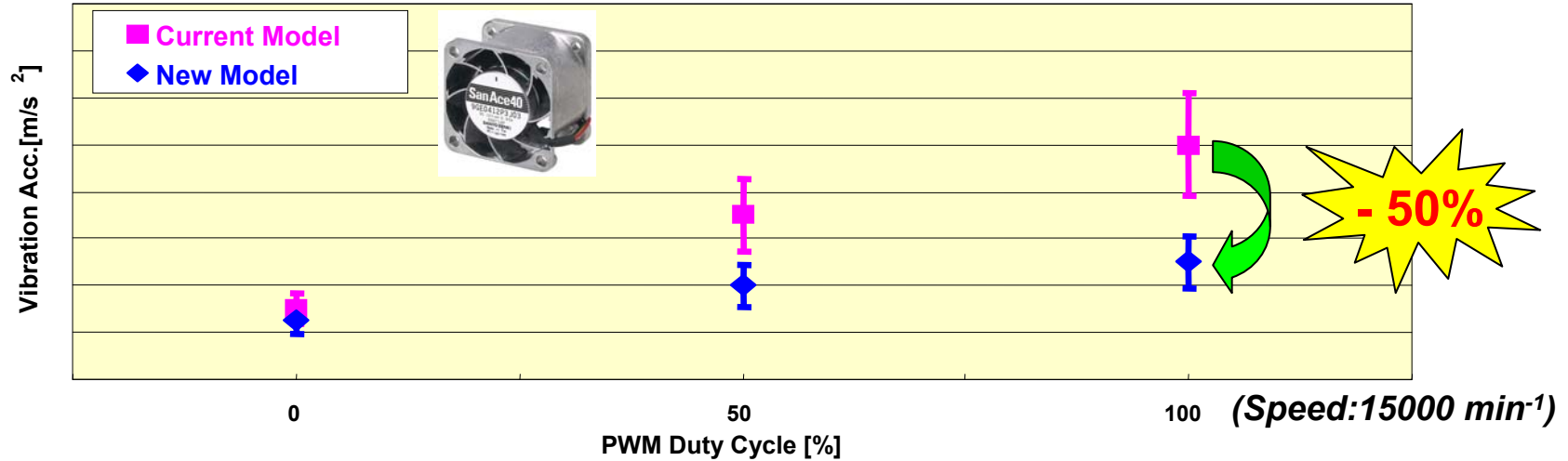
- **Sales Points :**

- ① Lower vibrations (up to 50%) with same airflow as GV type

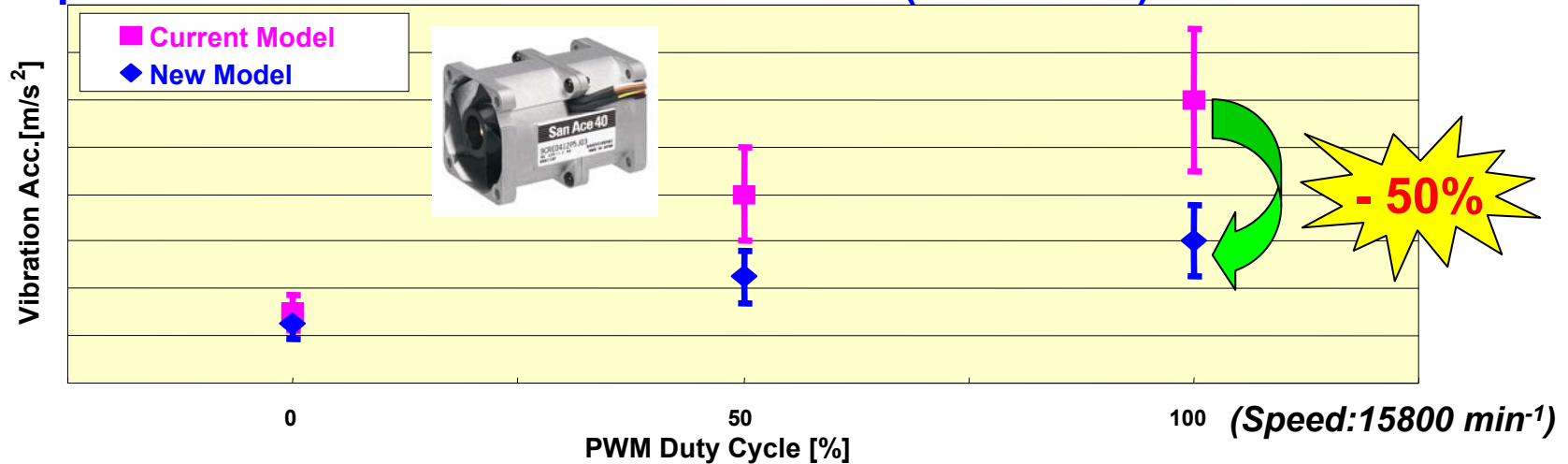


Low Vibration « GE » & « CRE » type : Design & Sales Points

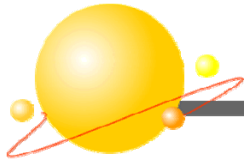
Comparison of vibration with current model (40x28GE)



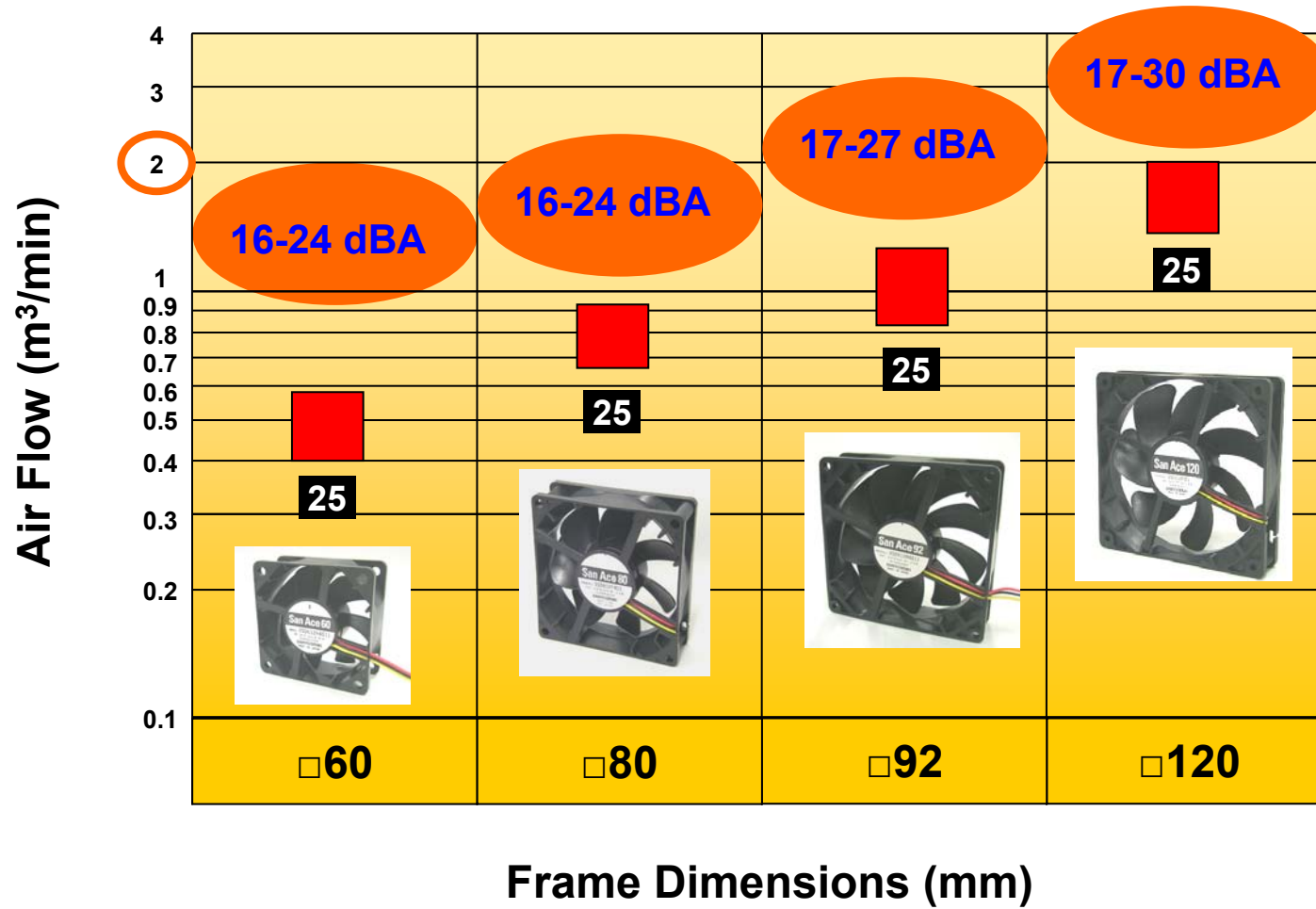
Comparison of vibration with current model (40x56CRE)

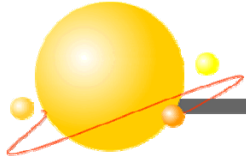


New model achieves lower vibrations !



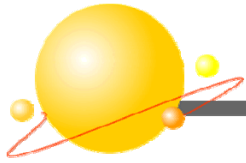
Silent Fan « S type » : Product Range





Silent Fan « S type » : Features

- **Air flow : 0.40 m³/min (14.1 CFM) to 2.0 m³/min (70.6 CFM)**
- **Size : 60x60x25, 80x80x25, 92x92x25, 120x120x25**
- **Rated Voltage : 12 VDC**
- **Life Expectancy : 40000 @ 60°C**
- **Pulse & lock sensors available**
- **Ribbed or ribless fram style available**
- **Low noise and Low vibration**



Silent Fan « S type » : Design & Sales Points

1 Reduced Fluid Noise

By newly designing the impeller and the frame, we achieved an average noise reduction of **-11,6%** (up to **-6dB**) in comparison with conventional models

2 Low Switching Noise

Using soft switching IC, we have reduced the switching noise which occurred at low-speed

3 Low vibration

By optimizing the frame and improving the motor, we have reduced vibration level by about **-50%**

4 Wide Voltage Range

With the wide operating voltage range, it is easy to control the speed and is effective in reducing noise level and power consumption.

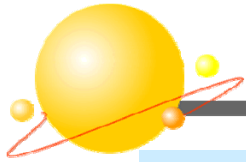
New Model : 5.0 to 13.8V (depending on models)

5 High Reliability

Life expectancy : 40,000 hours (90% Survival Rate, @ 60deg. C., Rated Voltage, Continuous Running, Free Air).

6 Various Options

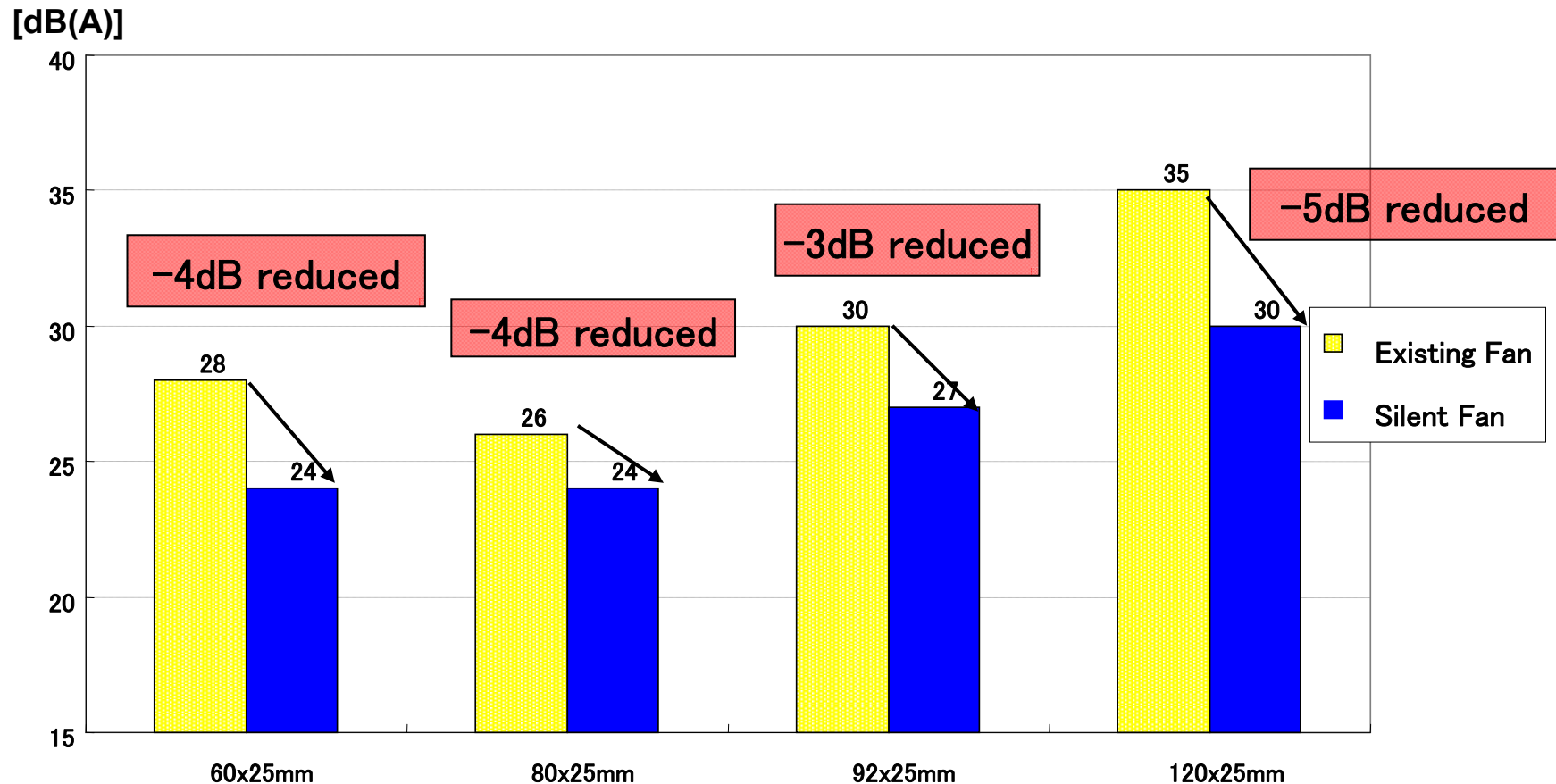
Sensor Options like Pulse Sensor (Tach Output) or Lock Sensor are available.

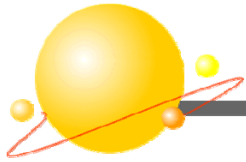


Silent Fan « S type » : Noise Reduction

We achieved 11.6% noise reduction with new technology (switching noise reduction) and newly designed motor

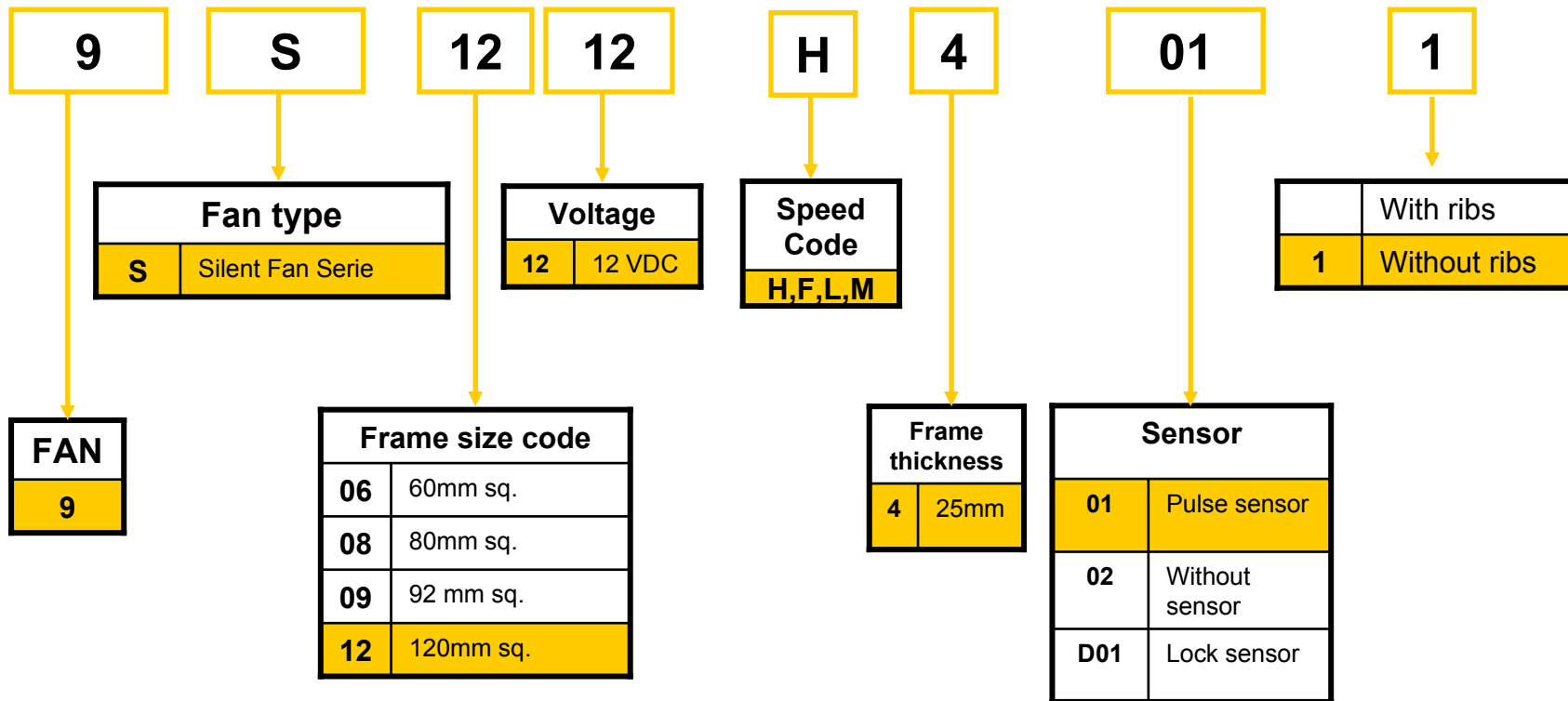
< Comparison of sound pressure level with existing fan >

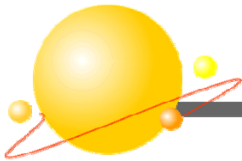




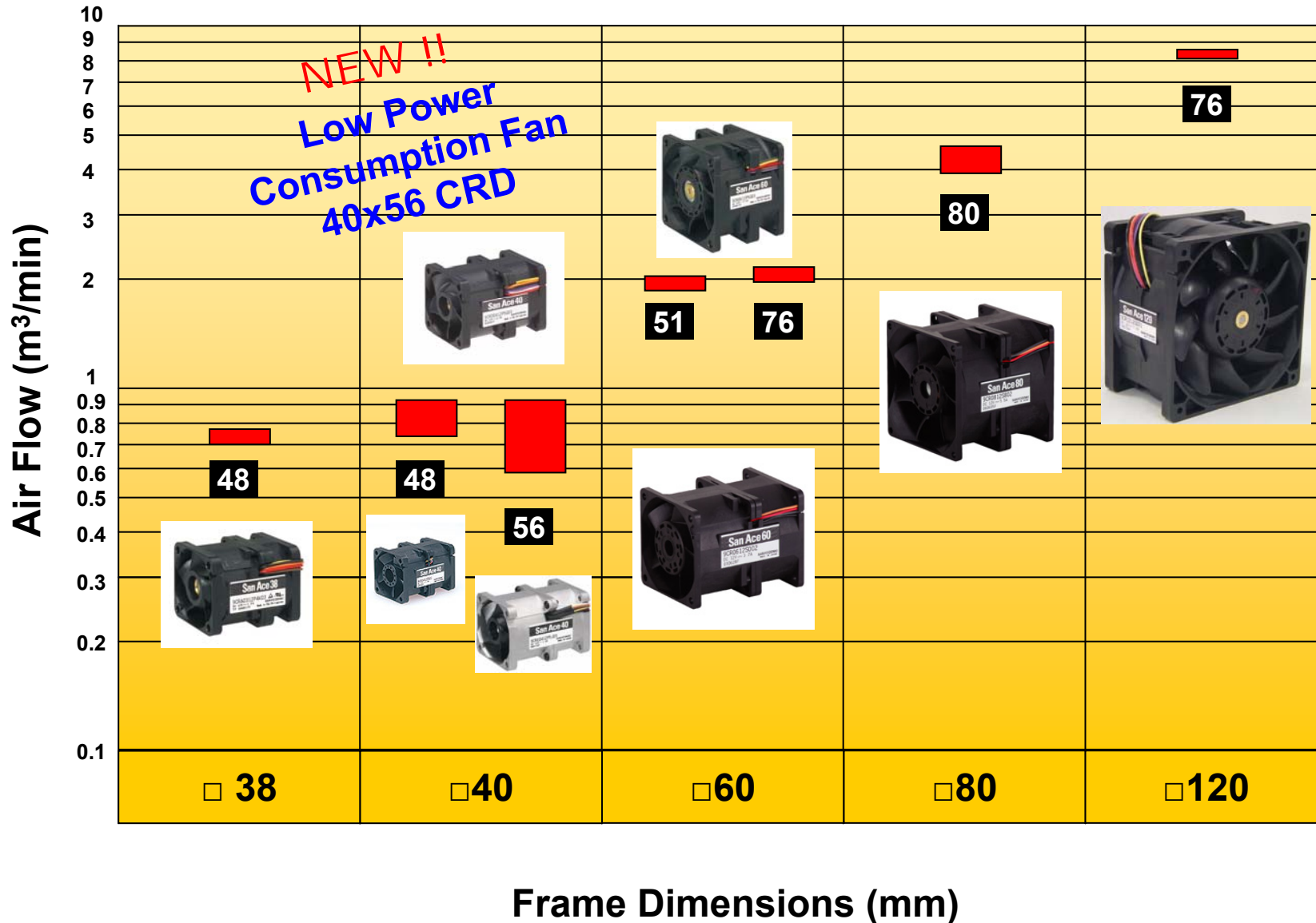
Silent Fan « S type » : How to read model N°

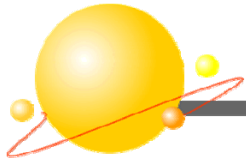
Example : 9S1212M4011





Counter Rotating Fan « CR type » : Product Range



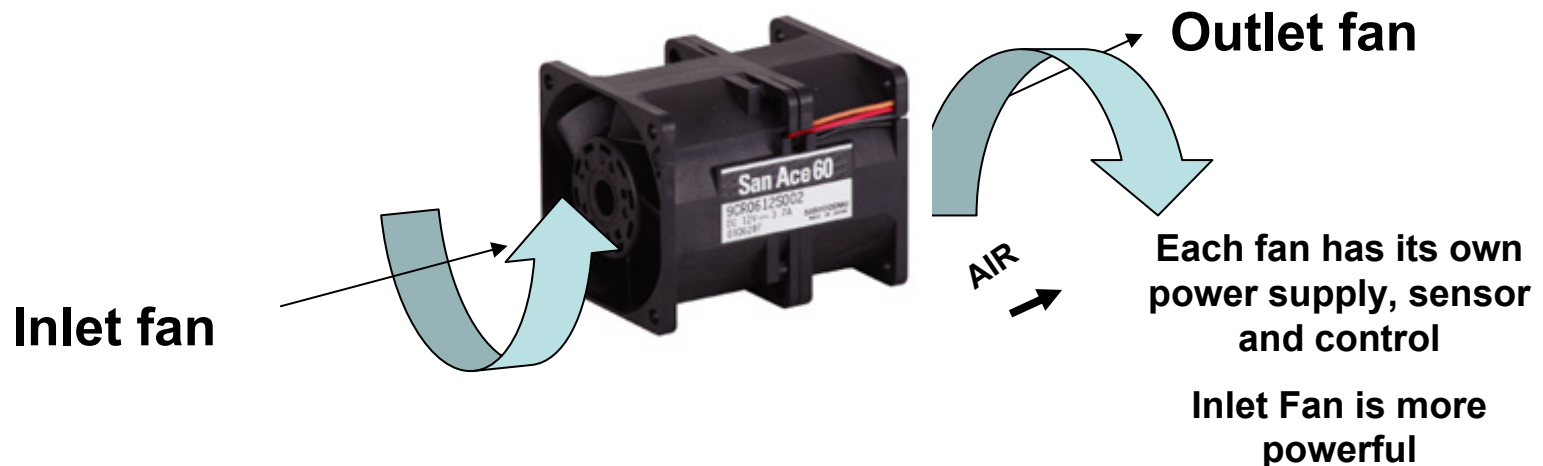


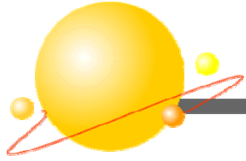
What is a Counter Rotating fan ?

Two fans that rotate in counterclockwise directions are placed in the same axial core in front and back, so that the characteristics of airflow and static pressure can be improved.

This method is called the counter rotating method, and we call a fan that uses this method a **Counter Rotating Fan**.

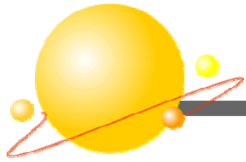
Improve significantly the cooling performances,
(Pressure Static & Air flow)





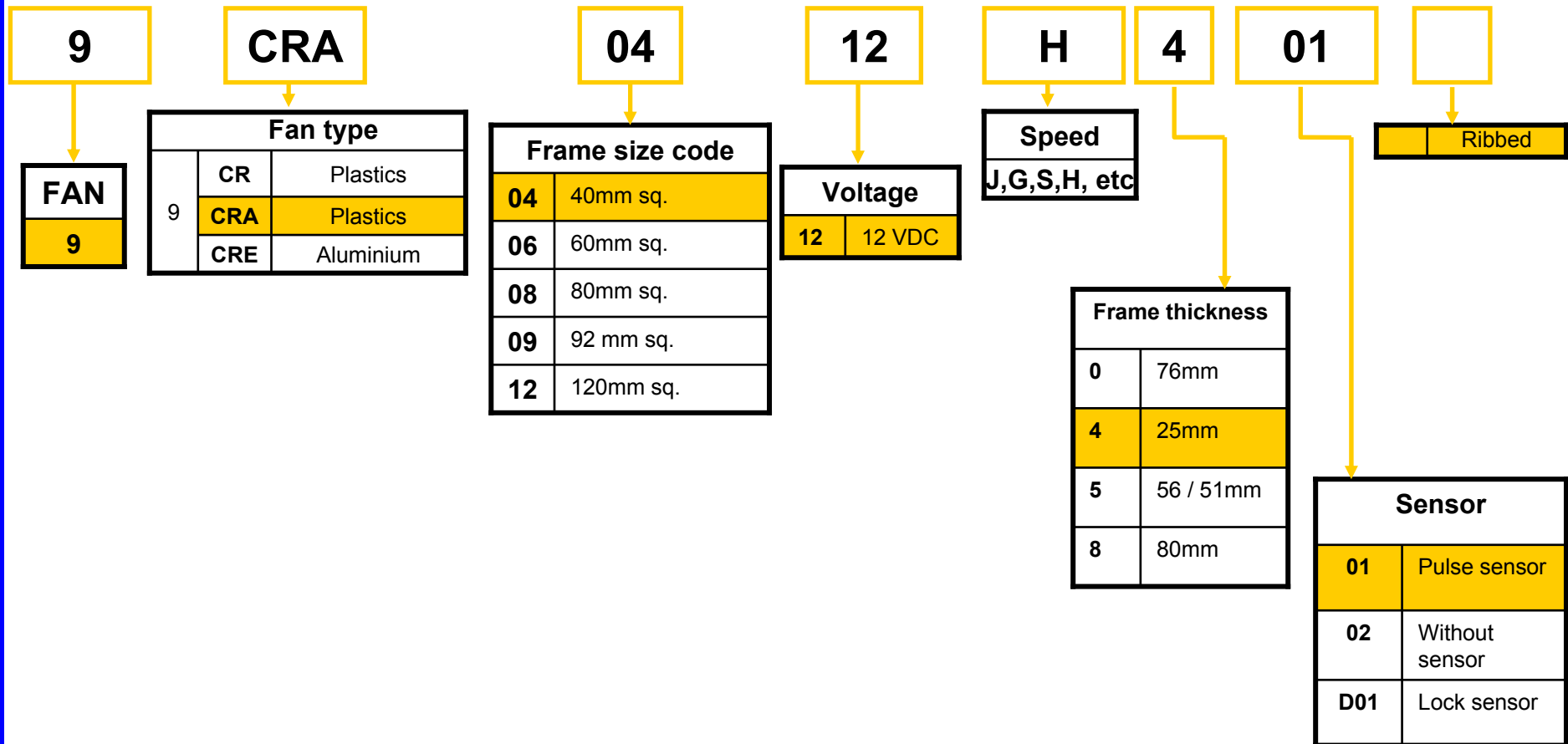
Counter Rotating Fan « CR type » : Features

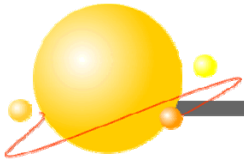
- **Air flow : 0.59 m³/min (20.8 CFM) to 8.5 m³/min (300 CFM)**
- **Size : 40x40x56, 40x40x48, 60x60x76, 80x80x80, 120x120x76**
- **Voltage : 12 VDC**
- **Life Expectancy : 40000 h @ 60°C**
- **Pulse, lock and low speed sensors available**
- **PWM control**



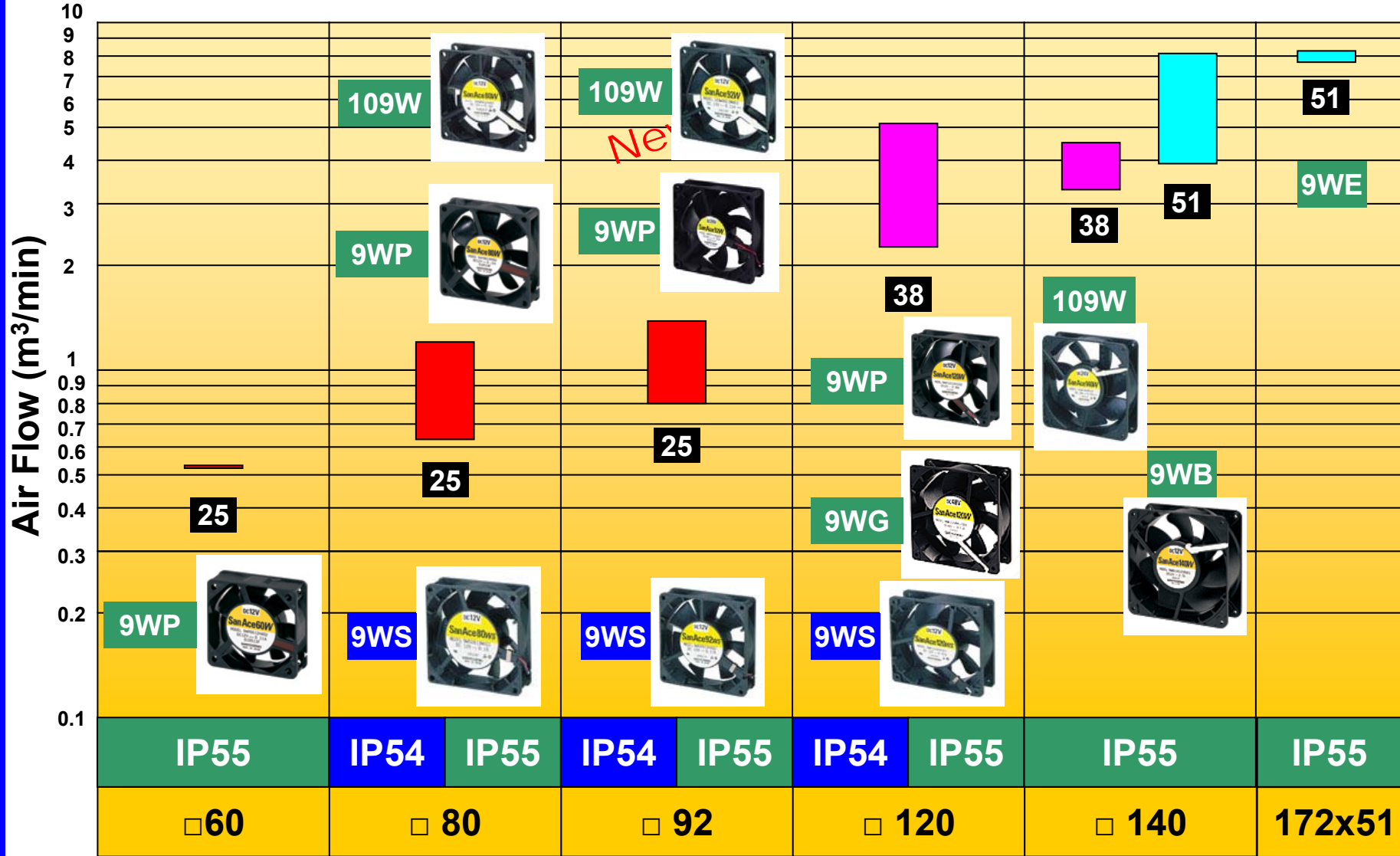
Counter Rotating Fan « CR type » : How to read Model N°

Example : 9CRA0412H401

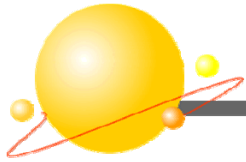




Splash Proof Fan IP54 & IP55 : Product Range



Frame Dimensions (mm)



Splash Proof Fan **IP54** & **IP55** : Features

❑ Air flow and Static Pressure Characteristics :

0.53 m³/min (18.7 CFM) – 40.2 Pa
to 8.1 m³/min (286 CFM) – 240 Pa

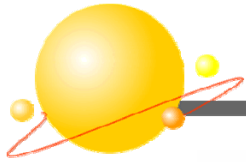
❑ Size : 7 frame size – 3 product families – 89 models

①	9WS	→	IP54 Plastic Frame
②	109W	→	IP55 Aluminium frame – Long Life
	9WB	→	IP55 Aluminium frame – Long Life
	9WG	→	IP55 Aluminium frame – Long Life
	9WE	→	IP55 Aluminium frame – Long Life
③	9WP	→	IP55 Plastic Frame

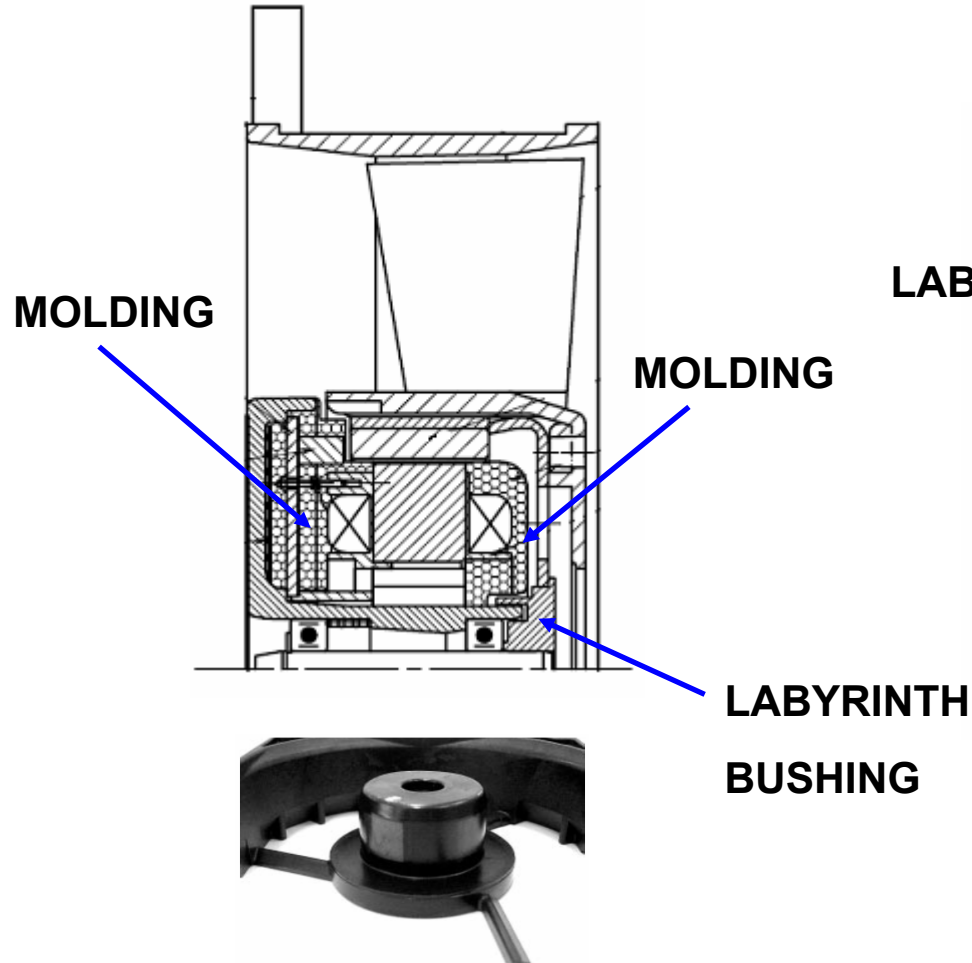
❑ Voltage : 12, 24 & 48 VDC

❑ Options : Pulse sensor, Lock sensor, Rib & ribless models

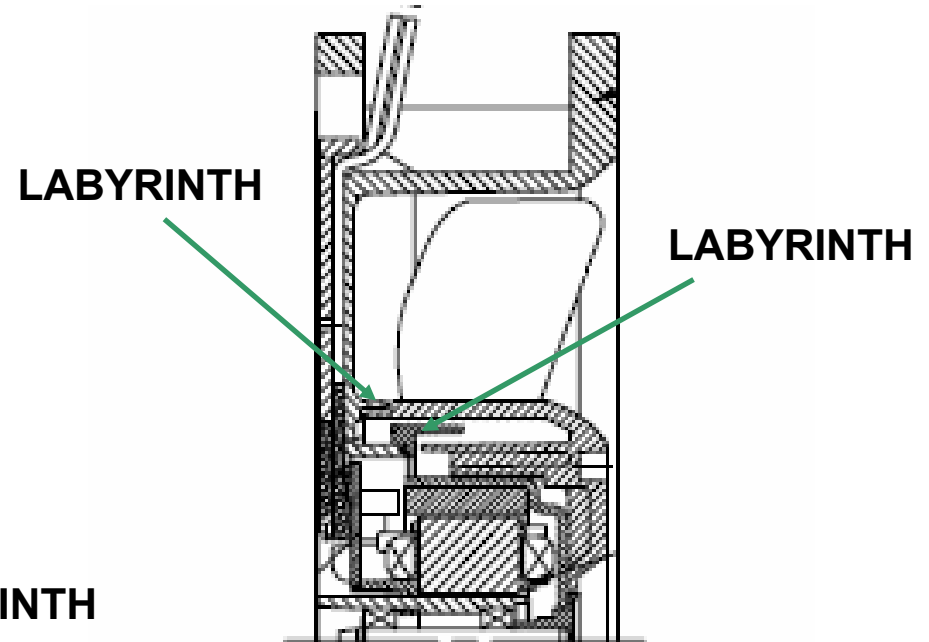




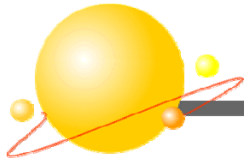
Splash Proof Fan : Construction



IP55 MOLDING CONSTRUCTION

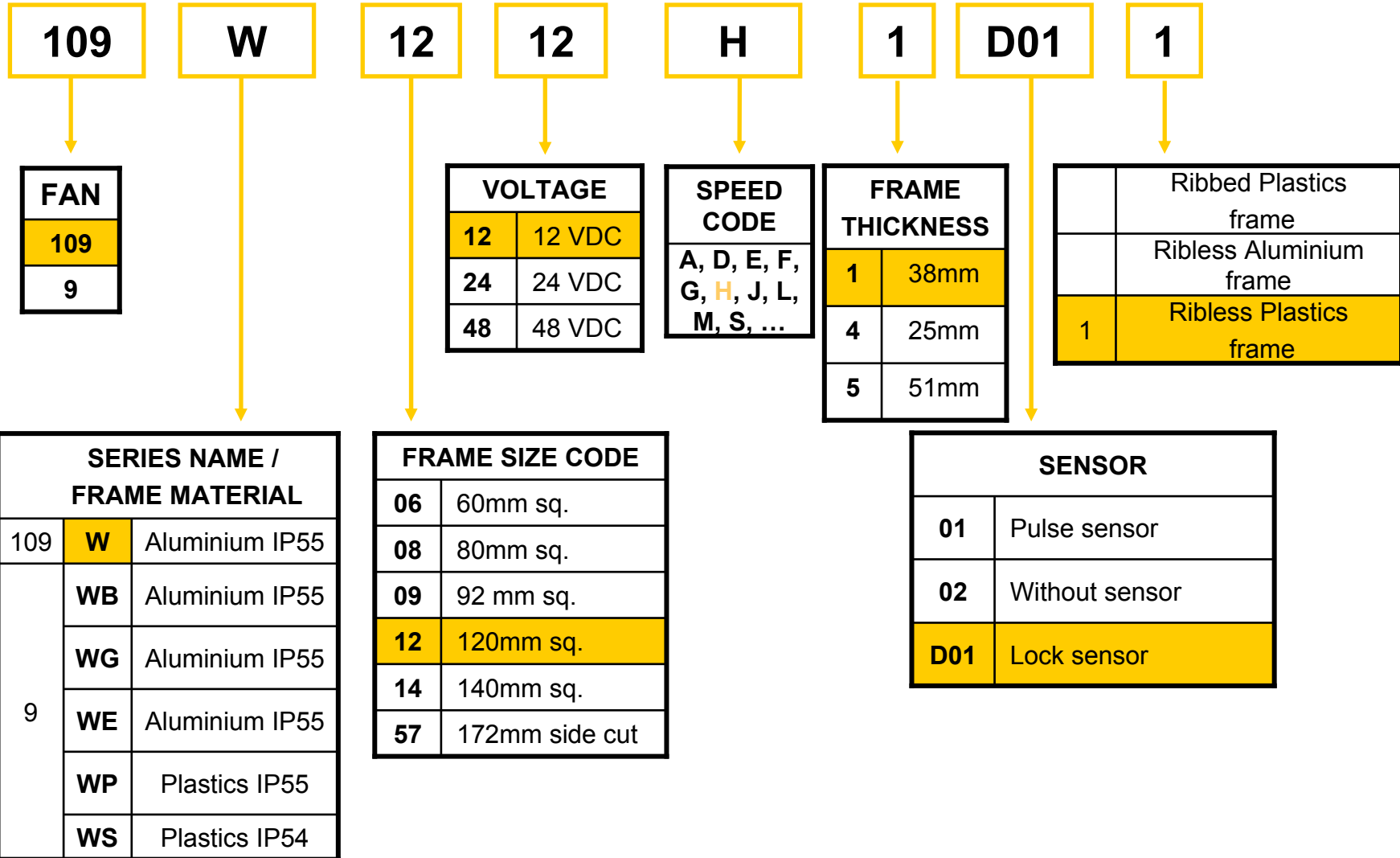


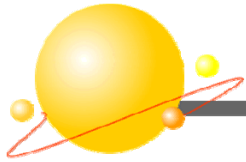
IP54 LABYRINTH CONSTRUCTION



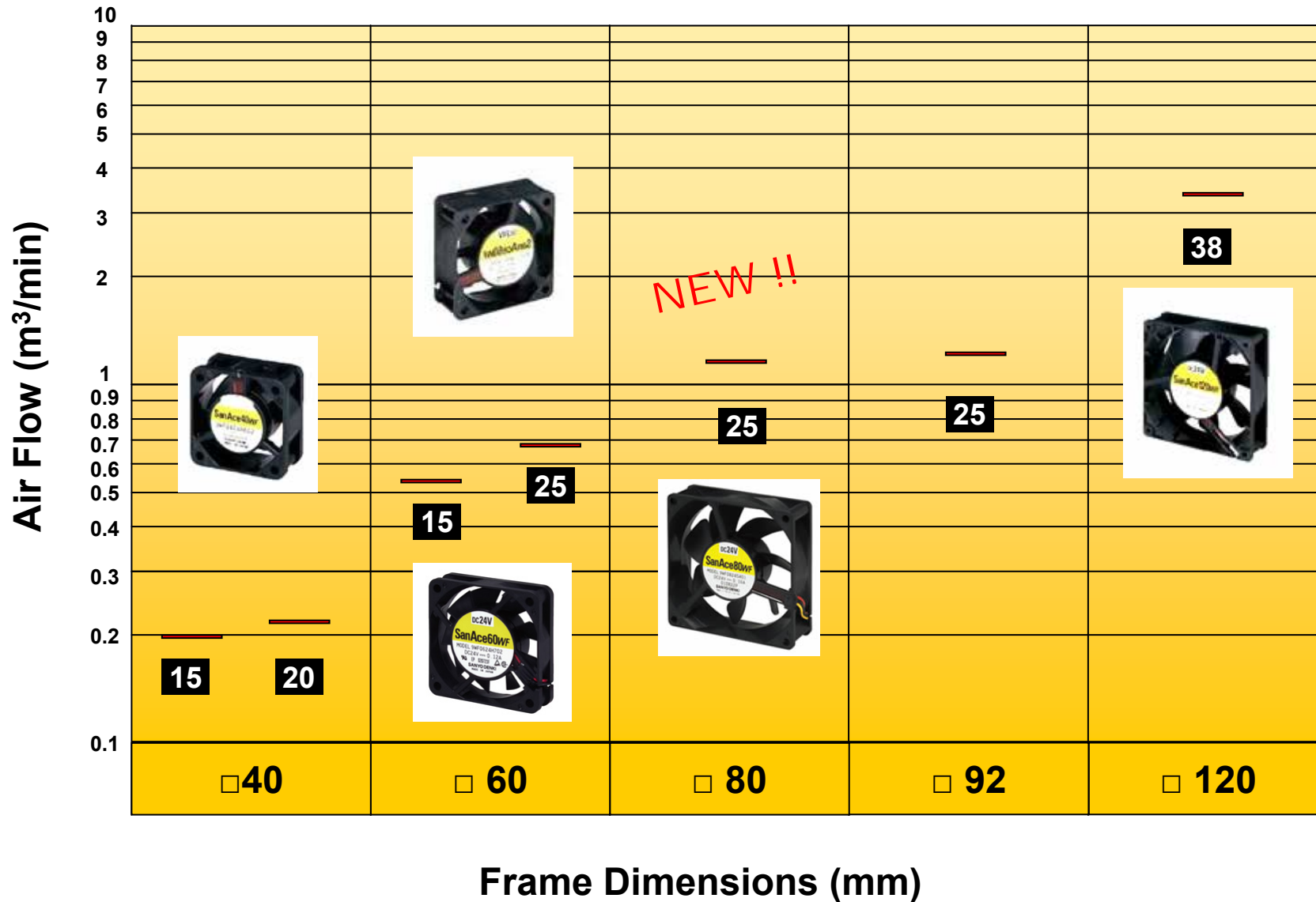
Splash Proof Fan : How to read Model N°

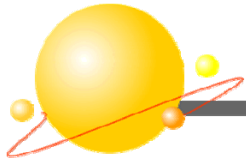
Example : 109W1212H1021





Oil Proof Fan « WF type » : Product Range





Oil Proof Fan « WF type » : Features

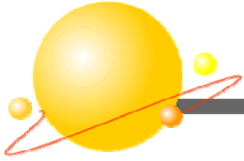
- ❑ **Air flow and Static Pressure Characteristics :**
0.26 m³/min (9.2 CFM) – 90 Pa
to 3.34 m³/min (118 CFM) – 100 Pa

- ❑ **Size :** 5 frame sizes – 7 models
9WF → Oil proof & IP 55 Plastic Frame

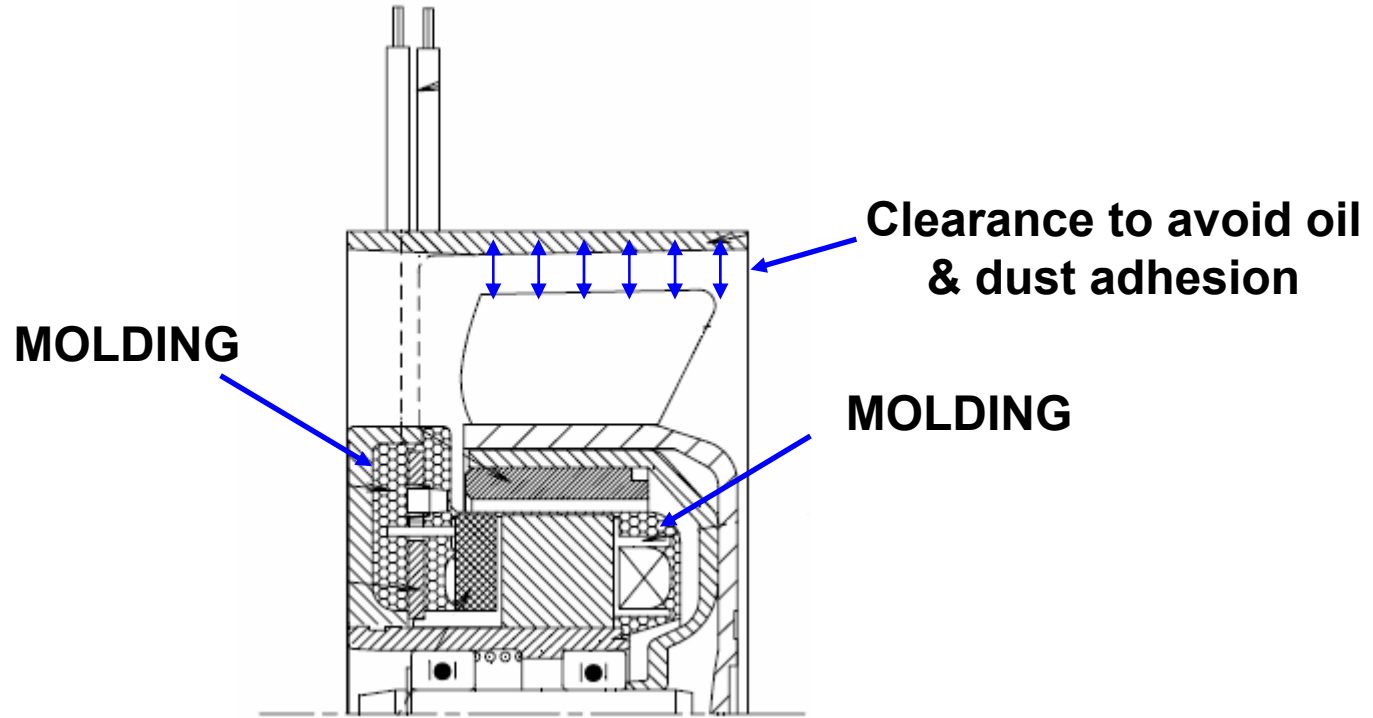
- ❑ **Voltage :** 24 VDC

- ❑ **Options :** Pulse sensor, Lock sensor

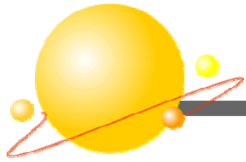




Oil Proof Fan Construction

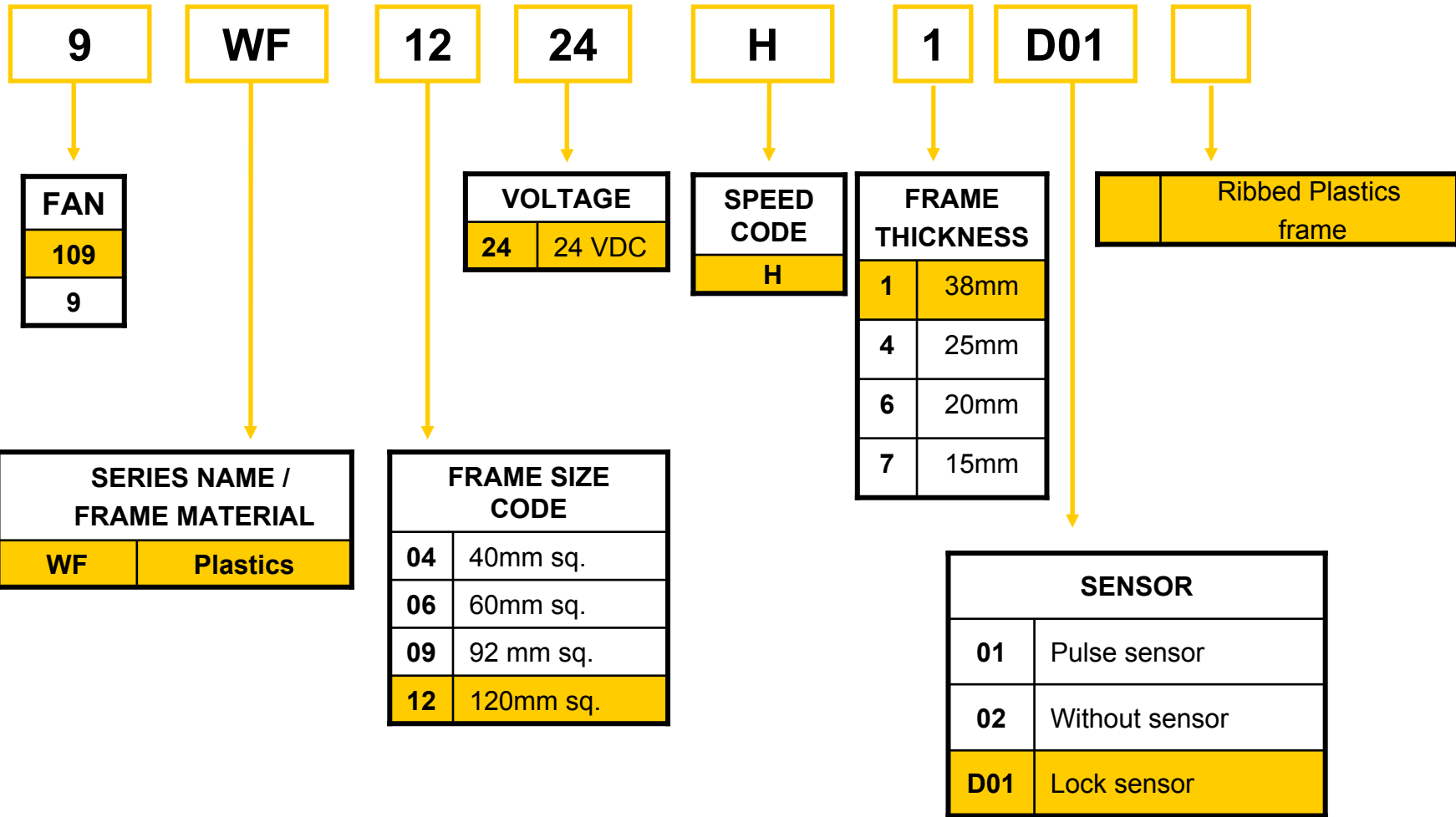


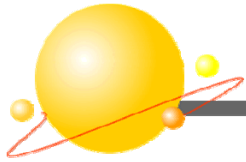
MOLDING CONSTRUCTION



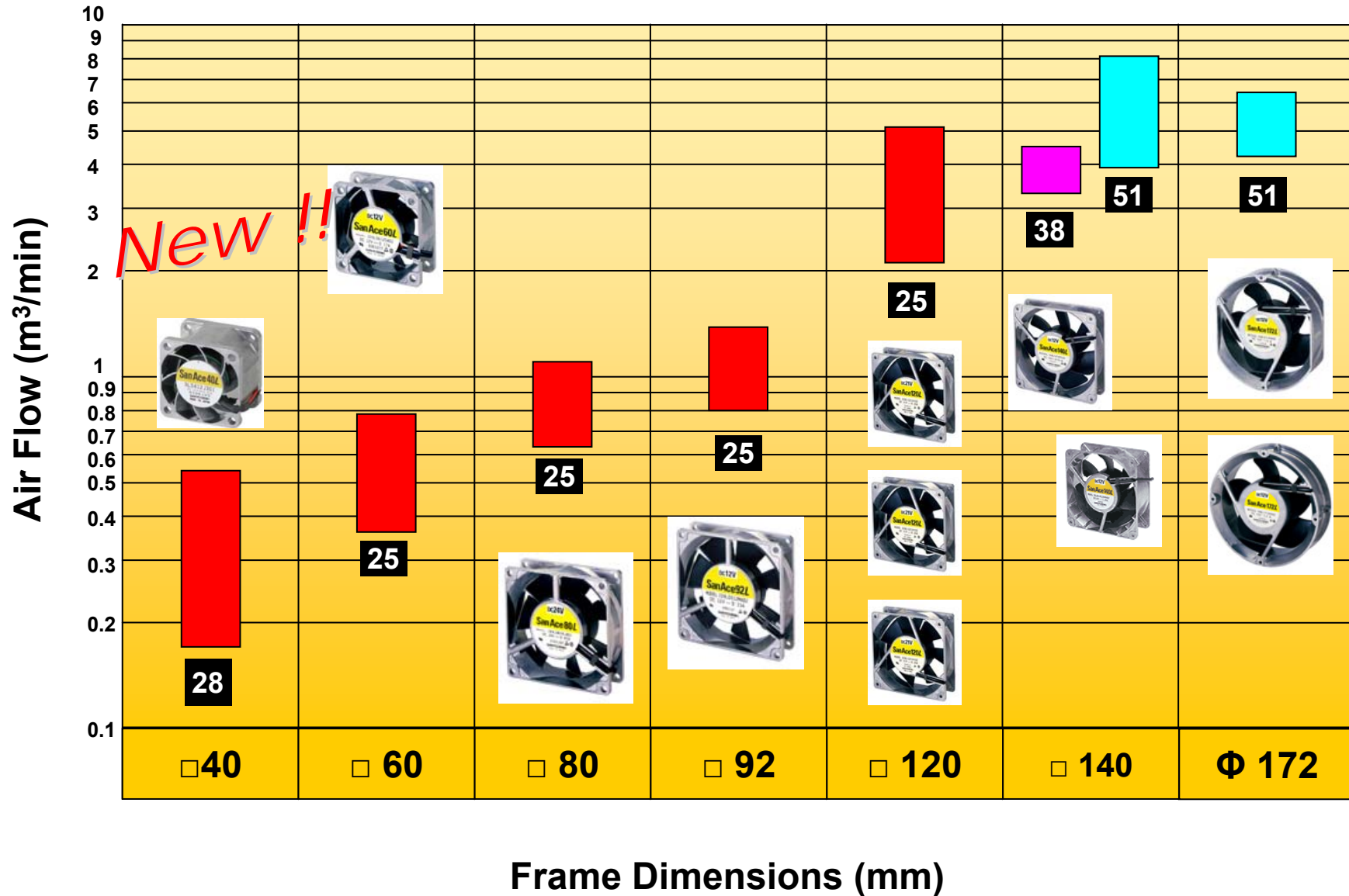
Oil Proof Fan : How to read Model N°

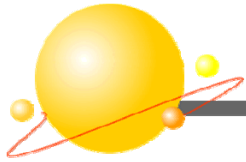
Example : 9WF1224H102





Long Life Fan « L type » : Product Range

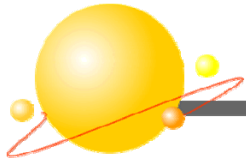




Long Life Fan « L type » : Features

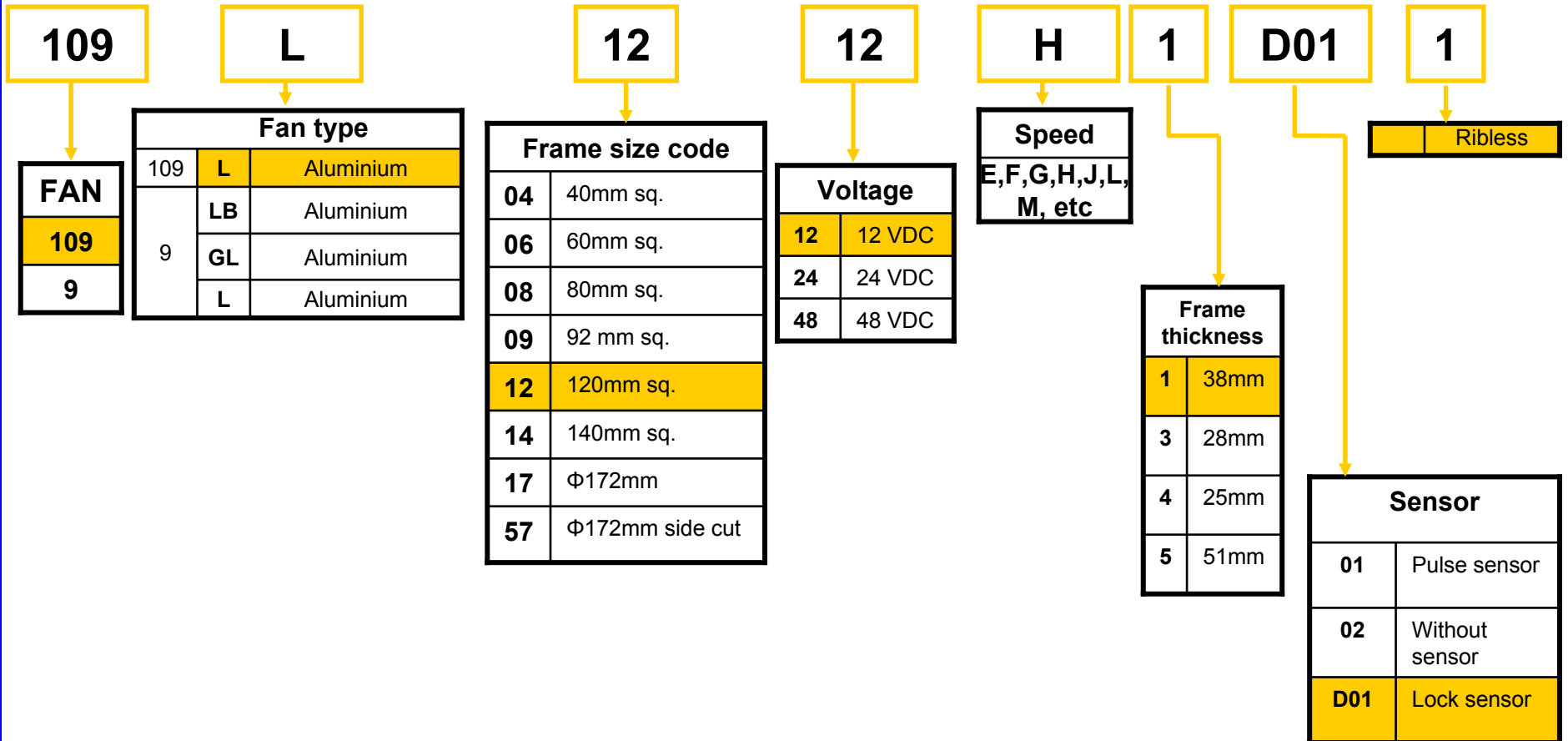
- **Air flow** : 0.16 m³/min (5,65 CFM) to 6.4 m³/min (226 CFM)
- **Size** : 40 mm square to 172 mm round (7 models)
- **Voltage** : 12, 24 & 48 VDC
- Through improvements to our standard fan configuration and materials, they now achieve lifetimes of **200,000 hours** (□120) and **100,000 hours** (□60, □80, □92, □140, Φ172) at ambient temperatures of **60°C**

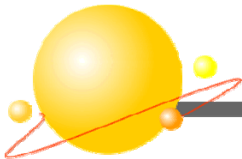




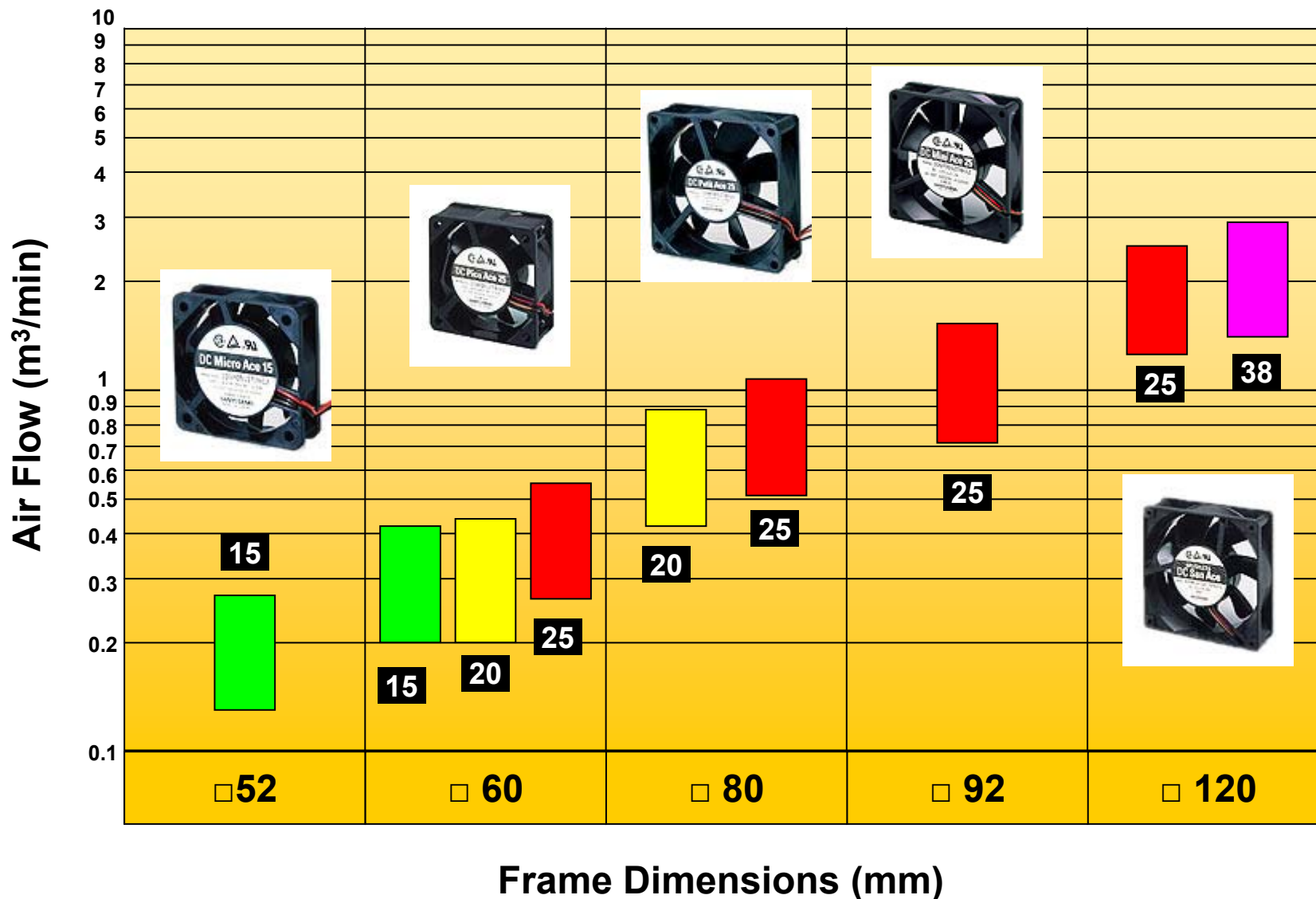
Long Life Fan « L type » : How to read Model N°

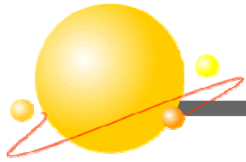
Example : 109L1212H1D01





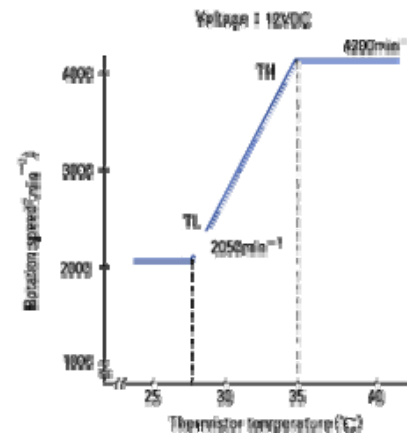
Thermally Speed Controlled Fan : Product Range

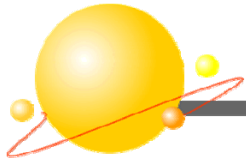




Thermally Speed Controlled Fan : Features

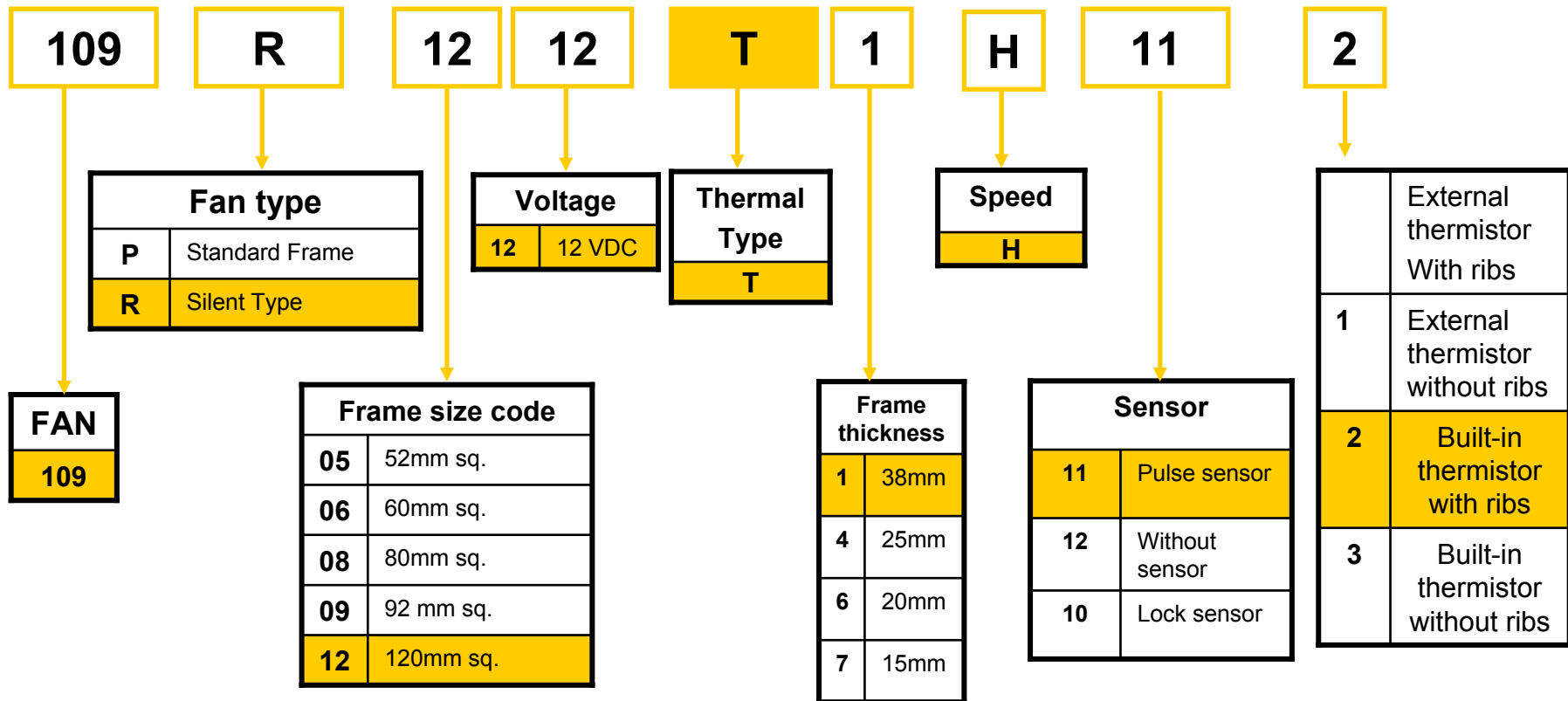
- ❑ Rotation speed varies according to temperature
- ❑ 2 types of temperature variable speed fans are available, the thermistor-embedded type and external type
- ❑ **Air flow** : 0.13 m³/min (4.6 CFM) to 2.9 m³/min (102.4 CFM)
- ❑ **Size** : 60 mm square to 120 mm square (5 models)
- ❑ **Voltage** : 12 VDC

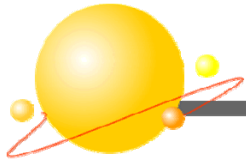




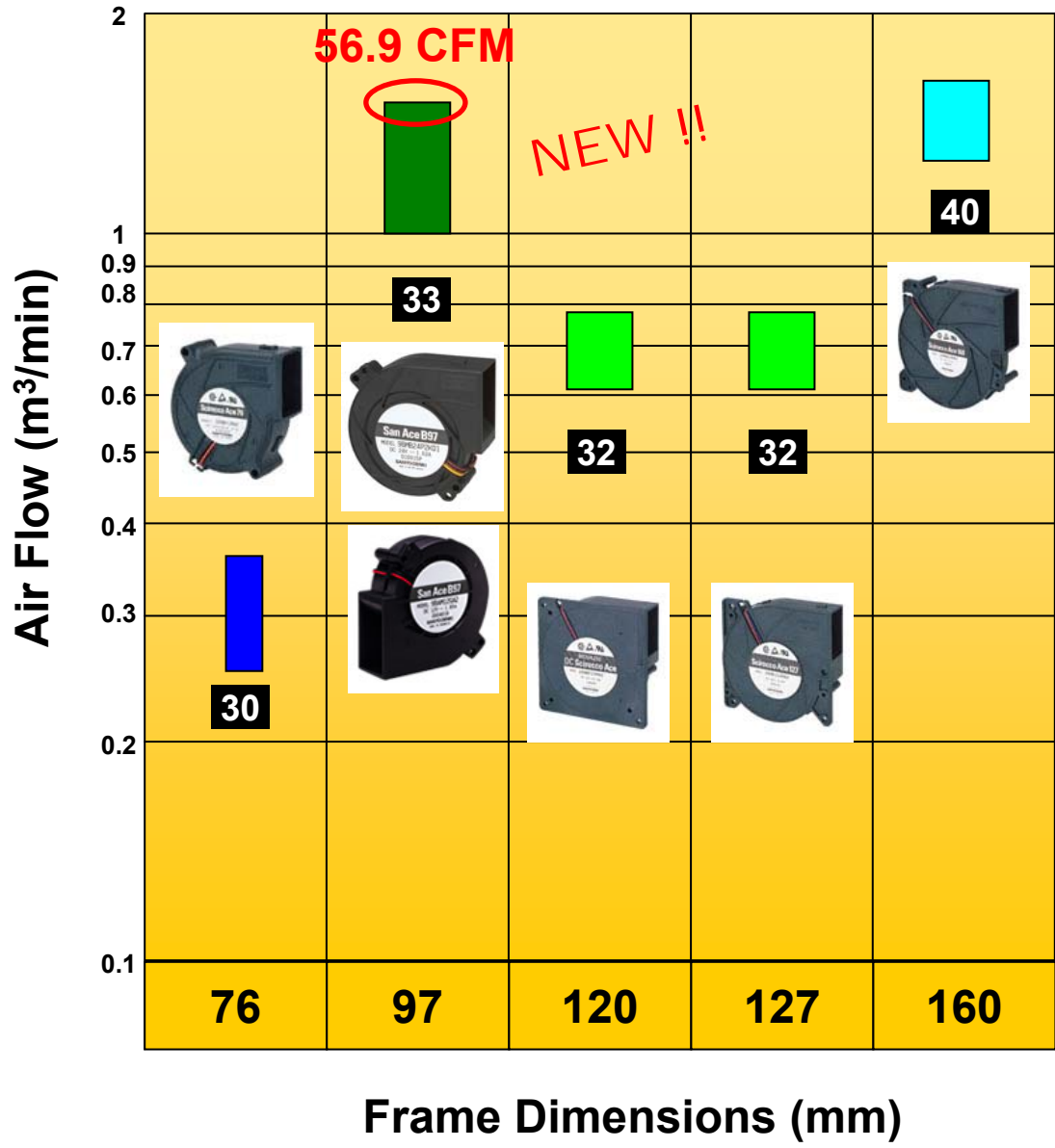
Thermally Speed Controlled : How to read Model N°

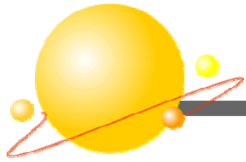
Example : 109R1212T1H112





BLOWER FAN

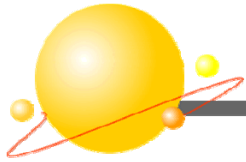




BLOWER FAN

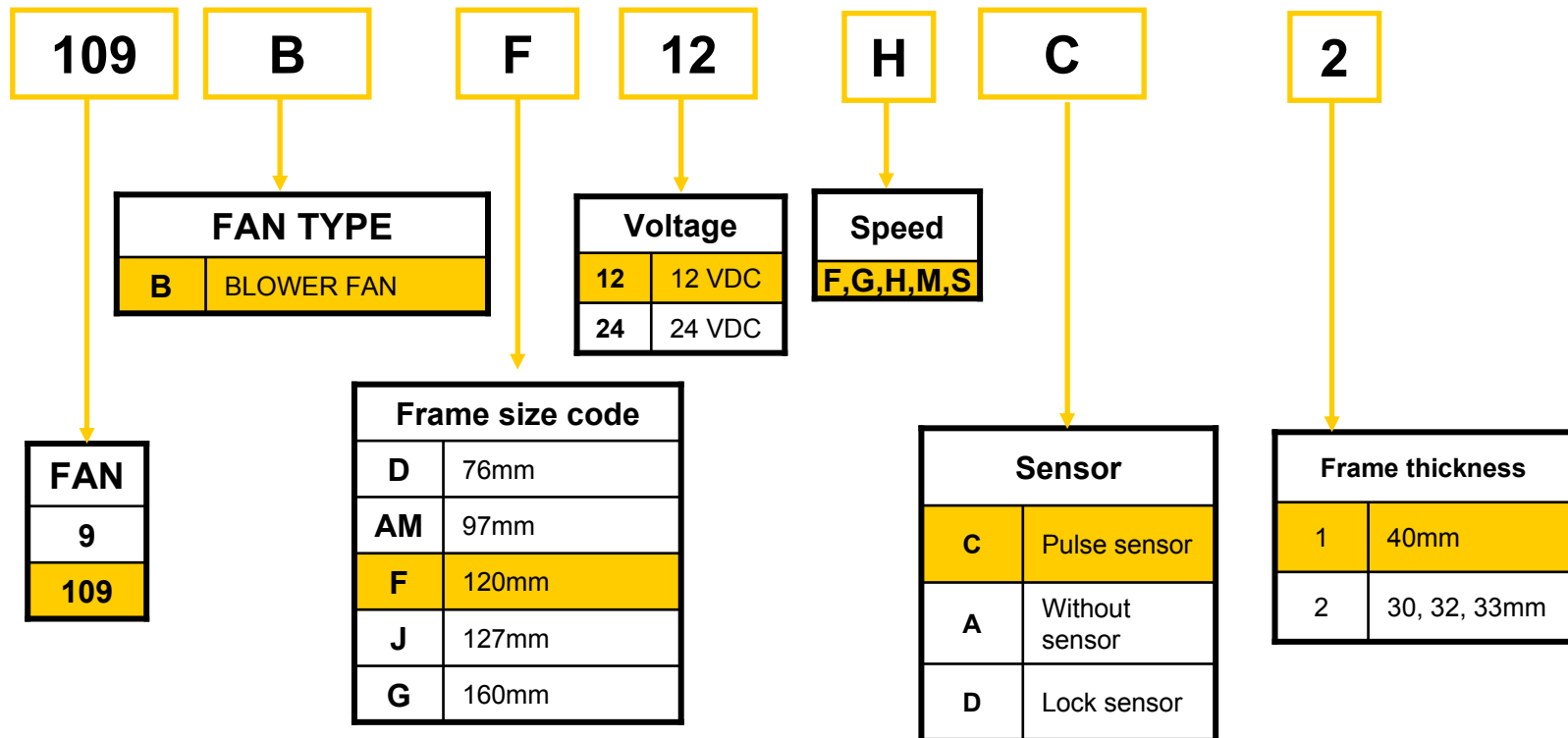
- ❑ Suitable for direct cooling a heat source / 90° airflow
- ❑ Air flow : 0.25 m³/min (8.8 CFM) to 1.62 m³/min (57.2 CFM)
- ❑ Size : 76 mm square to 160 mm square (5 models)
- ❑ Pulse and lock sensor available
- ❑ Life Expectancy : 40000 h @ 60°C
- ❑ PWM control and Analog control under request

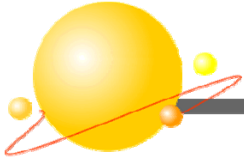




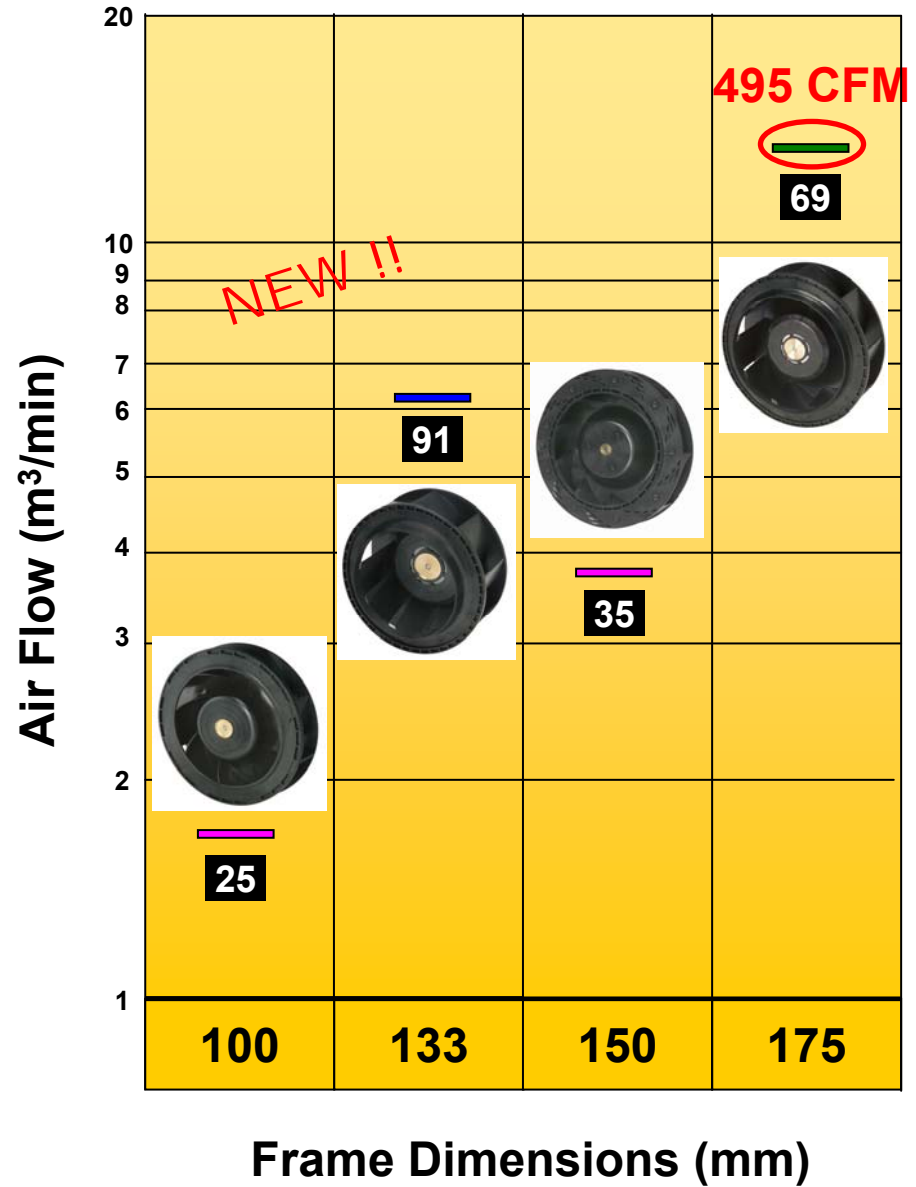
BLOWER FAN : How to read Model N°

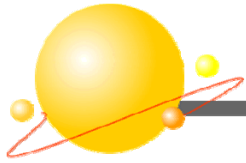
Example : 109BF12HC2



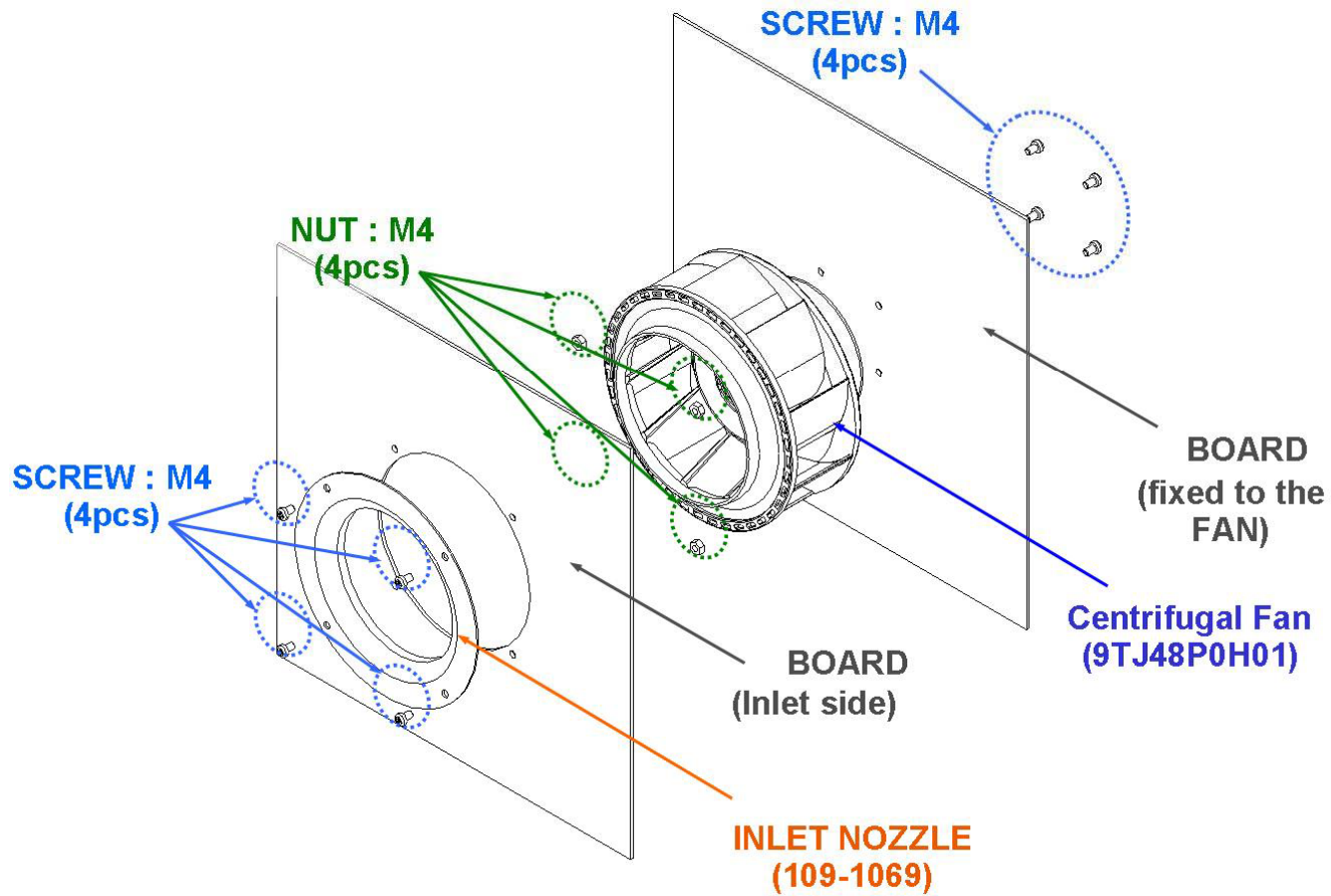


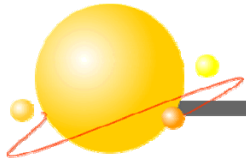
CENTRIFUGAL FAN





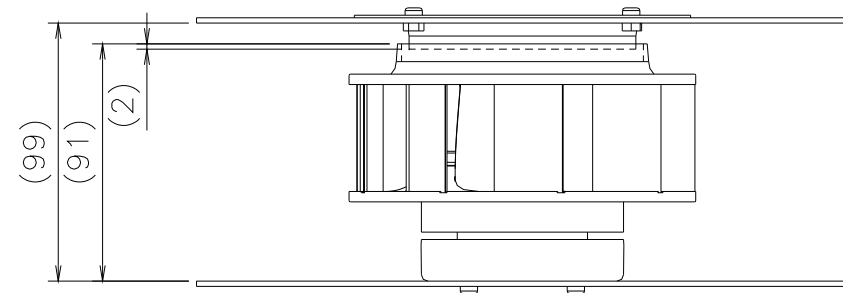
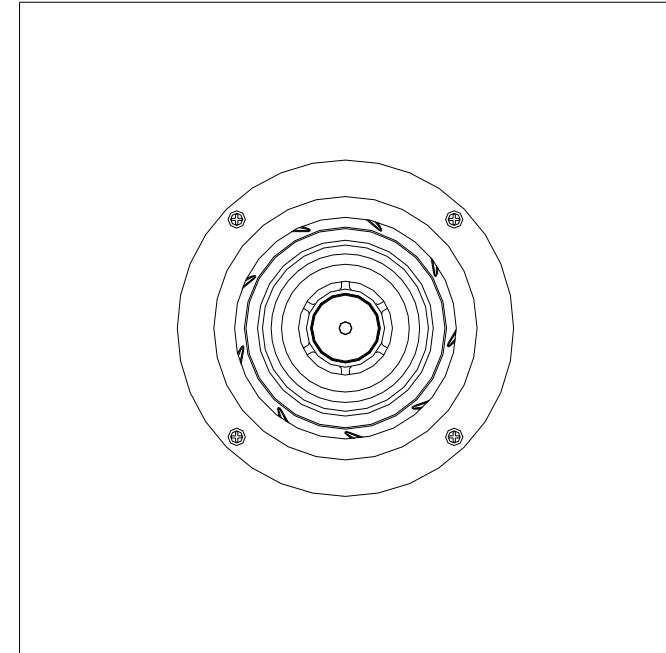
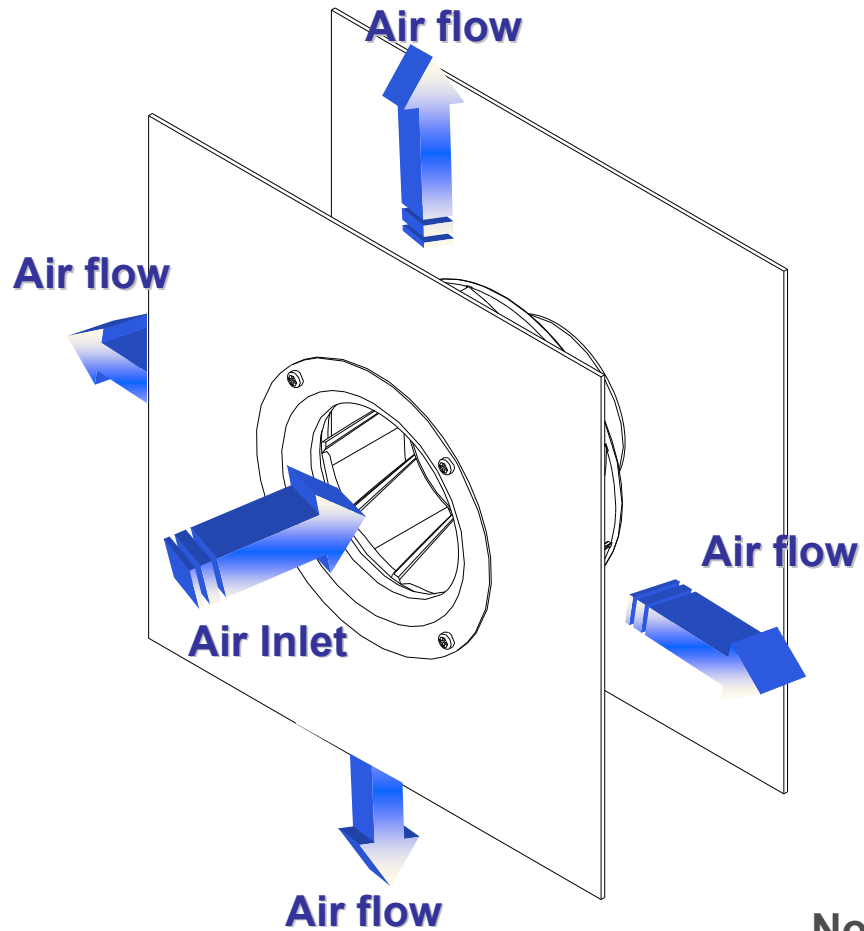
Installation & structure



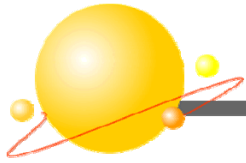


Installation Examples

Installation Example of Centrifugal & Inlet Nozzle



Note: This is the example of $\phi 133 \times 91$ Centrifugal Fan (9TJ48P0H01)



Installation Examples

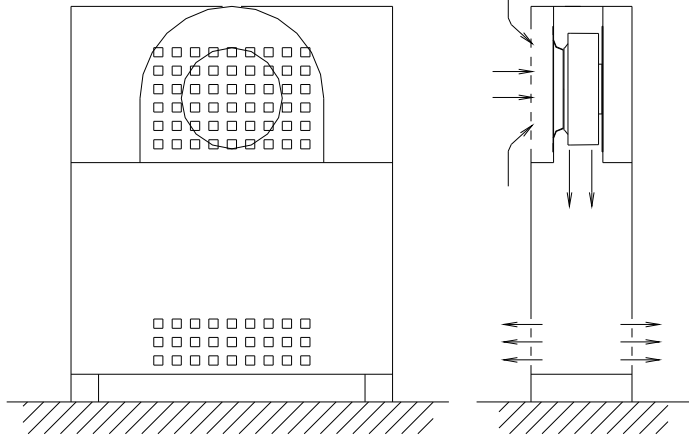


Fig.1 Vertical(Inlet)

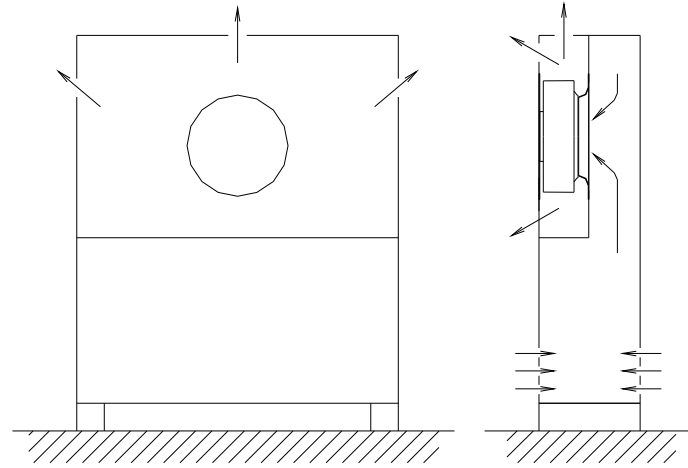


Fig.2 Vertical(Outlet)

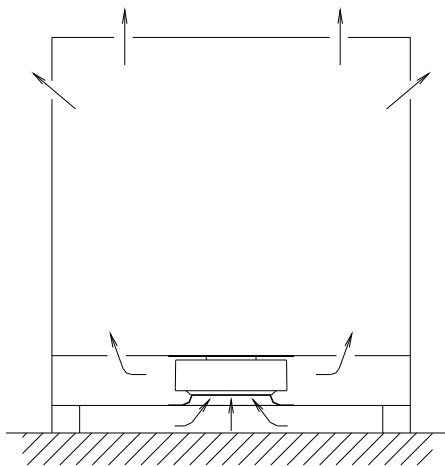


Fig.3 Horizontal(Inlet)

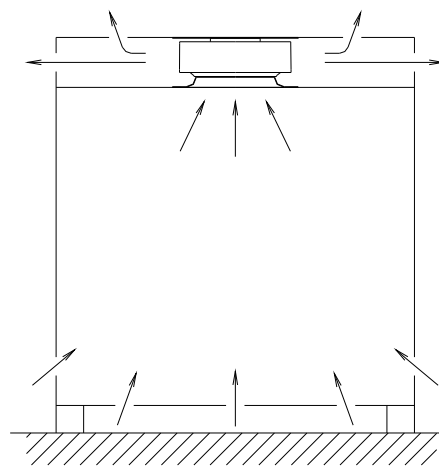


Fig.4 Horizontal(Outlet)

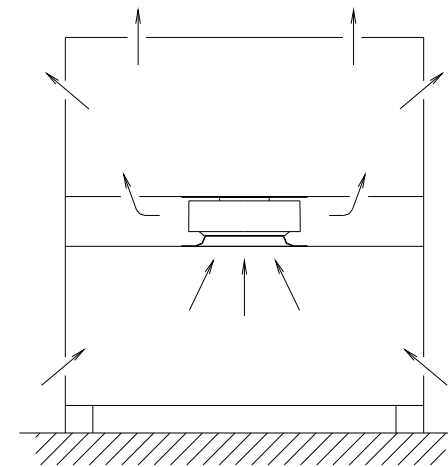
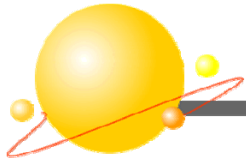
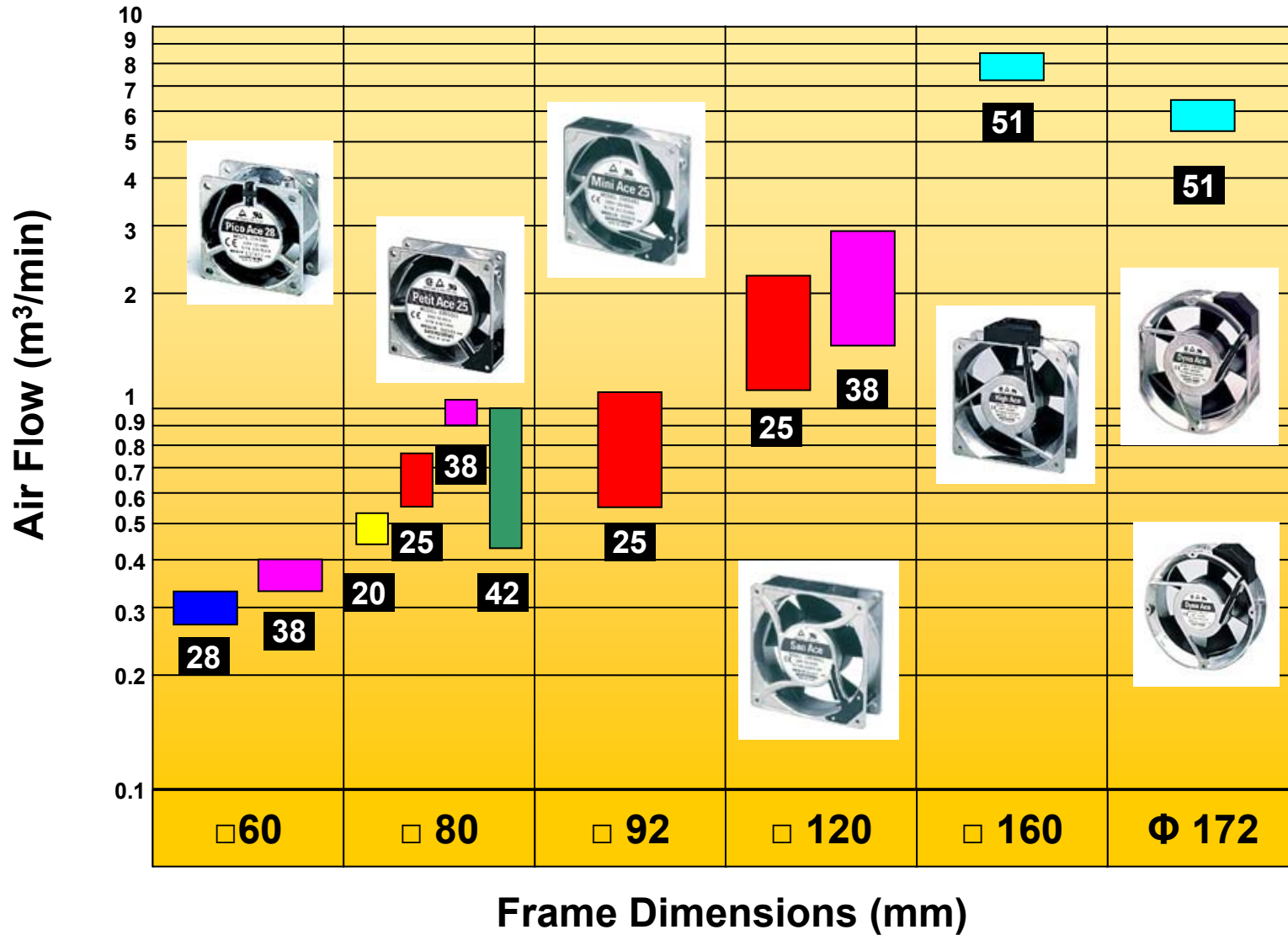
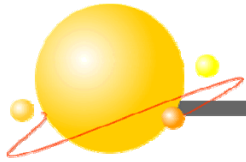


Fig.5 Horizontal(Middle)



AC Axial Fan

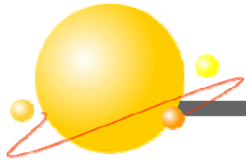




AC Axial Fan

- ❑ 100 VAC to 230 VAC
- ❑ **Air flow** : 0.27 m³/min (9.5 CFM) to 8.5 m³/min (300 CFM)
- ❑ **Size** : 60 mm square to 172 mm round (6 models)
- ❑ **Life Expectancy** : 25000 h @ 60°C
- ❑ Rotating speed sensor available





CPU COOLER – last models

Intel®Pentium®4 (Socket478)

109X9912T0D516



Intel®Pentium®4 (LGA 775)

109X9212PT0H016



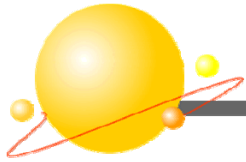
LGA : Land Grid Area

Socket 478 or LGA : physical connection between processor and motherboard.

478 : number of pins

775 : number of points (no more pins)





CPU COOLER – last models



**BTX standard CPU cooler
for Intel® LGA 775 package**

109G0912P*2E012

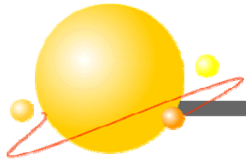
BTX : Balanced Technology eXtended

Standard developed by Intel to replace ATX

LGA :Land Grid Area

**(physical connection between processor and
motherboard)**

775 : number of points (no more pins)



CPU COOLER – last models



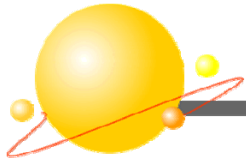
**Intel® Xeon® Processor
771-land LGA Package**

109X8712PT0S016

LGA :Land Grid Area

**(physical connection between processor and
motherboard)**

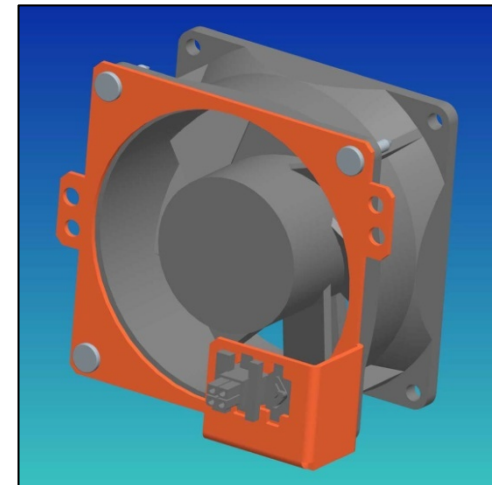
771 : number of points (no more pins)

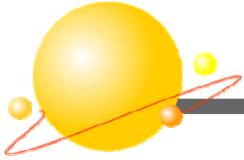


CUSTOMIZED EQUIPMENTS

ON DEMAND

- Electrolytic corrosion proof fan motors
- Program controlled fan motors
- Liquid Cooling Fan





Production & Factories

- Sanyo Denki produces around **3100000 fans / month** 1,19 fan each second !
 - Turbines 400 K
 - CPU Coolers 1200 K
 - AC & DC Fans 1500 K
- 2 factories (1 in Japan & 1 in the Philippines)
- The mean production lead time is about 6 weeks



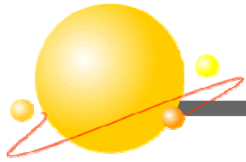
Fujiyama Works

Total area: 86260 m²
Number of employees: 339
Production capacity: 650000 fans/month

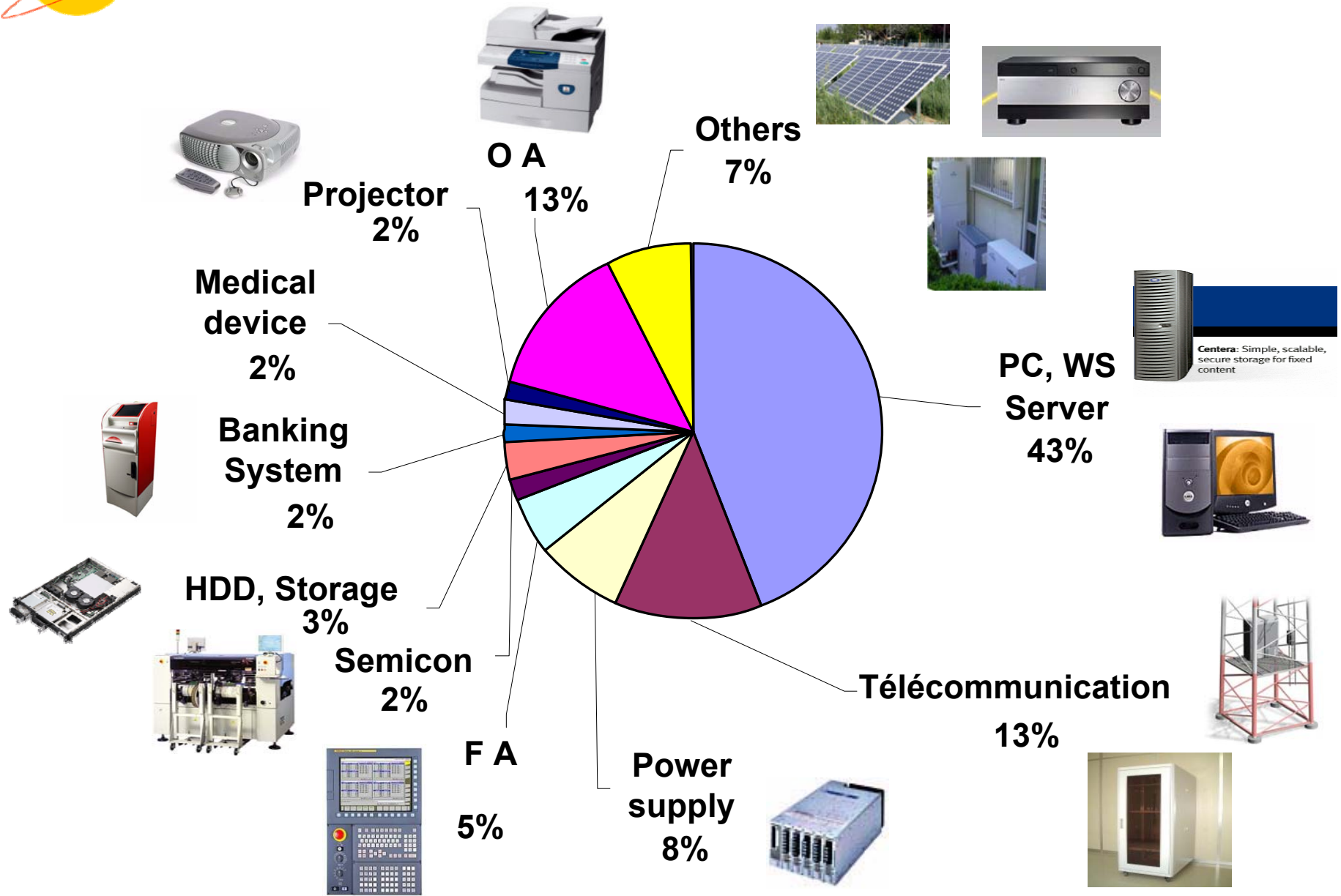
Subic Works (Philippines)

Total area: 43000 m²
Number of employees: 1792
Production capacity: 2600000 fans/month

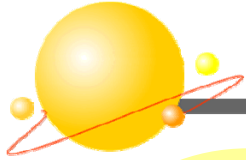




Fans sales by application



Centera: Simple, scalable, secure storage for fixed content



Sanyo Denki sales arguments

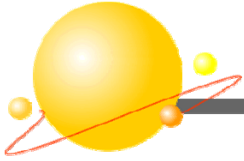
- 1 Largest product portfolio in the industry**
 - DC axial, AC axial, Blower, Centrifugal, CPU cooler
 - 5, 12, 24, 32, 48 VDC
 - 13 frame sizes (DC axial)

- 2 High performance and high reliability**
 - High airflow, high static pressure,
 - Wide temperature range (-10° C - +70° C)
 - Long life time (max. 100 000 hours)
 - Low noise
 - Low power consumption

- 3 Technology leader : 9CR, silent fans, low vibrations, endurance fans, ...**

- 4 Market leader for 1U market**

- 5 Value added services : connectors, fan tray, ...**



Thank You