A i r m o v e r s

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NMB-Minebea AIRMOVERS CATALOGUE

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NMB-Minebea GROUP PROFILE

'Delivering Excellence Through Precise Solutions'



Precision OEM Components

NMB-Minebea is a comprehensive manufacturer of OEM components for a wide variety of applications.

Products include miniature, small and specialist ball bearings, rod end and spherical bearings, small motors, floppy disk drive subassemblies, computer keyboards, cooling fans and blowers and a host of other precision components indispensable in the manufacture of information technology and telecommunications equipment, household electrical appliances, civil and military aircraft, automobiles and a wide range of other applications.

Global Operations

The NMB-Minebea Group comprises 58 subsidiaries and affiliates in 15 countries employing over 45,000 people.

These companies operate 40 plants, where they manufacture products which are distributed worldwide through 57 sales centres. All factories operate to internationally recognised Quality Assurance standards. In Europe, NMB-Minebea has 5 manufacturing operations, 5 Research and Development centres and four sales and distribution companies employing 1200 people.

Clean and Technologically Advanced Facilities

NMB-Minebea has built vertically integrated global manufacturing facilities.

These facilities engage in the mass production of superior-quality products and have stringent environmental conservation standards, helping ensure that they are welcomed by local communities.



NMB-Minebea EUROPEAN OPERATIONS

Global Reach, Personal Service

European Sales Offices

United Kingdom NMB-Minebea UK Ltd

UK Head Office TEL: +44-(0)1522 500 933

UK Sales Office TEL: +44-(0)1344 426 611

Germany NMB-Minebea-GmbH TEL: +49-6103-913-0

Italy NMB Italia S.r.L. TEL: +39-02-939711

France NMB-Minebea S.a.r.l. TEL: +33-1-34083939



NMB-Minebea sales operations In Europe. Based in France, Germany, Italy and UK

The NMB-Minebea sales operations in Europe have been set up to provide a high level of customer care. Each geographic location has specialist product sales engineers in the field discussing customer requirements on an ongoing basis.

The sales engineers work closely with the local sales co-ordinators to ensure the smooth flow of product, and are supported by the product engineering and R&D departments for the development of new business. The sales co-ordination function provides the link with the manufacturing operations and manages the supply chain, which includes central and local warehousing as appropriate.

The entire European operation is backed up by state-of-the-art communications, order processing, material management, accounting and other support systems to assist in the provision of high levels of customer care.



Spherical Bearings



EC Motors



Ball Bearings



Airmovers



Keyboards



Audio Components



NMB-Minebea R&D OPERATIONS





PMDM Airmovers Division Villingen Germany



NMB-Minebea Manufacturing Unit Karuizawa Japan



NMB-Minebea Electronics & High-Tech Components Shanghai China

R&D operations in Europe form part of a world-wide team developing Air Mover products for the NMB-Minebea Group. Our Air Movers divisions in Germany and Japan work together to optimise the manufacture and transfer of products, tools and production lines.

Karuizawa, Japan is the parent plant for Minebea's fan division, where vertical integration and mass production technologies are perfected.

Products are developed and transferred after stringent design review and testing to the required standards. Thereafter, regionally developed products become available to NMB-Minebea's world-wide sales teams as standard products. Airmover R&D operations work closely with other NMB-Minebea product groups, to offer customers a unique combination of engineering experience and a capability to develop higher assembly products for customer specific applications.

Blower modules comprising customised fans driven by the latest brushless dc drive & motor technology combine with power supplies and controllers to offer thermal management solutions for the latest electronics packaging applications.





NMB-Minebea AIRMOVERS DIVISION



Customer Service

NMB-Minebea offers four main sales office locations for it's European Operations, each providing localised application and customer service support for our customers, including links to other NMB-Minebea Group sales offices worldwide in support of global projects.

NMB-Minebea sales and application engineers work closely with customers to identify optimum NMB-Minebea products for a wide variety of applications requiring high reliability solutions.

Having identified and demonstrated the NMB-Minebea product solution, sales co-ordinators provide the link with manufacturing operations to manage the supply chain, including the provision of central and localised warehousing to complete an efficient and cost effective level of customer service.

Engineering Support

The Airmovers Division of PMDM [Precision Motors Deutsche Minebea] operates a fan and motor engineering support centre at VS-Villingen, Germany, providing a fully resourced design, development, prototype build and testing facility for all fan related products.

An experienced team offers quick and reliable application support for standard NMB-Minebea products, together with the development of blowers and customised solutions for a wide variety of commercial applications, including airconditioning, refrigeration and heat management systems.

Only after extensive testing are the newly developed products transferred from the Airmovers Division of PMDM in Germany to the volume manufacturing operations of NMB-Minebea in China. The integrated test facilities at PMDM includes airflow, noise, EMC, vibration and other environmental test equipment for product qualification and customer approval. In addition, software design tools enable our engineers to respond to customers' requests for new products using CFD for system, thermal and fluid flow analysis. Our engineers can model all aspects of the product, including application and design assistance for our customer's total systems.

NMB-Minebea STANDARDS

Quality and Environmental Protection

NMB-Minebea has developed ultraprecision machining technologies in parallel with its bearing operations. A ball-bearing is a typical machineprocessed part and very little about this basic part has changed in more than a century.

Today however, miniature ball bearings are the most crucial high precision machined components in industry and the key element in determining performance and quality of innumerable products, including PC's and other information and telecommunications equipment and household electrical products.

The precision of a ball bearing is determined by raceway roundness of inner & outer rings, sphericity of balls and the raw materials used. Improving precision is a demanding process. Moreover, the ability to mass produce high-precision ball bearings while ensuring a stable level of quality requires production lines composed of high-precision machining and assembly equipment, as well as high level maintenance technology to ensure line efficiency.

NMB-Minebea has amassed specialist knowledge over the last 50 years that delivers a precision level unequalled by competitors. The difference lies in our vertically integrated manufacturing system, evolved within the ball bearing division and replicated in all other NMB-Minebea product manufacturing divisions.

ISO 9000

NMB-Minebea supplies products to a world market which demands that uniform high quality is maintained, regardless of where those products are manufactured. NMB-Minebea's reputation for high quality is reflected in the fact that we have obtained ISO 9000 series certification, the international standard for quality assurance, in all product categories.

ISO 14001

NMB-Minebea considers environmental protection of primary importance and has taken effective steps to protect the environment at its manufacturing facilities throughout the world. Today, all of NMB-Minebea's main production plants have ISO 14001 certification, having eliminated specified CFC's from production processes by 1993. This was facilitated by propriety washing systems that use purified and deoxidized water.

Also, in line with its commitment to ozone-layer protection, NMB-Minebea actively discloses information on the technology used in these systems. NMB-Minebea has an open door policy to local residents, corporations, universities and government officials interested in touring the plants' wastewater treatment facilities.

EPA Stratospheric Ozone Protection Awards

The U.S. Environmental Protection Agency (EPA) gives these awards to groups, individuals and corporations that it judges have made significant contributions to efforts to protect the ozone layer. NMB-Minebea has been recognised by the EPA on three occasions, in 1993, 1995 and 1997, the last of which was awarded to the entire Group as "Best of the best" among the previous 10 years' award winners.





Introduction

In this section of our brochure we set out the basic principles used in fan engineering, including useful formulae, and we describe the fan types and options available leading to the selection of a suitable NMB-Minebea fan. NMB-Minebea offers a wide range of fans and blowers, from simple tube axial types for general cooling applications through to customised blower modules, complete with power conversion, fan speed control and monitoring, and emc protection, as part of a total capability and customised approach to cooling / heat management.

As electronics packages get smaller and more densely packed, so it becomes increasingly more difficult to provide cooling solutions to meet reliability and environmental requirements which are also becoming more demanding. NMB-Minebea engineers work to meet these demands by improving fan performance capabilities, together with improvements in both fan and motor efficiencies.

Fan Selection Process

Before attempting to select a fan, it is necessary to have some basic requirement information, as set out on the NMB-Minebea enquiry form.

The airflow required to cool a system can be easily calculated. Given the amount of heat to be removed and the permitted temperature rise of the cooling air,

$$m_a = Q/(c_p \times \Delta t)$$

- m_a air mass flow kg/s
- Q heat to be removed kW
- cp specific heat of air, kJ/kg K
- Δt cooling air temperature change, °C

The cp of air is taken as 1.01 kJ/kg K. Typical systems allow 10°C cooling air temperature rise.

The required air mass flow can be calculated from the equation above, and converted to air volume flow using the air density. At 20°C and sea level, the density of air is 1.2 kg/m3.

$$V = 3600 \text{ x } \text{m}_{a}/\rho$$

V	airflow, m ³ /hr
ma	air mass flow, kg/s
ρ	air densitv. ka/m3

In some systems considerations other than simple air temperature rise are necessary, and in many systems the cooling air density is not 1.2 kg/m3. NMB-Minebea engineers are available to help in the calculation process, but the equations above give an initial value.

Minebea	Fan Enquiry Form
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Pressure Losses

To specify a fan operating point – the "duty point" – the pressure losses through the system must also be stated. The duty point is the intersection of the fan performance curve and the system resistance curve.

System resistance can be determined in a number of ways:-

- by calculation
- by Computational Fluid Dynamics (CFD)
- by pressure measurements on a system using a trial fan
- by direct measurement of pressure losses through a complete system

NMB-Minebea engineers can advise on pressure losses, and can measure the losses through complete systems.



Fan Performance Measurement

NMB-Minebea uses a performance test chamber complying with British, American and International standards to measure flow and pressure of its fans. The test equipment at VS-Villingen is the same as is used at all NMB-Minebea development locations worldwide. The equipment is computer controlled, and generates performance curves automatically. This same chamber can be used to measure system pressure losses.

System Considerations

With electronics getting smaller, and components getting more powerful, the need to cool effectively becomes more important. Thermal management should be considered as one of the most important aspects of equipment design to ensure long term reliability. With extensive experience, a wide range of Airmover products and the latest CFD software, NMB-Minebea engineers can advise on system design.

Within a system, air will flow where it meets least resistance. Generally, low air velocities, particularly through inlet and outlet to the equipment, will reduce pressure losses. Inlet and outlet open areas should be made as large as possible. If the installation allows, some form of conical or curved inlet to the fan will improve its installed performance. Obstructions close to fan inlet and outlet should be avoided, as should sharp edged orifices and meshes. Guards should be only as fine as is required for safety considerations. Sudden changes in airflow velocity cause undesirable pressure losses, so should be avoided whenever possible.

Two options are open to the designer; either pressurise or evacuate the enclosure. When evacuating the enclosure by sucking air out of it, no heat load is added from the cooling fan motor. Air can be distributed through the system by providing inlets at various locations. However, this can cause problems of dust ingress to the system. Also, the fan handles air at the maximum system temperature, due to the equipment heat load, with consequent effect on life.

In contrast, a pressurised system can have the inlet air filtered at the fan inlet. In this configuration the cooling air entering the fan is at ambient temperature, improving the reliability of the fan. The fan motor raises the temperature of air delivered to the system, but this is normally by less than 1°C.

Critical components should be located close to the cooling air inlet i.e. at the coolest position, and high power dissipating components close to the outlet.

Noise

In many applications the fan is the only noise generator in the system. Noise reduction is of ever increasing importance, and noise considerations are therefore an important part of the selection process. Unfortunately, the



fan designer can only quantify the aerodynamic noise generated by the fan in isolation, and it is often the installation which causes objectionable noise and discrete tones.

The human ear can just detect a change in noise level of 3 dB, and can clearly discern a change of 6 dB. Reducing fan speed by 20% will reduce noise by about 5dB. Fan speed should therefore obviously be kept as low as possible.

Noise generation can be minimised by:-

- avoiding obstructions close to the fan inlet and outlet
- using vibration isolators to prevent transfer of mechanical noise and vibration. Fans must be balanced to a satisfactorily high standard
- stiffening enclosure surfaces and structure, to eliminate resonant frequencies
- mounting fans on interior surfaces, rather than exterior surfaces.
 Enclosure attenuates noise generated by fans
- avoiding the use of guards and meshes that cause turbulence.
 Circular cross-section wire guards give lower pressure losses and lower noise than sharp edged grilles
- locating meshes at low air velocity positions
- use of larger, slower fans, if space permits

NMB-Minebea has equipment enabling measurement of fan generated noise levels, either on fans in isolation or within customers' enclosures. Noise data is normally presented as a statement of Sound Power Level or as a statement of Sound Pressure Level at 1 meter from the fan in free radiation conditions, together with the 1/3rd octave spectrum.

Fan Life and Reliability

Fan Life Testing

Life expectancy of a cooling fan is a critical element in thermal design. NMB-Minebea uses parametric failure modes during life testing to calculate for life expectancy. Speed (RPM)and Current (mA)failures include both "hard failures " ((where the fan is non-functional) and "parametric failures ".These parametric failures are defined as 15% decrease in RPM and an increase in mA of 15%.

Including parametric failure modes leads to a more conservative L-10 and MTTF reporting standard than those methods that measure life performance using only hard failures.

The benefit to the customer is a fan that sets the quality and reliability standard for the cooling industry.

NMB-Minebea evaluates fan life and reliability during the design phase using accelerated life testing in conjunction with ORT (Ongoing Reliability Testing).Accelerated life testing is used to compress the amount of time required to conduct life testing. Development testing occurs early in the product design, prior to product release. It is vital to characterize the reliability of the product in the initial stages of design to allow for improvements and to meet the reliability specifications prior to release to manufacturing.

Once the design has been through design verification testing and is turned over to manufacturing, ORT is conducted. For some models, ORT evaluation has continued beyond 10 years. The value of ORT is a continued refinement of the accuracy of the accelerated life testing and constant review of the design of the fan. This continued process improvement allows for ongoing evaluation and increase in fan life and reliability. Under accelerated life testing NMB-Minebea fans are tested at extreme environmental conditions, with temperature stress factors above standard operating levels. In order to gather meaningful data within a reasonable time frame, the stress factors must be accelerated to simulate different operating environments. High temperature stress is the most common stress factor used for these purposes.

Proper understanding of accelerating stresses and design limits are necessary to implement a meaningful accelerated reliability test. NMB-Minebea uses the Arrhenius model for determining acceleration factors (AF)during life testing. This is the most commonly used model in accelerated life testing where thermal stress is the primary factor affecting life.

Life test data gathered from different types of fans and blowers lends to highly accurate statistical analysis. This data can produce very detailed information about the behavior of the product for reliability and prediction of fan performance in the field. The Weibull Distribution is a typical method employed by NMB-Minebea for which 10% of a population will have failed and 90% of a population will continue to operate within specifications.

DESIGN GUIDE

Arrhenius Weibull Model:

Life Stress Relation:Arrhenius

The Arrhenius life-stress relationship is given by:

$$\eta = L(V) = C \cdot e \frac{\beta}{V}$$

Where:

- L represents a quantifiable life measure, which is the scale parameter or characteristic life of the Weibull Distribution.
- V represents the stress level (formulated for temperature and temperature values in absolute units, i.e.degrees Kelvin or degrees Rankine)
- C is one of the model parameters to be determined (C >0).
- B is another model parameter to be determined.

Mean Life or MTTF

The mean, T ,also called MTTF or Mean Time To Failure, of the Arrhenius-Weibull relationship is given by:

$$\overline{T} = \mathbf{C} \cdot \frac{\mathbf{B}}{\mathbf{ev}} \cdot \mathbf{T}(\frac{1}{\beta} + 1)$$

Reliable Life

The Arrhenius Weibull Distribution model predicts the length of time at which a defined percentage of a product population will still be operating without failing to meet preset criteria. For cooling fans, this is normally characterized as L10 life expectancy, or the time at which 10% of a population will have failed and 90% of a population will continue to operate within specifications.

Example: Life Experiment Data Using Arrhenius Weibull



L10 - (10% Unreliability or 90% Reliability Over Time)

For specific product life and reliability, please contact NMB's Applications Engineers.







MTTF - (Mean Time to Failure or Mean Life)

For the Arrhenius-Weibull relationship, the reliable life,TR, of a unit for a specified reliability and starting the mission at age zero is given by:

 $T_R = C \cdot \frac{B}{ev} \{-1n[R(T_R, V)]\} \frac{1}{\beta}$

This is the life for which the unit will function successfully with a reliability of R(TR).If R (TR)=0.90 then TR =90%reliability or 10%unreliability (L10)or the life by which 90%of the units will survive.

NMB-Minebea uses parametric failure modes, or the condition at which a performance parameter fails to meet pre-set criteria, to record failures during accelerated life testing. This produces a more accurate prediction of field reliability than methods which use only non-operating failure modes to record failures.

Product L10 life expectancy for NMB-Minebea fans ranges from 30,000 hours to 200,000 hours of continuous operation at room temperature depending on fan speed, frame size, design structure, size of ball bearings and the type of ball bearings used. NMB-Minebea, a world leader in miniature precision ball bearings design and manufacturing, uses high quality, long life bearings produced in house to ensure extended fan life.



Fan Types

Having determined the operating point, and having taken into account the noise, reliability and installation requirements, fans can be selected from the extensive NMB-Minebea range.

Fan types are generally categorised according to configuration:-

- Axial flow fans, where air enters and leaves the fan in the same axial direction. This type of fan is suitable for relatively high air flow, relatively low pressure capability
- Radial flow fans. These are essentially motorised impellers. Air enters the impeller in an axial direction, and leaves at right angles to the axial, i.e. in a radial direction. Such fans can be enclosed in a volute, to improve pressure generation. They are suitable for relatively low air flow, relatively high pressure capability
- Scrolled centrifugal blowers. These need to have a suitable volute (scroll) enclosing the impeller to generate pressure. Air enters axially and leaves radially, as in the radial flow fans. They are suitable for relatively low airflow and relatively high pressure. The impeller diameter necessary for a given duty is less that for a radial fan, but efficiency tends to be lower.

- Mixed flow fans. These are midway between axial and radial flow designs. Air enters axially, but leaves at an angle typically about 45°. They are best suited to flows and pressures intermediate between axial and radial configuration fans.
- Crossflow fans. In this configuration air enters and leaves the impeller tangentially. It is unique in that air passes through the impeller blading twice. This type of fan is suitable for very low pressure, high volume flow applications. They are particularly suitable for creating curtains of air.

Fan performance details are normally presented in the form of curves of pressure, input power and/or current, efficiency and speed plotted against airflow rate. Noise and reliability data is normally supplied separately.

PRODUCT RANGE

















Axial Fans

NMB-Minebea offers an extensive range of standard AC and brushless DC axial fans up to 150mm dia., commonly used in PC/PSU and fan tray applications. In addition, NMB-Minebea offers a range of high performance fans with enhanced reliability, environmental protection and control features for high end applications, typical of server and telecommunication equipment applications. For more detailed information customers can download data from our e-catalogue at www.eminebea.com

Compact Blowers

The NMB-Minebea range of compact blowers features plastic (UL94-V0) construction in 12, 24 and 48Vdc versions for use in high density electronics packaging systems where space is at a premium. The NMB-Minebea range of blowers offers the designer an alternative to conventional axial fans where high system resistance demands the use of a non-stalling fan. For more detailed information customers can download data from our e-catalogue at www.eminebea.com

Radial Blowers

The NMB-Minebea range of brushless dc radial blowers comprises versions from 101 to 280mm diameter. These high efficiency fans can be operated in an open running configuration for system flexibility, or alternatively in a scroll for higher performance in medium pressure applications, typical of heat exchanger and cabinet cooling systems. Special sizes and higher assemblies combining NMB-Minebea controllers and power supplies can be provided on request.

Large Diameter Axial Fans

As a complement to the standard range of axial fans, NMB-Minebea offers larger diameter axial fans in 200, 250 and 300mm diameter models. NMB-Minebea can provide product solutions with short duct, wall plate and guard mounted versions with enhanced environmental protection for the motor and drive electronics in 24 and 48Vdc versions.

Scrolled Blowers

NMB-Minebea offers high performance single and double inlet blowers, constructed with forward curved, galvanised steel impellers and matching scrolls. The range provides designers with a solution for medium to high pressure applications typical of filtered, ducted and high density systems where enhanced airflow and low noise is a requirement.

Mixed Flow Fans

The mixed flow fan offers the designer an alternative to conventional axial fans as a solution to increasing system losses and heat loads. The NMB-Minebea products offered provide relatively low noise, high pressure designs driven by standard 24 and 48Vdc motors.

Fan Tray Modules

NMB-Minebea group product capability is offered for high assembly Airmover solutions that combine fans, controllers and power supplies into customised fan modules. NMB-Minebea engineers work closely with customers to provide "Total Solutions" from a wide range of engineering experience across European R&D teams. Typical applications include server, data storage and telecommunication base station cooling applications, where reliability and effective cooling is critical to systems design.

Accessories

NMB-Minebea offer a wide range of standard accessories including plastic and metal finger guards, filters and power cords, generally for use with axial fans, together with inlet rings for radial blowers.



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DC Axial Fans



Part Numbering System			17
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Engineering			18-20
Approvals			21
Panel Cut-outs			22
Product Series	Size (mm)	AirFlow (m ³ /hr)	Page
1004KL Series	25sq x 10	3.4	23
1204KL Series	30sq x 10	6.6	24
1404KL Series	35sq x 10	9.6	25
1604KL Series	40sq x 10	10.2	26
1606KL Series	40sq x 15	13.8	27
1608KL Series	40sq x 20	16.2	28
1611KL Series	40sq x 28	25.2	29
2004KL Series	50sq x 10	17.4	30
2006FL Series	50sq x 15	23.4	31
2106KL Series	52sq x 15	24.0	32
2404KL Series	60sq x 10	32.4	33
2406GL Series	60sq x 15	33.6	34
2406KL Series	60sq x 15	31.2	35
2408NL Series	60sq x 20	30.0	36
2408RL Series	60sq x 20		*
2410ML Series	60sq x 25	63.0	37
2410RL Series	60sq x 25	48.6	38
2415KL Series	60sq x 38		*
2806KL Series	70sq x 15	64.8	39
2806RL Series	70sq x 15		*
2810KL Series	70sq x 25	52.8	40
3106KL Series	80sq x 15	55.8	41
3108NL Series	80sq x 20	75.0	42
3108RL Series	80sq x 20		*
3110KL Series	80sq x 25	78.0	43
3110RL Series	80sq x 25		*
3112KL Series	80sq x 32	100.0	44
3115KL Series	80sq x 38		*
3610KL Series	92sq x 25	105.0	45
3610NL Series	92sq x 25	97.2	46
3612KL Series	92sq x 32	119.0	47
3615KL Series	92sq x 38	198.0	48
4710KL Series	119sq x 25	195.0	49
4712KL Series	119sq x 32	190.0	50
4712FL Series	119sq x 32	204.0	51
4715KL Series	119sq x 38	200.0	52
4715KL (R) Series	119sq x 38	224.0	53
4/15SL Series	119sq x 38	342.0	54
5015KL Series	127sq x 38	338.0	55
5020KL Series	127sq x 50	100 -	*
5910PL Series	Ø1/2 x 150 x 25	493.0	56
5920PL Series	Ø1/2 x 150 x 50	510.0	57
bozuper Series	1/2 X 50	510.0	58

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Common Specifications

Vibration Test: JIS C0040 Amplitude 1.5 mm, Frequency 10-55 Hz,1 hr per axis; X, Y, Z

Shock Test: JIS C0041 Acceleration 981 m/s 2 , Duration 6ms per axis: X, Y, Z

Note:1004KL, 1204KL, 1404KL, 1604KL, 1606KL, 1608KL, 2004KL, 2106KL, 2404KL, BM4515, BM5115, BM5125 and BM 6015 Series: Acceleration 500 m/s 2 ,Duration 11ms per axis: X, Y, Z

Noise: Measured at rated voltage, 1 meter distance from intake side in an Anechoic chamber, background noise 16 dBA Max.

Insulation Class: E class (UL:class A)

Motor Structure: Brushless Motor (BLDC)

Insulation Resistance: 10 Mohm Min.@DC 500V

Dielectric Withstand Voltage: AC700V for 1 second (<0.5 mA allowable, between lead and frame)

Installation Method: For either the suction or exhaust type, horizontal, vertical or inclined installation can be selected.

Protection: Motor burnout is prevented by locked rotor protection/automatic restart and polarity, thus safety is always insured.

Fan Sensors

Three types of DC fan sensors are available for NMB fans:

Locked Rotor Signal – outputs the status of the fan motor and is ideal for detecting if the fan motor is rotating or stopped.

Tachometer Signal – set to produce two cycles of rectangular waveform as the fan motor makes one rotation and is ideal for detecting speed.

Life Signal – detects a reduction in fan speed at a specified RPM level.

Output Circuit:Open Collector for both locked rotor and tach out.

Specifications: Vce max:+30V Vce max:+15V(1004KL,1404KL,1204KL,1604KL, 1606KL,1608KL,2004KL,2106KL,2406KL,2406GL, BM4515,BM5115,BM5125,BM6015) Ic max:5mA (Vce(sat)max=0.4V)

Alarm Signal Circuit



Alarm Signal Output:White,+:Red,-:Black TTL output is an available option.

Locked Rotor Alarm Signal:



Output Waveform: At Rated Voltage the output signal may correspond to either Case 1 or Case 2. Your design should provide for both waveforms.



Tachometer Signal

Output Waveform:At Rated Voltage



T=T1+T2+T3+T4=1 Rotation,

T1=T2=T3=T4=60/4m m:Rotation Speed min⁻¹ The output signal may correspond to Case 1 or Case 2.Your design should provide for both waveforms.

Life Signal

Output Waveform:At Rated Voltage



Speed Control

DC fan speed can be controlled in order to optimize cooling, reduce noise and decrease system power consumption. There are various methods of controlling fan speed.

2-speed DC fan motor

NMB Minebea's custom 2 speed fans are available with high and low speeds specified by the customer. The low end operating speed is fixed in order to reduce noise and lower power consumption.

Below is an example of an External connection for a 2-speed DC fan motor.

Control by relay contact



Control by transistor



Switch-over of fan speed S.W.OFF:LOW SPEED, ON :HI SPEED

Temperature Detecting Variable Speed DC Fan

The RPM may be automatically controlled and synchronised with temperature variation by installing a thermistor.

Varying the control voltage (0 to 6V) enables speed variation between the signal wire and ground.

Example of connection diagram:



PWM Control DC Fan

In PWM speed control, a fixed frequency square wave is applied to the speed control leadwire of the fan. The ratio of on time vs.off time (duty cycle) is directly proportional to the speed of the fan.

Black

Signal

TR DRIVER Q

Brushless DC fan

• GND

Example:



Correct signal connection is important to prevent damage to the internal fan IC.Connection should be designed as shown below:

Signal Output



IP54 Protection



In a drive to add more value to standard products, NMB-Minebea have developed a version of the standard DC fans which incorporate protection against the ingress of dust and water to the level of IP54 according to EN60529.

These fans have the motor and PCB fully encapsulated in silicon rubber material.

Typical applications for these fans are refrigeration, industrial motor controllers, automotive, in fact any harsh environment.

The availability of these models currently includes all DC fan sizes from 40mm (1608 series) up to 172mm (6820 series).

Contact your local sales office for more details.





Vst = 4.5~7.0V (Stopping MODE) Vst = 0~0.5V (Running MODE)



DC AXIAL FANS - APPROVALS

Fan Model	ULE89936	CSALR65829	VDE	CE
1004KL	Vol.1,S44	1087445	15 073-0023	✓
1204KL	Vol.1,S37	1223044	15073-0013/0027	✓
1404KL	Vol.1,S45	1065 707	15 073-0032	✓
1604KL	Vol.1,S40	1141408	15073-0008	✓
1606KL	Vol.1,S32	1255295	15073-0008/0025	✓
1608KL	Vol.1,S32/S48	1437715	15073-0022	✓
1611KL	Vol.1,S86	cUL	15073-0061	✓
2004KL	Vol.1,S43	1144468	15073-0017	✓
2006FL	Vol.1,S56	1124524		1
2106KL	Vol.1,S32	1255295	15073-0018	✓
2404KL	Vol.1,S61	1146135		
2406GL	Vol.1,S57	1124520	15073-0041	
2406KL	Vol.1,S38	1437705	15073-0020	\checkmark
2408NL	Vol.1,S34	1309625	15073-0013	✓
2410ML	Vol.1,S33	1193855	15073-0010	✓
2410RL	Vol.1,S90	cUL	15073-0064	In Process
2806KL	Vol.1,S91	In Process	15073-0060	\checkmark
2810KL	Vol.1,S65	1188649	15073-0008	
3106KL	Vol.1,S46	1038727	15073-0033	
3108NL	Vol.1,S29	1309625	15073-0016	\checkmark
3110KL	Vol.1,S35	1309625	15073-0008	\checkmark
3112KL	Vol.1,S35	1309625	15073-0008	\checkmark
3610KL	Vol.1,S31	1309625	15073-0008	\checkmark
3610NL	Vol.1,S7	-152	15073-0008	\checkmark
3612KL	Vol.1,S52	1253246	15073-0008	\checkmark
3615KL	Vol.1,S51	1195298	15073-0008/0056	\checkmark
4710KL	Vol.1,S64	1174022	15073-0049	
4712FL	Vol.1,S55	1143199	15073-0045	
4712KL	Vol.1,S41	1143199	15073-0008	\checkmark
4715KL	Vol.1,S36	-164	15073-0008	\checkmark
4715SL	Vol.1,S67	1197651	15073-0058	\checkmark
5015KL	Vol.1,S58	cUL	15073-0024	
5910PL	Vol.1,S74	1285829	15073-0034	\checkmark
5920PL	Vol.1,S30	1285831	15073-0044	\checkmark
6820PL	Vol.1,S30	1285831	15073-0044	1









CE

The information above represents typical performance of the product, and is subject to change without notice. Product performance may be varied or enhanced to meet individual requirements.

Inlet and Outlet Sides





1000 Series

1200 Series





1400 Series





2000 Series

4<u>-44.3</u>

2400 Series



68.0







3600 Series

4-\$4.3

4700 Series



5900 Series

3100 Series



E.

1004KL SERIES DC AXIAL FAN







•	Dimensions/Type:	25mm 🗆 x 10mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +60°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	7.5g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1004KL-01W-B30-	X00	5	4.5~5.5	0.065	0.325	7000	0.034	19.5	20.0
1004KL-01W-B40-	X00	5	4.5~5.5	0.085	0.425	9000	0.046	31.6	22.0
1004KL-01W-B50-	X00	5	4.5~5.5	0.125	0.625	11000	0.057	50.6	25.0
1004KL-04W-B30-	X00	12	8~13.8	0.035	0.42	7000	0.034	19.5	20.0
1004KL-04W-B40-	X00	12	8~13.8	0.045	0.54	9000	0.046	31.6	22.0
1004KL-04W-B50-	X00	12	8~13.8	0.060	0.72	11000	0.057	50.6	25.0

R

1204KL SERIES DC AXIAL FAN



•	Dimensions/Type:	30mm [∐] x 10mm Axial Fan					
•	Motor Protection:	Auto Restart/Reverse Polarity Protection					
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)					
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0					
•	Lead Wire:	UL1061, AWG26, +Red, -Black					
•	Weight:	8.5g					
•	Rotation Direction:	Clockwise					
•	Airflow Direction:	Out Over Support Struts					



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1204KL-01W-B30-	X00	5	4.5~5.5	0.10	0.50	7500	0.078	29.0	21.0
1204KL-01W-B40-	X00	5	4.5~5.5	0.14	0.70	9000	0.091	37.0	23.0
1204KL-01W-B50-	X00	5	4.5~5.5	0.18	0.90	10500	0.110	54.0	27.0
1204KL-04W-B30-	X00	12	6~13.8	0.06	0.72	7500	0.078	29.0	21.0
1204KL-04W-B40-	X00	12	6~13.8	0.07	0.84	9000	0.091	37.0	23.0
1204KL-04W-B50-	X00	12	6~13.8	0.08	0.96	10500	0.110	54.0	27.0



•	Dimensions/Type:	35mm 🗆 x 10mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	12g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1404KL-01W-B30-	X00	5	4.5~5.5	0.08	0.40	5000	0.086	15.5	19.0
1404KL-01W-B40-	X00	5	4.5~5.5	0.17	0.85	7000	0.120	26.8	22.0
1404KL-01W-B50-	X00	5	4.5~5.5	0.21	1.05	9000	0.160	41.0	27.0
1404KL-04W-B30-	X00	12	8.0~13.8	0.04	0.48	5000	0.086	15.5	19.0
1404KL-04W-B40-	X00	12	8.0~13.8	0.07	0.84	7000	0.120	26.8	22.0
1404KL-04W-B50-	X00	12	8.0~13.8	0.08	0.96	9000	0.160	41.0	27.0







Rib Type Only

•	Dimensions/Type:	40mm 🗆 x 10mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	15g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1604KL-01W-B30-	X00	5	4.5~5.5	0.075	0.375	4500	0.12	24.0	22.0
1604KL-01W-B40-	X00	5	4.5~5.5	0.120	0.600	5500	0.15	34.0	25.0
1604KL-01W-B50-	X00	5	4.5~5.5	0.155	0.775	6500	0.17	46.0	29.0
1604KL-04W-B30-	X00	12	10.2~13.8	0.062	0.744	4500	0.12	24.0	22.0
1604KL-04W-B40-	X00	12	10.2~13.8	0.073	0.876	5500	0.15	34.0	25.0
1604KL-04W-B50-	X00	12	10.2~13.8	0.073	0.876	6500	0.17	46.0	29.0
1604KL-05W-BX0-	X00	24	Produ	ict Under	Development				





•	Dimensions/Type:	40mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	20g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1606KL-01W-B30-	X00	5	4.5~5.5	0.120	0.600	6000	0.17	36.3	28.0
1606KL-01W-B40-	X00	5	4.5~5.5	0.150	0.750	7000	0.20	47.1	31.0
1606KL-01W-B50-	X00	5	4.5~5.5	0.240	1.200	8000	0.23	62.8	34.0
1606KL-04W-B30-	X00	12	10.2~13.8	0.067	0.804	6000	0.17	36.3	28.0
1606KL-04W-B40-	X00	12	10.2~13.8	0.075	0.900	7000	0.20	47.1	31.0
1606KL-04W-B50-	X00	12	10.2~13.8	0.085	1.020	8000	0.23	62.8	34.0
1606KL-05W-B30-	X00	24	22.0~25.2	0.045	1.080	6000	0.17	36.3	28.0
1606KL-05W-B40-	X00	24	22.0~25.2	0.054	1.296	7000	0.20	47.1	31.0
1606KL-05W-B50-	X00	24	22.0~25.2	0.062	1.488	8000	0.23	62.8	34.0



Rib Type Only

•	Dimensions/Type:	40mm 🗆 x 20mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	25g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1608KL-01W-B10-	X00	5	4.5~5.5	0.07	0.35	4500	0.14	20.0	20.0
1608KL-01W-B20-	X00	5	4.5~5.5	0.12	0.60	5500	0.17	30.1	22.5
1608KL-01W-B30-	X00	5	4.5~5.5	0.17	0.85	6500	0.21	42.2	25.5
1608KL-01W-B40-	X00	5	4.5~5.5	0.27	1.35	7500	0.24	54.2	29.0
1608KL-01W-B50-	X00	5	4.5~5.5	0.38	1.90	8500	0.27	69.4	33.0
1608KL-04W-B10-	X00	12	10.2~13.8	0.04	0.48	4500	0.14	20.0	20.0
1608KL-04W-B20-	X00	12	10.2~13.8	0.06	0.72	5500	0.17	30.1	22.5
1608KL-04W-B30-	X00	12	10.2~13.8	0.07	0.84	6500	0.21	42.2	25.5
1608KL-04W-B40-	X00	12	10.2~13.8	0.09	1.08	7500	0.24	54.2	29.0
1608KL-04W-B50-	X00	12	10.2~13.8	0.11	1.32	8500	0.27	69.4	33.0
1608KL-05W-B10-	X00	24	20.0~25.2	0.04	0.96	4500	0.14	20.0	20.0
1608KL-05W-B20-	X00	24	20.0~25.2	0.05	1.20	5500	0.17	30.1	22.5
1608KL-05W-B30-	X00	24	20.0~25.2	0.06	1.44	6500	0.21	42.2	25.5
1608KL-05W-B40-	X00	24	20.0~25.2	0.07	1.68	7500	0.24	54.2	29.0
1608KL-05W-B50-	X00	24	20.0~25.2	0.08	1.92	8500	0.27	69.4	33.0

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1611KL SERIES DC AXIAL FAN



•	Dimensions/Type:	40mm 🗆 x 28mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +60°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black
•	Weight:	25g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
1611KL-04W-B20-	X00	12	7.0~13.8	0.08	0.96	5500	0.24	45.5	29.5
1611KL-04W-B30-	X00	12	7.0~13.8	0.13	1.56	7000	0.32	76.0	35.0
1611KL-04W-B40-	X00	12	7.0~13.8	0.20	2.40	8500	0.39	109.7	40.0
1611KL-04W-B50-	X00	12	7.0~12.6	0.30	3.60	9500	0.42	118.1	43.0





Rib Type Only

•	Dimensions/Type:	50mm 🗆 x 10mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	20g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2004KL-01W-B30-	X00	5	4.5~6.0	0.10	0.50	3500	0.18	16.0	23.0
2004KL-01W-B40-	X00	5	4.5~6.0	0.16	0.80	4500	0.23	26.0	28.5
2004KL-01W-B50-	X00	5	4.5~6.0	0.30	1.50	5500	0.29	35.0	34.0
2004KL-04W-B30-	X00	12	10.2~13.8	0.04	0.48	3500	0.18	16.0	23.0
2004KL-04W-B40-	X00	12	10.2~13.8	0.07	0.84	4500	0.23	26.0	28.5
2004KL-04W-B50-	X00	12	10.2~13.8	0.10	1.20	5500	0.29	35.0	34.0
2004KL-05W-B30-	X00	24	15.5~27.6	0.04	0.96	3500	0.18	16.0	23.0
2004KL-05W-B40-	X00	24	11.5~27.6	0.06	1.44	4500	0.23	26.0	28.5
2004KL-05W-B50-	X00	24	13.5~27.6	0.08	1.92	5500	0.29	35.0	34.0





•	Dimensions/Type:	50mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	20g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	In Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2006FL-04W-B40-	H00	12	7.0~13.8	0.1	1.2	4000	0.28	16.4	28.0
2006FL-04W-B50-	H00	12	8.0~13.8	0.18	2.16	5500	0.39	31.2	37.0
2006FL-05W-B50-	H00	24	12.0~27.6	0.11	2.64	5500	0.39	31.2	37.0





Rib Type Only

Dimensions/Type:	52mm 🗆 x 15mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1061, AWG26, +Red, -Black
Weight:	25g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2106KL-04W-B30-	X00	12	10.2~13.0	0.07	0.84	3500	0.28	18.0	21.0
2106KL-04W-B40-	X00	12	10.2~13.0	0.09	1.08	4200	0.34	26.0	25.5
2106KL-04W-B50-	X00	12	10.2~13.0	0.13	1.56	4900	0.40	35.0	30.0



•	Dimensions/Type:	60mm 🗆 x 10mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B50	-10°C~+60°C (Operating)
	B30~B40	-10°C~+70°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	25g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2404KL-04W-B30-	X00	12	10.2~13.8	0.10	1.20	3600	0.39	16.7	29.0
2404KL-04W-B40-	X00	12	10.2~13.8	0.20	2.40	4200	0.46	23.0	33.0
2404KL-04W-B50-	X00	12	10.2~13.8	0.27	3.24	4800	0.54	30.1	36.0



•	Dimensions/Type:	60mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black
•	Weight:	40g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2406GL-04W-B30-	T00	12	10.5~13.8	0.14	1.68	3800	0.44	26.0	30.0
2406GL-04W-B40-	T00	12	9.0~13.8	0.17	2.04	4300	0.50	33.7	33.0
2406GL-04W-B50-	T00	12	7.0~13.8	0.20	2.40	4800	0.56	41.6	35.0





•	Dimensions/Type:	60mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +60°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black
•	Weight:	45g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2406KL-04W-B10-	X00	12	7.0~13.8	0.04	0.48	1800	0.19	8.5	19.0
2406KL-04W-B20-	X00	12	6.0~13.8	0.07	0.84	3100	0.33	23.4	25.0
2406KL-04W-B30-	X00	12	6.0~13.8	0.09	1.08	3600	0.40	31.3	28.0
2406KL-04W-B40-	X00	12	6.0~13.8	0.13	1.56	4100	0.45	39.7	31.0
2406KL-04W-B50-	X00	12	6.0~13.8	0.16	1.92	4600	0.52	51.2	34.0
2406KL-05W-B10-	X00	24	18.5~27.6	0.04	0.96	1800	0.19	8.5	19.0
2406KL-05W-B20-	X00	24	12.0~27.6	0.06	1.44	3100	0.33	23.4	25.0
2406KL-05W-B30-	X00	24	12.0~27.6	0.06	1.44	3600	0.40	31.3	28.0
2406KL-05W-B40-	X00	24	10.0~27.6	0.07	1.68	4100	0.45	39.7	31.0
2406KL-05W-B50-	X00	24	10.0~27.6	0.10	2.40	4600	0.52	51.2	34.0







Dimensions/Type:	60mm 🗆 x 20mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG26, +Red, -Black
Weight:	85g
Rotation Direction:	Counterclockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2408NL-04W-B10-	X00	12	6.0~13.8	0.05	0.60	2800	0.31	16.7	22.5
2408NL-04W-B20-	X00	12	6.0~13.8	0.07	0.84	3200	0.37	23.5	25.5
2408NL-04W-B30-	X00	12	6.0~13.8	0.08	0.96	3600	0.42	28.7	27.0
2408NL-04W-B40-	X00	12	6.0~13.8	0.09	1.08	4000	0.45	33.2	29.0
2408NL-04W-B50-	X00	12	6.0~13.8	0.11	1.32	4400	0.50	40.5	31.5
2408NL-05W-B10-	X00	24	15.0~27.6	0.04	0.96	2800	0.31	16.7	22.5
2408NL-05W-B20-	X00	24	15.0~27.6	0.04	0.96	3200	0.37	23.5	25.5
2408NL-05W-B30-	X00	24	15.0~27.6	0.045	1.08	3600	0.42	28.7	27.0
2408NL-05W-B40-	X00	24	15.0~27.6	0.05	1.20	4000	0.45	33.2	29.0
2408NL-05W-B50-	X00	24	15.0~27.6	0.055	1.32	4400	0.50	40.5	31.5




•	Dimensions/Type:	60mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	65g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2410ML-01W-B20-	X00	5	4.5~5.5	0.29	1.45	3600	0.48	31.9	28.0
2410ML-01W-B30-	X00	5	4.5~5.5	0.29	1.45	4000	0.54	40.2	31.0
2410ML-01W-B40-	X00	5	4.5~5.5	0.46	2.30	4550	0.61	51.9	33.5
2410ML-04W-B10-	X00	12	6.0~13.8	0.75	0.90	2950	0.39	20.6	23.0
2410ML-04W-B20-	X00	12	6.0~13.8	0.12	1.44	3600	0.48	31.9	28.0
2410ML-04W-B30-	X00	12	6.0~13.8	0.12	1.44	4000	0.54	40.2	31.0
2410ML-04W-B40-	X00	12	6.0~13.8	0.17	2.04	4550	0.61	51.9	33.5
2410ML-04W-B50-	X00	12	6.0~13.8	0.20	1.40	4900	0.66	62.2	35.0
2410ML-04W-B60-	X00	12	6.0~13.8	0.30	3.60	5300	0.71	73.0	36.0
2410ML-04W-B70-	X00	12	6.0~13.8	0.44	5.28	6800	0.94	125.0	45.0
2410ML-04W-B80-	X00	12	6.0~13.2	0.52	6.24	7350	1.05	143.0	50.0
2410ML-05W-B10-	X00	24	10.0~27.6	0.06	1.44	2950	0.39	20.6	23.0
2410ML-05W-B20-	X00	24	10.0~27.6	0.07	1.68	3600	0.48	31.9	28.0
2410ML-05W-B30-	X00	24	10.0~27.6	0.06	1.44	4000	0.54	40.2	31.0
2410ML-05W-B40-	X00	24	10.0~27.6	0.09	2.16	4550	0.61	51.9	33.5
2410ML-05W-B50-	X00	24	10.0~27.6	0.10	2.40	4900	0.66	62.2	35.0
2410ML-05W-B60-	X00	24	10.0~27.6	0.13	3.12	5300	0.71	73.0	36.0
2410ML-05W-B70-	X00	24	10.0~25.2	0.19	4.56	6800	0.94	125.0	45.0
2410ML-05W-B80-	X00	24	10.0~26.4	0.26	6.24	7350	1.05	143.0	50.0



•	Dimensions/Type:	60mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	65g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2410RL-04W-B10-	C00	12	6.0~13.8	0.05	0.60	2550	0.37	17.2	19.0
2410RL-04W-B20-	C00	12	6.0~13.8	0.08	0.96	3000	0.44	23.4	22.5
2410RL-04W-B30-	C00	12	6.0~13.8	0.10	1.20	3550	0.52	32.3	27.0
2410RL-04W-B40-	C00	12	6.0~13.8	0.12	1.56	4050	0.61	41.7	30.5
2410RL-04W-B50-	C00	12	6.0~13.8	0.15	1.80	4500	0.68	51.3	33.5
2410RL-04W-B60-	C00	12	6.0~13.8	0.20	2.40	4900	0.75	60.3	36.5
2410RL-04W-B70-	C00	12	6.0~13.8	0.27	3.24	5300	0.81	69.1	38.0
2410RL-05W-B10-	C00	24	15.0~27.6	0.04	0.96	2550	0.37	17.2	19.0
2410RL-05W-B20-	C00	24	15.0~27.6	0.06	1.44	3000	0.44	23.4	22.5
2410RL-05W-B30-	C00	24	15.0~27.6	0.08	1.92	3550	0.52	32.3	27.0
2410RL-05W-B40-	C00	24	15.0~27.6	0.10	2.40	4050	0.61	41.7	30.5
2410RL-05W-B50-	C00	24	10.0~27.6	0.12	2.88	4500	0.68	51.3	33.5
2410RL-05W-B60-	C00	24	10.0~27.6	0.15	3.60	4900	0.75	60.3	36.5
2410RL-05W-B70-	C00	24	10.0~27.6	0.20	4.80	5300	0.81	69.1	38.0





•	Dimensions/Type:	70mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black
•	Weight:	60g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2806KL-04W-B30-	X00	12	7.0~13.2	0.14	1.68	3000	0.69	17.3	27.5
2806KL-04W-B40-	X00	12	7.0~13.2	0.17	2.04	3600	0.84	25.5	33.0
2806KL-04W-B50-	X00	12	7.0~13.2	0.23	2.76	4200	0.99	34.5	36.5
2806KL-04W-B60-	X00	12	7.0~13.2	0.30	3.60	4500	1.08	55.8	39.5





Dimensions/Type:	70mm 🗆 x 25mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black
Weight:	72g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
2810KL-04W-B10-	X00	12	6.0~13.8	0.09	1.08	2400	0.54	18.0	21.5
2810KL-04W-B30-	X00	12	6.0~13.8	0.15	1.80	3150	0.71	28.4	28.0
2810KL-04W-B50-	X00	12	6.0~13.8	0.18	2.16	3800	0.88	41.1	33.5





•	Dimensions/Type:	80mm 🗆 x 15mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B50	-10°C~+50°C (Operating)
	B30~B40	-10°C~+60°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Material: Lead Wire:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0 UL1007, AWG26, +Red, -Black
•	Material: Lead Wire: Weight:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0 UL1007, AWG26, +Red, -Black 50g
•	Material: Lead Wire: Weight: Rotation Direction:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0 UL1007, AWG26, +Red, -Black 50g Clockwise



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3106KL-04W-B30-	X00	12	6.0~13.8	0.11	1.32	2200	0.66	16.0	26.0
3106KL-04W-B40-	X00	12	6.0~13.8	0.17	2.04	2600	0.80	22.5	30.0
3106KL-04W-B50-	X00	12	6.0~13.0	0.23	2.76	3000	0.93	30.0	34.0

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3108NL SERIES DC AXIAL FAN







Dimensions/Type:	80mm 🗆 x 20mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black
Weight:	85g
Rotation Direction:	Counterclockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3108NL-04W-B10-	X00	12	6.0~13.8	0.09	1.08	2350	0.75	21.0	26.0
3108NL-04W-B20-	X00	12	6.0~13.8	0.11	1.32	2600	0.84	26.0	29.0
3108NL-04W-B30-	X00	12	6.0~13.8	0.14	1.68	2950	0.98	33.5	32.5
3108NL-04W-B40-	X00	12	6.0~13.8	0.20	2.40	3350	1.15	43.7	38.5
3108NL-04W-B50-	X00	12	6.0~13.8	0.28	3.36	3750	1.25	50.1	42.0
3108NL-05W-B10-	X00	24	15.0~27.6	0.05	1.30	2350	0.75	21.0	26.0
3108NL-05W-B20-	X00	24	15.0~27.6	0.06	1.44	2600	0.84	26.0	29.0
3108NL-05W-B30-	X00	24	15.0~27.6	0.07	1.68	2950	0.98	33.5	32.5
3108NL-05W-B40-	X00	24	15.0~27.6	0.11	2.64	3350	1.15	43.7	38.5
3108NL-05W-B50-	X00	24	15.0~27.6	0.15	3.60	3750	1.25	50.1	42.0



•	Dimensions/Type:	80mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B70	-10°C~+60°C (Operating)
	B10~B60	-10°C~+70°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	95g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3110KL-04W-B10-	X00	12	6.0~13.8	0.10	1.20	2150	0.70	16.7	22.0
3110KL-04W-B20-	X00	12	6.0~13.8	0.11	1.32	2400	0.80	21.6	25.0
3110KL-04W-B30-	X00	12	6.0~13.8	0.17	2.04	2700	0.90	26.5	28.0
3110KL-04W-B40-	X00	12	6.0~13.8	0.20	2.40	3000	1.00	32.3	31.0
3110KL-04W-B50-	X00	12	6.0~13.8	0.23	2.76	3250	1.10	37.2	34.0
3110KL-04W-B60-	X00	12	6.0~13.0	0.26	3.12	3400	1.14	40.2	35.0
3110KL-04W-B70-	X00	12	6.0~13.8	0.29	3.86	4000	1.30	64.4	40.0
3110KL-05W-B10-	X00	24	10.0~27.6	0.06	1.44	2150	0.70	16.7	22.0
3110KL-05W-B20-	X00	24	10.0~27.6	0.07	1.68	2400	0.80	21.6	25.0
3110KL-05W-B30-	X00	24	10.0~27.6	0.08	1.92	2700	0.90	26.5	28.0
3110KL-05W-B40-	X00	24	10.0~27.6	0.10	2.40	3000	1.00	32.3	31.0
3110KL-05W-B50-	X00	24	10.0~27.6	0.12	2.88	3250	1.10	37.2	34.0
3110KL-05W-B60-	X00	24	10.0~26.4	0.14	3.36	3400	1.14	40.2	35.0
3110KL-05W-B70-	X00	24	10.0~27.6	0.16	3.84	4000	1.30	64.4	40.0
3110KL-07W-B30-	X00	48	36.0~52.6	0.05	2.40	2700	0.90	26.5	28.0

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3112KL SERIES DC AXIAL FAN





Specification Data:

Dimensions/Type:	80mm 🗆 x 32mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black
Weight:	95g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



300 min

80.0 ±0.3

Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3112KL-04W-B30-	X00	12	6.0~13.8	0.17	2.04	2850	1.08	35.2	32.0
3112KL-04W-B40-	X00	12	6.0~13.8	0.25	3.00	3350	1.33	54.5	37.0
3112KL-04W-B50-	X00	12	6.0~12.6	0.35	4.20	3850	1.46	65.1	41.0
3112KL-04W-B60-	X00	12	6.0~12.6	0.45	5.40	4350	1.66	78.9	44.0
3112KL-05W-B30-	X00	24	10.0~27.6	0.10	2.40	2850	1.08	35.2	32.0
3112KL-05W-B40-	X00	24	10.0~27.6	0.14	3.36	3350	1.33	54.5	37.0
3112KL-05W-B50-	X00	24	10.0~25.2	0.19	4.56	3850	1.46	65.1	41.0
3112KL-05W-B60-	X00	24	10.0~25.2	0.21	5.04	4350	1.66	78.9	44.0
3112KL-07W-B30-	X00	48	27.0~50.4	0.06	2.88	2850	1.08	35.2	32.0



•	Dimensions/Type:	92mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B60	-10°C~+60°C (Operating)
	B10~B50	-10°C~+70°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	95g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3610KL-04W-B10-	X00	12	6.0~13.8	0.07	0.88	1750	0.75	14.2	25.0
3610KL-04W-B20-	X00	12	6.0~13.8	0.11	1.32	2100	0.95	20.1	29.5
3610KL-04W-B30-	X00	12	6.0~13.8	0.16	1.92	2450	1.15	27.0	34.0
3610KL-04W-B40-	X00	12	6.0~13.8	0.22	2.64	2850	1.35	37.2	37.5
3610KL-04W-B50-	X00	12	6.0~13.0	0.32	3.78	3200	1.55	48.0	41.0
3610KL-04W-B60-	X00	12	10.5~12.6	0.43	5.16	3600	1.75	57.2	44.5
3610KL-05W-B10-	X00	24	10.0~27.6	0.05	1.20	1750	0.75	14.2	25.0
3610KL-05W-B20-	X00	24	10.0~27.6	0.06	1.44	2100	0.95	20.1	29.5
3610KL-05W-B30-	X00	24	10.0~27.6	0.09	2.16	2450	1.15	27.0	34.0
3610KL-05W-B40-	X00	24	10.0~27.6	0.12	2.88	2850	1.35	37.2	37.5
3610KL-05W-B50-	X00	24	10.0~25.0	0.16	3.84	3200	1.55	48.0	41.0
3610KL-05W-B60-	X00	24	10.0~25.0	0.20	4.80	3600	1.75	57.2	44.5



•	Dimensions/Type:	92mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	160g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3610NL-04W-B10-	X00	12	6.0~13.8	0.1	1.20	2100	0.93	25.5	28.0
3610NL-04W-B20-	X00	12	6.0~13.8	0.13	1.56	2400	1.08	31.4	30.5
3610NL-04W-B30-	X00	12	6.0~13.8	0.18	2.16	2800	1.28	43.1	35.5
3610NL-04W-B40-	X00	12	6.0~13.8	0.27	3.24	3200	1.52	57.8	39.5
3610NL-04W-B50-	X00	12	6.0~13.8	0.35	4.20	3600	1.65	66.6	41.5
3610NL-05W-B10-	X00	24	10.0~27.6	0.05	1.20	2100	0.93	25.5	28.0
3610NL-05W-B20-	X00	24	10.0~27.6	0.07	1.68	2400	1.08	31.4	30.5
3610NL-05W-B30-	X00	24	10.0~27.6	0.10	2.40	2800	1.28	43.1	35.5
3610NL-05W-B40-	X00	24	10.0~27.6	0.13	3.12	3200	1.52	57.8	39.5
3610NL-05W-B50-	X00	24	10.0~27.6	0.18	4.32	3600	1.65	66.6	41.5





Specification Data:

•	Dimensions/Type:	92mm 🗆 x 32mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	230g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3612KL-04W-B30-	X00	12	6.0~13.8	0.21	2.52	2600	1.34	41.0	34.0
3612KL-04W-B40-	X00	12	6.0~13.8	0.31	3.72	3200	1.66	61.0	38.0
3612KL-04W-B50-	X00	12	6.0~13.8	0.47	5.64	3800	1.98	83.0	43.5
3612KL-04W-B60-	X00	12	10.5~13.2	0.48	5.76	4000	2.00	96.0	44.0
3612KL-05W-B30-	X00	24	15.0~27.6	0.10	2.40	2600	1.34	41.0	34.0
3612KL-05W-B40-	X00	24	15.0~27.6	0.16	3.84	3200	1.66	61.0	38.0
3612KL-05W-B50-	X00	24	15.0~27.6	0.25	6.00	3800	1.98	83.0	43.5
3612KL-07W-B30-	X00	48	*	*	*	2600	1.34	41.0	34.0
3612KL-07W-B40-	X00	48	*	*	*	3200	1.66	61.0	38.0

* For further details please contact your local Sales Office

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3615KL SERIES DC AXIAL FAN







Dimensions/Type:	92mm 🗆 x 38mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1061, AWG26, +Red, -Black
Weight:	210g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3615KL-04W-B30-	X00	12	7.0~13.2	0.25	3.00	3200	1.71	57.9	40.5
3615KL-04W-B40-	X00	12	7.0~13.2	0.34	4.08	3600	1.94	72.0	44.0
3615KL-04W-B50-	X00	12	7.0~12.6	0.46	5.52	4000	2.16	89.2	46.5
3615KL-05W-B30-	X00	24	12.0~26.4	0.15	3.60	3200	1.71	57.9	40.5
3615KL-05W-B40-	X00	24	12.0~26.4	0.20	4.80	3600	1.94	72.0	44.0
3615KL-05W-B50-	X00	24	12.0~25.2	0.24	5.76	4000	2.16	89.2	46.5
3615KL-05W-B70-	X00	24	15.0~26.4	0.70	16.8	5900	3.00	189.0	53.0
3615KL-07W-B30-	X00	48	25.0~55.2	0.09	4.32	3200	1.71	57.9	40.5
3615KL-07W-B70-	X00	48	30.0~50.2	0.36	17.3	5800	3.10	178.0	55.0





•	Dimensions/Type:	119mm \square x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	10° C $+60^{\circ}$ C (Operating)
		$-10 \text{ C} \rightarrow 70^{\circ} \text{C}$ (Operating)
	B10~B40	
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	180g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4710KL-04W-B10-	X00	12	6.0~13.8	0.12	1.44	1600	1.80	17.9	27.0
4710KL-04W-B20-	X00	12	6.0~13.8	0.19	2.28	1900	2.15	24.8	31.0
4710KL-04W-B30-	X00	12	6.0~13.8	0.28	3.36	2200	2.50	32.3	35.0
4710KL-04W-B40-	X00	12	6.0~13.8	0.40	4.80	2500	2.85	40.9	38.5
4710KL-04W-B50-	X00	12	6.0~13.0	0.55	6.60	2800	3.25	50.5	41.5
4710KL-05W-B10-	X00	24	10.0~27.6	0.08	1.92	1600	1.80	17.9	27.0
4710KL-05W-B20-	X00	24	10.0~27.6	0.10	2.40	1900	2.15	24.8	31.0
4710KL-05W-B30-	X00	24	10.0~27.6	0.15	3.60	2200	2.50	32.3	35.0
4710KL-05W-B40-	X00	24	10.0~27.6	0.22	5.28	2500	2.85	40.9	38.5
4710KL-05W-B50-	X00	24	10.0~26.0	0.29	6.96	2800	3.25	50.5	41.5
4710KL-07W-B10-	X00	48	25.0~55.2	0.05	2.40	1600	1.80	17.9	27.0
4710KL-07W-B20-	X00	48	25.0~55.2	0.07	3.36	1900	2.15	24.8	31.0
4710KL-07W-B30-	X00	48	25.0~55.2	0.09	4.32	2200	2.50	32.3	35.0
4710KL-07W-B40-	X00	48	25.0~50.0	0.12	5.76	2500	2.85	40.9	38.5
4710KL-07W-B50-	X00	48	25.0~50.0	0.18	8.64	2800	3.25	50.5	41.5







Dimensions/Type:	119mm 🗆 x 32mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black
Weight:	240g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4712KL-04W-B10-	P00	12	6.0~13.8	0.16	1.92	1600	1.59	22.0	29.0
4712KL-04W-B20-	P00	12	6.0~13.8	0.32	3.84	2300	2.33	42.0	39.0
4712KL-04W-B30-	P00	12	6.0~13.8	0.48	5.76	2800	2.83	60.0	44.0
4712KL-04W-B40-	P00	12	6.0~13.8	0.69	8.28	3100	3.17	82.0	47.0
4712KL-05W-B10-	P00	24	12.0~27.6	0.09	2.16	1600	1.59	22.0	29.0
4712KL-05W-B20-	P00	24	12.0~27.6	0.17	4.08	2300	2.33	42.0	39.0
4712KL-05W-B30-	P00	24	12.0~27.6	0.28	6.72	2800	2.83	60.0	44.0
4712KL-05W-B40-	P00	24	12.0~27.6	0.34	8.16	3100	3.17	82.0	47.0
4712KL-07W-B10-	P00	48	28.0~55.2	0.07	3.36	1600	1.59	22.0	29.0
4712KL-07W-B20-	P00	48	28.0~55.2	0.11	5.28	2300	2.33	42.0	39.0
4712KL-07W-B30-	P00	48	28.0~55.2	0.16	7.68	2800	2.83	60.0	44.0
4712KL-07W-B40-	P00	48	28.0~55.2	0.21	10.08	3100	3.17	82.0	47.0







100 80 60 40 20 0 0 0 1.0 2.0 3.0 Airflow, m³/min

•	Dimensions/Type:	119mm 🗆 x 32mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG22, +Red, -Black
•	Weight:	240g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	In Over Support Struts

Model	Product	Rated Voltage	Voltage	Current	Input Power	Speed	Max. Airflow	Max. Static	Noise
	No.	(VDC)	Range	(A)	(W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
4712FL-07W-B40-	P00	48	24.0~56.0	0.21	10.08	3600	3.40	94.2	57.0







 Dimensions/Type: 	119mm 🗆 x 38mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
• Temperature Range: B50 B10~B40 B50 B10~B40	-10°C~+40°C (Operating) -10°C~+70°C (Operating) -40°C~+60°C (Storage) -40°C~+70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black
• Weight:	260g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Strute





Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4715KL-04W-B10-	P00	12	6.0~13.8	0.27	3.24	2300	2.37	44.1	37.0
4715KL-04W-B20-	P00	12	6.0~13.8	0.40	4.80	2650	2.75	55.9	41.0
4715KL-04W-B30-	P00	12	6.0~13.8	0.55	6.60	2950	3.07	68.2	42.5
4715KL-04W-B40-	P00	12	6.0~13.8	0.70	8.40	3200	3.34	81.4	46.5
4715KL-04W-B50-	P00	12	9.5~12.6	1.00	12.00	3600	3.68	110.0	50.0
4715KL-05W-B10-	P00	24	10.0~27.6	0.15	3.60	2300	2.37	44.1	37.0
4715KL-05W-B20-	P00	24	10.0~27.6	0.21	5.04	2650	2.75	55.9	41.0
4715KL-05W-B30-	P00	24	10.0~27.6	0.31	7.44	2950	3.07	68.2	42.5
4715KL-05W-B40-	P00	24	10.0~27.6	0.35	8.40	3200	3.34	81.4	46.5
4715KL-05W-B50-	P00	24	18.0~25.0	0.50	12.00	3600	3.68	110.0	50.0
4715KL-07W-B10-	P00	48	25.0~55.2	0.08	3.84	2300	2.37	44.1	37.0
4715KL-07W-B20-	P00	48	25.0~55.2	0.11	5.28	2650	2.75	55.9	41.0
4715KL-07W-B30-	P00	48	25.0~55.2	0.16	7.68	2950	3.07	68.2	42.5
4715KL-07W-B40-	P00	48	25.0~55.2	0.20	9.60	3200	3.34	81.4	46.5









•	Dimensions/Type:	119mm 🗆 x 38mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B40~B50	-10°C~+45°C (Operating)
	B30	-10°C~+50°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0) Impeller: Plastic (Black) 94V-0)
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	260g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4715KL-04W-B50-	R00	12	9.5~12.6	0.85	10.2	3900	3.73	113.0	54.0
4715KL-05W-B50-	R00	24	20.0~25.0	0.48	11.5	3900	3.73	113.0	54.0
4715KL-07W-B30-	R00	48	25.0~55.2	0.13	6.24	3100	2.97	74.0	47.0
4715KL-07W-B40-	R00	48	25.0~50.4	0.16	7.68	3500	3.44	97.5	51.0
4715KL-07W-B50-	R00	48	36.0~50.0	0.20	9.60	3900	3.73	113.0	54.0



Dimensions/Type:	119mm 🗆 x 38mm Axial Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C~+60°C (Operating) -40°C~+70°C (Storage)
Material: Impeller:	Casing: Aluminium (Black) Plastic (Black) 94V-0)
Lead Wire:	UL1007, AWG24, +Red, -Black
Weight:	400g
Rotation Direction:	Clockwise
Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4715SL-041W-B40-	D00	12	8.0~13.8	1.00	12.00	3700	4.02	136.0	53.5
4715SL-041W-B50-	D00	12	8.0~13.2	1.46	17.50	4200	4.59	173.0	56.5
4715SL-041W-B60-	D00	12	8.0~12.9	1.92	23.00	4700	5.13	213.0	59.5
4715SL-041W-B70-	D00	12	8.0~12.6	3.20	38.40	5100	5.69	260.5	62.3
4715SL-041W-B40-	D00	24	15.0~27.6	0.52	12.50	3700	4.02	136.0	53.5
4715SL-041W-B50-	D00	24	15.0~27.6	0.74	17.80	4200	4.59	173.0	56.5
4715SL-041W-B60-	D00	24	15.0~26.4	0.93	22.40	4700	5.13	213.0	59.5
4715SL-041W-B70-	D00	24	15.0~25.2	1.50	36.00	5100	5.69	260.5	62.3
4715SL-041W-B40-	D00	48	30.0~55.2	0.27	13.00	3700	4.02	136.0	53.5
4715SL-041W-B50-	D00	48	30.0~55.2	0.37	17.80	4200	4.59	173.0	56.5
4715SL-041W-B60-	D00	48	30.0~52.8	0.49	23.50	4700	5.13	213.0	59.5
4715SL-041W-B70-	D00	48	30.0~50.4	0.83	39.84	5100	5.69	260.5	62.3



•	Dimensions/Type:	127mm 🗆 x 38mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	
	B50	-10°C~+60°C (Operating)
	B10~B40	-10°C~+70°C (Operating)
	All Classes	-40°C~+70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG24, +Red, -Black
•	Weight:	360g
•	Rotation Direction:	Clockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
5015KL-04W-B10-	E00	12	8.0~13.8	0.48	5.76	2600	3.26	64.1	45.5
5015KL-04W-B20-	E00	12	8.0~13.8	0.72	8.64	3100	3.94	89.7	50.5
5015KL-04W-B30-	E00	12	8.0~13.8	0.98	11.76	3600	4.62	119.7	55.0
5015KL-04W-B40-	E00	12	8.0~13.8	1.44	17.28	4000	5.11	147.0	57.5
5015KL-04W-B50-	E00	12	8.0~13.2	2.04	24.48	4400	5.64	176.5	60.5
5015KL-05W-B10-	E00	24	18.0~27.6	0.22	5.28	2600	3.26	64.1	45.5
5015KL-05W-B20-	E00	24	18.0~27.6	0.34	8.16	3100	3.94	89.7	50.5
5015KL-05W-B30-	E00	24	18.0~27.6	0.51	12.24	3600	4.62	119.7	55.0
5015KL-05W-B40-	E00	24	18.0~27.6	0.68	16.32	4000	5.11	147.0	57.5
5015KL-05W-B50-	E00	24	18.0~26.4	0.90	21.60	4400	5.64	176.5	60.5
5015KL-07W-B10-	E00	48	36.0~55.2	0.17	8.16	2600	3.26	64.1	45.5
5015KL-07W-B20-	E00	48	36.0~55.2	0.23	11.04	3100	3.94	89.7	50.5
5015KL-07W-B30-	E00	48	36.0~55.2	0.33	15.84	3600	4.62	119.7	55.0
5015KL-07W-B40-	E00	48	36.0~55.2	0.38	18.24	4000	5.11	147.0	57.5
5015KL-07W-B50-	E00	48	36.0~52.8	0.45	21.60	4400	5.64	176.5	60.5



Specification Data:

•	Dimensions/Type:	150 x 172 x 25mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Black) Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG22, +Red, -Black
•	Weight:	510g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Rib Type Only



Airflow, m³/min

Model	Product	Rated Voltage	Voltage	Current	Input Power	Speed	Max. Airflow	Max. Static	Noise
	No.	(VDC)	Range	(A)	(VV)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
5910PL-04W-B10-	L00	12	6.0~18.0	0.86	10.3	2500	4.81	76.0	54.1
5910PL-04W-B20-	L00	12	6.0~18.0	1.13	13.6	2850	5.38	93.2	57.0
5910PL-04W-B30-	L00	12	6.0~18.0	1.52	18.2	3150	5.95	115.2	58.9
5910PL-04W-B40-	L00	12	6.0~18.0	1.70	20.4	3350	6.52	141.0	61.5
5910PL-04W-B50-	L00	12	6.0~18.0	2.06	24.7	3500	7.08	163.7	62.5
5910PL-05W-B10-	L00	24	12.0~30.0	0.41	9.8	2500	4.81	76.0	54.1
5910PL-05W-B20-	L00	24	12.0~30.0	0.58	13.9	2850	5.38	93.2	57.0
5910PL-05W-B30-	L00	24	12.0~30.0	0.75	18.0	3150	5.95	115.2	58.9
5910PL-05W-B40-	L00	24	12.0~30.0	0.86	20.6	3350	6.52	141.0	61.5
5910PL-05W-B50-	L00	24	12.0~30.0	1.00	24.0	3500	7.08	163.7	62.5
5910PL-05W-B60-	L00	24	12.0~30.0	1.16	27.8	3750	7.65	187.0	62.9
5910PL-05W-B70-	L00	24	12.0~30.0	1.55	37.2	4100	8.20	233.0	65.4
5910PL-07W-B10-	L00	48	25.0~60.0	0.22	10.6	2500	4.81	76.0	54.1
5910PL-07W-B20-	L00	48	25.0~60.0	0.28	13.4	2850	5.38	93.2	57.0
5910PL-07W-B30-	L00	48	25.0~60.0	0.37	17.8	3150	5.95	115.2	58.9
5910PL-07W-B40-	L00	48	25.0~60.0	0.45	21.6	3350	6.52	141.0	61.5
5910PL-07W-B50-	L00	48	25.0~60.0	0.51	24.5	3500	7.08	163.7	62.5
5910PL-07W-B60-	L00	48	25.0~60.0	0.58	27.8	3750	7.65	187.0	62.9
5910PL-07W-B70-	L00	48	25.0~60.0	0.74	35.5	4100	8.20	233.0	65.4

The information above represents typical performance of the product, and is subject to change without notice.

Product performance may be varied or enhanced to meet individual requirements.

4

5920PL SERIES DC AXIAL FAN





Specification Data:

•	Dimensions/Type:	150 x 172 x 50mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Black) Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG22, +Red, -Black
•	Terminal (option):	Faston 110 equivalent
•	Weight:	830g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
5290PL-04W-B10-	D00	12	6.0~18.0	0.80	9.60	2550	5.10	92.5	50.0
5290PL-04W-B20-	D00	12	6.0~18.0	1.00	12.00	2850	5.66	117.5	53.0
5290PL-04W-B30-	D00	12	6.0~18.0	1.15	13.80	3150	6.37	140.0	55.0
5290PL-04W-B40-	D00	12	6.0~18.0	1.44	17.28	3350	6.80	155.0	58.0
5290PL-04W-B50-	D00	12	6.0~18.0	1.60	19.20	3500	7.36	182.75	60.3
5290PL-05W-B10-	D00	24	12.0~30.0	0.36	8.64	2550	5.10	92.5	50.0
5290PL-05W-B20-	D00	24	12.0~30.0	0.46	11.04	2850	5.66	117.5	53.0
5290PL-05W-B30-	D00	24	12.0~30.0	0.55	13.20	3150	6.37	140.0	55.0
5290PL-05W-B40-	D00	24	12.0~30.0	0.66	15.84	3350	6.80	155.0	58.0
5290PL-05W-B50-	D00	24	12.0~30.0	0.79	18.96	3500	7.36	182.75	60.3
5290PL-05W-B60-	D00	24	12.0~30.0	0.88	21.12	3750	7.93	210.5	62.5
5290PL-05W-B70-	D00	24	12.0~30.0	1.08	25.92	4000	8.50	226.5	63.2
5290PL-07W-B10-	D00	48	25.0~60.0	0.18	8.64	2550	5.10	92.5	50.0
5290PL-07W-B20-	D00	48	25.0~60.0	0.23	11.04	2850	5.66	117.5	53.0
5290PL-07W-B30-	D00	48	25.0~60.0	0.27	12.96	3150	6.37	140.0	55.0
5290PL-07W-B40-	D00	48	25.0~60.0	0.33	15.84	3350	6.80	155.0	58.0
5290PL-07W-B50-	D00	48	25.0~60.0	0.40	19.20	3500	7.36	182.75	60.3
5290PL-07W-B60-	D00	48	25.0~60.0	0.47	22.56	3750	7.93	210.5	62.5
5290PL-07W-B70-	D00	48	25.0~60.0	0.51	24.48	4000	8.50	226.5	63.2



Specification Data:

•	Dimensions/Type:	172mm x 50mm Axial Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Black) Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG22, +Red, -Black
•	Terminal (option):	Faston 110 equivalent
•	Weight:	830g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts







Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
6820PL-04W-B10-	D00	12	6.0~18.0	0.80	9.60	2550	5.10	92.5	50.0
6820PL-04W-B20-	D00	12	6.0~18.0	1.00	12.00	2850	5.66	117.5	53.0
6820PL-04W-B30-	D00	12	6.0~18.0	1.15	13.80	3150	6.37	140.0	55.0
6820PL-04W-B40-	D00	12	6.0~18.0	1.44	17.28	3350	6.80	155.0	58.0
6820PL-04W-B50-	D00	12	6.0~18.0	1.60	19.20	3500	7.36	182.75	60.3
6820PL-05W-B10-	D00	24	12.0~30.0	0.36	8.64	2550	5.10	92.5	50.0
6820PL-05W-B20-	D00	24	12.0~30.0	0.46	11.04	2850	5.66	117.5	53.0
6820PL-05W-B30-	D00	24	12.0~30.0	0.55	13.20	3150	6.37	140.0	55.0
6820PL-05W-B40-	D00	24	12.0~30.0	0.66	15.84	3350	6.80	155.0	58.0
6820PL-05W-B50-	D00	24	12.0~30.0	0.79	18.96	3500	7.36	182.75	60.3
6820PL-05W-B60-	D00	24	12.0~30.0	0.88	21.12	3750	7.93	210.5	62.5
6820PL-05W-B70-	D00	24	12.0~30.0	1.08	25.92	4000	8.50	226.5	63.2
6820PL-07W-B10-	D00	48	25.0~60.0	0.18	8.64	2550	5.10	92.5	50.0
6820PL-07W-B20-	D00	48	25.0~60.0	0.23	11.04	2850	5.66	117.5	53.0
6820PL-07W-B30-	D00	48	25.0~60.0	0.27	12.96	3150	6.37	140.0	55.0
6820PL-07W-B40-	D00	48	25.0~60.0	0.33	15.84	3350	6.80	155.0	58.0
6820PL-07W-B50-	D00	48	25.0~60.0	0.40	19.20	3500	7.36	182.75	60.3
6820PL-07W-B60-	D00	48	25.0~60.0	0.47	22.56	3750	7.93	210.5	62.5
6820PL-07W-B70-	D00	48	25.0~60.0	0.51	24.48	4000	8.50	226.5	63.2



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Product Series	Size (mm)	AirFlow (m ³ /hr)	Page
2412PS Series	60sq x 30	15.6	62
3110PS Series	80sq x 25	33.6	63
3115PS Series	80sq x 38	54.0	64
3610PS Series	92sq x 25	59.0	65
4710PS Series	119sq x 25	120.0	66
1715FS Series	119sq x 38	153.0	67
4715MS Series	119sq x 38	174.0	68
5915PC Series	Ø172x150x38	360.0	70



AC AXIAL FANS - ENGINEERING

Agency Approvals

Fan Model	ULE89936	CSALR65829	VDE	CE
2412PS	Vol.1,S3	1202307	15073-1014	1
3110PS	Vol.1,S3	1202307		✓
3115PS	Vol.1,S3	1202307		✓
3610PS	Vol.1,S3	1202307	15073-0006	✓
4710PS	Vol.1,S3	1202307	15073-0009	✓
4715FS	Vol.1,S27			✓
4715MS	Vol.1,S6	1202307	15073-0011	\checkmark
5915PC	Vol.2,S1	1202307	15073-0012	1









CE

Common Specifications

Operating Voltage: +10% of rated voltage

Noise: Measured at rated voltage,1 meter distance from side in an Anechoic chamber, background noise 16 dBA Max.

Vibration Test: JIS C0040 Amplitude 1.5 mm, Frequency 10-55 Hz,1 hr per axis;X,Y,Z

Shock Test: JIS C0041 Acceleration 100 G,Duration 6ms per axis:X,Y,Z

Insulation Class: E class (UL:class A)

Motor Structure: Shaded Pole Induction Motor/capacitor – run induction motor

Insulation Resistance: 10 Mohm Min.@DC 500V

Dielectric Withstand Voltage: AC1800V for 3 seconds (<0.5 mA allowable, between lead and frame)

Installation Method: For either the suction or exhaust type,horizontal,vertical or inclined installation can be selected.

Protection: Motor burnout is prevented by the impedance system or thermal protection system, thus safety is always insured.

Impedance System: The fixed impedance of the coil keeps the specified temperature below that specified by the insulation class of the motor coil.

Thermal Protection System: The coil includes a bimetallic strip to control the connection switch. This operates to keep the temperature below the specified insulation class.

Panel Cut-outs

Inlet and Outlet Sides



2412PS SERIES AC AXIAL FAN



•	Dimensions/Type:	60mm 🗆 x 30mm Axial Fan
•	Motor Protection:	Impedance Protection
•	Motor Type:	Shaded Pole Induction Motor
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)
•	Lead Wire:	UL3266, CSA CL1252, AWG22
•	Weight:	140g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product	Rated	Frequency	Starting	Current	Input	Speed	Max. Airflow	Max. Static	Noise
	No.	Voltage (V)	(Hz)	Voltage (V)	(A)	Power (W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
2412PS-12W-B30-	A00	115 115	50 60	65 65	0.070 0.060	4.5 4.0	2000 2600	0.20 0.26	13.7 22.6	28.0 29.0

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3110PS SERIES AC AXIAL FAN



•	Dimensions/Type:	80mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Impedance Protection
•	Motor Type:	Shaded Pole Induction Motor
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)
•	Lead Wire:	AWG22, UL3266, CSA CL1252
•	Weight:	220g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product	Rated	Frequency	Starting	Current	Input	Speed	Max. Airflow	Max. Static	Noise
	No.	Voltage (V)	(Hz)	Voltage (V)	(A)	Power (W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
3110PS-12W-B30-	A00	115 115	50 60	65 65	0.085 0.075	6.0 5.0	2600 3100	0.46 0.56	39.2 53.9	28.0 33.0

3115PS SERIES AC AXIAL FAN



Specification Data:

80mm 🗆 x 38mm Axial Fan • Dimensions/Type: Motor Protection: . Impedance Protection • Motor Type: Shaded Pole Induction Motor Temperature Range: -10°C ~ +70°C (Operating) . -40°C ~ +70°C (Storage) • Material: Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled) Terminal: Faston 110 equivalent . Lead Wire (Optional): AWG22, UL3266, CSA CL1252 • 270g Weight: ٠ • Rotation Direction: Counterclockwise Airflow Direction: Out Over Support Struts •



Model	Product No.	Rated Voltage (V)	Frequency (Hz)	Starting Voltage (V)	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3115PS-12T-B10-	A00	115 115	50 60	75 75	0.060 0.055	4.5 4.0	1700 1900	0.50 0.55	16.6 21.5	23.0 25.0
3115PS-12T-B20-	A00	115 115	50 60	75 75	0.080 0.070	5.0 4.5	2100 2300	0.60 0.68	24.5 29.4	29.0 32.0
3115PS-12T-B30-	A00	115 115	50 60	75 75	0.140 0.110	9.0 7.0	2700 3200	0.75 0.90	34.3 49.0	33.0 38.0
3115PS-23T-B10-	A00	230 230	50 60	150 150	0.055 0.050	6.0 5.0	1800 2100	0.50 0.63	17.6 24.5	23.0 26.0
3115PS-23T-B20-	A00	230 230	50 60	150 150	0.050 0.045	7.0 6.0	2200 2500	0.63 0.74	24.5 35.2	30.0 34.0
3115PS-23T-B30-	A00	230 230	50 60	150 150	0.070 0.055	10.0 8.0	2700 3200	0.75 0.90	34.3 49.0	33.0 38.0







ROTATION

•	Dimensions/Type:	92mm 🗆 x 25mm Axial Fan
•	Motor Protection:	Impedance Protection
•	Motor Type:	Shaded Pole Induction Motor
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)
•	Terminal:	Faston 110 equivalent
•	Lead Wire (Optional):	UL3266, CSA CL1252, AWG22
•	Weight:	300g
•	Rotation Direction:	Counterclockwise
•	Airflow Direction:	Out Over Support Struts



Model	Product No.	Rated Voltage (V)	Frequency (Hz)	Starting Voltage (V)	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
3610PS-12T-B10-	A00	115	50	75	0.090	7.0	1450	0.46	13.7	22.0
SOLOLO IEL BIO	7100	115	60	75	0.080	6.0	1800	0.58	19.6	25.0
261000 107 000	A00	115	50	75	0.090	7.0	2100	0.60	29.4	30.0
301053-121-020-	AUU	115	60	75	0.080	6.0	2500	0.80	39.2	35.0
261000 107 020	۸00	115	50	75	0.170	12.0	2600	0.80	43.1	33.5
3010F3-121-030-	AUU	115	60	75	0.130	9.0	3100	0.98	60.7	38.0
2610D0 00T D10	A00	230	50	180	0.050	7.0	1450	0.46	13.7	22.0
301043-231-010-	A00	230	60	Voltage (v) (A) Power (w) (HPM) (m/min) Pressure (Pa) (dBA) 75 0.090 7.0 1450 0.46 13.7 22.0 75 0.080 6.0 1800 0.58 19.6 25.0 75 0.090 7.0 2100 0.60 29.4 30.0 75 0.080 6.0 2500 0.80 39.2 35.0 75 0.170 12.0 2600 0.80 43.1 33.5 75 0.130 9.0 3100 0.98 60.7 38.0 180 0.050 7.0 1450 0.46 13.7 22.0 180 0.040 6.0 1800 0.58 19.6 26.0 180 0.050 7.0 2100 0.60 29.4 30.0 180 0.050 6.0 2500 0.80 39.2 35.0 180 0.050 6.0 2500 0.80 3	26.0					
261000 027 000	A00	230	50	180	0.050	7.0	2100	0.60	29.4	30.0
301043-231-020-	A00	230	60	180	0.050	6.0	2500	0.80	39.2	35.0
	400	230	50	180	0.090	13.0	2600	0.80	43.1	34.0
3010PS-231-B30-	A00	230	60	180	0.070	10.0	3100	0.98	60.7	39.0

4710PS SERIES AC AXIAL FAN



Specification Data:

 Dimensions/Type: 	119mm └ x 25mm Axial Fan
Motor Protection:	B20 Impedance Protected B3A Thermally Protected
Motor Type:	Shaded Pole Induction Motor
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
• Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)
• Terminal:	Faston 110 equivalent
• Weight:	360g
Rotation Direction:	Counterclockwise
 Airflow Direction: 	Out Over Support Struts



Model	Product No.	Rated Voltage (V)	Frequency (Hz)	Starting Voltage (V)	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4710PS-12T-B20-	A00	115	50	75	0.100	8.0	1900	1.40	23.5	29.0
	/.00	115	60	75	0.090	7.0	2000	1.50	21.5	30.0
1710DC 10T D2A	A00	115	50	75	0.190	14.0	2300	1.80	41.1	34.0
4/10F3-121-D3A-	AUU	115	60	75	0.160	11.0	2700	2.00	41.1	38.0
1710DQ_22T_B20_	A00	230	50	175	0.060	9.0	1900	1.40	23.5	29.0
4710PS-12T-B3A- 4710PS-23T-B20-	700	230	60	175	0.050	8.0	2100	1.50	21.5	30.0
1710DC 00T D0A	A00	230	50	175	0.100	14.0	2300	1.80	41.1	34.0
47 10PS-231-B3A-	AUU	230	60	175	0.090	11.0	2700	2.00	41.1	38.0



4715FS SERIES AC AXIAL FAN





Dimensions/Type:	119mm 🗆 x 38mm Axial Fan
Motor Protection:	Thermally Protected
Motor Type:	Shaded Pole Induction Motor
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
• Material:	Casing: Aluminium (Painted) Impeller: Plastic (Black) UL94V-0
Terminal:	Faston 110 equivalent
Lead Wire (Optional):	UL3266, CSA CL1252, AWG22
• Weight:	550g
Rotation Direction:	Counterclockwise
Airflow Direction:	In Over Support Struts



Model	Product	Rated	Frequency	Starting	Current	Input	Speed	Max. Airflow	Max. Static	Noise
	No.	Voltage (V)	(Hz)	Voltage (V)	(A)	Power (W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
4715FS-23T-B5A-	XXX	230 230	50 60	175 175	0.090 0.064	TBC TBC	2800 3250	2.6 3.0	90 100	TBC TBC

4715MS SERIES AC AXIAL FAN





Specification Data:

Dimensions/Type:	119mm 🗆 x 38mm Axial Fan
Motor Protection:	B10 ~ B30 Impedance B4A ~ B5A Thermal
Motor Type:	Shaded Pole Induction Motor
Temperature Range: B10~B4A B5A All Classes	-10°C ~ +70°C (Operating) -10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)

٠	Terminal:	Faston 110 equivalent					
•	Lead Wire:	UL3266, CSA CL1252, AWG22					
•	Weight:	550g					
•	Rotation Direction:	Counterclockwise					
•	Airflow Direction:	Out Over Support Struts					

Model	Product No.	Rated Voltage (V)	Frequency (Hz)	Starting Voltage (V)	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
4715MS-12T-B10-	X00	115	50	75	0.090	6.0	1350	1.30	15.6	27.0
		115	60	75	0.080	5.5	1450	1.40	16.6	28.0
/715MS_12T_B20_	X00	115	50	75	0.100	7.0	2100	2.00	35.2	32.0
47 101010-121-020-	700	115	60	75	0.100	7.0	1950	1.90	Max. Static (m³/min) Max. Static Pressure (Pa) No. (df (df) 1.30 15.6 27 1.40 16.6 28 2.00 35.2 32 1.90 24.5 30 2.30 49.9 37 2.40 50.9 35 2.70 64.6 39 2.50 44.7 27 1.30 14.7 28 2.90 76.4 41 1.30 14.7 28 2.00 35.2 32 1.90 21.5 30 2.50 51.9 37 2.40 53.9 35 2.50 51.9 37 2.40 53.9 35 2.70 63.7 37 2.50 51.9 37 2.50 63.7 37 2.50 63.7 37 2.90 70.5 41	30.0
4715MC 10T D20	V00	115	50	75	0.160	11.0	2400	2.30	49.9	34.0
47 101010-121-030-	700	115	60	75	0.140	10.0	2600	2.50	49.9	37.0
4715MS-12T-B4A-	X00	115	50	75	0.220	15.0	2450	2.40	50.9	35.0
		115	60	75	0.190	13.0	2750	2.70	64.6	39.0
	Model Product No. SMS-12T-B10- X00 SMS-12T-B20- X00 SMS-12T-B30- X00 SMS-12T-B4A- X00 SMS-12T-B5A- X00 SMS-12T-B5A- X00 SMS-12T-B5A- X00 SMS-23T-B10- X00 SMS-23T-B20- X00 SMS-23T-B30- X00 SMS-23T-B4A- X00 SMS-23T-B4A- X00 SMS-23T-B4A- X00	115	50	65	0.250	15.5	2600	2.50	64.6	37.0
4715MS-121-B5A-		115	60	65	0.210	14.5	2900	2.90	76.4	41.0
4715MO 00T D10	Noo	230	50	175	0.050	6.5	1350	1.30	14.7	27.0
47 15IVIS-231-B10-	XUU	230	60	175	0.045	6.0	1450	1.40	14.7	28.0
4715M0 00T D00	VOO	230	50	175	0.060	7.5	2100	2.00	35.2	32.0
47 101010-231-820-	200	230	60	175	0.060	7.5	1900	1.90	21.5	30.0
4715MO 00T D00	VOO	230	50	175	0.100	12.0	2400	2.30	49.0	34.0
47 101010-231-030-	XUU	230	60	175	0.080	11.0	2600	2.50	51.9	37.0
	Voo	230	50	175	0.120	15.0	2450	2.40	53.9	35.0
47 I DIVIS-23 I-B4A-	700	230	60	175	0.100	13.0	2750	2.70	63.7	39.0
	VOO	230	50	175	0.120	15.0	2600	2.50	63.7	37.0
4715MS-23T-B5A-	X00	230	60	175	0.100	14.0	2900	2.90	70.5	41.0

The information above represents typical performance of the product, and is subject to change without notice.

Product performance may be varied or enhanced to meet individual requirements.

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5915PC SERIES AC AXIAL FAN



 Dimensions/Type: 	150 x 172 x 38mm Axial Fan
Motor Protection:	B10 ~ B20 Impedance B30 Thermal
Motor Type:	Capacitor Start
Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Aluminium (Painted) Impeller: Polycarbonate (Glass Filled)
• Terminal:	Faston 110 equivalent
• Weight:	800g
Rotation Direction:	Counterclockwise
 Airflow Direction: 	Out Over Support Struts



Model	Product No.	Rated Voltage (V)	Frequency (Hz)	Starting Voltage (V)	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
5915PC-12T-B10-	A00	115 115	50 60	75 75	0.160	16.0	1400 1650	2.40	43.1 60.7	35.0
5015PC-12T-B20-	A00	115	50	75	0.200	21.0	2200	4.00	98.0	46.0
J91JF0-121-D20-	700	115	60	75	0.210	22.0	2600	4.70	117.6	50.0
5915PC-12T-B30-	A00	115	50	75	0.380	35.0	2700	5.00	156.8	52.0
		115	60	75	0.360	32.0	3200	6.00	215.6	56.0
5915PC-23T-B10-	A00	230	50	145	0.090	16.0	1400	2.40	43.1	35.0
		230	60	145	0.110	18.0	1650	2.90	60.7	38.0
5915PC-23T-B20-	A00	230	50	145	0.120	23.0	2200	4.00	98.0	46.0
		230	60	145	0.140	26.0	2600	4.70	117.6	50.0
5915PC-23T-B30-	A00	230	50	145	0.190	35.0	2700	5.00	156.8	52.0
		230	60	145	0.180	35.0	3200	6.00	215.6	56.0



DC COMPACT BLOWERS



DC Compact Blowers



Part Numbering System							
Common Specifications Engineering Information							
Panel Cut-outs							
Product Series	Size (mm)	Inlet	AirFlow (m³/hr)	Pressure (Pa)	Page		
BM4515 Series	45 x 15	Single	6.0	200	77		
BM5115 Series	51 x 15	Single	6.0	200	78		
BM5125 Series	51 x 25	Single	11.4	160	79		
BM5525 Series	55 x 25	Double			*		
BM6015 Series	60 x 15	Single	7.2	169	80		
BM6023 Series	60 x 23	Double			*		
BM6025 Series	60 x 25	Single	10.2	122	81		
BM6025 Series	60 x 25	Double			*		
D00700 0 :	40 00	0: 1	10.0	450	00		

Page

BG0702 Series	40 x 20	Single	16.2	153	82
BG0703 Series	76 x 30	Single	15	110	83
BG0801 Series	80 x 15	Single			*
BG0803 Series	80 x 30	Single			*
BG0903 Series	95 x 33	Single	65	482	84
BG1002 Series	100 x 25	Single	36.6	190	85
BG1203 Series	120 x 32	Single	56	260	86
BL4447 Series	119 x 30	Single	63	475	*
BL6464 Series	162 x 51	Single			*

* For further details please contact your local Sales Office


DC COMPACT BLOWERS ENGINEERING

Part Numbering System



00: Standard 01-99: Customised Standard T0: Standard Value T1-T9: Customised Value

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DC COMPACT BLOWERS ENGINEERING

Common Specifications

Noise: Measured at rated voltage,1 meter distance from fan intake in an Anechoic chamber. Background noise 16 dBA Max.

Vibration Test: JIS C0040 Amplitude 1.5 mm, Frequency 10-55 Hz,1 hr per axis; X, Y, Z

Shock Test: JIS C0041 Acceleration 1000 m/s 2 , Duration 6ms per axis: X, Y, Z

Insulation Class: E class (UL:class A)

Insulation Resistance: 100 Mohm Min.@DC 500V between frame and (+)terminal

Dielectric Withstand Voltage: AC 700V 1s

Polatrity Protection: Motor withstands reverse connection for positive and negative leads

Fan Sensors

Three types of DC fan sensors are available for NMB fans:

Locked Rotor Signal – outputs the status of the fan motor and is ideal for detecting if the fan motor is rotating or stopped.

Life Signal – detects a reduction in fan speed at a specified RPM level.

Tachometer Signal – set to produce two cycles of rectangular waveform as the fan motor makes one rotation and is ideal for detecting speed.

Output Circuit:Open Collector for both locked rotor and tach out.

Specifications: Vce max:+30V Vce max:+15V(1004KL,1404KL,1204KL,1604KL, 1606KL,1608KL,2004KL,2106KL,2406KL,2406GL, BM4515,BM5115,BM5125,BM6015) Ic max:5mA (Vce(sat)max=0.4V)

Alarm Signal Output:White,+:Red,-:Black

Alarm Signal Circuit



TTL output is an available option.

Locked Rotor Alarm Signal:



Output Waveform: At Rated Voltage the output signal may correspond to either Case 1 or Case 2. Your design should provide for both waveforms.

Life Signal:

Output Waveform:At Rated Voltage



Tachometer Signal:

Output Waveform:At Rated Voltage

T=T1+T2+T3+T4=1 Rotation,

T1=T2=T3=T4=60/4m m:Rotation Speed min⁻¹ The output signal may correspond to Case 1 or Case 2.Your design should provide for both waveforms.

DC COMPACT BLOWERS ENGINEERING



Speed Control

DC fan speed can be controlled in order to optimize cooling,reduce noise and decrease system power draw. There are various methods of controlling fan speed.

2-speed DC fan motor:

NMB Minebea's custom 2 speed fans are available with high and low speeds specified by the customer. The low end operating speed is fixed in order to reduce noise and lower power consumption.

Below is an example of an External connection for a 2-speed DC fan motor.

Control by relay contact



Control by transistor



Switch-over of fan speed S.W.OFF: LOW SPEED, ON: HI SPEED

Temperature Detecting Variable Speed DC Fan:

The RPM may be automatically controlled and synchronised with temperature variation by installing a thermistor.

Varying the control voltage (0 to 6V)enables speed variation between the signal wire and ground.

Example of connection diagram:



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PWM Control DC Fan:

In PWM speed control, a fixed frequency square wave is applied to the speed control leadwire of the fan. The ratio of on time vs.off time (duty cycle) is directly proportional to the speed of the fan.

Example:



Vst = 4.5~7.0V (Stopping MODE) Vst = 0~0.5V (Running MODE)

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DC COMPACT BLOWERS ENGINEERING

Agency Approvals

Fan Model	ULE89936	CSALR65829	VDE	CE
BM4515	Vol.1,S62	1161575		1
BM5115	Vol.1,S50	1057185	15073-0030	\checkmark
BM5125	Vol.1,S53	1082756	15073-0022	\checkmark
BM6015	In Process	In Process		\checkmark
BM6025	In Process	In Process		\checkmark
BG0702	Vol.1,S63	1133535		1
BG0703	Vol.1,S42	1419031	15073-0019	1
BG0903	Vol.1,S59	1120644	15073-0039	\checkmark
BG1002	Vol.1,S60	1158401	15073-0043	\checkmark
BG1203	Vol.1,S49	1031559	15073-0029	1

BL4447

Vol.1,S77











Panel Cut-outs

Inlet Sides



BM4500 Series



BG0700 Series



BM5100 Series



BG0900 Series



BM6015 Series



BG1000 Series



BM6025 Series



BG1200 Series



BM4515 SERIES DC COMPACT BLOWER



•	Dimensions/Type:	45mm x 15mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range: B50 Class B30~B40 Class All Class	-10°C ~ +60°C (Operating) -10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black Length 200mm min
•	Weight:	25g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BM4515-04W-B30	L00	12	10.2~13.8	0.09	1.08	5500	0.075	100	35.0
BM4515-04W-B40	L00	12	10.2~13.8	0.14	1.68	6500	0.085	160	39.0
BM4515-04W-B50	L00	12	10.2~13.8	0.19	2.28	7500	0.10	200	43.0









51mm x 15mm Centrifugal Fan
Auto Restart/Reverse Polarity Protection
-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
UL1061, AWG26, +Red, -Black Length 200mm min
25g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BM5115-04W-B30	X00	12	10.2~13.8	0.06	0.72	3500	0.06	60	26.0
BM5115-04W-B40	X00	12	10.2~13.8	0.12	1.44	4500	0.08	120	35.0
BM5115-04W-B50	X00	12	10.2~13.8	0.18	2.16	5500	0.10	200	42.0



BM5125 SERIES DC COMPACT BLOWER



•	Dimensions/Type:	51mm x 25mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range: B50 Class B30~B40 Class All Class	-10°C ~ +60°C (Operating) -10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black Length 200mm min
•	Weight:	35g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BM5125-04W-B30	L00	12	10.2~13.8	0.06	0.72	2500	0.10	35	27.0
BM5125-04W-B40	L00	12	10.2~13.8	0.13	1.56	3500	0.15	85	34.0
BM5125-04W-B50	L00	12	10.2~13.8	0.24	2.88	4500	0.19	160	41.0









•	Dimensions/Type:	60mm x 15mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black Length 200mm min
•	Weight:	30g



Model	Product	Rated Voltage	Voltage	Current	Input Power	Speed	Max. Airflow	Max. Static	Noise
	No.	(VDC)	Range	(A)	(W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
BM6015-04W-B50	X00	12	9~12.6	0.22	2.64	5600	0.12	168.9	42.0



BM6025 SERIES DC COMPACT BLOWER



•	Dimensions/Type:	60mm x 25mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +60°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1061, AWG26, +Red, -Black Length 200mm min
•	Weight:	35g



Model	Product	Rated Voltage	Voltage	Current	Input Power	Speed	Max. Airflow	Max. Static	Noise
	No.	(VDC)	Range	(A)	(W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
BM6025-04W-B50	T00	12	10.0~13.0	0.32	3.84	3500	0.17	121.9	31

BG0702 SERIES DC COMPACT BLOWER







•	Dimensions/Type:	75.0mm x 25mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range:	-10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black Length 200mm min
•	Weight:	90g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BG0702-B043-000	X0	12	6~13.8	0.16	1.92	3000	0.22	94	39.0
BG0702-B044-000	X0	12	6~13.8	0.19	2.28	3300	0.24	124	41.0
BG0702-B045-000	X0	12	6~13.8	0.25	3.00	3600	0.27	153	43.0
BG0702-B053-000	X0	24	10~27.6	0.10	2.40	3000	0.22	94	39.0
BG0702-B054-000	X0	24	10~27.6	0.11	2.64	3300	0.24	124	41.0
BG0702-B055-000	X0	24	10~27.6	0.14	3.36	3600	0.27	153	43.0



BG0703 SERIES DC COMPACT BLOWER



•	Dimensions/Type:	75.7mm x 30mm Centrifugal Fan
•	Motor Protection:	Auto Restart/Reverse Polarity Protection
•	Temperature Range: B0x5 Class B0x1~B0x4 Class All Class	-10°C ~ +60°C (Operating) -10°C ~ +70°C (Operating) -40°C ~ +70°C (Storage)
•	Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
•	Lead Wire:	UL1007, AWG26, +Red, -Black Length 200mm min
•	Weight:	90g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BG0703-B041-000	X0	12	6~13.8	0.10	1.20	2000	0.19	40	28.0
BG0703-B042-000	X0	12	6~13.8	0.12	1.44	2200	0.21	50	29.5
BG0703-B043-000	X0	12	6~13.8	0.18	2.16	2550	0.25	75	34.5
BG0703-B044-000	X0	12	6~13.0	0.29	3.48	3000	0.30	110	38.5
BG0703-B045-000	X0	12	6~13.0	0.51	6.12	3650	0.37	164	43.0
BG0703-B051-000	X0	24	10~27.6	0.06	1.44	2000	0.19	40	28.0
BG0703-B052-000	X0	24	10~27.6	0.07	1.68	2200	0.21	50	29.5
BG0703-B053-000	X0	24	10~27.6	0.09	2.16	2550	0.25	75	34.5
BG0703-B054-000	X0	24	10~26.0	0.15	3.60	3000	0.30	110	38.5
BG0703-B055-000	X0	24	10~26.2	0.2	4.80	3650	0.37	164	43.0



BG0903 SERIES DC COMPACT BLOWER



Dimensions/Type:	95mm x 33mm Centrifugal Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG26, +Red, -Black Length 300mm min
Weight:	210g



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BG0903-B042-000	00	12	8~13.8	0.40	4.80	2700	0.58	152	47.5
BG0903-B043-000	00	12	8~13.8	0.64	7.68	3200	0.70	225	51.5
BG0903-B044-000	00	12	8~12.8	1.03	12.40	3700	0.81	342	54.5
BG0903-B047-000	00	12	10.8~12.6	1.6	19.20	5200	1.08	482	61.0
BG0903-B052-000	00	24	10~27.6	0.21	5.04	2700	0.58	152	47.5
BG0903-B053-000	00	24	10~27.6	0.33	7.92	3200	0.70	225	51.5
BG0903-B054-000	00	24	10~25.0	0.49	11.80	3700	0.81	342	54.5



BG1002 SERIES DC COMPACT BLOWER



100mm x 25mm Centrifugal Fan
Auto Restart/Reverse Polarity Protection
-10°C ~ +60°C (Operating) -40°C ~ +60°C (Storage)
Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
UL1007, AWG26, +Red, -Black Length 300mm min
170g



Model	Product	Rated Voltage	Voltage	Current	Input Power	Speed	Max. Airflow	Max. Static	Noise
	No.	(VDC)	Range	(A)	(W)	(RPM)	(m³/min)	Pressure (Pa)	(dBA)
BG1002-B044-000	00	12	10~13.8	0.56	6.7	3300	0.61	212	48.0

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BG1203 SERIES DC COMPACT BLOWER







Dimensions/Type:	120mm x 32mm Centrifugal Fan
Motor Protection:	Auto Restart/Reverse Polarity Protection
Temperature Range:	-10°C ~ +60°C (Operating) -40°C ~ +70°C (Storage)
Material:	Casing: Plastic (Black) 94V-0 Impeller: Plastic (Black) 94V-0
Lead Wire:	UL1007, AWG24, +Red, -Black Length 300mm min
Weight:	270g
	Dimensions/Type: Motor Protection: Temperature Range: Material: Lead Wire: Weight:



Model	Product No.	Rated Voltage (VDC)	Voltage Range	Current (A)	Input Power (W)	Speed (RPM)	Max. Airflow (m³/min)	Max. Static Pressure (Pa)	Noise (dBA)
BG1203-B042-000	00	12	6~13.8	0.30	3.60	1800	0.63	100	41.5
BG1203-B043-000	00	12	6~13.8	0.48	5.78	2100	0.74	145	46.5
BG1203-B044-000	00	12	6~13.8	0.65	7.80	2250	0.80	175	48.5
BG1203-B045-000	00	12	6~13.8	0.93	11.16	2650	0.94	260	54.0
BG1203-B052-000	00	24	12~27.6	0.17	4.08	1800	0.63	100	41.5
BG1203-B053-000	00	24	12~27.6	0.25	6.00	2100	0.74	145	46.5
BG1203-B054-000	00	24	12~27.6	0.30	7.20	2250	0.80	175	48.5
BG1203-B055-000	00	24	12~25.2	0.48	11.52	2650	0.94	260	54.0



DC Radial Blowers



Part Numbering Syste	em			88
Engineering Informati	on			89-91
Product Series	Size (mm)	AirFlow (m ³ /hr)	Page
101R055 Series	Ø101 x 55			92
110R041 Series	Ø110 x 41	137	180	93
133R091 Series	Ø133 x 91			*
160R054 Series	Ø160 x 54			*
175R069 Series	Ø175 x 69	680	597	94
190R071 Series	Ø190 x 71	720	680	95
220R071 Series	Ø220 x 71	1100	630	96
225R099 Series	Ø225 x 99	1100	500	97
225R107 Series	Ø225 x 107	1180	520	98
250R089 Series	Ø250 x 89			*
250R100 Series	Ø250 x 100	1420	560	99
280R125 Series	Ø280 x 125	1680	430	100

Page

* For further details please contact your local Sales Office



DC RADIAL BLOWERS - ENGINEERING

External Rotor Brushless DC Motors

The NMB range of Blower products has been designed to utilise the benefits of the external rotor DC brushless motor. Standard axial fans are offered with both AC and brushless DC motors.



Motor Construction

The motor assembly comprises two major sub-assemblies, rotor and stator. A multi-pole rotor is formed from a ring of permanent magnet material installed within a steel rotor cup. The cup combines the functions of magnetic return path, magnet containment and mechanical interface to the impeller. The relatively high inertia of the external rotor construction is advantageous in reducing acoustic noise and minimising small speed disturbances. Because the rotor requires no magnetising current, motor efficiency is higher than for an equivalent AC induction motor.

The stator consists of a stack of externally slotted electrical iron laminations, electrically insulated and wound with enamelled copper wire. This wound assembly is mounted onto the baseplate, which also supports a printed circuit board containing the drive electronics and rotor position sensing element. This results in a very compact assembly, with all the heat-producing components integrated into a single sub-assembly.

Motor Assembly

By virtue of being installed within the impeller, the motor benefits from efficient cooling, maximising the life of the product whilst minimising the overall height of the fan. All rotating parts are assembled using NMB ball bearings and then balanced as a single component to reduce vibration and bearing loads, for improved reliability.

Simple motor construction and minimal parts count ensure a high reliability, cost-effective solution. NMB have further evolved this construction method to include totally enclosed motor drive electronics, allowing the product to withstand adverse environmental conditions.

All the traditional benefits of brushless DC motor technology are available, such as long life, high efficiency, high momentary torque, integral speed sensing and speed controllability.

Features Available

The following features are standard on NMB-Minebea fan using 92mm motors

- · Variable speed control by either voltage or PWM input
- Motor speed (Tacho) output signal
- Locked rotor protection
- Motor overload protection
- Motor slow start
- · Wide voltage supply range
- Reverse connection protection

In addition to the standard features the following can be included as required

- IP54 protection
- Fan fault line/s
- · Closed loop speed control
- Bi-directional communication (typically configured as I²C bus)
- Integral RFI filtering
- · Over/Under voltage Indication or protection
- Speed Indication or Protection

DC RADIAL BLOWERS - ENGINEERING



Motor Drive Circuit

The drive circuits integrated into NMB fans use state of the art electronics, giving increased design flexibility, controllability and high levels of protection for the fan and its supply. Drives and motors are available for nominal supplies from 12 to 48V. The newest generation of drives has embedded microcontroller and innovative design topologies providing a significantly increased voltage range, including the ability to operate over the range 18 to 75Vdc.

Flexibility

The latest NMB brushless DC motor drives are based around a powerful microcontroller, allowing application specific firmware to be written for customised applications. Typical uses of this facility would be:

- Mapping of the relationship between the input speed demand signal and actual fan speed. This could be linear, exponential or custom defined.
- Speed demand "end stops" may also be included to provide a fan full speed condition above and fan stopped below predetermined speed demand input conditions.

• The flexibility of the drives is further enhanced by optional circuit elements which allow for the tailoring of input and output control circuitry to meet particular requirements.

Controllability

The use of an embedded microcontroller gives significant improvements in the types of motor control available. The fan speed can be controlled within a tolerance of tens of rpm in closed loop configurations (operating the fan in closed loop mode ensures the motor speed remains at the value selected by the control input line irrespective of changing supply voltage or aerodynamic load).

The rate of change of motor speed both at start up and in response to changing speed demand can be programmed into the microcontroller. The response of the drive in the event of various fault conditions is defined within the firmware to ensure maximum levels of protection for the fan and supply. Bi-directional communication is available allowing remote monitoring and control. It is also possible for fans to communicate within a multiple unit system.

Protection

The 92mm motor drive circuits include protection features designed to prevent damage to the motor and supply system in the event of inappropriate use and to minimise damage should a fault develop within the fan.

Where appropriate, a UL listed fuse is fitted within the drive for protection in the event of a catastrophic failure. The most common fault is locked rotor and under these circumstances the drive circuit will switch off power to the motor for a short period of time and then attempt to restart. If upon re-applying power to the motor, the rotor is still locked, the drive will again switch off the motor and continue to cycle until the obstruction is removed.

In the event of an overload condition (excessive current being drawn) the drive will either remove power from the motor and then attempt a restart, or reduce motor speed until the level of current drawn through the motor is within acceptable limits. The two strategies available for protecting the motor in the event of an overload are dependent upon customer requirements.

If the supply connections are inadvertently reversed the fan will draw no current and no damage will result. The unit will not operate until this connection fault is corrected. The

DC RADIAL BLOWERS - ENGINEERING

motors are continuously rated for locked rotor, overload and reverse connection conditions over the full stated operational voltage and temperature range. In addition to the standard protection features control protocols are also available for under/over speed and under/over voltage conditions if required.

HMS Controller (Heat Management System)

NMB-Minebea offers an improved version of an HMS controller, designed to supervise the operation of Heat Management Systems, primarily installed in outdoor electronic equipment enclosures.



The controller operates a wide range of '4-wire' NMB fan types, from mid-size axial fans to heavy-duty blowers. It can also control cabinet frost protection heaters, monitor voltfree alarm inputs and report the overall system status to ancillary equipment via volt-free relay contacts.

The control and operating parameters of the HMS controller are fully user-configurable by selecting values on a Windows based graphical interface running on a standard PC. This enables the user to easily adjust the relationships between fan speed and temperature, the thresholds of various alarm types and the action to be take during each alarm event, and so tune the HMS to suit the thermal performance of individual cabinets.

With the controller able to sense two temperature points, and with its four blowers grouped into two logical pairs of two blowers, it can be configured in a variety of operating modes. The controller can be set up so that the speeds of the pairs of blowers are inter-related, for use in an enclosed heat exchanger system with separate (but related) internal and external air circuits.

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Alternatively, the controller can be configured as two totally independent systems, with each pair of blowers reacting individually to the temperature of the sensor assigned to it.

The user can select which Alarm relay is mapped to which alarm event (either internal or external) and also set the blower speed and heater state during each event. In this way for instance, the HMS inputs can be used to facilitate system diagnostics such as heater/fan test on the press of a button, or as an interlock to stop the fans when a door switch is activated.

Outline Technical Specification

Supply	20 to 75VDC
Operating Temperature:	-40°C ~ +70°C
Temperature Sensors:	1 - 2
Fans/Blowers	1 - 4 (each 5A max)
Heater Control:	1KW max
Alarm Inputs:	6 (volts-free)
Internal Alarms:	Blower Failure
	Temp Sensor Failure
	Heater Failure
	Over/Under Temp
Dimensions:	170 x 90 x 40mm

101R055 SERIES RADIAL BLOWER





Features:

- High efficiency 101mm dia. backward curved radial blower, currently the smallest in an extensive range of high efficiency blowers.
- Ideally suited for fan tray modules in medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 51mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Max.Operating Temp (deg.C)
101R055D04	12	9 - 14	0.3	-30 to +70
101R055D05	24	16 - 28	0.3	-30 to +70
101R055D07	48	36 - 60	0.3	-30 to +70

Specification Data:

 Dynamic balance: 	G6.3 (ISO 1940)
Operational life:	75,000 hrs @ 50 Deg C (L ₁₀)
Speed control:	PWM
Reverse polarity protection	
 Locked motor protection 	
• Tacho	2 x pulses per rev
Voltage cap speed limit	

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	139.9	0.0	4461	63.0	14.0
2	111.7	65.9	4390	63.0	14.4
3	57.9	184.1	4520	63.0	13.8
4	28.5	228.5	4738	64.0	12.8
5	104.9	0.0	3346	56.0	5.9
6	83.8	37.1	3293	56.0	6.1
7	43.4	103.6	3390	56.0	5.8
8	21.4	128.5	3354	57.0	5.4
9	70.0	0.0	2231	30.0	1.7
10	55.9	16.5	2195	29.0	1.8
11	29.0	46.0	2260	30.0	1.7
12	14.3	57.1	2369	31.0	1.6

110R041 SERIES RADIAL BLOWER





EQUI-SPACED ON 47 PCD

Features:

- High efficiency 110mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for fan tray modules in medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 51mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
110R040D04	12	9 - 14	0.3	-40 to +60
110R040D05	24	16 - 28	0.3	-40 to +60
110R040D07	48	36 - 60	0.3	-40 to +60

Specification Data:

•	Dynamic balance:	G6.3 (ISO 1940)
•	Operational life:	75,000 hrs @ 50 Deg C (L ₁₀)
•	EMC (conducted emissions):	EN55022 class B
•	Speed control:	PWM
•	Reverse polarity protection	
•	Locked rotor protection	

s per	rev
9	es per

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	137	0	3188	53	11.5
2	100	54	3203	54	10.6
3	70	104	3370	55	10.1
4	34	142	3538	55	10.1
5	102	0	2379	46	6.7
6	74	30	2385	47	5.8
7	50	54	2471	50	5.8
8	26	74	2593	48	5.8
9	68	0	1596	38	3.8
10	50	14	1624	38	3.8
11	34	24	1681	38	3.8
12	18	34	1755	40	3.8

175R069 SERIES RADIAL BLOWER







Features:

- High efficiency 175mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 76mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions. Alternatively, NMB offers a version with conformally coated electronics with an open frame motor construction.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	tage Voltage Range W DC) (VDC)		Operating Temp (deg.C)
175R069D05	24	14 - 30	1.2	-10 to +70
175R069D07	48	30 - 60	1.2	-10 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
- Operational life: 40,000 hrs @ 40 Deg C
- EMC (conducted emissions): EN55022 class B
- Speed control: PWM or variable voltage signal
- Reverse polarity protection
- Soft start
- Locked rotor protection
- Tacho 1 or 2 x pulses per rev
- Alarm Circuitry option also available

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	690	0	4000	71.8	74.4
2	520	140	3700	70.1	58.9
3	350	260	3600	69.5	54.2
4	160	420	3900	71.3	69.0
5	530	0	3000	65.6	31.4
6	415	70	2800	64.1	25.5
7	285	135	2750	63.7	24.2
8	135	240	3000	65.6	31.4
9	350	0	2000	56.7	9.3
10	285	30	1850	55.1	7.4
11	200	45	1730	53.6	6.0
12	100	100	1900	55.6	8.0



190R071 SERIES RADIAL BLOWER



Tacho

Features:

- High efficiency 190mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
190R71D05	24	16 - 28	1.8	-40 to +70
190R71D07	48	36 - 60	1.8	-40 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
 Operational life: 40,000 hrs @ 40 Deg C
 EMC (conducted emissions): EN55022 class B
 Speed control: PWM or variable voltage signal
 Reverse polarity protection
 Soft start
 Locked rotor protection
 - 1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	720	0	3164	73	88.3
2	460	240	3110	70	86.4
3	290	365	3230	70	84.0
4	140	490	3585	71	81.6
5	560	0	2462	66	47.5
6	360	150	2406	64	43.2
7	220	220	2523	66	43.2
8	110	290	2731	67	38.4
9	350	0	1626	55	20.6
10	230	60	1594	56	19.2
11	140	90	1653	57	19.2
12	70	120	1800	60	16.8

220R071 SERIES RADIAL BLOWER



4-OFF MOUNTING HOLES M4 x 8.5 FULL THREAD EQUI-SPACED ON 58 PCD

-20

Features:

- High efficiency 220mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
220R071D05	24	16 - 24	1.8	-40 to +70
220R071D07	48	36 - 60	1.8	-40 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
 Operational life: 40,000 hrs @ 40 Deg C
 EMC (conducted emissions): EN55022 class B
 Speed control: PWM or variable voltage signal
 Motor overload protection
 Reverse polarity protection
 Soft start
 Locked rotor protection
- Tacho 1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	1100	0	2844	70	99.8
2	840	160	2689	70	100.8
3	550	300	2703	68	100.8
4	270	430	2931	71	93.6
5	820	0	2132	64	49.4
6	630	90	2020	63	48.0
7	410	170	2027	63	48.0
8	200	240	2185	65	45.6
9	560	0	1492	57	25.4
10	450	40	1432	56	24.0
11	300	90	1449	58	24.0
12	140	120	1568	59	21.6



225R099 SERIES RADIAL BLOWER



Tacho

Features:

- High efficiency 225mm dia. backward curved radial blower.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
225R099D05	24	16 - 28	2.1	-40 to +70
225R099D07	48	36 - 60	2.1	-40 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
 Operational life: 40,000 hrs @ 40 Deg C
 EMC (conducted emissions): EN55022 class B
 Speed control: PWM or variable voltage signal
 Reverse polarity protection
 Soft start
 Locked rotor protection
 - 1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	1100	0	2464	67	87.8
2	830	130	2228	66	95.9
3	570	250	2231	66	95.9
4	270	360	2499	67	77.0
5	820	0	1857	61	41.3
6	620	70	1727	60	45.9
7	420	135	1706	60	45.9
8	210	205	1905	62	40.5
9	520	0	1225	52	16.7
10	410	30	1140	50	17.6
11	280	60	1149	50	17.6
12	140	90	1294	54	14.9

225R107 SERIES RADIAL BLOWER



Features:

- High efficiency 225mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Low weight construction using injection moulded (UL94-V0) impeller, mounted onto a plated steel backplate.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life .
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
225R107D05	24	16 - 28	2.4	-40 to +70
225R107D07	48	36 - 60	2.4	-40 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
- Operational life: 40,000 hrs @ 40 Deg C
- EMC (conducted emissions): EN55022 class B
- Speed control: PWM or variable voltage signal
- Reverse polarity protection
- Soft start

Tacho

- Locked rotor protection
 - 1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	1180	0	2533	68	88.3
2	870	150	2241	66	98.6
3	570	260	2248	66	98.6
4	270	370	2524	70	81.0
5	950	0	2040	64	49.1
6	690	90	1854	62	54.0
7	450	160	1827	62	54.0
8	220	240	2058	65	48.6
9	560	0	1252	62	17.0
10	420	30	1163	56	17.6
11	280	60	1159	57	17.6
12	140	90	1308	57	16.2

250R100 SERIES RADIAL BLOWER



Features:

- High efficiency 250mm dia. backward curved radial blower, part of an extensive range of high efficiency blowers.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Fabricated from plated sheet steel for low weight and strength. Corrosion protection for salt-fog conditions available on request.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
250R100D05	24	16 - 28	2.4	-40 to +70
250R100D07	48	36 - 60	2.4	-40 to +70

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
 Operational life: 40,000 hrs @ 40 Deg C
 EMC (conducted emissions): EN55022 class B
 Speed control: PWM or variable voltage signal
 Reverse polarity protection
 Soft start
 Locked rotor protection
 - Tacho1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	1420	0	2370	71	121.9
2	1180	80	2245	71	125.0
3	860	190	2162	69	134.4
4	460	340	2279	69	124.8
5	1100	0	1867	67	66.7
6	920	50	1778	66	64.8
7	660	120	1710	64	67.2
8	360	210	1797	64	64.8
9	720	0	1234	58	26.4
10	600	20	1188	57	26.4
11	440	50	1143	56	26.4
12	240	90	1193	56	26.4

280R125 SERIES RADIAL BLOWER



Features:

- High efficiency 280mm dia. backward curved radial blower, currently the largest in the NMB range of high efficiency blower.
- Ideally suited for medium pressure applications such as heat exchangers and cabinet cooling.
- Fabricated from plated sheet steel for low weight and strength. Corrosion protection for salt-fog conditions available on request.
- Powered by a 92mm external rotor brushless dc motor with NMB ball bearings for high reliability and longer life.
- Fully enclosed electronics for protection against adverse environments, including salt-fog conditions.
- Fully customised blowers and blower modules available on request.
- For speed control NMB can offer an HMS (heat management system) controller.



Series	Voltage (VDC)	Voltage Range (VDC)	Weight (kg)	Operating Temp (deg.C)
280R125D05	24	16 - 28	2.6	-40 to +60
280R125D07	48	36 - 60	2.6	-40 to +60

Specification Data:

- Dynamic balance: G6.3 (ISO 1940)
 Operational life: 40,000 hrs @ 40 Deg C
- EMC (conducted emissions): EN55022 class B
- Speed control: PWM or variable voltage signal
- Motor overload protection
- Reverse polarity protection
- Soft start
- Locked rotor protection
- Tacho 1, 2 or 3 x pulses per rev

	Airflow (m³/hr)	Pressure (Pa)	Speed (RPM)	Noise (dBA)	Power (W)
1	1680	0	1766	71	104.2
2	1260	95	1614	69	105.6
3	820	170	1572	68	110.4
4	420	270	1741	71	93.6
5	1340	0	1430	65	59.5
6	1000	60	1339	66	62.4
7	660	115	1302	65	62.4
8	540	175	1401	64	57.6
9	860	0	939	56	24.5
10	660	25	888	56	24.0
11	440	50	870	55	24.0
12	220	75	904	57	24.0



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Fan Accessories & Customisation

To compliment the extensive range of fans available, NMB-Minebea offer approved accessories to allow connection and protection within customer applications. Fan tray assemblies typify an application that combines the use of NMB-Minebea fans, power cords, filters and guards.

In addition NMB-Minebea can provide fans customised with features to meet the specific requirements of the application. To minimise assembly time, fans can be fitted with specified lead lengths, connectors and have threaded inserts or tapped holes applied.









Page

Product Series	Fan Size (mm)	Wire Form Guard	Plastic Fan Guard	Aluminium Filter	Filter Assemblies
1000 Series	25	•			
1200 Series	30	٠			
1400 Series	35	•			
1600 Series	40	•	•		•
2000 Series	50	٠			
2100 Series	52	٠			
2400 Series	60	٠	٠	•	٠
2800 Series	70	٠			
3100 Series	80	٠	٠	٠	٠
3600 Series	92	٠	٠	٠	٠
4700 Series	119	٠	٠	•	•
5000 Series	127	٠		•	
5900 Series	162	٠	•	•	•
6800 Series	172	•	•	٠	•

Fan Size Fan Size 30mm 35mm Fan Size 40mm Part No PG12-02 Part No PG14-02 Part No PG16-02 32.0mm 31.5mm 29.5mm 25.8mm 21.8mm 24mm 4.0mm - 4.0mm Dia Dia Dia. - 3.2m 4 Positions 4.8mm 4.8mm 4 Positions 4 Positions 4.8mm Ring Diameter: 1.6 mm Ring Diameter: 1.6 mm Ring Diameter: 1.6 mm Rib Diameter: 1.6 mm Rib Diameter: 1.6 mm Rib Diameter: 1.6 mm Fan Size 60mm Fan Size 70mm Fan Size 80mm Part No PG24-03 Part No PG28-02 Part No PG31-02 76.5mm 61.5mm 50.0mm 53.2mm Dia. - 4.6mm 4 Positions Dia. - 4.6mm Dia. - 4.6mm 4 Positions 4.4mm 4.4mm 5.5mm 4 Positions Ring Diameter: 1.6 mm Rib Diameter: 1.6 mm Ring Diameter: 1.8 mm Rib Diameter: 1.8 mm Ring Diameter: 1.6 mm Rib Diameter: 1.6 mm Fan Size 120mm Fan Size 127mm Fan Size 162mm Part No PG47-02 Part No PG50-02 PG59-02 Part No 162.1mm 104.8mm 15.6mm 56. 5

Ring Diameter: 1.8mm Rib Diameter: 2.3 mm

6.5mm

- 4.6mm

Dia. - 4.6n 4 Positions

Ring Diameter: 1.8mm

Rib Diameter: 2.3 mm

5.5mm

Metal Fan Guards

When heat dissipation, noise and airflow are critical design elements, metal guard designs allow for 23-30% greater airflow, heat removal and substantially less noise than even the optimum sheetmetal guard.

All metal finger guards comply with ring spacing Safety Agency Regulations.



Dia. - 4.6m 4 Positions 4.6mm

Ring Diameter: 1.6 mm

Rib Diameter: 1.8 mm

4 8mm





Ring Diameter: 1.8 mm Rib Diameter: 1.8 mm

Dia. - 5.0m 2 Positions 5.0mm

2

Plastic Fan Guards

NMB-Minebea offer a low cost range of black plastic flame retardant guards to UL94V-0 standards to provide users with an alternative finish.

All plastic guards comply with ring spacing Safety Agency Regulations.





Part No	Fan Series	Fits Fan Size	A (mm)	B (mm)	C (mm)	Hole Dia.(mm)
PG16-02P	1600	40	40	32	4.75	4.3
PG24-02P	2400	60	60	50	6.2	4.5
PG31-02P	3100	80	80	71.4	6.3	4.5
PG36-02P	3600	92	92	82.5	7.0	4.5
PG47-02P	4700	120	119	105	7.1	4.5
PG59-02P	5900/6800	172	154x176	161.5	82	5.0

Aluminium Fan Filters

Aluminium/Stainless filters offer high levels of air passage while efficiently filtering contaminants and shielding EMI/RFI. Their tightly woven stainless corrugated mesh screen offers the highest performance. Designed to fit all 60mm, 80mm, 92mm, 120mm and 162mm tube axial fans, filters may be mounted directly onto the fan or to any other housing.



Part No	Fan Series	Fits Fan Size	A (mm)	B (mm)	C (mm)	Hole Dia.(mm)
FM-60	2400	60	60	50	4.3	4.3
FM-80	3100	80	80	71.4	4.5	4.3
FM-92	3600	92	92	82.5	4.3	4.3
FM-120	4700	120	120	104.8	4.5	4.3
FM-127	5000	127	127	113.3	4.5	4.3
FM-162	6800	162	182	162	4.2	4.3

Plastic Fan Filter Assemblies

Plastic fan filter assemblies consist of a finger guard, foam filter and retainer. The guards and retainer are manufactured using high impact plastics which all meet UL94-V0 flammability requirements. The foam filter is manufactured to meet UL94HF1 smoke generation requirements.







Fits Square Fan, Retainer, Filter, Guard 30 or 45PPI



Part No	Fan Series	Fits Fan Size	A (mm)	B (mm)	C (mm)
SC40-P15/30	1600	40	40	32	6.1
SC40-P15/45	1600	40	40	32	6.1
SC60-P15/30	2400	60	60	50	6.6
SC60-P15/45	2400	60	60	50	6.6



Fits Square Fan, Retainer, Filter, Guard 30 or 45PPI

Part No	Fan Series	Fits Fan Size	A (mm)	B (mm)	C (mm)
SC80-P15/30	3100	80	83.5	71.4	9.9
SC80-P15/45	3100	80	83.5	71.4	9.9
SC92-P15/30	3600	92	95.8	82.6	10.2
SC92-P15/45	3600	92	95.8	82.6	10.2
SC120-P15/30	4700	120	122.0	104.9	11.2
SC120-P15/30	4700	120	122.0	104.9	11.2



Fits Square Fan, Retainer, Filter, Guard 30 or 45PPI

Part No	Fan Series	Fits Fan Size	A (mm)	B (mm)	C (mm)
SC162-P15/30	5900/6800	162	179.3	162.0	7.9
SC162-P15/45	5900/6800	162	179.3	162.0	7.9

Fan Power Cords

NMB-Minebea offer the DNA Straight and the HP75 45° styles of plug for use with Terminal Type Fans in 260 or 360mm cord lengths in 1,2,3,4 or 6 way. Other lengths available upon request.







Part Number	No of Heads	Length between Heads (mm)	Head 1 Style	Other Heads Style	Cable
DNA-01-00-260	1	260	Straight		Double Insulated
DNA-01-00-360	1	360	Straight		Double Insulated
DNA-01-01-260	2	260	Straight	•	Double Insulated
DNA-01-01-360	2	360	Straight	•	Double Insulated
DNA-01-02-260	3	260	Straight	٠	Double Insulated
DNA-01-02-360	3	360	Straight	•	Double Insulated
DNA-01-03-260	4	260	Straight	•	Double Insulated
DNA-01-03-360	4	360	Straight	•	Double Insulated
DNA-01-05-260	6	260	Straight	•	Double Insulated
DNA-01-05-360	6	360	Straight	•	Double Insulated
HP75-10.5	1	260	45°		Single Insulated
HP75-14	1	360	45°		Single Insulated
HP75-10.5x1-10	.5 2	260	45°	٠	Single Insulated
HP75-14x1-14	2	360	45°	٠	Single Insulated
HP75-10.5x2-10	.5 3	260	45°	٠	Single Insulated
HP75-14x2-14	3	360	45°	٠	Single Insulated
HP75-10.5x3-10	.5 4	260	45°	٠	Single Insulated
HP75-14x3-14	4	360	45°	•	Single Insulated
HP75-10.5x5-10	.5 6	260	45°	•	Single Insulated
HP75-14x5-14	6	360	45°	•	Single Insulated



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