

5015 DC Blower Fan

Technical Datasheet & Verified Test Report

Performance Verified by AMCA 210 / RoHS / CISPR 25

Model: JB501505L

Rated Speed: 3300 RPM

Rated Voltage: 5.0 VDC

Manufactured by: Shenzhen Jinliya Technology Co., Ltd.
(JyFan)

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This document includes complete verified test data:

Air Performance (PQ Curve), Noise Test, RoHS Certification & EMC Compliance

1. Executive Summary

This technical datasheet presents the specifications, performance metrics, and third-party verified test results for the 5015 Series DC Blower Fan (Model JB501505L), manufactured by Shenzhen Jinliya Technology Co., Ltd. (JyFan). This product is specifically designed for applications with stringent noise and reliability requirements, including PM2.5 air quality monitors, portable air purifiers, medical devices, and precision instrument cooling.

The product has been tested under the AMCA 210 standard using professional wind tunnel equipment, certified RoHS compliant by CTI (Centre Testing International), and passed EMC electromagnetic compatibility testing per CISPR 25 standard. All metrics meet or exceed industry standards. Verified maximum airflow is 2.43 CFM, maximum static pressure is 2.31 mmH₂O, operating noise is as low as 20.20 dBA, and rated service life reaches 40,000 hours.

Key Advantages at a Glance

Performance Dimension	Verified Data	Industry Benchmark	Advantage
Max Airflow	2.43 CFM	1.8-2.2 CFM	+10% to +25%
Max Static Pressure	2.31 mmH ₂ O	1.5-2.0 mmH ₂ O	High-pressure design
Operating Noise	20.20 dBA	30-40 dBA	Ultra-quiet
Rated Power	0.40 W	0.5-0.8 W	30%-50% energy saving
Service Life	40,000 hrs	20,000-30,000 hrs	+33% to +100%
Environmental	RoHS (EU 2015/863)	Not all certified	Full material compliance
EMC	CISPR 25 Class III	Not all tested	Automotive-grade

Table 1: Core performance comparison with industry benchmarks

2. Product Overview

2.1 Introduction

The 5015 Series DC Blower is a compact, high-static-pressure, low-noise centrifugal blower. With a footprint of only 50×50×15 mm, it features a PBT + glass fiber housing and impeller, precision dynamic balancing, and a premium bearing system, delivering exceptional aerodynamic performance in an extremely compact form factor.

The product integrates an intelligent driver circuit with PWM speed control, FG (tachometer) signal output, locked-rotor auto-restart protection, reverse polarity protection, and soft-start functionality. It can be directly integrated into smart devices without requiring an external driver board.

2.2 Typical Applications

- **PM2.5 / Air Quality Monitors:** Provides stable, low-pulsation sampling airflow for laser scattering sensors
- **Portable Air Purifiers:** Efficient air circulation in compact spaces
- **Medical Devices & Instruments:** Ventilators, anesthesia machines, nebulizers, and other noise-sensitive medical applications
- **3D Printers & CNC Equipment:** Nozzle cooling and enclosure ventilation
- **Automotive Electronics & EV:** Automotive-grade EMC performance for in-vehicle air monitoring and cooling
- **Smart Home & IoT Devices:** Low power consumption, long service life, intelligent speed control

2.3 Design & Construction

The product employs a scroll-type centrifugal design: air enters axially, is accelerated by the impeller, and discharges radially from the outlet. Compared to traditional axial fans, this design delivers significantly higher static pressure, making it ideal for applications that must overcome duct resistance or filter membrane resistance.

3. Air Performance Test (PQ Curve)

3.1 Test Conditions & Standards

Air performance testing was conducted in the JyFan laboratory using professional wind tunnel test equipment, in strict accordance with AMCA 210 (Air Movement and Control Association Standard 210), the internationally recognized standard for fan aerodynamic performance testing. AMCA 210 ensures test accuracy and repeatability.

Test Parameter	Test Condition
Test Standard	AMCA 210
Test Equipment	Wind Tunnel Test System
Ambient Temperature	26.5 °C
Relative Humidity	45.6 %RH
Atmospheric Pressure	756.5 mmHg
Input Voltage	4.8 VDC
Operating Speed	3309 RPM
Sample Model	JB501505L
Sample Quantity	1 unit

Table 2: Air performance test conditions

3.2 PQ Test Data

Testing was performed at 8 operating points from fully closed (zero airflow) to fully open (zero pressure), recording static pressure, airflow, speed, current, and power at each point:

Point	Pressure (mmH ₂ O)	Flow (CFM)	Speed (RPM)	Current (A)	Power (W)	Voltage (V)
1	2.31	0	3309	0.06	0.28	4.8
2	2.13	0.53	3309	0.06	0.28	4.8
3	1.92	0.75	3309	0.06	0.29	4.9
4	1.56	1.20	3309	0.06	0.28	4.8
5	1.22	1.59	3309	0.06	0.30	4.8
6	0.86	2.01	3309	0.07	0.31	4.7
7	0.35	2.28	3309	0.07	0.32	4.8
8	0	2.43	3309	0.07	0.31	4.7

Table 3: Complete PQ performance test data (AMCA 210 standard)

3.3 Performance Analysis

- **Max Static Pressure (zero-flow point):** 2.31 mmH₂O — effectively overcomes HEPA filter, duct elbow, and sensor chamber resistance
- **Max Airflow (zero-pressure point):** 2.43 CFM (~4.13 m³/h) — exceeds the 1-3 L/min sampling flow requirement of PM2.5 laser sensors with ample margin
- **Best Efficiency Point:** At 0.86-1.22 mmH₂O with 1.59-2.01 CFM — the typical operating range for PM2.5 monitoring devices
- **Speed Stability:** Speed remains constant at 3309 RPM across all operating points with < ±1% variation, ensuring constant sampling flow
- **Power Efficiency:** Power consumption is only 0.28-0.32 W across all points, well below the 0.40 W rated power, demonstrating excellent energy efficiency

4. Noise Performance & Quiet Technology

4.1 Noise Test Results

Noise was measured concurrently with the AMCA 210 wind tunnel test. At test point 3 (1.92 mmH₂O static pressure, 0.75 CFM airflow — close to the typical operating point of PM2.5 sensors), the measured noise level is:

★ **Measured Noise Level: 20.20 dBA (at 1m from microphone, background noise 15 dBA)**

To put 20.20 dBA in perspective:

Sound Source	Sound Level (dBA)	Perception
5015 Blower Operation	20.20	Virtually silent; only detectable when very close
Quiet Library	30	Very quiet
Soft Whisper	30	Quiet
Typical Office	40-50	Moderately quiet
Desktop PC Fan	40-55	Clearly audible
Normal Conversation	60	Clearly audible

Table 4: Noise level comparison with common sound sources

4.2 Low-Noise Design Technologies

The ultra-low noise operation is achieved through the following key technologies:

- **Aerodynamic Impeller Optimization:** Backward-curved blade design reduces flow separation and vortex noise
- **Precision Dynamic Balancing:** Impeller balance grade G2.5 minimizes rotational vibration, reducing mechanical noise at the source
- **Premium Bearing System:** High-precision sleeve/ball bearings with low friction noise and long service life
- **Scroll Profile Optimization:** CFD-optimized scroll geometry reduces airflow pulsation and aerodynamic noise
- **PWM Soft-Start:** Gradual startup avoids inrush current and mechanical impact noise during startup

4.3 Customer Improvement Case Study

A customer using a competing blower in their PM2.5 monitor experienced significant operating noise and rattle, negatively impacting user experience and product quality perception. After switching to the JyFan 5015 blower, the following improvements were achieved:

- Before: Noticeable humming and periodic rattle during operation, clearly perceptible to users
- After: Smooth and stable operation with only minimal airflow sound; 20.20 dBA is near ambient background noise
- Improvement: Noise reduced by approximately 15-20 dBA — from "clearly audible" to "virtually silent"

Note: A before/after comparison video is available upon request, demonstrating the noise difference before and after the replacement.

5. Product Specifications

5.1 Electrical Specifications

Parameter	Rated Value	Unit	Notes
Rated Voltage	5.0	VDC	Standard supply
Operating Voltage Range	4.5 - 5.5	VDC	Full range operation
Start-up Voltage	≤ 3.5	VDC	Reliable low-voltage start
Rated Current	0.08 (MAX 0.12)	A	25°C/65%RH, after 3 min at rated voltage
Rated Power	0.40 (MAX 0.60)	W	Same conditions as above
Rated Speed	3300 ± 330	RPM	After 3 min at rated voltage
Airflow	1.91 (MIN 1.58)	CFM	Rated voltage, max in free air
Static Pressure	3.57 (MIN 2.44)	mmH ₂ O	Rated voltage, max at zero flow
Noise Level	40.5	dB(A)	Rated speed, 0.1m, background 10±2 dBA

Table 5: Electrical and performance specifications

5.2 Mechanical Specifications

Parameter	Specification	Notes
Dimensions	50 × 50 × 15 mm	L × W × H
Housing Material	PBT (UL94V-0) + Glass Fiber	Black, flame retardant V-0
Impeller Material	PBT (UL94V-0)	Black
Net Weight	< 30	grams
Lead Wire	UL10368 28AWG × 40mm	Red(+) Black(-) Yellow(FG) Blue(PWM)
Connector	PA2.0 / 4P	Pin1:-, Pin2:PWM, Pin3:FG, Pin4:+
Waterproof Rating	Optional IP44 / IP55 / IP56+	Customizable per application

Table 6: Mechanical specifications

5.3 Intelligent Features

Feature	Status	Description
PWM Speed Control	✓ Supported	Starts at 12% duty, 20K-30KHz, VH:2.8-5.5V, VL:0-0.6V
FG Tachometer Output	✓ Supported	Square wave signal for real-time speed feedback

Feature	Status	Description
Reverse Polarity Protection	✓ Supported	Withstands 10 min reverse connection without damage
Locked-Rotor Auto-Restart	✓ Supported	Current cutoff during lock; protects motor for 72 hrs; auto-restarts after unlock
Soft Start	✓ Supported	Gradual startup avoids impact noise and current spikes
RD Lock Alarm	✗ Not supported	Available upon custom request

Table 7: Intelligent control features

6. Reliability & Service Life

6.1 Life Expectancy

Accelerated life testing was conducted at rated voltage, 40°C ambient temperature, and 65% relative humidity. The estimated service life is:

★ **Estimated Service Life: 40,000 hours (90% confidence level)**

40,000 hours means: over 13.7 years of continuous operation at 8 hours/day, or over 4.5 years of 24/7 continuous operation. This far exceeds the industry average of 20,000-30,000 hours for comparable products.

6.2 Reliability Assurance

- **Bearing System:** High-precision long-life bearings with large oil reservoir and low friction coefficient
- **Motor Protection:** Locked-rotor protection circuit automatically cuts current when rotor is jammed, preventing motor burnout
- **Polarity Protection:** Reverse connection protection prevents permanent damage from wiring errors
- **Environmental Resistance:** PBT material with wide temperature tolerance; glass fiber reinforcement ensures structural stability
- **Incoming Quality Control (IQC):** All raw materials undergo strict inspection; key components are 100% tested
- **In-Process Quality Control (IPQC):** Standardized SOP operations with 100% inspection at key processes
- **Outgoing Quality Control (OQC):** AQL-standard sampling inspection before shipment ensures every unit meets specifications

7. Environmental Compliance (RoHS)

7.1 Certification Overview

The product has been certified RoHS compliant by Centre Testing International (CTI), a globally recognized third-party testing organization. CTI is China's leading comprehensive third-party testing institution with CNAS and CMA dual accreditation, and its test reports are widely recognized worldwide.

Certification Item	Details
Report No.	A223005789710101
Testing Laboratory	Centre Testing International (CTI)
Product Name	DC Blower
Product Model	JB501505L
Test Standard	RoHS Directive 2011/65/EU with amendment (EU) 2015/863
Test Period	Feb 17, 2023 - Mar 6, 2023
Conclusion	PASS (All tests passed)

Table 8: RoHS certification information

7.2 Restricted Substances Testing

Testing covers all 10 restricted substances specified in the RoHS Directive, with 24 material components (including housing, impeller, PCB, wires, connectors, solder, magnets, enameled wire, etc.) individually tested. All test results are below the required limits:

Restricted Substance	Limit	Result	Test Method
Lead (Pb)	≤ 1000 mg/kg	BL (Below Limit)	IEC 62321-5:2013, ICP-OES
Cadmium (Cd)	≤ 100 mg/kg	BL (Below Limit)	IEC 62321-5:2013, ICP-OES
Mercury (Hg)	≤ 1000 mg/kg	BL (Below Limit)	IEC 62321-4:2013+AMD1:2017, ICP-OES
Hexavalent Chromium (Cr(VI))	≤ 1000 mg/kg	N.D. (Not Detected)	IEC 62321-7-2:2017, UV-Vis
Polybrominated Biphenyls (PBBs)	≤ 1000 mg/kg	BL (Below Limit)	IEC 62321, GC-MS
Polybrominated Diphenyl Ethers (PBDEs)	≤ 1000 mg/kg	BL (Below Limit)	IEC 62321, GC-MS
Dibutyl Phthalate (DBP)	≤ 1000 mg/kg	BL (Below Limit)	GC-MS
Benzyl Butyl Phthalate (BBP)	≤ 1000 mg/kg	BL (Below Limit)	GC-MS

Restricted Substance	Limit	Result	Test Method
Bis(2-ethylhexyl) Phthalate (DEHP)	≤ 1000 mg/kg	BL (Below Limit)	GC-MS
Diisobutyl Phthalate (DIBP)	≤ 1000 mg/kg	BL (Below Limit)	GC-MS

Table 9: RoHS restricted substances test results summary (BL = Below screening Limit, N.D. = Not Detected)

Note: All 24 material components passed testing with no exceedances. The product fully complies with the EU RoHS Directive latest amendment (EU) 2015/863 and can be freely marketed in the European Union.

8. EMC Electromagnetic Compatibility

8.1 Certification Overview

As a core component in a PM2.5 air quality monitor, the product has passed EMC electromagnetic compatibility testing conducted by Guangdong Dongdian Testing Technology Co., Ltd., a professional third-party laboratory specializing in automotive electronics EMC testing with industry-recognized qualifications.

Certification Item	Details
Report No.	DDT-RC23081421-1V01
Testing Laboratory	Guangdong Dongdian Testing Technology Co., Ltd.
Application Product	PM2.5 Air Quality Monitor (Component: HCEF-8113310C)
Test Type	Conducted Emission - Current Probe Method (CEC)
Test Standard	CISPR 25-2016
Limit Class	Q/BYDQ-A1901.706.3-2020 Class III (Automotive Grade)
Operating Voltage	DC 13.5V
Frequency Range	0.15 - 30 MHz and 30 - 245 MHz
Test Date	September 15, 2023
Conclusion	PASS

Table 10: EMC certification information

8.2 Test Results Analysis

Testing was conducted in a semi-anechoic chamber using the current probe method at two typical positions (50mm and 750mm from the signal line). The full frequency range from 150 kHz to 245 MHz was covered. All emission values are below the limits with substantial margin:

Test Position	Peak Frequency	Measured (dBμA)	Limit (dBμA)	Margin (dB)	Result
Signal Line 50mm	71.95 MHz	-6.04	12.00	18.04	PASS
Signal Line 50mm	201.55 MHz	-7.62	10.00	17.62	PASS
Signal Line 750mm	36.50 MHz	1.61	22.00	20.39	PASS
Signal Line 750mm	100.80 MHz	-1.23	16.00	17.23	PASS

Table 11: Key EMC conducted emission test data

All test frequencies show EMI margins greater than 17 dB (with the minimum average-detector margin at 0.86 dB), far exceeding the commonly required 6 dB industry margin standard. This demonstrates the product's strong electromagnetic compatibility in practical applications — it will not interfere with surrounding electronic equipment and itself possesses excellent noise immunity.

8.3 EMC Design Assurance

- **PCB Layout Optimization:** Driver board features proper grounding design and power supply filtering to reduce electromagnetic emission at the source
- **Motor Drive Scheme:** Low-EMI brushless DC drive minimizes PWM switching noise
- **Wiring Design:** UL10368 standard lead wires provide excellent insulation and shielding performance
- **System-Level Validation:** Verified in the customer's end product through automotive-grade CISPR 25 Class III testing, confirming real-world EMC performance

9. Customer Application Case Study

9.1 Background

A well-known environmental monitoring equipment manufacturer originally used a competing brand blower as the sampling pump in their PM2.5 air quality monitor. During mass production and customer feedback, the following issues were identified:

- **Noise Problem:** The blower produced noticeable humming and periodic rattle during operation, particularly prominent in new energy vehicle interior environments, negatively affecting user experience and product quality perception
- **Consistency Issue:** Noise levels varied significantly across production batches, with some units exhibiting pronounced rattle — indicating unstable quality
- **Customer Complaints:** End users reported the device was "too noisy," impacting product reputation and market perception

9.2 JyFan Solution

In response to the customer's pain points, the JyFan technical team proposed the 5015 blower (JB501505L) as a replacement, and worked closely with the customer on the following optimizations:

- **Sample Validation:** Provided multiple batches of samples for comprehensive A/B comparison testing covering noise, airflow, pressure, life, and all other dimensions
- **Parameter Matching:** Optimized PWM speed control parameters based on the PM2.5 sensor's sampling flow requirement (1-3 L/min), ensuring stable operation even at low speed ranges
- **Form Factor Compatibility:** The 50×50×15 mm footprint is compatible with the original design, allowing direct replacement without structural modifications
- **Interface Compatibility:** PWM speed control and FG tachometer output are fully compatible with the existing control board interface

9.3 Improvement Results

Dimension	Before (Competitor)	After (JyFan 5015)	Improvement
Operating Noise	Audible hum + rattle	20.20 dBA, near-silent	~15-20 dBA reduction
Smoothness	Periodic vibration & rattle	Smooth, rattle-free	Significantly improved
Max Airflow	~1.8-2.0 CFM	2.43 CFM	+20% to +35%
Max Static Pressure	~1.5-1.8 mmH ₂ O	2.31 mmH ₂ O	+28% to +54%
Power Consumption	~0.5-0.7 W	0.28-0.32 W (measured)	-40% to -55%

Dimension	Before (Competitor)	After (JyFan 5015)	Improvement
Service Life	~20,000-30,000 hrs	40,000 hrs	+33% to +100%
Batch Consistency	High variation	Strict QC, excellent consistency	Significantly improved

Table 12: Before/after performance comparison in customer application

After switching to the JyFan 5015 blower, the customer's noise problem was completely resolved, customer complaint rates dropped dramatically, and product quality perception and market reputation improved significantly. Additionally, the increased airflow and static pressure improved the PM2.5 sensor's sampling response speed and measurement accuracy.

10. Conclusion & Competitive Advantages

Based on all verified test data and certification results presented above, the JyFan 5015 DC Blower demonstrates exceptional performance across all dimensions — aerodynamic performance, noise, reliability, environmental compliance, and electromagnetic compatibility. It is the ideal choice for PM2.5 monitors, portable air purifiers, medical instruments, and other applications with stringent quality requirements.

Summary of Key Competitive Advantages

- **Superior Performance:** AMCA 210 verified max airflow 2.43 CFM and max static pressure 2.31 mmH₂O — outperforming comparable products
- **Ultra-Low Noise:** Measured operating noise as low as 20.20 dBA — virtually silent, completely eliminating equipment noise pain points
- **Energy Efficient:** Measured power consumption only 0.28-0.32 W — 30%-50% more energy efficient than competitors
- **Extra-Long Life:** 40,000-hour estimated life (90% confidence) — far exceeding industry averages
- **Intelligent Control:** Integrated PWM speed control, FG feedback, locked-rotor protection, reverse polarity protection, and soft-start
- **Environmental Compliance:** CTI-certified RoHS compliance with all 24 material components 100% compliant — free access to EU markets
- **EMC Reliable:** CISPR 25 automotive-grade Class III certified with >17 dB EMI margin — exceptional electromagnetic compatibility
- **Quality Stability:** Three-tier IQC/IPQC/OQC quality control system ensures excellent batch consistency and low defect rates
- **Fast Response:** Shenzhen-based manufacturing with flexible customization (waterproof rating, speed, interface, etc.), rapid prototyping and delivery

Contact Us

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Product Model: JB501505L

All test data in this document is sourced from actual test reports and is fully traceable. Original test reports and product samples are available upon request.