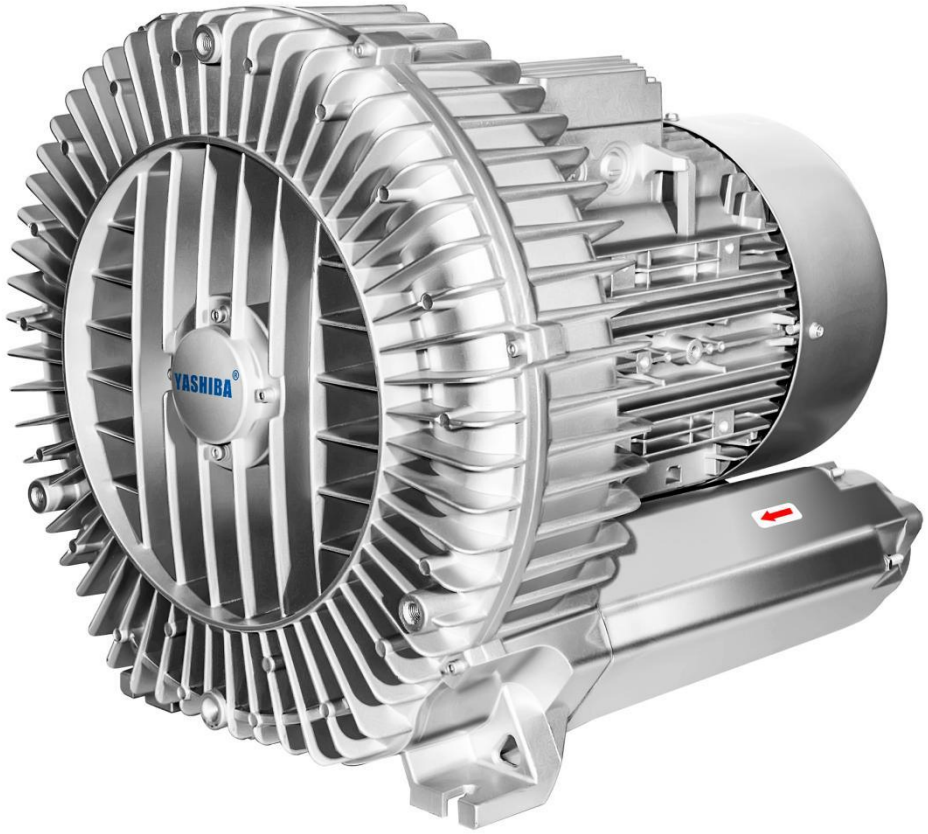
User Manual for HG Series



Thank you for your purchase of our company's Vortex Fan.
This specification provides the required technical parameters, use, maintenance and repair for the correct use of the fan equipment knowledge. Ask users to be familiar with the instructions before using the vortex fan equipment, remember the content of the precautions, To ensure that the product is in a good technical and safe state. With the continuous improvement and improvement of the product, so it is possible to produce The introduction of this manual is different from the actual structure, please understand.

catalog

1 overview

To meet the demand for fluid control and pneumatic components in industrial applications, simple centrifugal high-pressure fans emerged in Germany, Japan, and the United States. Initially, these were defined as centrifugal air pumps. However, as time progressed, people sought higher pressure and airflow requirements beyond what centrifugal air pumps could offer. Additionally, the noise generated by centrifugal air pumps became a concern within factory settings.

As a response, Japan introduced the first fully enclosed side-channel fan, known today as the vortex fan (or vortex-type air pump). This fan, with its compact size and low noise, satisfied the societal demand for high-pressure fans at that time. Subsequently, the vortex fan underwent upgrades, leading to the development of single-stage, two-stage, and three-stage impeller high-pressure fans. The vortex fan quickly gained popularity in both domestic and international markets, earning the trust of numerous enterprises due to its strong financial backing, advanced technology, reasonable pricing, and comprehensive after-sales service system. It became a designated product for many large-scale enterprises.

The application of high-pressure vortex fans has become widespread, finding use in various industries.

1.1 Product Features

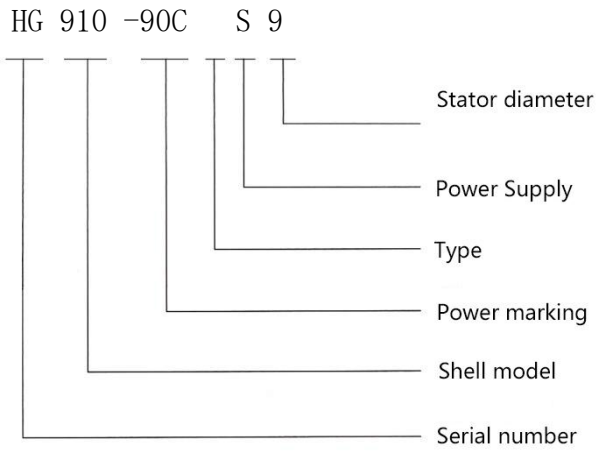
- Dual Functionality: It can be used for both suction and blowing, providing versatility and convenience.
- Oil-Free Operation: The vortex fan operates with minimal or no oil, ensuring clean output air.
- High Pressure: Compared to centrifugal fans and medium-pressure fans, the vortex fan can generate significantly higher pressure, often exceeding that of centrifugal fans by several times.

- Easy Installation: If the pump body is made of die-cast material and equipped with anti-vibration mounting feet, the installation requirements are relatively low. In some cases, it can even operate without fixed mounting feet, saving both installation costs and time.
- Low Noise: Compared to other types of fans, the vortex fan operates with lower noise levels, especially noticeable in higher power models (5.5KW and above).
- Maintenance-Free: The vortex fan has minimal wearable parts, typically limited to two bearings. Within the warranty period, regular maintenance is usually not required.

1.2 Main uses and scope of use

The vortex fan is widely used in various industries, including:Paper Cutting Machines、Oxygen Reduction Burners、Cigarette Filter Forming Machines、Electroplating Tank Agitation、Spray Drying Equipment、Water Treatment Aeration、Screen Printing Machines、Photographic Plate Making Machines、Injection Molding Machines、Automatic Feeding and Drying Machines、Liquid Filling Machines、Powder Filling Machines、Welding Equipment、Film Machinery、Paper Transport、Dry Cleaning、Cleaning Applications、Air Dust Removal、Bottle Drying、Gas Conveying、Feeding, Collection, and Central Dust Collection for Environmental Protection、Aquaculture、Electroplating、Dust Removal、Food Industry、Packaging and Filling、Glass Products、Airflow Conveying, and more.The versatility and reliability of the vortex fan make it suitable for a wide range of applications in these industries.

1.3 The composition of the model



(1) The numerical digits following "HG" represent the shell type. The conventional models include: single-stage impeller 010, 011, 110, 210, 310, 410, 510, 610, 710, 711, 750, 810, 910, 950; high-flow models include: 530, 730, 830, 930, and so on.

(2) Power indication: The unit is denoted by "W" (watts), "A" represents one zero, "B" represents two zeros (for power below 4KW), and "C" represents two zeros (for power above 4KW). For example, "75A" indicates 750W; "22B" indicates 2200W; "40C" indicates 4000W.

(3) The letter following the power indicates the type of power supply: "D" in the model denotes single-phase power; "S" denotes three-phase power.

1.4 Environmental conditions of use

1) Installation Location: The fan should be installed indoors, away from exposure to rain, wind, and sand. If installed outdoors, additional protective measures should be taken to prevent damage caused by intense sunlight, rain, and sand erosion.

2) Operating Environment: Ambient temperature should be ≤40℃, and short-term tolerance can be up to 40-60℃ (if the ambient temperature is too high, cooling measures should be implemented). Inlet temperature should be ≤90℃, and short-term tolerance can be up to 90-120℃. Relative humidity should be below 80%. The fan can be used at an altitude of ≤2000m.

3) Gas Requirements: If the air contains corrosive or flammable gases such as acids or alkalis, the high-pressure fan should avoid inhalation to prevent potential hazards.

4) Dust Protection: If the environment contains a large amount of dust particles or fibers, please install dust filters at the inlet and regularly clean the dust accumulated on the filter and inside the high-pressure fan to prevent blockage.

5) Ventilation and Heat Dissipation: Please use the fan in a well-ventilated area, allowing the motor fan to draw in ambient air for cooling. Avoid long-term use in enclosed spaces or sealed enclosures.

6) Placement Space: To facilitate routine maintenance or repairs, avoid installing the fan in excessively cramped spaces.

7) Vibration Avoidance: Please install the fan in a vibration-free location. If vibration is unavoidable at the installation site, additional measures such as anti-vibration pads should be used to prevent long-term damage caused by fan vibration.

1.5 Working conditions

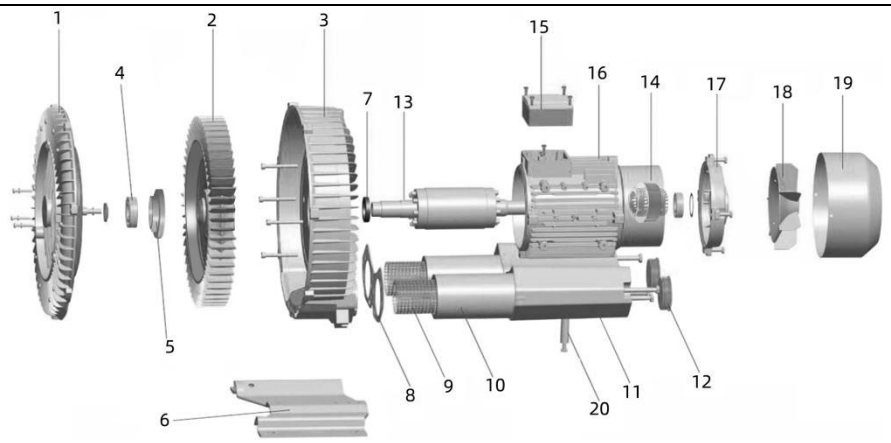
1) Operating Temperature: -40℃ to +60℃
2) Relative Humidity: 0% to 80% (non-condensing)
3) Altitude: ≤2000M
4) Power Specifications for Fans Below 4KW: Power Input: Single-phase 220V (Voltage Range: 220-240V) Power Input: Three-phase 200-240△, 345-415Y
5) Power Specifications for Fans 4KW and Above: Power Input: Three-phase 345-415△, 600-720Y

1.6 Security matters

It is essential to ensure a reliable grounding system for the system. Please ensure a stable power supply to prevent phase loss that may lead to equipment damage.

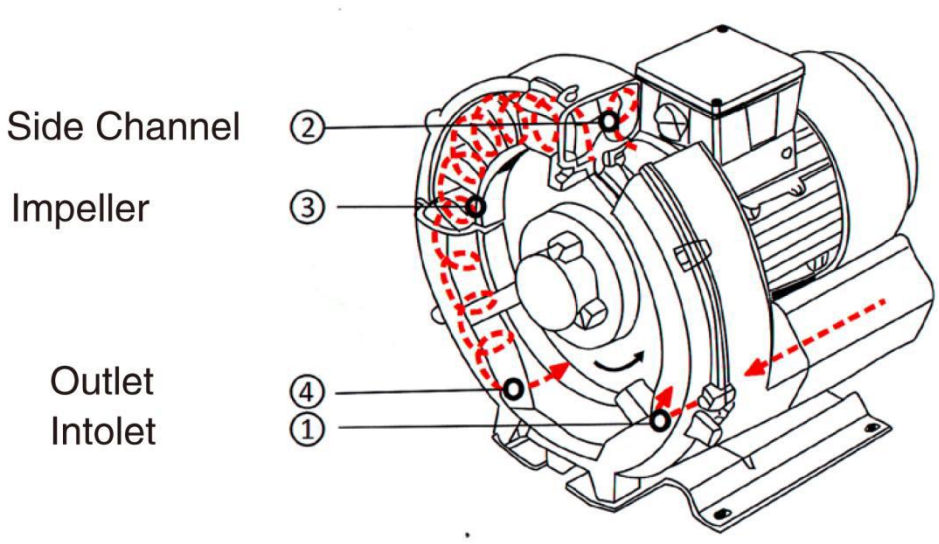
2 Product structure and working principle

1) Product structure



1.Pump Cover	6.Base Plate	11.Silencer Pipe	16.Motor Cylinder
2.Impeller	7.Oil Seal	12.Connector（Flange）	17.Motor End Cover
3.Pump Body	8.Gasket	13.Rotor	18.Motor Fan
4.Bearing	9.Silencer Net	14.Coil	19.Motor Back Cover
5.Bearing Seat	10.Silencer Sponge	15.Terminal Box	20.Supporting Tube

2) Working principle



The impeller of the fan is directly mounted on the rotor of the motor, ensuring a completely contactless compression. With the pump shaft located outside the compression chamber, even under maximum pressure differentials, the mechanical reliability of the system is guaranteed.

The gas is drawn in through the intake port 1, but once it enters the side channel 2, the rotating impeller 3 imparts velocity to the gas in the direction of rotation, while the centrifugal force on the blades accelerates the gas outward and increases its pressure.

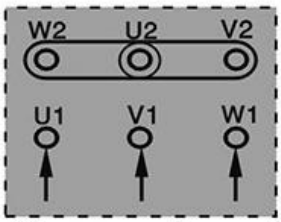
As the rotation continues, the kinetic energy of the gas increases, leading to further pressure buildup along the side channel. As the side channel narrows at the outlet, the gas is squeezed out of the blades and expelled from the pump body through the outlet silencer

3 Installation considerations

- This product can be installed at any angle. It is recommended to securely fasten the base to a sturdy concrete foundation using screws. Install vibration dampers, such as porous rubber pads, between the base and the foundation.

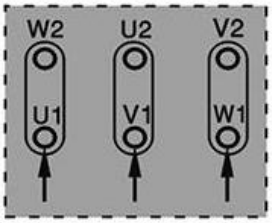
- Before installation, please verify that the power supply voltage matches the indicated value. The voltage deviation should be within ±5% of the rated voltage, and the frequency deviation should be within ±2%.

- Select the appropriate standard wire based on the motor power and application. When connecting the wires, ensure that the terminals in the motor junction box are connected correctly (refer to the wiring diagram provided). Tighten each wire securely, ensuring that the installed wiring is free from short circuits and phase imbalances before powering on the supply.



The Y-type connection method
(for power less than 4 kW).

In the Y-type connection, the winding terminals U2, V2, and W2 are interconnected, while the terminals U1, V1, and W1 are connected to the power supply lines.



The Δ connection method
(for power equal to or greater than 4 kW).

In the Δ-type connection, the terminals of the three-phase windings are interconnected in sequence.

Note: The Y-type and Δ-type connections mentioned above are applicable for 380V three-phase power systems. In general, the Y-type connection is used for motors with a power rating below 4kW, while the Δ-type connection is used for motors with a power rating of 4kW or above.

- After completing the wiring, turn on the power switch and verify if the airflow direction of the fan is correct and if there are any noticeable noises. The airflow direction can be determined by the arrow indicators on the air duct. If the airflow direction is incorrect, you can interchange any two of the three power lines in the motor junction box.

- The current of the motor will vary with the pressure changes experienced by the high-pressure fan when under load. Therefore, it is recommended to install an overload protection switch suitable for this type of motor during the wiring process. Additionally, ensure that the motor is operated at its rated full load current to prevent motor burnout.

4 Precautions for use

1) This product generates high temperatures during operation, so it is important to avoid touching the outer casing to prevent burns.

2) The total cross-sectional area of the inlet and outlet vents should be greater than 70% of the cross-sectional area of the air duct of this product. If the area of the vents is too small, prolonged use may cause the machine to become starved of air, leading to abnormally high temperatures and motor burnout.

3) Hard objects, dust, particles, fibers, and water droplets should be filtered and removed before entering the intake duct. You can install a dust collection filter or a water filtration system. The filtration equipment should be equipped with a pressure relief valve to prevent blockage and subsequent damage to the blower.

4) If used for air delivery in water, the water pressure should be less than 70% of the maximum rated air pressure indicated for the fan. Additionally, the fan should be positioned at least 20cm above the water level to prevent water from flowing back and causing damage after shutdown.

5) When using this product for pressurized air delivery, the outlet air temperature will be approximately 10°C higher than the inlet air temperature due to the compression and friction of the impeller. Therefore, high-temperature resistant fittings should be used for the connection pipes.

6) Ensure a tight connection of the delivery pipes to prevent leakage. The delivery pipes should be kept as short as possible, minimizing bends, drops, and changes in diameter. Otherwise, there may be varying degrees of pressure loss and airflow reduction, affecting the performance of the system.

5 Care & Maintenance

1) Regularly clean the surface dust and internal dust accumulation of this product. Excessive dust accumulation can affect the blower's heat dissipation, block the air ducts, and lead to temperature rise, reduced airflow, increased vibration, and other machine malfunctions.

2) The inlet and outlet vents of this product should be cleaned regularly to ensure unobstructed airflow. External filters and aeration devices should also be cleaned periodically to prevent blockages that could affect the normal operation of the machine.

3) Bearings, oil seals, and other consumable parts should be replaced regularly. The replacement specifications should match the original specifications. You can contact the manufacturer for technical support. Additionally, non-consumable parts such as blades, casing, and metal mesh can be replaced based on the usage environment.

4) If the operation is not smooth or abnormal noise occurs during use, promptly turn off the power for inspection. If the temperature rises sharply after starting, the machine should be shut down for inspection as well.

6 Fault analysis and troubleshooting

Fault	Cause	Remedy	Carried out by
Motor does not start; no motor noise.	At least two power supply leads interrupted.	Eliminate interruption by fuses, terminals or power supply cables.	Electrician
Motor does not start; humming noise.	One power supply lead interrupted.	Eliminate interruption by fuses, terminals or power supply cables.	Electrician
	Impeller is jammed.	Open vacuum pump/compressor cover, remove foreign body, clean.	Service*)
		Check or correct impeller gap setting if necessary.	Service
	Impeller defective.	Replace impeller.	Service*)
	Rolling bearing on drive motor side or vacuum pump/compressor side defective.	Replace motor bearing or vacuum pump/compressor bearing.	Service*)
Protective motor switch trips when motor is switched on. Power consumption too high.	Winding short-circuit.	Have winding checked.	Electrician
	Motor overloaded. Throttling does not match specification on rating plate.	Reduce throttling.	Service*)
		Clean filters, mufflers and connection pipes if necessary.	Service*)
	Compressor is jammed.	See fault: "Motor does not start; humming noise" with cause: "Impeller is jammed.".	Service*)
Pump-motor unit	Leak in system.	Seal leak in the system.	Operator

does not generate any or generates insufficient pressure difference.	Wrong direction of rotation.	Reverse direction of rotation by interchanging two connecting leads.	Electrician
	Incorrect frequency (on pump-motor units with frequency converter).	Correct frequency.	Electrician
	Shaft seal defective.	Replace shaft seal.	Service*)
	Different density of pumped gas.	Take conversion of pressure values into account. Inquire with Service Department.	Service
	Change in blade profile due to soiling.	Clean impeller, check for wear and replace if necessary.	Service*)
Abnormal flow noises.	Flow speed too high.	Clean pipes. Use pipe with larger cross-section if necessary.	Operator
	Muffler soiled.	Clean muffler inserts, check condition and replace if necessary.	Service*)
Abnormal running noise.	Ball bearing lacking grease or defective.	Regrease or replace ball bearing.	Service*)
Compressor leaky.	Seals on muffler defective.	Check muffler seals and replace if necessary.	Service*)
	Seals in motor area defective.	Check motor seals and replace if necessary.	Service

***) Only when the maintenance manual is at hand: rectification by the operator.**

7 Warranty notice

From the date of purchase, the warranty period for your device is as follows: one year for the entire unit and two years for the head. The warranty will not be applicable in the following circumstances:

（1） The user fails to provide proof that the product is within the warranty period.

（2） The product is beyond the warranty period.

（3） Damage caused by improper usage, maintenance, not following the instructions provided.

（4） Modification or disassembly of the product against the explicit instructions in the user manual, resulting in performance alteration or damage.

（5） Improper handling by the user, leading to the inability to determine the technical cause of the malfunction.

（6） Damage caused by factors unrelated to the product's quality.

（7） Damage caused by events of force majeure.

Please carefully read and adhere to the above terms. Thank you for your cooperation. The interpretation of this warranty policy belongs to Zhejiang Yashiba Electric Co., Ltd.

8 Repair record sheet

Maintenance record sheet

Name			Tel		
Customer address			Post Code		
Product category		Model			
Repair record					
Date of repair submission	Delivery date	Fault/issue During repair	Repair status	Warranty provider Signature	Return/Exchange Proof of record

9 Warranty Certificate

Warranty Certificate

1. Please carefully read the contents and terms of the warranty certificate.
2. When obtaining the warranty certificate from the purchasing store, please ensure that the necessary information is filled in as required by the store.

Product category		
Model		
Date of manufacture		
Date of purchase		
User	Name	
	Address	
	Telephone	
	Primary use / location	
Selling store	Name of the selling store	
	Address	
	Telephone	

Note: This certificate will be kept as an important user document, so please make sure to fill it out carefully. When requesting warranty service, please present the warranty card.