

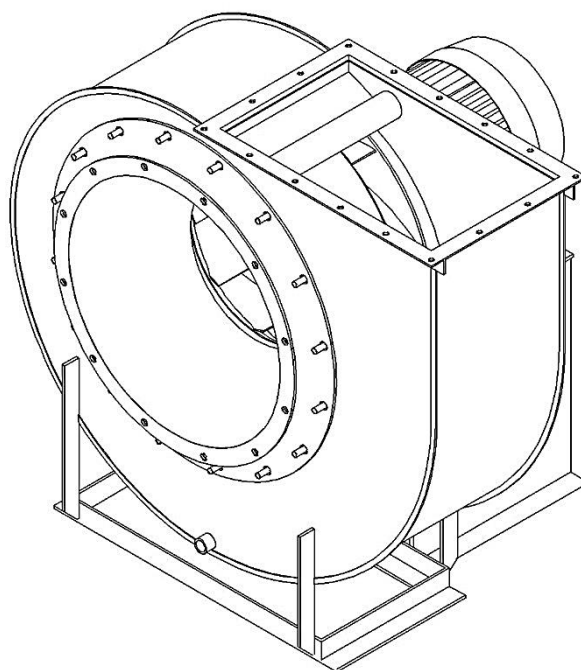
ZF-9503-6E

Electric Blower Motor


Operating Instructions and Warnings

デンチョク®

Centrifugal Motor Direct-coupling Blower



Showa Denki

Thank you for purchasing Showa Denki's blower.
 These Operating Instructions and Warnings provide explanations on the specifications for the "Standard-type/Air-cooling type" Electric Blower Motor.
 In order to ensure "SAFE" and "EFFICIENT" use of this product, please read these Operating Instructions and Warnings carefully, particularly the parts marked with the  mark.
 Also read Operating Instructions of the electric motor.

**Please keep these Operating Instructions and Warnings at hand
 for your later reference.**

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1. How to Read These Operating Instructions and Warnings

The Warning mark in the text indicates that incorrect operation may lead to an accident resulting in death or serious injury, or fire.
The Caution mark in the text indicates that incorrect operation may lead to an accident resulting in injury, or damage to the product.

2. Symbols



Prohibited.
(applicable to all items)



Perform as instructed.



Incorrect operation may cause serious injury.



Disassembly prohibited



Grounding required.



Caution against electric shock



Contact us.

All the warnings and instructions should be strictly observed.

3. Carrying

Warning Carrying or unpacking the product

If the blower is not supported securely while being suspended and carried in, dropping it may result in injury.

Before unpacking the product, confirm the top and bottom. If the product is packed in a wooden frame, pay attention to pegs, etc.



4. For SAFE Use of the Blower

Warning

Installation in a hazardous location is strictly prohibited

This blower does not have an explosion-proof structure. Operating the blower in a location with the risk of explosive atmosphere may lead to “**explosion**” of surrounding gas in the case of motor burnout (when it is burnt and broken) or in the case of a spark caused by static electricity or contact with metal, etc.



Warning

To avoid fire and electric shock

The wiring of the blower must be installed by a qualified electrical engineer, as per the electrical equipment technical standards and the extension rules.

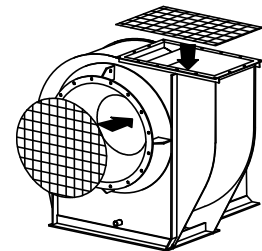
Also refer to the operating instructions of the motor.



Warning

Attaching a metallic wire net to the intake port/discharge port

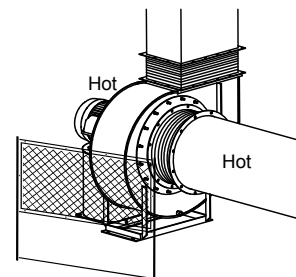
If a duct is not attached to the intake port/discharge port of the blower or if the tip opens even after the duct is attached, be sure to attach a metallic wire net. With a metallic wire net not attached, part of the human body or objects may be taken in or something previously taken in may rush out. This may cause an accident.



Warning

Attaching a heat insulator or a protective fence to the air-cooling type blower

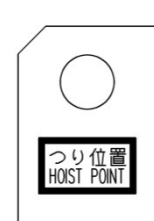
Always attach a heat insulator or a protective fence to the air-cooling blower. If no heat insulator or protective fence is attached, contact with the body may cause burns to it or contact with flammable substances may cause fire accidents.



⚠ Warning Use the hoisting hole

When hoisting the blower, always use the hoisting holes indicated as hoisting positions.

Using a position other than the specified position or an eye bolt of the motor may cause the blower to deform, turn over, or fall. Avoid hoisting the blower by using only one point. It is dangerous. The hoisting operation should be performed by a qualified person.



⚠ Warning Safety guard

To prevent the body or clothing from being caught in the machine during operation, be sure to attach the safety guard and the cover of the inspection door.



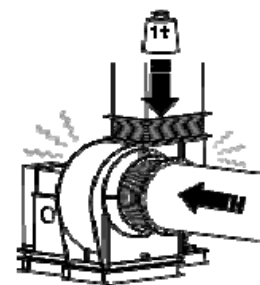
⚠ Caution Caution when a high-efficiency electric blower is employed

A high-efficiency motor (IE2 or IE3) is designed to reduce the resistance of the motor because the loss is reduced compared with that of the standard motor (IE1 or motor conforming to it). Therefore, the starting current may increase depending on the product. Replacement with our existing product may require changing a breaker, etc.



⚠ Caution Duct connection

Do not transfer the load of the duct to the blower. If the load of the duct is transferred to the blower, deformation of the blower may cause contact of rotating parts, resulting in fire or damage accidents. For the thermo-resistive type blower, the duct stretches due to high temperature. Therefore, use flexible joints on both the intake and discharge sides.



⚠ Caution

Use of an inverter

An inverter can only be used for three phase 200V-class motors. When the use of an inverter is planned for any motor other than 200V-class, be sure to contact us on the possibility of a special order. For use of an inverter, refer to page 14.



⚠ Caution

Disassembly prohibited

Never disassemble the motor or inside of the casing. The disassembly may cause a defect or accident.



⚠ Caution

Suctioned substances

Blowers other than plate fans are unavailable as a blower for the intake of dust and solid materials. For substances taken in, refer to page 8.



⚠ Caution

Test operation

Before starting test operation, confirm that nothing is left in the connected duct or casing or near the intake port/discharge port, e.g., remaining materials, bolts, nuts, tools, etc. Operating the blower with an object left may cause an accident due to intake or rush-out.



⚠ Caution

Operation

Prevent frequent repetition of stopping operation. Otherwise, the blower lifetime will be reduced. (Also refer to the Operating Instructions of the motor.)



5. Check upon Delivery

Although we test and inspect carefully before shipment, please double-check the following points for the delivered blower.

- Is it the exact product that you ordered?
- Is the blower free from abnormality due to transport, such as damage and deformation?
- Are all the set items enclosed?
- Are the bolts and nuts tightened without looseness?

6. Storage of the Blower

When the blower is to be stopped and stored for a long time (one month or longer), please take the following precautions:

- (1) In the case of packaged storage
Store the package in a dry indoor location with few temperature changes.
- (2) In the case of installed stoppage
Protect the motor from **large vibration** or **heat** generated by other machines. It is recommended to cover it with a plastic sheet etc. for protection from water, oil, dust and so on.

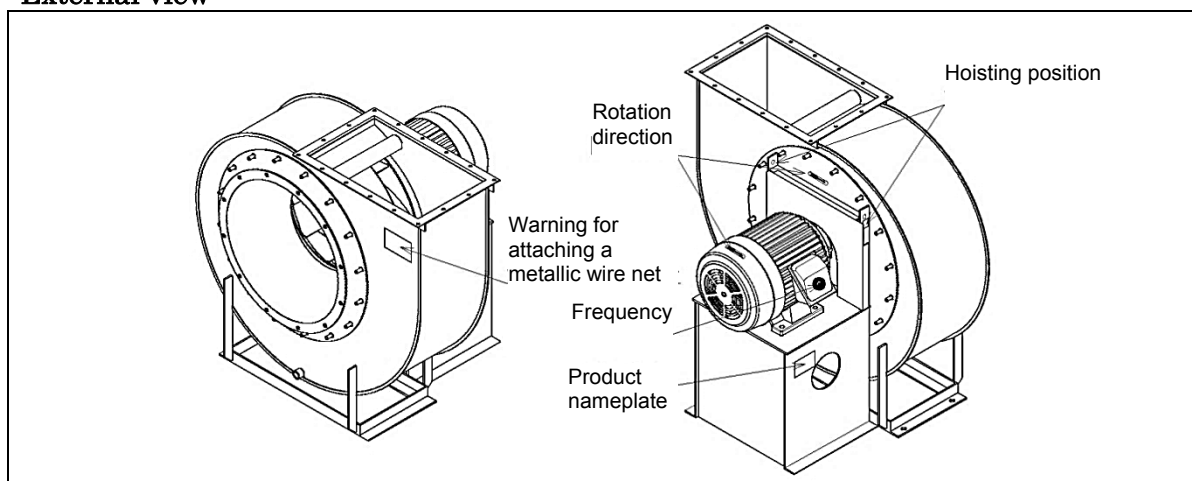
Caution **Maintenance and care during storage and stoppage**

If the impeller shaft of the blower is stopped for a long time (one month or longer), rust may form depending on the season and environment during the storage/stoppage. This may cause abnormal noise after restart. Please rotate the impeller 10 times manually about once every three months. When rotating the impeller manually, carefully prevent your hand from being caught. Please undertake trial operation, if possible.

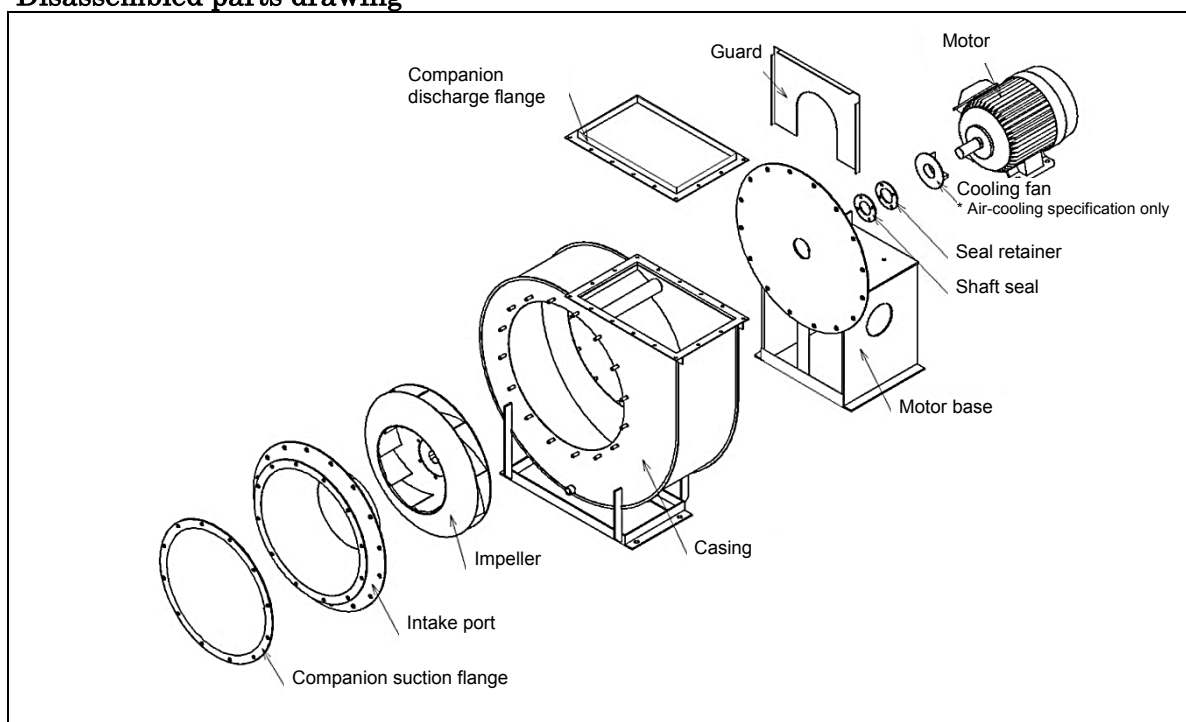


7. Structure and Name of , and Label Indications

External view



Disassembled parts drawing



- (Remarks)
- Air-cooling fan belongs to air-cooling specifications.
 - As shown in the drawing below, the shape of the impeller differs depending on the model

Sirocco fan	Turbo fan	Air wheel fan	Plate fan	Turbo blower

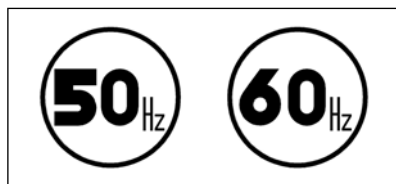
The contents of various labels are as follows:

(1) “Product nameplate

KSB-H55-R312						
VOLUME	85	m ³ /min	TEMP.	20	°C	
STAT.PRESS	5.20	kPa				
MOTOR POWER	5.5	kW	2 p	FREQUENCY	60	Hz
SPEED	3510	min ⁻¹				
SERIAL NO.	12345678	DATE	2015			
SHOWA DENKI CO., LTD. IGA FACTORY OSAKA JAPAN						
NF371S						

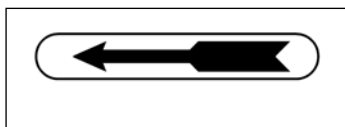
Indicates the product type, maximum air flow, maximum static pressure, rated output, rated frequency, rated rotation speed, serial No., etc. Note: “Rated” refers to the specified limit values.

(2) “Frequency” label



Specifies that the blower is for 50 Hz or 60 Hz. If this label is not affixed to the blower, confirm the frequency indicated on the product nameplate or delivery specification drawing.

(3) “Rotation direction indication” label



Indicates the rotation direction of the impeller. Be sure to confirm the rotation direction before test operation. If the motor rotates in the reverse direction, the air flow and static pressure are reduced. In addition, this may cause the load to increase, leading to a risk of motor burnout.

(4) “Hoisting position indication” label



When hoisting the blower, be sure to use the hoisting holes indicated as hoisting positions. Using a position other than the specified position or an eye bolt of the motor may cause the blower to deform, turn over, or fall.

(5) “Warning for attaching a metallic wire net” label



If no duct is attached to the intake/discharge port of the blower or if the tip opens even after a duct is attached, be sure to attach a metallic wire net in advance. With no metallic wire net attached, part of human body or objects may be taken in or objects taken in before may rush out, resulting in accidents.
(The label is not affixed to the air-cooling type.)

8. Ambient Temperature and Suction Temperature

(1) Ambient temperature and ambient relative humidity

	Three-phase motor (Totally-enclosed fan-cooled type)
Ambient temperature	-10°C or more to 40°C or less
Ambient relative humidity Without dew concentration	Relative humidity of 90% or less

(2) Suction temperature and intake humidity

Type classification		Paint color	Allowable intake temperature	Allowable intake humidity
KSB-H model	Standard type	Standard (2.5Y6/2)	-10°C or more to 80°C or less	Relative humidity of 90% or less Without dew concentration
	Air-cooled/standard bearing type	Heat-proof (silver)	-10°C or more to 250°C or less	
K1D/M2D/T1D/T2D model K1S/M2S/T1S/T2S model	Standard type	Standard (2.5Y6/2)	-10°C or more to 80°C or less	
	Air-cooled/standard bearing type	Heat-proof (silver)	-10°C or more to 200°C or less	
	Air-cooled/heat-proof bearing type	Heat-proof (silver)	-10°C or more to 250°C or less	
B1D/B1S type	Standard type	Standard (2.5Y6/2)	-10°C or more to 50°C or less	
	Air-cooled/standard bearing type	Heat-proof (silver)	Contact us.	

Note: Since specifications may be different, refer to the delivery specification drawing, etc., to confirm the details.



Caution

Stoppage of air-cooling type blower

When using an air-cooling type blower, stop it after the intake air temperature goes below 120°C.

Since the cooling fan also stops, no heat is radiated. Otherwise, the bearing lifetime is reduced.



9. Intake Substances

(1) Prevent the intake of substances other than air.

Be sure to prevent the intake of explosive gas, organic solvent, sparks, live cigarettes, etc. This may cause explosion, fire, or damage to the product.

(2) Suction of substances other than air



In the case of intake of substances other than air, be sure to contact us.



(3) Dew condensation and corrosion

1. In the case of constant intake of air with a relative humidity of 90% or more, **rust** may occur due to a material used in parts contacting air. The blower lifetime may be reduced depending on the situation.
2. Suction of air whose temperature is largely different from the ambient temperature of the blower leads to easy occurrence of dew condensation just after the start of operation even if the relative humidity is 100%, although this differs depending on the region and season.



In the case of the intake of air containing water or in the case that the occurrence of even slight corrosion is not allowed, be sure to contact us.



10. Installation

(1) Selection of installation location

1. Install the blower in a well-ventilated and low-dust location with low humidity.
2. Select a location where the blower is protected from **large vibration** or **heat** generated by other machines.
3. Around the blower, secure a space whose dimensions are more than or equal to the height of the blower to enable inspection and repair activities.
4. If the blower is installed near a wall with the intake port/discharge port open during operation, secure that the distance between the wall and the intake port/discharge port is more than or equal to the dimension of the bore diameter.

(2) Base and installation

1. For the installation foundation of the blower, secure a horizontal surface with a solid structure. Installation of the blower on an unstable foundation may cause failures in the blower due to abnormal vibration, resulting in a risk of abnormal noise or accidents.
2. Make the installation surface a little higher to drain water well.

3. As a rough indication, the appropriate amount of concrete for the foundation is 3 times of the mass of the blower.
4. To use a mount, install the blower firmly on the horizontal installation surface with a strong structure.
5. Prevent rattling between the blower installed and the foundation surface. In addition, securely tighten the bolts and nuts.
6. Remove the protecting parts used in transport, e.g., bolts for retaining vibration-proofing (flexible) joints, fixing fittings of the vibration-proofing base, etc.
7. After having installed a blower in the basics, please remove a part for protection at the time of the transportation such as base fixation metal fittings.

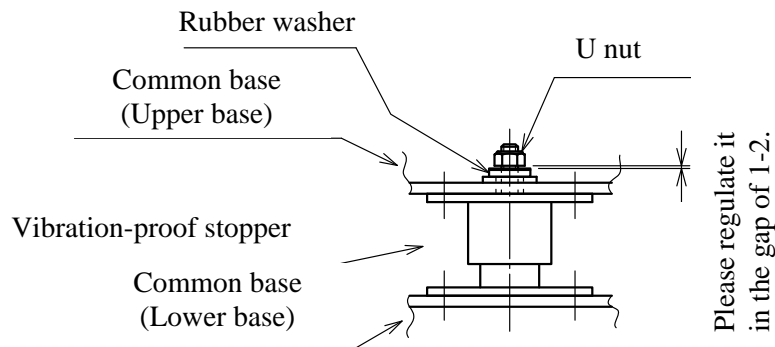
Not only a protection against vibration effect is not provided when driven with attaching base fixation metal fittings, but also might cause abnormality vibration and the noise outbreak.

- * At the time of movement before the installation, the transportation, please do not take off the base fixation metal fittings. When I lift a blower with taking off base fixation metal fittings and move, damage and the accident of the protection against vibration device might occur.



Base fixing bracket

When you repair it at local construction installation time and construct it, please confirm an installation state of the earthquake-resistant stopper by all means as follows.



The vibration-proof stopper details

⚠ Warning

Ambient atmosphere

Corrosive gas such as acid or alkali significantly reduces the blower lifetime.

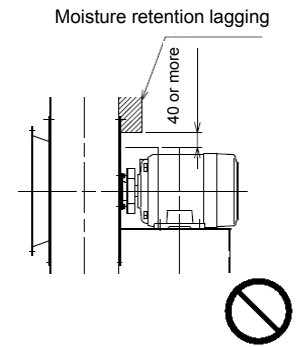
Never install the blower in a location with an atmosphere in which flammable/explosive gas may be generated. Otherwise, this may lead to a risk of the occurrence of serious accidents such as fire and explosion.



⚠ Caution

Caution for installing a heat insulator

Do not wind heat insulator around the air-cooling type cooling fan.
Otherwise, this prevents heat radiation, resulting in reducing the bearing lifetime.
Secure a ventilation space of 40 mm or more.



1 1 . Piping

(1) Piping for the intake port and the exhaust port

For connection with the intake port/ discharge port, be sure to use a flexible joint or a flexible duct hose. Apply appropriate tension to the flexible joint. Keep the length to the minimum necessary by putting in a reinforcing ring to prevent shrinkage on the negative pressure side in particular. If the blower uses a rubber vibration insulator or has a vibration-proofing mount, transmission of vibration causes occurrence of noise.

(2) When direct piping to the intake port/discharge port is unavoidable

Align the center of the intake port/discharge port with the center of the duct (pipe) and then tighten them in such a manner that the flange face of the blower is parallel to that of the duct. Be sure to attach a support to the duct to prevent applying load to the intake port/discharge port.

⚠ Caution

Piping in air-cooling type blower

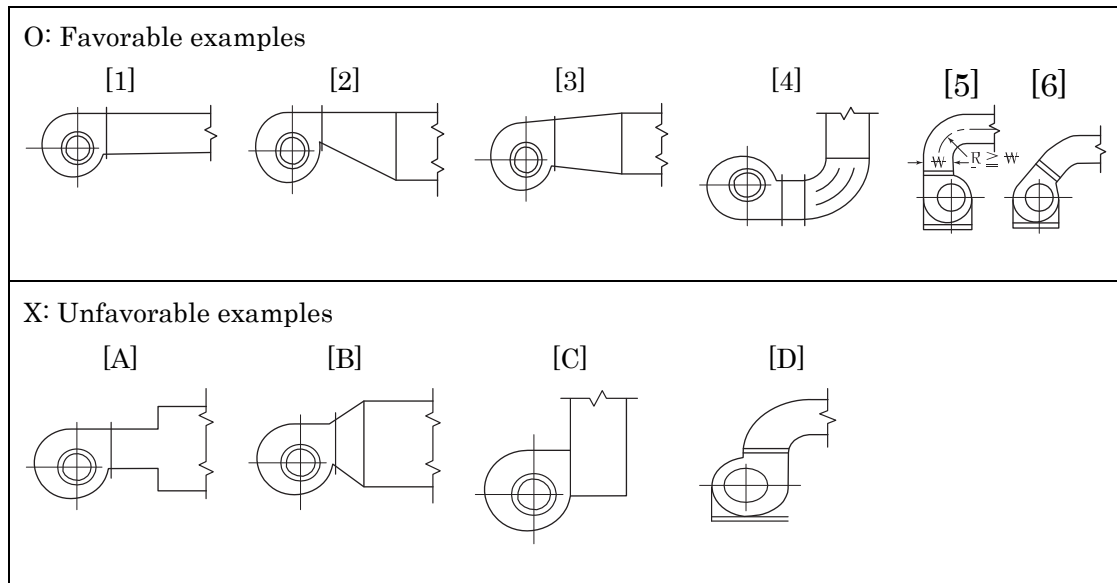
If the air-cooling type blower is used at an **intake air temperature of 80°C or more**, release the heat, for example, by using a heat-proof joint taking into account **thermal expansion**.



(3) Duct connection

If a duct to be connected is sharply expanded, shortened or bent, air flow and static pressure are reduced, causing noises.

Reference examples of duct connection



(4) Attachment of metallic wire net

If either intake port or discharge port is not connected to a duct or neither of them is connected to it (exposed to the atmosphere), attach a 12 to 13 mm metallic wire net to the port(s). If the tip of a duct is opened even after the duct is attached, attach a metallic wire net. Otherwise, part of human body or objects may be taken in or objects taken in before may rush out, resulting in accidents.

(5) Drain piping

If the product has a drain port, connect a pipe to it to secure the drainage. Incomplete connection causes the floor and wall to be dirty. Unsmooth drainage may cause accumulation of water, etc., inside the casing, leading to overload of the motor, at the time of start, resulting in failures such as burnout.

1 2. Wiring

Warning

Wiring of the blower must be installed by a qualified electrical engineer, as per the electrical equipment technical standards and the extension rules.

Before using the blower, install an earth leakage breaker/overload protection device in it.

Be sure to earth the blower to prevent electric shock



Caution

Use the power supply with the **rated voltage and rated frequency** indicated on the product name panel.



Voltage regulation should be **within $\pm 5\%$** from the rated voltage.
(Temporary variation to $\pm 10\%$ is acceptable.)
Current should be up to the rated current.



The rotation direction is indicated by a label affixed to the blower. In test operation after the completion of wiring, confirm that the rotation direction is as indicated. If the three-phase motor of the product rotates in the reverse direction, switch two of the three power cables with each other when the other cable remains connected.



Be sure to connect all of the three cables of a three-phase blower.

(1) Test operation

Before test operation, be sure to perform the following inspection to confirm that the condition is normal.

1. Confirm that materials, bolts, nuts, tools, etc., used in the construction work are not left inside the duct or casing, or near the intake port/discharge port.
2. Confirm that all bolts and nuts are tightened without omission.
3. Confirm that the protective parts used in transport have been removed.
4. Confirm that a metallic wire net has been attached with the intake port/discharge port open.
5. Confirm the electric wiring. Immediately after turning on the start switch, turn it off to confirm that the rotation direction is normal without contact noise.

If no abnormality is found in the above inspection, confirm the inside of the casing and bearing sound. Also confirm that no abnormal vibration is generated from each section and that the current value is normal.

- * When the blower is equipped with an air flow adjustment damper, **fully close** the damper at the time of startup and then gradually open the damper to the predetermined position after the startup. Perform this inspection while the current value is being checked to prevent overload of the motor.

1 3 . Operation, Maintenance and Inspection

(1) Operation, Maintenance and Inspection

When the blower starts operation, regular maintenance and inspection are required. If daily inspection is performed on the following items and the results are recorded, abnormalities can be detected early to prevent problems.

1. Check for vibration and abnormal noise every 3 months as a rough indication, and inspect the insulation every year.
Inspect the motor based on the operating instructions of the motor.
2. Maintenance and inspection of the shaft seal and packing differ depending on the deterioration status and operating environment.
However, it is recommended to replace them together when the bearing is replaced.

3. When the blower used is an air-cooling type or quasi-moisture-proofing type blower, or when air containing dust is taken in, gas contact parts (e.g., inside of the casing, impeller, etc.) can be badly corroded and the rotation contact portion can be significantly worn. Therefore, the inspection cycles should be shortened.

Inspection item			Recommended inspection cycle			Inspection contents
			3 months	6 months	12 months	
Condition inspection	Abnormal noise	Blower	■	□	□	Check for abnormal noise due to rattles. Check for metal contact noise. Check for other noise considered to be abnormal.
		Motor	■	□	□	Check the grease. Check for loose bolts. Check the bearings for abnormal noise.
	Vibration		■	□	□	Check the vibration value and any changes to it.
	Temperature		■	□	□	Check the temperature near the bearing and any changes to it.
	Electrical section		□	■	□	Check the current value and voltage value, and any changes to them.
Component inspection	Anti-vibration rubber		□	■	□	Check for hardening. Check for wear or cracks.
	Shaft seal		□	□	■	Check for cracks or damage.
	Packing		□	□	■	Check for damage or hardening.

(2) Abnormal noise

If an abnormal noise is heard, immediately stop the operation to perform inspection. Possible sections and causes of abnormal noise are as follows:

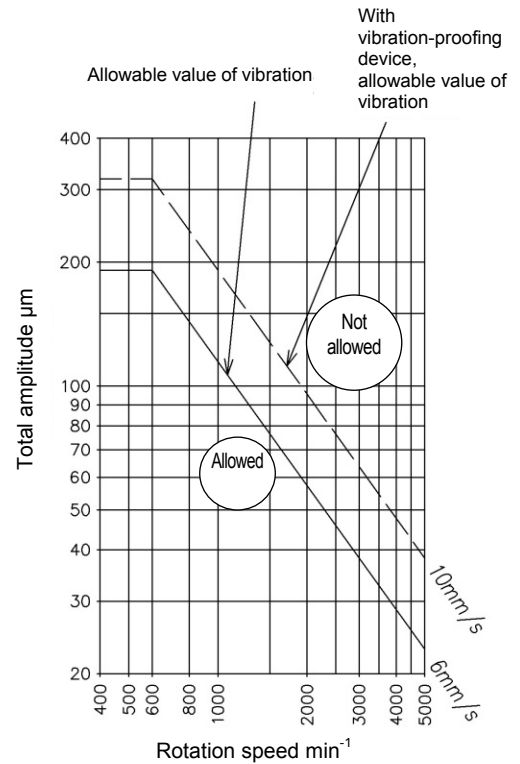
1. Motor bearing sound (judge by comparing the sound with that heard at the beginning of operation)
2. Contact sound (contact of the impeller with the casing or intake port)
 - Deformation by pressure from outside due to the duct, etc.
 - Due to abnormally high temperature
 - Intake of foreign material
3. Chattering noise
 - Looseness of blower mounting bolt, etc.
 - Transmission of vibration from the duct or mount
4. Surging sound (repeatedly changing pulsing sound)
 - Excessively throttled air flow
 - Excessively large resistance of the device
5. Others
 - Adhesion of foreign material to the cooling fan

(3) Vibration

If vibration exceeds the reference value shown in the diagram above, stop the operation and perform the inspection.

Possible causes of vibration are as follows:

1. Adhesion of dust, adhesive, etc., to the impeller causes unbalance.
2. The impeller deforms or is worn or damaged, or check bolt of the impeller is loosened.
3. The motor shaft or bearing is abnormal.
4. Bolts fixing portions are loosened.
5. Vibration is transmitted from outside.
6. The strength of the foundation is insufficient.
7. Water is accumulated in the casing.



(4) Replenishment of lubricating oil (grease)

Most of the bearings of motors installed in blowers adopt an oil-free system, which does not require replenishment of oil. However, some of the bearings of medium-sized/large-sized and special motors employ an oiling system. If the motor employs an oiling system, regularly replenish it with lubricating oil (grease) according to the Operating Instructions for the motor.

(5) Restart of operation after suspension or stoppage

If the operation is suspended, clean the impeller and the inside of the blower regardless of whether the suspension period is long or short. Take sufficient corrosion prevention measures and then store the blower. To prevent corrosion of the bearing, perform no-load running once in a month by rotating the impeller about 10 times manually.

Before the restart of operation, be sure to perform the inspection similar to that for test operation and confirm the following items:

- Check for corrosion in the impeller and casing.
- Remove the drain plug and check for water accumulating in the casing.

1 4 . Use of an Inverter (Frequency Converter)

(1) The upper-limit frequency shall be the frequency indicated on the nameplate. (Operating the inverter at a frequency exceeding that indicated on the nameplate may cause overload, resulting in motor burnout. In addition, increase in centrifugal force may cause deformation or damage of the impeller.)

(2) Different voltage

An inverter with a differing voltage zone (380 - 460 V) may cause failure of the product, due to excessive surge voltage that destroys insulation of the winding. Be sure to contact us on the possibility of special order.

- (3) Phenomena that may occur when an inverter is used
1. Abnormal noise
If the carrier frequency is changed, measures can be taken to reduce abnormal noise. When using an inverter, follow the operating instructions for the inverter. (Abnormal noise may occur during inverter operation because the voltage wave pattern is not favorable for the commercial power supply, and due to the higher harmonic wave.)
 2. Resonance
The product lifetime may get shortened through continued use under a condition with large vibration. (At a specific frequency, vibration may become larger due to resonance, because of the natural frequency of the blower. Resonance may be caused by the piping method, installation method, etc. Since resonance may also occur due to the piping method, prevent direct piping as much as possible.)
 3. Temperature rise
During inverter operation, temperature of the winding rises higher than with the commercial power supply
 4. Startup and shutdown
In cases where the inertial moment of the impeller is large, long startup/shutdown time may cause a trip of the inverter. Sudden acceleration/sudden deceleration causes a failure of the motor and should be prevented. (Change the inverter setting for acceleration/deceleration time. If the acceleration time is short, overcurrent trip may occur. If the deceleration time is short, overvoltage trip may occur due to regenerative current.)
 5. Air-cooling type blower
In the air-cooling type blower, heat radiation may be insufficient due to the reduction of rotation speed of the cooling fan.
 6. Others
For details, refer to the operating instructions for the inverter.

1 5 . Warranty

Scope of warranty

Repair service is provided free of charge for a failure during the warranty period, as long as the blower has been used in compliance with these Operating Instructions, labels attached to the body, and other instructions.

In the case that this product is incorporated into other equipment used by the customer, the warranty does not cover costs for removal from such equipment, reattachment to such equipment, costs of other incidental work, costs of transportation etc., resulting opportunity loss incurred by the customer, lost operation, or any other indirect loss or damage suffered by the customer.

- For requests for repair service, please contact our nearest branch or sales office.

Warranty period

One (1) year from the date of delivery of the product.

Even during the warranty period, only charged service is provided in principle, if any of the following applies:

- Failure or damage due to incorrect use that is not compliant with these Operating Instructions, labels attached to the body, or other instructions, and/or unauthorized repair or modification
- Failure or damage due to transportation, dropping, etc. after the purchase

- Failure or damage due to fire, earthquake, storm, flood, lightning or other natural disasters, environmental factors such as salt damage and public pollution, abnormal voltage, use of a power supply (voltage or frequency) other than that specified, or the like
- Failure or damage due to repair or modification (including punching, etc. in the product) not conducted by our company
- Failure or damage due to the use of parts other than those designated by our company
- Failure or damage due to the entry of foreign material
- Discoloration, scratching, natural consumption of consumable parts or other defects due to use or deterioration over time
- Failure or damage caused by neglecting the maintenance and inspection described in the Operating Instructions

We will not compensate for any loss or damage resulting from defects that occur during the use of this product.

[Notices]



- (1) The descriptions in these Operating Instructions are subject to change without prior notification in the future.
- (2) We have made all possible efforts to prepare these Operating Instructions. However, if you have any questions about them or find any inquiries, errors, omissions, etc., please contact our nearest branch or sales office.
- (3) If the power supply frequency changes due to a change in the location where the blower is used, it may not be used as it is. We will consider a measure in each case where it is required. In such a case, please contact our nearest branch or sales office.
- (4) At the time of inquiry, please describe the product type and the manufacturing number indicated on the product nameplate.

1 6 . Inquiries

- (1) For technical inquiries on this blower, contact our offices listed below.

	Technical Group (Showa Denki Group)
	Showa Denki Iga Co., Ltd.
	TEL: +81-595-45-2725
	FAX: +81-595-45-5025

- (2) For inquiry on defects of this product, or request for repair or other services, please contact our nearest branch or sales office, as listed on the back cover of this document. At the time of inquiry, please notify the product name (TYPE) and the manufacturing number (SERIAL No.) indicated on the product nameplate.

TYPE	Showa FAN <small>デンチヨク</small> 	
	KSB-H55-R312	
VOLUME	85 m ³ /min	TEMP. 20 °C
STAT.PRESS	5.20 kPa	
MOTOR POWER	5.5 kW 2 p	FREQUENCY 60 Hz
SPEED	3510 min ⁻¹	
SERIAL NO.	12345678	DATE 2015
	 SHOWA DENKI CO., LTD. IGA FACTORY OSAKA JAPAN NF3715	

1 7 . Malfunction Causes and Measures

Causes and measures for blower malfunctions

Malfunction status Malfunction cause	Overs and shorts of quantity of wind, the static pressure	Excess/short of motor	Bearing overheat/burnout	Abnormal vibration	Peculiar noise	Corrosion and wear	Abnormal contact	Motor not activated	Measures
Defective installation			○	○	○		○	○	Re-installation
Poor foundation			○	○	○				Renovation
Contact with the rotator?		○	○	○	○		○	○	Processing of contact part, and re-installation
Defective duct/duct joint	○		○	○	○		○	○	Renovation
Defective lubricating oil			○						Replenishment
Inappropriate oil quality, contamination, excessive amount of oil			○						Replacement or recycling
Inappropriate material				○	○	○			Replacement
Unbalanced impeller			○	○	○		○		Correction
Deformation or damage of impeller				○					Repair or replacement
Wear or corrosion of impeller	○			○					Repair or replacement
Operation at a dangerous speed			○	○	○		○		Renovation or remodeling of operation point
Abnormal bearing of the motor			○	○	○				Replacement
Wrong rotation direction	○	○			○		○	○	Change
Malfunction of the motor	○	○		○	○			○	Repair or replacement
Intake of light gas	○								Renovation/replacement of impeller
Intake of heavy gas	○	○							Renovation/replacement of impeller
Mixture of foreign object or adhesion of scale	○	○		○	○	○	○	○	Cleaning
Surging operation	○			○	○				Change of operation point
Resistance to the pipe system	○				○				Renovation
Failure of damper	○	○		○	○			○	Repair
Accumulation in the drain		○		○	○	○		○	Draining
There is less pressure loss than a plan	○	○							Damper adjustment, change of the rotary speed

Note on your purchased blower

Fan identification information that you may need when making an inquiry of us.

TYPE		SERIAL NO.	
Date of Purchase	Year/Month/Day	Date of start of operation	Year/Month/Day
Supplier	TEL: _____ Person in charge: _____		



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