TOHIN ROTARY VANE BLOWER
HC Type

Model: HC-251s, 30s, 301s, 301H, 40s,
401s, 50s, 501s, 60s, 80s,100s

Instruction Manual

Tohin Industry Co., Ltd.
Tohin Shoji Co., Ltd.

WARNING

IMPORTANT SAFETY INSTRUCTIONS

READ AND FOLLOW THESE INSTRUCTIONS

- To avoid possible electric shock or an accident, special care should be taken when the blower is used in the open air. Personnel undertaking service or repair work must be suitably qualified.
- To prevent rain water and to ensure safety, always have an overall cover over the apparatus in case of outdoor.
- Carefully examine the blower after installation. It should not be plugged in if there is water on parts not intended to be wet.
- Do not operate if the power cord or plug is damaged or if the blower is malfunctioning, dropped, or damaged in any way.
- To prevent from getting wet, the plug, circuit breaker and power outlet should be have water-proof coverings. Always install the terminal box cover over the portion that supplies power to motor.
  This should avoid water dripping onto the plug or outlet.
  The power cord that connects power outlet to blower should be arranged in the “drip-loop” manner, and do not put anything on the cord.
  If the plug or the power outlet gets wet, DO NOT UNPLUG THE CORD. Disconnect the fuse or circuit breaker supplying power to the blower. Then unplug and examine for the presence of water in the outlet.
- Do not use the blower near volatile liquids such as gasoline, thinners, etc., as this creates the possibility of an explosion
- Do not put any object near the blower (about 50cm around)

CAUTIONS FOR USE

- When the blower is used by or near children, ensure that the overall cover or belt cover is in place or install in a separate room for the apparatus.
- The blower is only for pumping air. Do not, under any circumstances, attempt pumping water or any other liquid.
- Always turn off the motor when replacing the belt.
- Ensure that power is turned off when installing or taking off the overall cover.

- The operating temperature of the blowers is from -10 to 40 ºC.
- Do not block the air being discharged. A blower must have sufficient room to allow proper heat dissipation.
- Always unplug the blower prior to servicing.
- Do not use components that are not ensured for safety.
- Ensure the blower is securely mounted prior to operation.
- Read and observe all important markings on the blower.
- Ensure that extension cords (if required) have the correct or higher rating (amperes or watts). Ensure the power cord is properly positioned to avoid tripping.
- In case of either of abnormal stop, abnormal sound, or abnormal vibration, turn off power and call a qualified specialist to check.

WARNING: TO PREVENT ELECTRIC SHOCK, FIRE, OR OTHER ACCIDENTS, FOLLOW THESE INSTRUCTIONS.

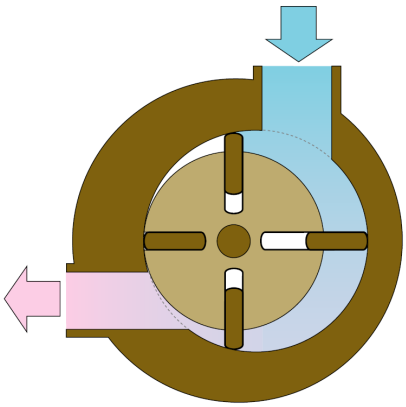
What is Tohin Rotary Vane Blower?

Feature

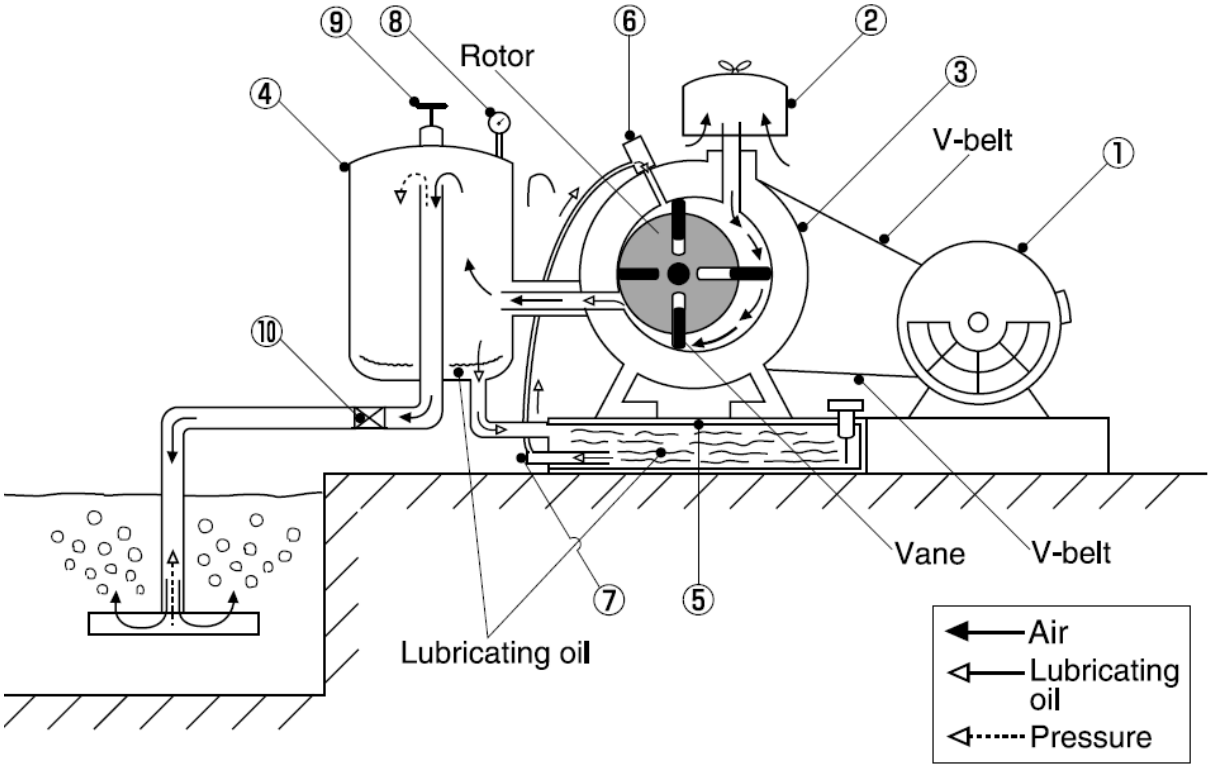
- Compact, powerful air flowrate and silent operating sound
- Very little vibration and easy installation and handling
- Strong against pressure change
- Smooth outlet by air chamber unit
- Heavy duty to keep high performance
- Superior cost performance

The Tohin rotary vane blower discharges a lot of air at pressure from 0.01 to 0.05MPa. The product is consisted of mainly Motor, Air filter, Blower body, Air chamber, Base with oil tank and Oil dripping nozzle.

The blower body has a rotor mounted with four vanes. The rotor rotates eccentrically and the vanes move in-and-out to intake air, compress, and discharge continuously. While the rotor and the vanes keep running, some heat is generated by friction between the parts and inside surface of the cylinder. To minimize this friction and heat, the oil-dripping nozzle gives lubricating oil constantly into the cylinder to prevent generating over-heat and noise. Also, the oil works on increasing airtightness by coating over each part with itself. Therefore one of the most important maintenance for the machine is not to let the lubricating oil run out. The oil circulates automatically by pressure differential between oil tank and blower body (cylinder). Pressure level in the oil tank is higher than that of cylinder. Therefore oil in the oil tank is pushed out to the cylinder. For this reason, please do not run the machine with no-load at discharge port. If there is no load, no pressure differential is produced, and lubricating oil does not circulate. If you keep running a blower with no-load, it can be over-heated and cause a problem. For this reason, please make sure to fulfill water in a tank when you run the blower.



Description of each part



1. Motor

A motor is sensitive for humidity. Keep it away from high humidity and water. Do not reverse a motor.

2. Air filter

Air filter plays an important role to intake clean air to the blower. If dust comes into a blower, lubricating oil will become soiled, and furthermore it may shorten the service life of the machine.

3. Blower body

Blower body, which consists of Cylinder, Rotor, Vanes, and Covers, is the heart of the system. Our unique “eccentric rotary design” is adapted. It is produced with high accuracy techniques, and it runs very quietly.

4. Air chamber

Compressed air from the blower body comes here. It keeps a certain volume of compressed air in it and discharges the air from the outlet. Also, in the chamber, air and very small amount of lubricating oil are separated respectively. Subsequently, air comes out from the outlet and the oil returns to the oil tank through the oil strainer (filter) for circulation. The other role of

the chamber is to dampen pulsation of air. It is also equipped with a safety valve and an air pressure gauge.

5. Main base

This is a pedestal equipped with an oil tank. The lubricating oil circulates automatically using difference of air pressure at inlet and outlet. By this system, the oil drips constantly into the blower (cylinder) body. Air and oil from the blower part are separated in the air chamber, and the oil returns to the oil tank in the base.

6. Oil-dripping nozzle

This is a device that drips suitable amount of lubricating oil continuously into the blower body. It has a unique mechanism so that it can prevent clogging and saturating of the oil.

7. Oil strainer

This filters solids or dust in circulating lubricating oil.
Larger models have two pieces of the strainer. See below.

1 piece: HC-251s, 30s, 301s, 301H, 40s, 401s, 50s, and 501s
2 pieces: HC-60s, 80s and 100s

8. Pressure gauge

This indicates loading pressure in operation. High pressure may suggest that discharge outlet or a diffuser is clogged. Except for check the pressure, close the valve of the gauge.

9. Safety valve

This protects the blower from abnormally high pressure caused by clogging or something.
It works when pressure rises to more than 0.05MPa.

10. Check valve

This prevents backflow of the air while the blower stops or switching operation of the blowers.

Optional parts

The following optional parts are also available

- Discharge silencer
- Suction silencer
- Flexible joint
- Vibration isolator

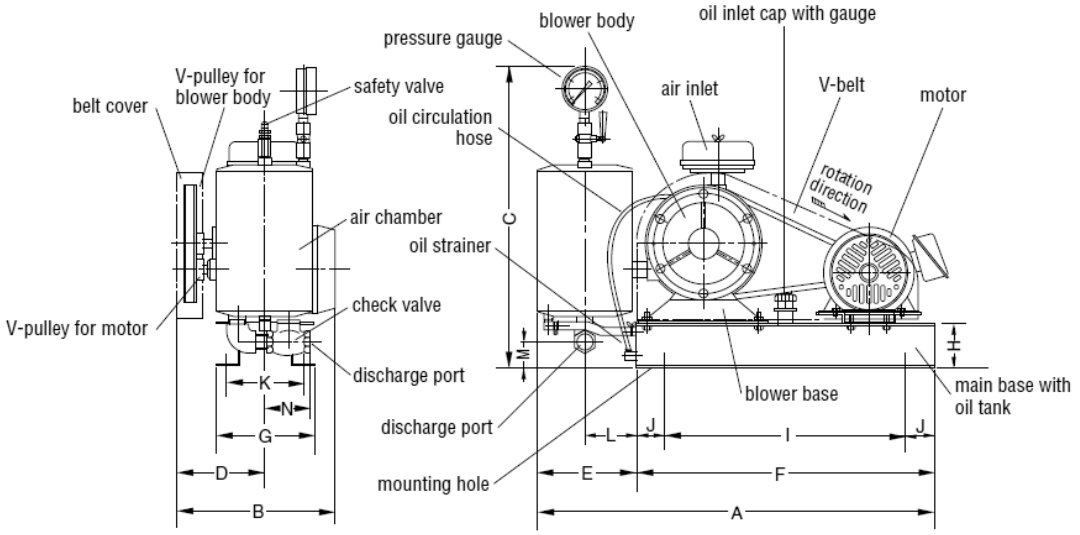
Specifications

Model	Outlet diameter	Motor output (kW)	Frequency (Hz)	RPM	Air flow rate m3/min					V pulley		V belt	Lubricating oil in the tank (L)	Approx. weight (Kg)
					0.01 MPa	0.02 MPa	0.03 MPa	0.04 MPa	0.05 MPa	Blower	Motor			
HC-251s	¾”	0.4	50	450	0.31	0.30	0.29	0.29	0.28	8”A1	2” ½ A1	A-40	1.5	44
			60	450	0.31	0.30	0.29	0.29	0.28	8”A1	2”A2	A-40		
HC-30s	1”	0.4	50	460	0.36	0.35	0.34	0.33	0.32	10”A1	3” 1/4	A-44	1.5	50
			60	460	0.36	0.35	0.34	0.33	0.32	10”A1	2” 3/4A2	A-44		
HC-301s	1”	0.75	50	520	0.42	0.41	0.40	0.39	0.38	10”A1	3” ½A1	A-45	1.5	50
			60	520	0.42	0.41	0.40	0.39	0.38	10”A1	3”A1	A-44		
HC-301H	1”	0.75	50	650	0.52	0.51	0.50	0.49	0.48	8”A1	85A1	A-41	1.5	50
			60	650	0.52	0.51	0.50	0.49	0.48	8”A1	3”A1	A-41		
HC-40s	1” ¼	0.75	50	500	0.66	0.65	0.63	0.61	0.59	12”A2	4”A2	A-52	2.5	80
			60	500	0.66	0.65	0.63	0.61	0.59	12”A2	3” ½A2	A-52		
HC-401s	1” ¼	1.5	50	580	0.80	0.77	0.74	0.71	0.67	12”A2	4” ½A2	A-52	2.5	85
			60	580	0.80	0.77	0.74	0.71	0.67	12”A2	4”A2	A-52		
HC-50s	1” ½	1.5	50	430	1.14	1.12	1.09	1.06	1.02	14”A2	4”A2	A-64	3.5	120
			60	430	1.14	1.12	1.09	1.06	1.02	14”A2	3 ½”A2	A-64		
HC-501s	1” ½	2.2	50	500	1.44	1.42	1.39	1.36	1.32	14”A2	4 ½”A2	A-64	3.5	125
			60	500	1.44	1.42	1.39	1.36	1.32	14”A2	4”A2	A-64		
HC-60s	2”	2.2	50	450	1.90	1.87	1.82	1.77	1.71	16”B2	5”B2	B-74	5.5	190
			60	450	1.90	1.87	1.82	1.77	1.71	16”B2	4”B2	B-72		
HC-80s	2” ½	3.7	50	390	2.82	2.74	2.66	2.59	2.50	18”B2	5”B2	B-84	8.0	250
			60	390	2.82	2.74	2.66	2.59	2.50	18”B2	4”B2	B-84		
HC-100s	3”	5.5	50	390	4.32	4.28	4.25	4.18	4.11	20”B3	5” ½B3	B-93	20.0	375
			60	390	4.32	4.28	4.25	4.18	4.11	20”B3	4” ½B3	B-93		

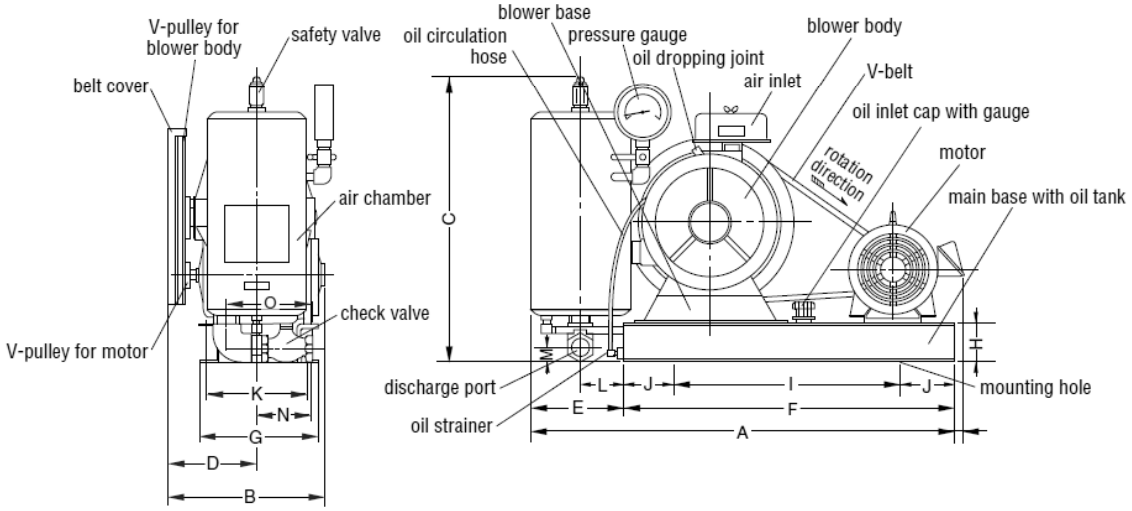
- Specifications and dimensions are subject to change without notice due to continual improvements

Dimensions

HC-251s



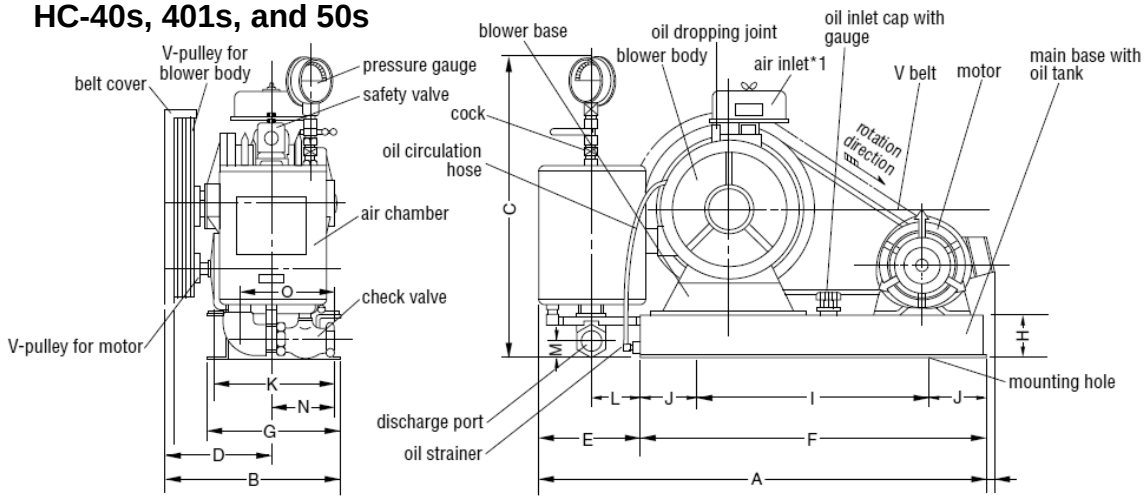
HC-30s, 301s, and 301H



(unit: mm)

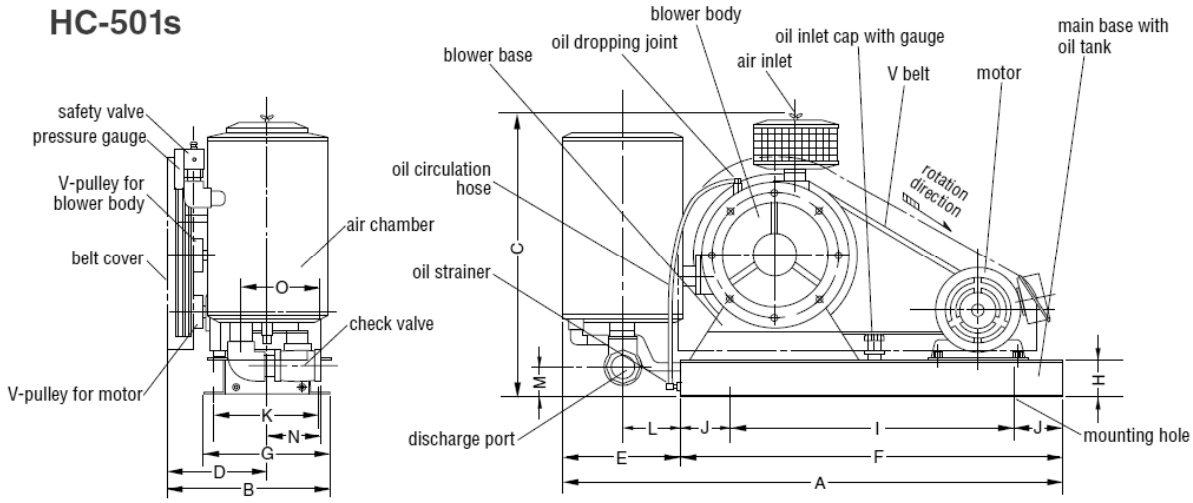
Model	A	B	C	D	E	F	G	H	I	J	J*	K	L	M	N
HC-251s	679	270	515	149	169	510	170	75	410	50	-	130	87	40	74
HC-30s	686	273	515	160	176	510	170	75	410	50	-	130	90	55	80
HC-301s	686	267	515	160	176	510	170	75	410	50	-	130	90	55	80
HC-301H	686	267	515	160	176	510	170	75	410	50	-	130	90	55	80
HC-40s	779	310	505	184	179	600	230	75	400	100	-	190	88	40	125
HC-401s	779	310	505	184	179	600	230	75	400	100	-	190	88	40	125
HC-50s	1018	339	600	213	218	800	265	75	600	100	-	225	106	60	117
HC-501s	1049	339	600	213	249	800	265	75	600	100	-	225	123	55	117
HC-60s	1180	385	825	233	330	850	300	100	485	125	115	260	185	60	110
HC-80s	1325	440	878	260	325	1000	350	100	580	150	120	310	180	65	166
HC-100s	1500	550	990	325	400	1100	470	150	660	150	140	410	223	70	163

HC-40s, 401s, and 50s

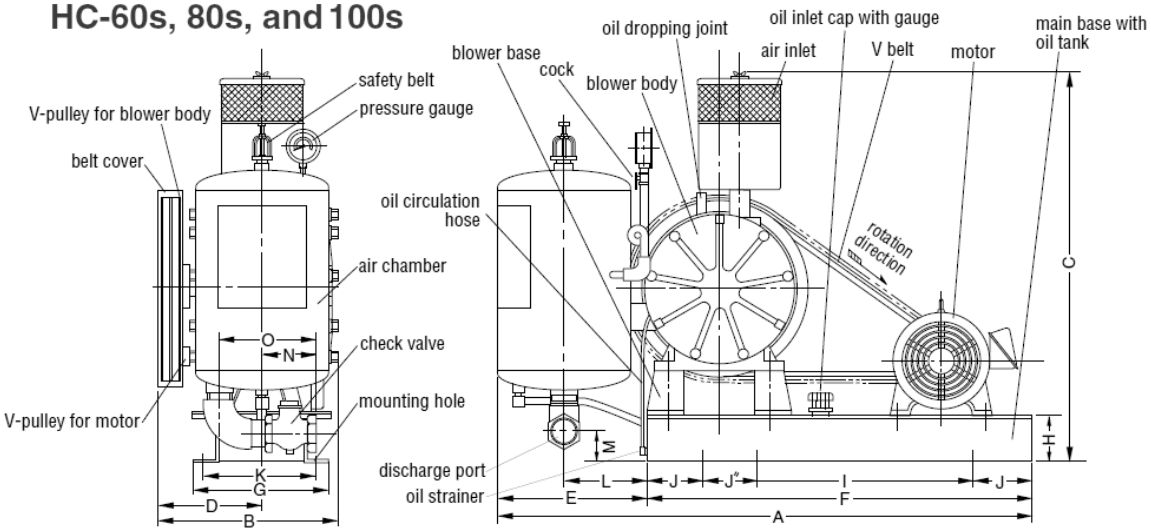


*1: Air inlet of HC-50s is the same as one of HC-501s

HC-501s



HC-60s, 80s, and 100s



Transportation, Installation, Start-up, and Maintenance

Transportation

- Handle with much care when you transport a product. Strong impact to a product may be a cause of malfunction. Do not make an impact especially on axis direction of a blower.

Installation

- When installing in a cubicle, ensure it has a ventilation opening or a ventilation fan on it, to avoid airtight.
- Install as low humidity place as possible, and keep a level on the firm place. Set the machine on safety site to avoid damage by flood.
- When using the blower to supply air into liquid, ensure to place the blower higher than the surface level of the liquid, otherwise that liquid may run back into the blower when the power is turned off.
- Keep away from chlorine chemical such as sterilant. It may cause rust.
- Diameter of a pipe connected to the discharge port has to be the same or bigger than that of the port. Do not install any stop valve in the air pipe, and be aware not to get foreign matter or gravel into the pipe. These matters can be cause of overload to the motor. Piping should be as short as possible.
- Electric wiring must be correct. The motor has to run right direction as indicated on the motor. If reversing motor, water can come into the blower and cause damage.
- The blower must be grounded. Proper grounding have to be done in accordance with all appropriate codes and ordinaces.
- All the electrical jobs, such as connection of power supply, voltage check, and installation of a circuit breaker, have to be done by an authorized specialist.

Start-up

- Test run or first run may be tried after more than 6 or 12 months after production. In this case, some oil (about 30cc), that is attached to the machine as extra, has to be added from the air inlet. This is because the oil-dripping nozzle is designed to feed minimum amount of oil and it takes some time to go around in the blower body.
- Open the oil inlet cap and check with the gauge if there is enough lubricating oil in the oil tank. Normally, you do not need to fill additional oil since enough oil is fulfilled when shipped.
- Connect the power cable to suitable power point and run the machine. (There is no ON/OFF switch on the product.)
- When turning on the machine, check if lubricating (circulating) oil begins to flow in the

oil-feed hose (pink color plastic hose). If no-load is given to the blower at the discharge port, because no piping is connected to the port or there is no water in a tank where air is sent, lubricating oil does not flow.

Do not run the machine with no-load at discharge port. If you keep running a blower with no-load, it can be over-heated and cause a problem.

- Check if the V-belt does not slip and V-pulley is fitted firmly.
- Check the right running direction of the motor

Maintenance

The following care maintains your blower in good condition and good performance.

1. Lubricating (circulating) oil

Check regularly (about every 3 moths) with the oil gauge if there is enough oil in the tank. For refill, use oil which viscosity is #46, #68, or #100 degree by ISO. Oil viscosity is chosen depending on temperature of installation site. In general, #46 is suitable for cold area, #68 is suitable for middle temperature area, and #100 is suitable for hot area.

2. Air filter

A lot of amount of air is taken through the air filter. Filter clogging by dust may cause malfunctioning or damage to the machine, therefore regular check and cleaning (about every 3 months) is necessary. If the filter is dirt, wash it with detergent.

3. V-belt

V-belt goes slack slightly in a certain period of time at the beginning of operation. In this case, you need to readjust tension of the belt by adjusting the motor position. If the tension is too strong, operation sound can be bigger. Also, keep parallel between the two pulleys, and check fastening of screws on the two pulleys.

4. Oil-dripping nozzle

Check if there is no clogging in it. If you can see oil flows in the pink hose, it works well. To clean the nozzle, unscrew and wash it in kerosene. Be aware not to miss the O-ring.

5. Oil leakage or air leakage

Take a look at oil sealing portion, connected portion by screws, and welded part to check oil or air leakage. Slight oil oozing is not oil leakage. Also check air leakage from piping. If air comes out from the safety valve, there may be some clogging in the pipe.

6. Oil strainer

The oil strainer should be checked every six months. If it is found to be too contaminated, clean it with kerosene. When remounting the oil strainer, seal tape must be used around screw thread. Clogging strainer may cause the temperature rise, louder noise, and finally damage to the blower. Also check the screw fitted on the blower side.

7. Pressure gauge

Check the operating pressure by opening the valve of the gauge. If it shows higher pressure than usual, it may indicate some clogging in the pipe or the diffuser in the tank. If operation is continued at high pressure level, some damage may be caused, such as increasing oil consumption, more wear rate of the motor bearing and the belt, louder noise.

On the contrary, operation in less than 0.01MPa can cause trouble for circulation of the lubricating oil.

8. Others

Check if operation sound is too big, if machine temperature is too high, and if pressure is too high. If you find abnormal status, try to find out its cause. Apart from the blower itself, other factors such as installation status may cause a problem.

Trouble shooting

Problem	Possible cause	Check or Solution
Blower doesn't work	Supplied voltage is low or power outrage	Check voltage at the power point, circuit breaker and fuse.
	Power cord or coil damage	Check the cord or coil
	Over load	Check clogging of pipes, discharge port, and the diffuser; or belt tension.
	Motor damage	Repair or replace the motor.
	Heat damage of the blower body	Replace the blower body.
Low outlet	Low voltage	Check the voltage
	Air leakage from pipe	Repair or replace of the pipe
	Inadequate valve control	Open the valve
	Clogging of air filter	Clean the air filter
	Insufficient lubricating oil	Refill the oil and clean the strainer and the oil dripping nozzle
	Loose belt fitting	Adjust the tension
Abnormal sound	Resonance or chattering due to incorrect installation	Correct the installation
	Discharging pressure is too high	Clean the pipe and the discharge port
	Clogging of the air filter	Clean the air filter
	Insufficient lubricating oil	Refill the oil and clean the strainer and the oil dripping nozzle
	Damage to the inside surface of the cylinder	Replace the blower body
	Vane wear	Replace the blower body
	Bearing damage	Replace the blower body
	Incorrect belt tension	Adjust the tension
Abnormally high temperature	High discharge pressure	Clean the pipe and the discharge port
	Clogging of the air filter	Clean or replace the air filter
	Contact of the rotor against the axial direction	Adjust the play
	Insufficient lubricating oil	Refill the oil and clean the strainer and the oil dripping nozzle
	Loose belt fitting	Adjust the tension
Belt damage	Incorrect belt tension	Adjust the tension
	Unbalanced alignment between the two pulleys	Adjust the alignment