WONCHANG
Vacuum Co., Ltd

Installation
and
Operating Manual

WVH / WVS & WBS-Series Vacuum Pumps
Models WVH-2,3,5 / WVS-3,5,6,8,9,10, WBS 30A ~100B

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INTRODUCTION

This manual is written to cover WVH / WVS and WBS-Series dry rotary vane vacuum pumps.
The model number is stamped into the nameplate.
The number will appear as follows: WVS-XXXXX or WBS-XXXXX
Please identify the model number and serial number when ordering parts.

1.0 INSTALLATION

1.1 Unpacking

Inspect the box and pump carefully for any signs of damage incurred in transit. Since all pumps are ordinarily shipped F. O. B. from our factory or regional warehouse, such damage is the normal responsibility of the carrier and should be reported to them.

The vacuum pump is bolted to the skid with studs that are connected through base or the rubber feet of the pump. Remove the nuts from the underside do the crate and remove the pump. Unscrew the studs from base or the rubber feet.

The inlet and exhaust of the pump are covered with plastic caps to prevent dirt and other foreign substances from entering the pump. Leave these caps in place until you are ready to pipe the pump to your equipment.

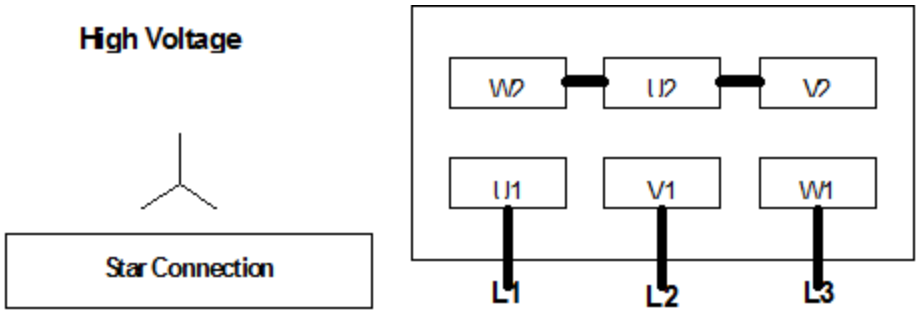
1.2 Location

Install the pump in a horizontal position on a level surface so that the pump can be evenly supported on its rubber feet or its base. Leave 30 ~ 45 cm of access around the pump to allow proper cooling. Also, adequate ventilation must be provided for the fans and motor.

1.3 Power Requirements

A schematic diagram for the electrical motor terminal connections is located in the junction box of the motor or on the motor nameplate. Typical wiring for Three Phase Motors are as below:

Wiring Scheme- Three Phase Motor



2.0 SAFETY

Please read the following safety notice carefully before operating the pump.

2.1 General Notices

- Understand fully this installation and operating manual before operation.
- The other person except authorized operator should not operate the pump.
- When the pump is not properly working, it should be stopped immediately.
- Wonchang shall have no liability for any accident and failure arising from no compliance with Instructions in this manual.

2.2 Warning labels and its explanation

Following warning labels are shown and attached on WVS *& WBS series pumps.

2.2.1 Read and Understand a manual:

Read and understand operator's manual before using this machine.

2.2.2 Burn Harzard:

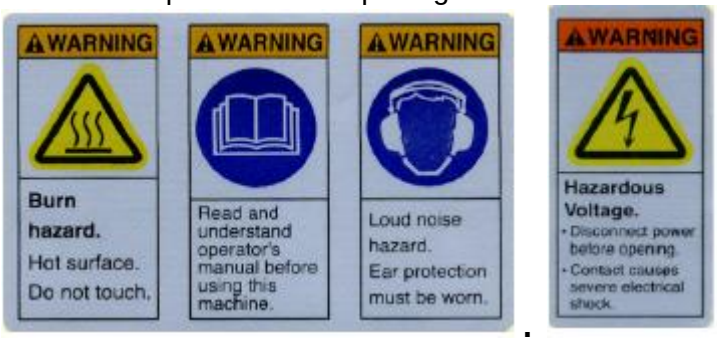
Hot surface. Do not touch.

2.2.3 Loud noise Hazard

Loud noise hazard. Ear protection must be worn.

2.2.4 Hazardous Voltage:

Disconnect power before opening. Contact causes severe electrical shock



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2.3 Location of the labels

The labels of 2.2.1 Read and Understand a manual, 2.2.2 Burn Hazard, and 2.2.3 Loud noise Hazard shall be shown on the top of manifold.

The label of 2.2.4 Hazardous Voltage shall be shown on the cover of motor's terminal box**.**

3. Excellent Points of WONVAC Dry Vacuum Pump

3.1. The Characteristics and Features:

- Compact Design - Reliability & Durability - Easy to Maintain and Operate.
- Simple Installation - Air Cooled, No water required.
- Quite Operation - Long Life

WVS Series has a single pump module only for vacuum or for blow, but it can be used for vacuum and pressure under the limited pressures.

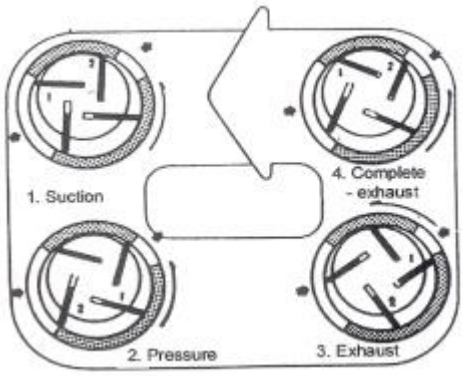
WBS series has dual pump modules and is ideal for simultaneous operation of pressure and vacuum. See technical data in this manual for various types of WVS/WBS.

3.2 The advantages:

- In comparison with wet type pump, no need to check the pump for repair frequently, because it doesn't need oil supply.
- It is hardly polluted.

- This dry pump can be used with best condition in the field of fool, medical, printing, bookbinding, farming, and others, because it doesn't blow out oil mist when used for blower.

3.3 Principles:



The Dry Rotary Vane Pump operates according to rotary vane principal. The rotor is eccentrically positioned in the pump cylinder and has machined slots for sliding of the vanes. The centrifugal forces of rotation push the vanes out of these slots and towards the wall of cylinder. The gas enters the pump through the manifold (air filter) and is compressed and pushed out through the manifold (bulit-in silence) installed on the pump module. The regulators installed on the manifold control the air flow for vacuum and pressure. Please see above sketches for operating principle.

3.4 General Structures and parts:

See attached Assembly drawings and part list.

3.5 Technical data:

Models			WVH			WVS							WBS								
			2	3	5	3 / 3H	5 / 5H	6 / 6H	8 / 8H	9 / 9H	10A/10AH	10 / 10H	30A	50A	60A	80A	80B	85B	90B	95B	100B
Displace-ment	60Hz	l/min	145	26	400	280	480	685	1115	1350	2350	2200	280x2	480x2	685x2	1115x2	1115x2	1350+ 1115	1350x2	1280+ 2200	2200x2
	50Hz	l/min	120	220	330	235	405	575	935	1130	1960		235x2	405x2	575x2						
End- Vacuum	mm HgG		720	724		610	650				670 / 740		650								
Normal Operating Vacuum	mm HgG		400~ 720	400~724		450 / 600					410 / 600		450								410
Normal Operating Pressure	Kgf/cm2					0.6					0.5 / 0.7		0.6								
Motor	Kw		0.2	0.4	0.75	0.4	0.75	1.5	1.5(6P)	2.2(6P)	3.7(6P)	4	0.75	1.5	2.2	4	4	4	5.5	5.5	7.5
Pump RPM	60Hz	rpm	1430	1430	1300	1740	1740	1740	1160	1160	1160	1100	1740	1740	1740	1160	1160	1160	1160	1100	1100
	50Hz	rpm	1190	1190	1080	1450	1450	1450	980	980	980	1100	1450	1450	1450						
Operating Amb.Temp	℃		0 ~ 40 ℃																		
Connections	Intake(G-Bsp)		1/4"	3/8"		3/4"			1"		1-1/4"		3/4"			1"				1" -1-1/4"	1-1/4"
Driven			T-Belt			Coupling						V-Belt	T-Belt			V-Belt					
Weight	kg (w/ motor)		15	22	33	24	33	44	73	97	120	120	40	56	75	115	129	150	165	200	235

Weight can be varied upon motor makers and its specipication.

4. Before Use

4.1 Checking Points

When you purchase our pump, please check following points first.

1. Whether damaged or not.
2. Whether bolts and nuts are tightened well or not.
3. Whether the shaft can be rotated easily (Rotate it after open the exhaust port or intake port).

4.2 Preparations

4.2.1. Installation Place to be:

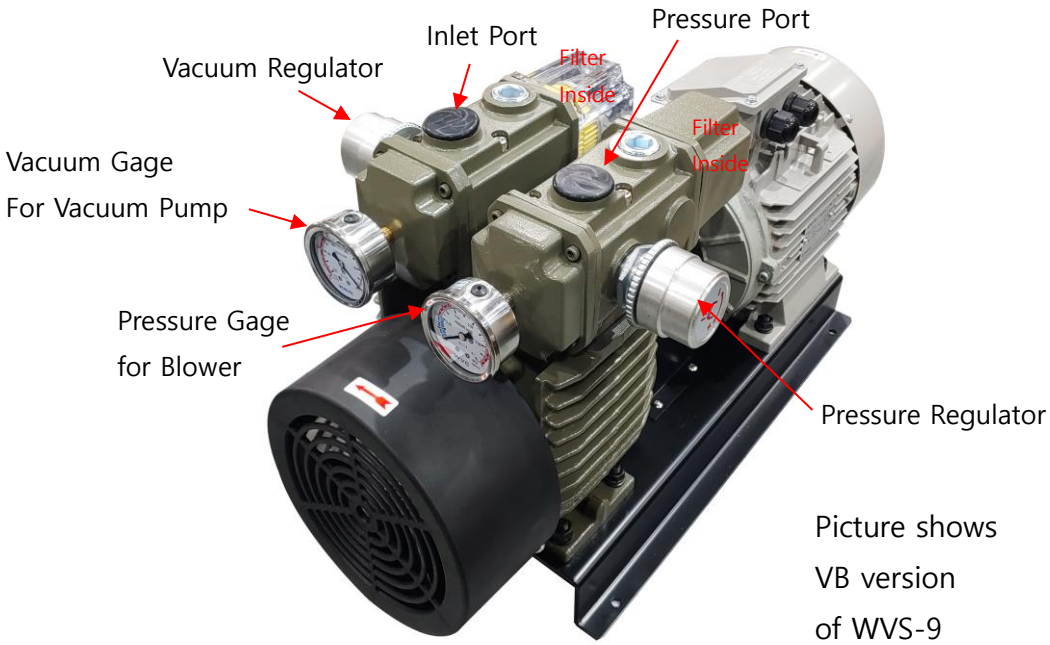
a. Well ventilated and below 40℃ ambient temperature.
b. Clean place without dust.
c. a place where the oil or moistures can not reach the pump.
d. a place not to be exposed to the direct rays of the sun.
c. with enough space to check the pump for maintenance or repair.

4.2.2. Installations

You may purchase dry vacuum pump less motor or with motor. In any case, please install pump under close attention to the following points:

- Please install the pump horizontally on the even surface.
- The surface should be firm like concrete. If not, please fix it tightly to steel frame or log.
- This pump should be free from vibrations with proper installation.

4.2.3. Piping and Connections:
Standard Position of Gages and regulators



*** Note :**

- You may install vacuum regulator, pressure regulator, vacuum gauge, pressure gauge in the middle of pipe line. But if possible, install vacuum gage and pressure gage near to pump. Use a pipe size that is at least the size of the pump inlet connections. Smaller lines result in a reduced pump capacity.

① Install regulator and attach gauge at correct position as shown on the picture. When you install, please use proper tools. Installation by hands may cause problems.
② Install vacuum gauge and vacuum regulator at vacuum side, and pressure gauge and pressure regulator at blow side.
③ Use carbon steel pipe or pressure resistant hose for piping. The hose should be resistant to heat.
④ Clean dust or rust completely inside of hoses or steel pipe before use.
⑤ Be careful not to be inserted inside of pipe or pump when you use sealing tape.
⑥ If oil, moistures or any liquid (including humid air) is inhaled inside of pump, it may cause serious problems.
⑦ If the intake air contains too much dust, please install inlet filter.
⑧ If the vacuum or exhaust pipe is long, when the pump is stopped, the pump may rotate in reverse way because of remaining pressure, so please make sure to install check valve at intake or exhaust ports. Reverse rotating may cause trouble (vane break) in pump.

5. Operation.

After electrical connections have been made, the rotation of the motor should be checked. If backward, reverse any two leads of the three at the power connection. Correct direction of rotation is marked by an arrow on the motor fan housing and is counterclockwise when looking at the motor from the motor's fan side.

Please do not rotate pump in reverse for long time to check rotation direction.

5.1 General operation Guide:

1. The ambient temperature of Dry-Vacuum Pump must be observed between 0℃ ~ 40℃.
2. Be careful that impurities like oil, moistures, dusts should not enter into the pump.

5.1.1 Starting.

1. Please turn vacuum regulator, pressure regulator completely to (-) direction and turn on power switch. When the pump rotation is correct, please adjust each regulators to reach normal degree of vacuum and blow pressure.

2. When you start pump after long time rest or when you start it after re-assembly, please start it after checking the pulley and connection parts, and checking the pump could be turned softly by hand.

5.1.2 During the operation.

The pump is recommended to operate within the normal operating pressure: Operating over the normal operation range may cause the pump failures and shorten the lifetime of pump.

WVS Standard Version

V Version (Vacuum only)	**B Version (Blower only)**	**VB Version (Both vacuum & pressure)**
Level of Vacuum : Below 450 mmHgG (60kPa)	Level of pressure: Below 0.6kg/cmG (60kPa)	Level of Pressure (Sum of V and B): Below 450 mmHgG (60kPa)

WVS H Version

V Version (Vacuum only)	**B Version (Blower only)**	**VB Version (Both vacuum & pressure)**
Level of Vacuum : Below 600 mmHgG (80kPa)	Level of pressure: Below 0.7kg/cmG (70kPa)	Level of Pressure (Sum of V and B): Below 600 mmHgG (80kPa)

※ ***If you want to use it for other purpose, please consult us in advance.***

5.2. Stop

Please adjust regulator until the vacuum gauge and blow gauge show " 0 ", then shut off the pump. If possible, please keep the pressure inside of pump same as pressure outside to give easy starting in next work.

6. Storage

Please be careful to keep the pump free from rust, if you do not use it for a long time.

1. Keep it indoors with proper covers.
2. Store it free from oil or moistures.
3. Store it clean and dry place.
4. Store under the good air ventilation and normal temperature place (below 40℃).
5. Store it free from any Chlorine (Cl), Sulfurous gas or other gases which may cause the rust of pump.

7. Maintenance

7.1 Troubleshooting.

7.1.1 Troubles : The vacuum and blow pressure do not produce.

. *Cause*	*Remedy*
1) Air intake may be blocked due to dust, oil or other contamination on Filter element	Take out filter element and clean it by High pressure air-gun, or replace filter element.
2) Blade (Vane) does not slide out well because of oil contamination in the pump.	Remove the exhaust port form filter case and put volatile cleaning solvent into exhaust port or
	inhalation port of the pump body. After that turn the fan.(If the fan does not move, please wait for a while). If the fan is not turning, please switch on and blow out cleaning solvent and oil. Please be careful not to breathe in any volatile gas of cleaning solvent and keep air circulation of the working place.
3) Blade(Vane) does not slide out because of contamination of the pump.	Disassemble and remove contaminated parts.
4) Rust inside of pump and so Blade (Vane) does not slide out.	Disassemble and carefully remove the rust.
5) Gauge trouble.	Replace with new gauge.
6) Air leakage	Tighten parts, like filter case, pipes and air tank to protect from air leakage.
7) Loosing belt and bolt, coupling.	Adjust tension of belt and fasten bolt of pulley or coupling.
8) RPM down caused by motor trouble.	Repair or replace motors (Check Voltage and Amp. Of the motors)
9) Blade (Vane) damage	Disassemble and replace blade(Vane)
10) The blade (Vane) worn out.	Replace blade with new one.

7.1.2 Troubles : Strange noise and pulsation of the gauge.

Cause	*Remedy*
1) When vacuum and blow pressure is higher than standard, pump may make noise.	Adjust level of vacuum and blow pressure to normal set points.
2) When the coupling parts are not assembled correctly, pump may make noise.	Adjust center of couplings.
3) Motor damage can make noise.	Repair or replace motor (Check Voltage and Amp. of the motor)
4) When the bolts of each parts become loose, pump may make noise.	Adjust and tighten all bolts.
5) Gauge defect.	Replace gauge with new one.

6) Air intake is not clean because of dust on filter element.	Please follow procedure A)-1)
7) Contamination may damage the vanes.	Disassemble to clean contaminants or replace blade (vane)

7.1.3 Troubles : Pump does not run properly.

Cause	*Remedy*
1) Blade (Vane) damage because of contamination of the pump	Disassemble to remove contamination and replace blade (Vane) with new one.
2) Rotor friction by abnormal pressure.	Disassemble to grind friction point by sandpaper or call engineer.
3) Default in electric system	Check electric system.

8. Periodic Check Points:

Check the pump regularly according to following recommendations.

8.1 Cleaning of the Filter

Filter cleaning will eliminate around 90％ of troubles, so keep the filter clean periodically. High pressure air－gun can be used for cleaning, but please replace it if the filter can not be cleaned well. ***Clean it weekly.***

8.2 Cleaning of vacuum regulator and pressure regulator.

The performance of the regulator will be down if the regulator base is dirty, so, please regularly check and clean the concerned parts. ***Clean it monthly.***

8.3 Checking of piping.

Make sure every possible leak points tightened, like pipe connections, knob of filter case.
Clean it monthly.

8.4 Pump body checking.

Release connecting pipe and turn the shaft by hand under the unloading condition. If the shaft does not move smoothly, please contact your engineer.
If the pump capacity is dropping down suddenly or the pump is making noise, Please check the status of the pump according to the conditions described in trouble shooting section. In this case of serious demage of pump module, please contact your supplier for repair or replacement.
Please use only our **genuine heat resistant bearings** for the pump.

8.5 Power transmission checking.

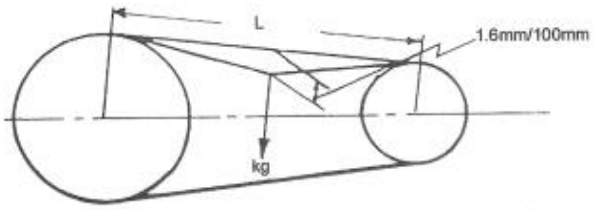
8.5.1 Coupling power transmission.

Check whether the pump shaft and motor shaft are on the same axle, and also check rubber insert between the coupling halves.
If the pump shaft and motor shaft are not on the same axle, adjust it to have them positioned at the same axle.
If the insert rubber is worn out, replace it with new one.

8.5.2 Belt power transmission

Check the belt condition for replacing by new one. Tension of the belt and adjustment of pulley should be checked together.

Checking of tension of the belt



1. Hang up the tension meter (or spring scale) at the center of belt span and measure bending degree. The bending degree should be 1.6mm at 100m of the span under the loading condition.(If the span is 500mm, the bending shall be 8mm)

2. Adjust tension of the belt for the following minimum and maximum load.

The load of the belt at proper tension of the belt.

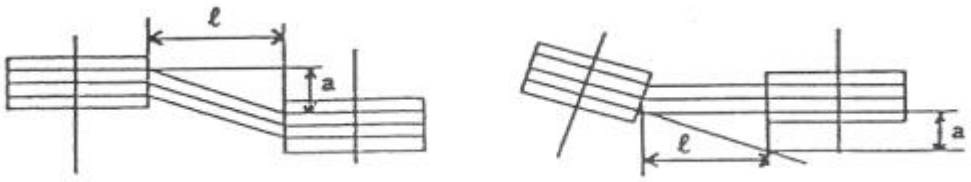
Belt Type	Min. Load(Kgs)	Max. Load(Kgs)
A	0.68	1.02
B	1.58	2.36
C	2.93	4.75

Note :

1. The life time of the belt and power transmission shall be varied depend on tension of the belt.
2. When you replace the belt or install new belt, please shorten the distance of center of the pulleys to install and then adjust tension.
3. If you need to replace one more belts, please replace all together.

Adjustment of the pulley

If the pulley adjustment is not done well enough, the life time of belt may be shorten. Please adjust it within $a \leq 0.0006\ell$ as shown on following figure.



Acquisition of Certification

Registered ISO 9001:2008 / 14001:2004

RoHS COMPLIANT

REACH The new EU chemicals legislation

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