

**WONCHANG**  
**Vacuum Co., Ltd**

**Installation  
and  
Operating Manual**

**WOVP-Series Vacuum Pumps  
Models 0020 - 1500**

# **INSTALLATION & OPERATING MANUAL**

WOVP-SERIES SINGLE STAGE ROTARY VANE  
VACUUM PUMPS

WOVP-0020~1500

Please read the manual before operating the vacuum pump.

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# INSTALLATION AND OPERATING MANUAL

This manual is written to cover WOVP-Series Model vacuum pumps. The model number is stamped into the nameplate. The number will appear as follows:

WOVP-XXXX L, WOVP-XXXX N, WOVP-XXXX NM and WOVP-XXXX F.

**Please identify the model number and serial number when ordering parts.**

## Versions:

**L: 20 mbar - With Oil Return Line w/o float valve from oil sump to inlet port of inlet flange.**

**N: 0.5 mbar- With Oil Return Valve.**

**NM: 2 mbar - With Oil Return Line from oil sump to end plate.**

**F: 0.5mbar- With Oil Return Line with float valve from oil sump to inlet port of inlet flange.**

## 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 the rubber feet of the pump. Remove the nuts from the underside do the crate and remove the pump. Unscrew the studs from 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. Leave about 30 cm of access around the pump to allow proper cooling. Also, adequate ventilation must be provided for the fans, radiator, and motor.

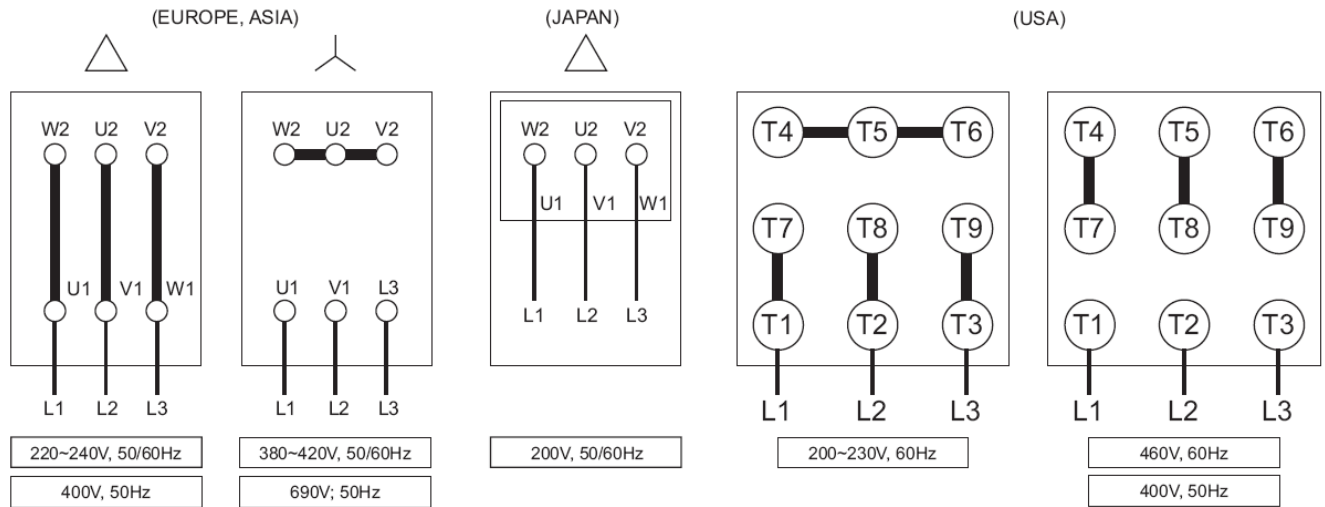
Allow access to the oil sight glass in order to inspect the oil level, and the exhaust port for easy access to change the exhaust Filters.

**Do not tip the pump over if filled with oil.**

### 1.3 Power Requirements

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

## Wiring Scheme- Three Phase Motor



The motor must be connected according to the electrical codes through a fused switch in order to protect the motor against electrical or mechanical overload conditions. The overload of the motor starter must be set at a level equal to the full load motor current listed on the motor nameplate.

If the pump is supplied with a motor starter, it is preset at the factory according to customer specifications. It is advisable to check that these settings are in line with the voltage at your location. If the voltage is different, please contact Wonchang for motor and starter information.

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.

**After electrical connections have been made, but prior to filling with oil, the rotation of the motor should be checked. If backward, reverse any two leads of the three at the power connection.**

### 1.4 Vacuum Connections

Use a pipe size that is at least the size of the pump inlet connections. Smaller lines result in a reduced pump capacity.

Pumps operating in parallel on a common main line should have a manual or automatic operated shut-off valve or positive action check valve, installed in the suction line adjacent to the pump suction flange. The built-in anti-suck back valve should not be used as a shut-off valve for the vacuum system. Remove the plastic protective cap from the inlet port prior to connection of pump to the system.

Should process gas contain dust or other foreign particles, a suitable in line (inlet) filter should be connected to the inlet port. Consult Wonchang for recommendations.

The vacuum piping should be designed to ensure that no liquids such a condensate or liquid carried over from the process can reach the pump. If this possibility exists, a knock-out liquid separator should be installed. Consult Wonchang for recommendations.

If an exhaust manifold is connected, install a drip leg and drain near the pump exhaust to prevent exhaust condensation from entering the exhaust box. The following thread sizes are standard on the Wonchang pumps (NPT thread is available upon request)

<u>Pump Model</u>	<u>Inlet Size</u>	<u>Exhaust Size</u>
WOVP-0020/0030/ 0040	1/2" G	1 1/4" G or Open Grid
WOVP-0060/0090	1 1/4" G	1 1/4" G
WOVP-0130/0200	1 1/4" G	1 1/4" G
WOVP-0320/0430	2" G	1 1/2" G
WOVP-0350/0500/0600	2" G	2" G
WOVP-0800/1000/1200/1500	3" G	3" G

## 1.5 Oil Filling

The pump is shipped without oil. After level installation and correct rotation has been established, fill the pump with recommended oil through the oil fill port. Oil level should be at the 3/4 positions on the oil sight glass.

Non-detergent oil should be used. We recommend original Wonchang Vacuum Pump oil. Wonchang oil is a high quality vacuum oil that will provide longer running time between oil changes, better lubrication at high operating temperatures and prolongs the life of the exhaust filter elements.

Oil detergent additives can cause exhaust filters to become clogged and shorten their service life.

Depending on the ambient temperature around the pump, following viscosity of oil is recommended.

<b>Ambient Temp.</b>	<b>Viscosity</b>	<b>Type of Oil</b>	<b>For Model</b>
0°C~ 30°C	ISO VG 32	Mineral Oil	WOVP-20,30 and 40
< 0°C	ISO VG 32	Mineral Oil	WOVP-60 ~ 1500
0°C~ 12°C	ISO VG 68	Mineral Oil	
12°C~ 30°C	ISO VG 100	Mineral Oil	
> 30°C or < 0°C	ISO VG 100	Synthetic Oil	

At ambient temperatures from 12°C up to 30°C, following brand of oil can be used:

- **Wonchang Vacuum Pump Oil**
- **BP Energol CS 100**
- **Shell Talpa G 100**
- **Texaco Ursa Oil P 100**

At ambient temperatures over 30°C, or area where cold starting required, Synthetic oil would be recommended.

- **Shell Omala Fluid RL 100 / 150 or Eqv.**

The following table gives the approximate quantities of oil required for each model.

<u>Pump Model</u>	<u>Capacity (liter)</u>
WOVP-0020/0030/0040	0.5
WOVP-0060/0090	1.4
WOVP-0130/0200	2.5/2.7
WOVP-0320/0430	7.0
WOVP-0350/0500/0600	7.0+
WOVP-0800/1000/1200/1500	19.0

**Do not add fill oil with pump running or through the inlet or exhaust ports! Do not overfill.**

## 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 WOVP 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



### 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 Oil sump of WOVP series pump.

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

## 3.0 OPERATION

### 3.1 Start-up

Check rotation of the motor as described in paragraph 1.3 Power Requirements.  
Fill the pump with oil as described in paragraph 1.5 - Oil Filling

Start the pump with the inlet closed. Run the pump for a few minutes and then shut down. Check the oil level again and make sure the oil level is between the 3/4 marks and full on the upper oil sight glass.

Add oil, if necessary. Pump oil should only be added when the pump is off and circulating oil has sufficient time to return to the oil sump.

**If** the ambient temperature is below 10°C, it is recommended to use a heater with thermostatic control to warm up oil to room temperature. If necessary, the heater with control can be used to keep the oil temperature at operating temperature for immediate start up with system where water vapor comes in. Please consult Wonchang or representative for installation of a heater with control.

### 3.2 Stopping the pump

To stop the pump, turn off the power. A built in anti-suck back valve will prevent oil from the oil reservoir being sucked back into the cylinder after the pump is shutdown.

**Do not utilize the anti-suck back valve as a check valve. Consult Wonchang for proper check valves.**

### 3.3 Gas Ballast

WOVP-N, NM, and F series pumps are equipped with gas ballast. The gas ballast valve is located between the inlet port and the exhaust box. Its main function is to prevent water vapor from condensing in the pump that causes emulsification of the oil resulting in possible pump failure.

In applications, when the quantity of water vapor is moderate, it is recommended to run the pump for 10~30 minutes to its normal operating temperature (about 75°C), prior to going on process with suction line shut off. The pump should also be operated at off process for 10 ~30 minutes prior to shut down. A slight air bleed (purge) is recommended during these 10~30 minute cycles to prevent the vapor from condensing in the pump.

### 3.4 Check Valve (Built-In)

WOVP series pumps are equipped with Built-in Check Valve. The valve is located in inlet flange housing, which is upper part of Pump module to prevent oil back to inlet side (system) when the pump is running off. (However, it is recommended to install separate check valve in the line of inlet if necessary)

### 3.5 Exhaust Pressure Gage (Optional)

This gage shall be installed on the Oil fill Plug for easy checking of status of saturation of the exhaust filter. If the reading is 0.6 Bar or grater, you need to change the exhaust filter(s) with new one.

## 4.0 MAINTENANCE

WOVP-Series vacuum pumps require very little maintenance. To ensure optimum performance, the following maintenance steps should be followed:

### 4.1 Pump Oil

#### 4.1.1 Oil Level

Under normal circumstances it should not be necessary to add oil between oil changes. A significant drop in oil level means there is either an oil leak, a defective exhaust filter or O-ring, or a leaking anti-suck back valve. If the pump is smoking excessively, the exhaust filter may be installed improperly.

It is normal for the oil to be foamy or lightly colored in an operating pump. This may be normal aeration of the oil. If the oil appears milky or dark colored, it is contaminated or burned and must be changed.

Check the oil level only when the pump is shut off. Replenish oil if it drops below the  $\frac{1}{4}$  mark of the top sight glass.

**Caution: Do not add oil while the pump is running, since hot oil can escape from the oil fill port.**

#### 4.1.2 Oil Type and Quantity

See section 1.5 - Oil Filling - for details on oil type and quantity

#### 4.1.3 Oil Change

Oil life is dependent on the operating conditions. A clean and dry air stream and operating temperatures below 100 C are ideal. When using proper Vacuum Pump Oil, it is recommended to change the oil every 500-1000 operating hours or after half a year. Oil life can be shorter than 500 hours if the pumps are operated under unfavorable operating conditions

Oil change frequency is dependent upon the application and ambient temperature. It is recommended that the customer monitor the condition of the oil during this period.

**Caution: Always change the oil when the pump is off but still at working temperature.  
When disposing of used oil, please observe the relevant environmental regulations.**

#### 4.1.4 Oil Spin-On Filter

Replace automotive-type spin on filter at every oil change.

<u>Pump Model</u>	<u>Part No.</u>
WOVP-0060 ~ WOVP-0200	OF-200 or # 06100
WOVP-0320 ~ WOVP-0600	OF-500 or # 50100
WOVP-0800 ~ WOVP-1500	OF-1200 or # 120100

### 4.2 Inline (Inlet) Filter

Check inline (inlet) filter on a weekly basis. The filter cartridge should be cleaned or replaced when dirty. Consult Wonchang for replacement element information.



**Caution: Depending on the mounting position of the filter, be careful not to allow accumulated foreign material to fall in the pump suction inlet when removing the filter cartridge. Horizontal filter installation is recommended to prevent this.**

#### 4.3 Exhaust Filter

Replace these filters every 9 to 18 months of operation or as necessary. The service life of these filters varies depending upon the application and frequency of oil change. It is necessary to change these filters only when they become clogged. Indications of clogged filters are smoke or oil mist coming from the exhaust of the pump, higher than normal motor current, and the exhaust pressure gauge (Optional) reading 0.6bar or greater.

<u>Pump Model</u>	<u>Part No.</u>
WOVP-0020 ~ WOVP-0040	# 02120A
WOVP-0060	# 06120B
WOVP-0090 ~ WOVP-0200	# 06120A
WOVP-0320C ~ WOVP-0430C	# 43120A
WOVP-0500 ~ WOVP-0600	# 50120A
WOVP-0800 ~ WOVP-1500	# 120120A

**Do not clean or re-use these filters. Filters must be disposed of in a proper way as they might contain toxic substances carried over from the process. Replace O-rings on filter when changing.**

#### 4.4 Gas Ballast Filter

Replace or clean the filter every as necessary or annually.

Type: 1) WOVP-60~200: Gas Ballast without ball valve with paper filter - Replace paper filter  
2) WOVP-320~1500: Gas Ballast with ball valve with sponge filter – Clean or replace the Sponge filter

#### 4.5 Maintenance Chart

**Daily:** Visually check oil level and color.

**Weekly:** Inspect inline (inlet) filter and check oil leaks from the vacuum pump.

**Monthly:** Check the exhaust filter's function.  
(If oil mist at exhaust, replace the exhaust filter with O-ring)

**Every 2- 6 month:** Drain and discard oil from pump while hot. Refill with fresh oil.

**Every 9-18 month:** Replace exhaust filters with O-ring and gas ballast filter.

**Every 500 ~ 2000 operating hours:** Change the oil and oil filter.  
In version of float valve with oil return line, check the float valve's operating conditions.

**For Motor:** See the motor manufacture's manual for periodic motor maintenance.

**The operating life of the pump is greatly enhanced based on the oil quality and condition of the filters. Periodic maintenance will ensure a reliable operating vacuum pump.**

#### **4.6 Gasket Kit, Overhaul Kit and other Parts**

A gasket kit contains a set of gaskets and O-rings

An Overhaul (Maintenance) kit contains a set of gaskets, O-rings, vanes, bearing, bearing sleeves, shaft seals and taper pins, oil filter and exhaust filter(s).

Other parts are available. **Please consult Wonchang parts department for information.**

## **5.0 PROBLEM SOLVING**

### **5.1 Problem**

Pump does not reach end pressure. This is the lower absolute (best vacuum) when running with the inlet closed.

#### **5.1.1 Possible Cause**

Oil condition is most often the cause of not reaching end vacuum.

*Remedy* : drain oil from pump and refill with fresh oil. Run pump with fresh oil for 15 minutes then take new pressure reading.

#### **5.1.2 Possible Cause**

Inlet screen clogged with debris.

*Remedy* : clean screen and check inlet filter element.

#### **5.1.3 Possible Cause**

Shaft seal leak

*Remedy* : replace shaft seal from overhaul kit, or call Wonchang for exchange program.

#### **5.1.4 Possible Cause**

Vane stuck in rotor slot.

*Remedy* : drain oil with flushing oil. Run pump for 15 minutes and drain. Replace fluid with fresh oil, exhaust filter, and spin on filter.

- replace vane from overhaul kit; call Wonchang for exchange program

#### **5.1.5 Possible Cause**

Anti-suck back valve stuck in closed position due to oil contamination.

*Remedy* : disassemble valve and screen, clean as required. Drain old oil and replace with fresh oil.

#### **5.1.6 Possible Cause**

No oil or low oil level in reservoir.

*Remedy* : shut down pump, drain balance of oil and refill with fresh oil.

#### **5.1.7 Possible Cause**

Vacuum fitting or hose is not leak tight.

*Remedy* : check hose and pipe connections for leaks.

### **5.1.8 Possible Cause**

Radial clearance between rotor and cylinder are no longer adequate.

*Remedy* : overhaul pump or call Wonchang for exchange program.

### **5.1.9 Possible Cause**

Float Valve does not close well.

*Remedy* : check the condition of float valve, and adjust the nozzle position or repair it.

## **5.2 Problem**

Pump runs very noisy.

### **5.2.1 Possible cause**

Coupling insert is worn.

*Remedy* : replace coupling insert in motor/pump coupling.

### **5.2.2 Possible Cause**

Vanes stuck

*Remedy* : follow flush procedure from 5.1.4 or replace vane or call Wonchang for exchange program.

### **5.2.3 Possible Cause**

Bearing noise

*Remedy* : replace bearings or call Wonchang or exchange program.

## **5.3 Problem**

Pump starts, but labors and draws high amperage.

### **5.3.1 Possible Cause**

Oil is too viscous.

*Remedy* : drain and change with fresh oil or correct oil with recommended viscosity.

### **5.3.2 Possible Cause**

Exhaust filter is clogged

*Remedy* : replace exhaust filters, maintain proper oil condition, oil level and use Vacuum pump oil.

- make sure inlet filter is operational preventing particulate carryover.

### **5.3.3 Possible Cause**

Loose connection in motor terminal box wired for wrong voltage.

*Remedy* : check wiring diagram for proper connections; tighten or replace loose connections.

### **5.3.4 Possible Cause**

Foreign particles in pump. Broken vanes or seized bearings.

*Remedy* : overhaul pump or call Wonchang for exchange program.

### **5.3.5 Possible Cause**

Pump is overfilled with oil or wrong kind of oil is in pump.

*Remedy* : drain oil; use correct type of Vacuum pump oil.

### **5.3.6 Possible Cause**

Pump runs in wrong direction.

*Remedy* : check for correct rotation. If incorrect, switch any two leads.

## **5.4 Problem**

Pump will not start.

### **5.4.1 Possible Cause**

Supply voltage is not proper or is overloaded. Motor starter overload settings are too low or improper; fuses are burned; wire size is too small or too long causing a voltage drop.

*Remedy* : check voltage supply; overload settings in motor starter for size and settings according to motor nameplate. Install proper size wire. If ambient temperature is high, use the next larger size overloads or adjust settings 5% above motor nameplate value.

*Remedy* : turn pump fan by hand. If it will not turn, remove motor from pump and check motor and pump separately. Repair or replace if needed or call Wonchang for exchange program.

### **5.4.2 Possible Cause**

Oil temperature is below 12°C or oil is too viscous due to contamination.

*Remedy* : Heat the pump and oil, or change the oil

## **5.5 Problem**

Pump smokes at the exhaust side or expels oil droplets from the exhaust.

### **5.5.1 Possible Cause**

Exhaust filters are not properly installed with O-ring; Filter media is damaged.

*Remedy* : check exhaust filter placement and replace if needed.

### **5.5.2 Possible Cause**

Exhaust filters are clogged with foreign particles.

*Remedy* : replace filter and O-ring.

### **5.5.3 Possible Cause**

Oil is not re-circulating properly.

*Remedy* : check oil quality and make certain oil lines are clean.

## **5.6 Problem**

Pump is running too hot. (Typical operating temperature of the WOVP-Series pump is 75°C ~ 95°C)

### **5.6.1 Possible Cause**

Not enough oil in the oil reservoir or oil is badly burned or carbonized.

*Remedy* : check upper part of oil sump (open the exhaust filter cover) if there is the oil filled and not re-circulated to the inlet side of pump, check the condition of float valve (in Oil Sump or Float Valve Box), and adjust the nozzle position or change the float if float is not float well, or check oil return line if it is not clogged or not

*Remedy* : drain oil and refill with proper oil ; change oil more frequently.

### **5.6.2 Possible Cause**

Not enough air ventilation to pump

*Remedy* : clean radiator and motor fins. Make certain a sufficient amount of fresh air is supplied to the pump.

## 5.7 Problem

Pump will not operate (seized up).

### 5.7.1 Possible cause

Pump operated without oil and vanes broke.

*Remedy* : Call Wonchang for exchange program

### 5.7.2 Possible Cause

Liquid carry over into pump cylinder broke vanes while pump was running.

*Remedy* : Install knock-out pot at inlet of pump..

## 6.0 Technical Data

Models			20	30	40	60	90/80	130	200
Displacement	60Hz	m <sup>3</sup> /h	12	18	24	36	54/48	78	120
	50Hz		10	15	20	30	45/40	65	100
End- Vacuum	N or F Type	mbar	NA	NA	NA	0.5	0.5	< 0.5	< 0.5
	NM Type		2	2	2	NA	NA	NA	NA
	L Type		20	20	20	NA	NA	NA	NA
Motor ( 3Ph)	IEC(Kw)	60Hz	0.4	0.75	0.9	1.1	1.5	2.2	3
		50Hz	0.4	0.75	0.9	0.9	1.1	1.5	2.2
	NEMA(Hp)	60Hz	N/A	N/A	N/A	2	2	3	5
Motor( 1Ph)	IEC(Kw)	50/60Hz	0.4	0.75	0.9	1.5	1.5	N/A	N/A
Revolution	RPM	60Hz	1740	1740	3480	1740	1740	1740	1740
		50Hz	1450	1450	2870	1450	1450	1450	1450
Noise	dB(A)	60Hz	59	60	62	67	67	68	68
		50Hz	57	58	60	64	64	65	65
Water Vapor	Tolerance	mbar				40	40	40	40
	Capacity(L/Hr)	50/60Hz				0.7/0.9	0.9/1.1	1.6/1.8	2.6/2.8
Operating Temp.	℃	50/60Hz	77	80	85	76/78	78/80	81/83	83/85
Oil Capacity	Ltr		0.5	0.5	0.5	1	1	2	2
Connections	G(BSP) or NPT	Intake	1/2"	1/2"	1/2"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
		Exhaust	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
Weight	kg (with motor)		20	22	20	47	53/52	66	75

Models			320	350	430	500	600	800	1000	1200	1500
Displacement	60Hz	m <sup>3</sup> /h	192	210	258	300	360	560	600	780	NA
	50Hz		160	175	215	250	300	448	500	630	750
End-Vacuum	N or F Type	mbar	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
	NM Type		NA	NA	NA	NA	NA	NA	NA	NA	NA
	L Type		NA	NA	NA	NA	NA	10	10	10	10
Motor (3Ph)	IEC(Kw)	60Hz	3.7	5.5	5.5	7.5	8.6	15	15	18.5	NA
		50Hz	3.7	5.5	5.5	7.5	7.5	11.25	11.25	15	18.5
	NEMA (Hp)	60Hz	5	7.5	7.5	10	11.5	15	20	25	NA
Motor(1Ph)	IEC(Kw)	50/60Hz	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Revolution	RPM	60Hz	1740	1740	1740	1740	1740	1160	1160	1160	NA
		50Hz	1450	1450	1450	1450	1450	980	980	980	1450
Noise	dB(A)	60Hz	75	77	77	77	78	78	78	79	NA
		50Hz	72	74	74	74	75	76	76	77	81
Water Vapor	Tolerance	mbar	40	40	40	40	40	40	40	40	40
	Capacity (L/Hr)	50/60Hz	3.0/ 3.6	3.0/ 3.6	4.0/ 4.5	4.5/ 5.0	5.0/ 5.8	17/19	21/23	27/30	30
Operating Temp.	°C	50/60Hz	80/83	77/80	82/85	82/85	83/86	78/81	78/81	80/83	88
Oil Capacity	Ltr		7	7	7	7	7	19	19	19	19
Connections	G(BSP) or NPT	Intake	2"	2"	2"	2"	2"	3"	3"	3"	3"
		Exhaust	1-1/2"	2"	1-1/2"	2"	2"	3"	3"	3"	3"
Weight	kg (with motor)		124	164	145	184	184	504/ 491*	537/ 524*	703/ 582*	660*

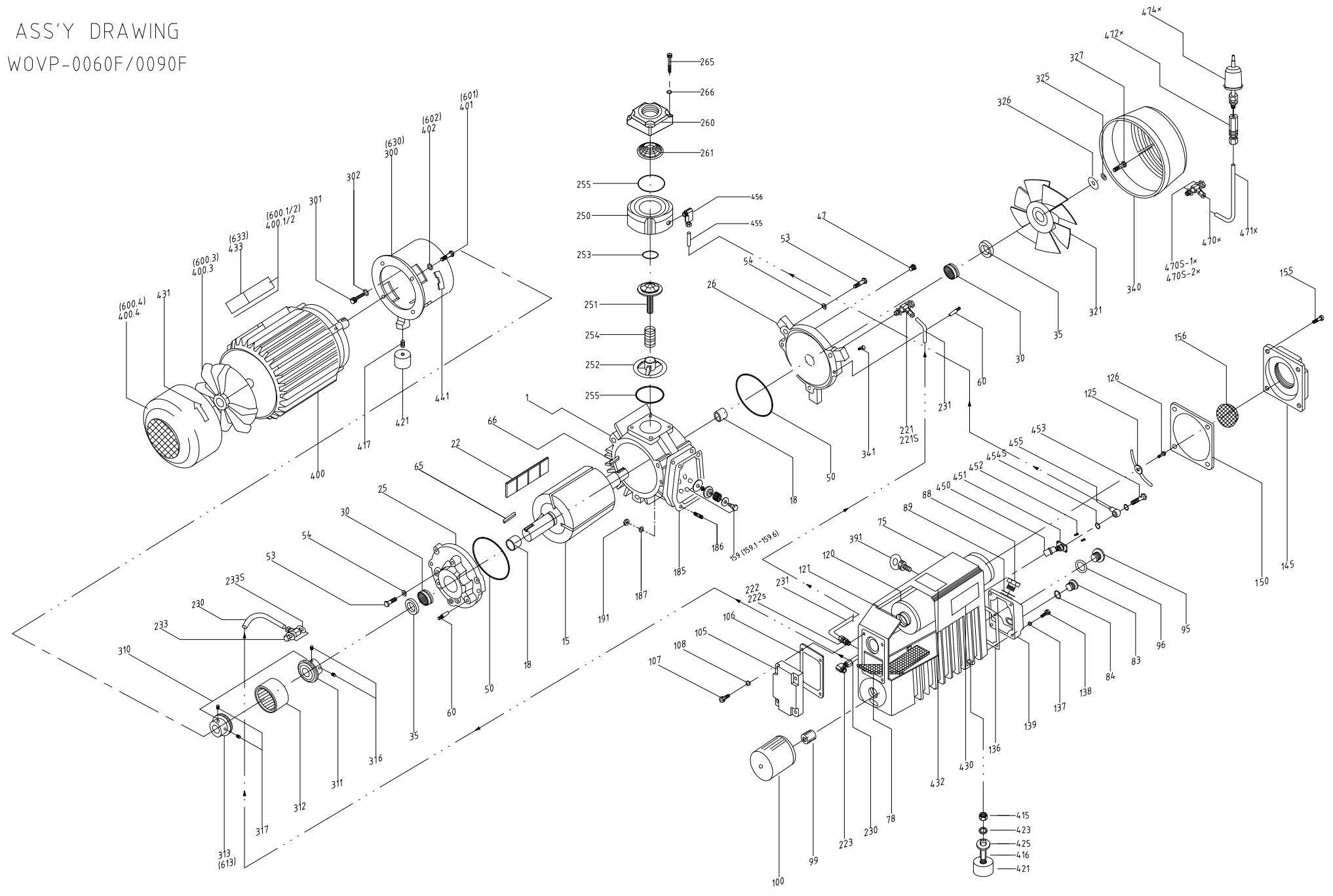


**WOVP- 0020 , 0030 & 0040 PARTS LIST**

Pos. No.	Description	20 Qty	30 Qty	40 Qty	Pos. No.	Description	20 Qty	30 Qty	40 Qty	Pos. No.	Description	20 Qty	30 Qty	40 Qty
1	Cylinder	1	1	1	159-4	Exhaust valve plate	1	1	1	296***	Banjo fitting (For NM Only)	1	1	1
15	Rotor	1	1	1	159-5	Exhaust valve lock nut	1	1	1	297***	Oil Return tube (For NM Only)	1	1	1
18	Sleeve, Bearing	2	2	2	159-6	Exhaust valve seat plate	1	1	1	300	Motor mounting bracket	1	1	1
22	Vane	3	3	3	186	Allen bolt	4	4	4	301	Allen bolt	3	3	3
25	A-end plate	1	1	1	190	Spring lock washer	4	4	4	302	Spring lock washer	3	3	3
26	B-end plate	1	1	1	200	Plug, Drum	1	1	1					
30	Bearing	2	2	2	201	O-Ring, Drum plug	1	1	1					
35	Shaft seal	1	1	1	221	Elbow hydraulic fitting	1	1	1					
36	O-Ring, Bracket	1	1	1	222	Elbow hydraulic fitting	1	1	1					
37	Bracket	1	1	1	223	Straight hydraulic fitting	1	1	1	310	Coupling Set( 311 ~313)	1	1	1
38	Hexagon head screw	3	3	3	231	Oil tube(B)	1	1	1	311	Coupling, pump side	1	1	1
50	O-Ring, End plate	2	2	2	233	Elbow hydraulic fitting	1	1	1	312	Coupling, sleeve	1	1	1
53	Hexagon head screw	6	6	6	240	Cooling spiral	1	1	1	313	Coupling, Motor side	1	1	1
54	Spring lock washer	6	6	6	251	Check valve plate	1	1	1	316	Set screw (pump side)	2	2	2
60	Taper pin	4	4	4	252	Check valve guide	1	1	1	317	Set screw ( Motor side)	2	2	2
65	Shaft key	1	1	1	253	O-Ring, Check valve plate	1	1	1	400	Motor (IEC) for WOVP-0200	1	1	1
75	Oil sump	1	1	1	254	Check valve spring	1	1	1	400.3	Motor fan blade	1	1	1
83	Oil sight glass	1	1	1	255	O-Ring, Inlet part	1	1	1	400.4	Motor fan cover	1	1	1
84	Gasket, Oil sight glass	1	1	1	260	Inlet flange, NM type	1	1	1	401	Hexagon head screw	4	4	4
88	Plug, Oil fill	1	1	1	260	Inlet flange, L type	1	1	1	402	Spring lock washer	4	4	4
89	O-Ring, Oil fill plug	1	1	1	261	Inlet screen	1	1	1	416	Slotted set screw	1	1	1
95	Plug, Oil Drain	1	1	1	262	Retaining ring for bores	1	1	1	417	Slotted set screw	2	2	2
96	O-Ring, Oil drain plug	1	1	1	265	Hexagon head screw	4	4	4	419	Sleeve	1	1	1
120	Exhaust filter	1	1	1	266	Spring lock washer	4	4	4	421	Rubber foot	3	3	3
121	O-Ring, Exhaust filter	1	1	1	270*	Plug (For N only)	1	1	1	430	Name plate	1	1	1
125	Filter spring	1	1	1	275*	Oil return valve (For N only)	1	1	1	431	Directional arrow label	1	1	1
126	Slotted cheese head screw	1	1	1	275S*	Sealing ring (For N only) for 275*	1	1	1	490	Gasket Set	1	1	1
145	Exhaust cover (w/ threaded flange)	1	1	1	285**/**	Oil Recirculation Screw (For L or NM)	1	1	1	500	Maintenance Kit	1	1	1
150	Gasket, Exhaust cover	1	1	1	286**/**	Banjo fitting (For L or NM )	1	1	1	510	Conversion kit, L type	1	1	1
155	Allen bolt	4	4	4	285S-1**	Sealing ring (For L or NM) for 285**	2	2	2	530	Conversion kit, NM Type	1	1	1
156	Outlet screen	1	1	1	285S-2**	Sealing ring (For L or NM) for 285**	2	2	2	145-1	Rubber Flap for 02145	1	1	1
159	Exhaust valve ass'y( 159.1~ 159.6)	1	1	1	290**	Oil return tube (For L only)	1	1	1	145-2	Washer for 02145	1	1	1
159-1	Exhaust valve fixed bolt	1	1	1	291**	Elbow hydraulic fitting ( For L only)	1	1	1	145-3	Slotted cheese head screw for 02145	1	1	1
159-2	Exhaust valve washer	1	1	1	295S***	Sealing ring (For NM) for 295**	3	3	3	800	Inlet Air Filter	1	1	1
159-3	Exhaust valve spring	1	1	1	295***	Oil return valve (For NM Only)	1	1	1	900	Pump Module	1	1	1



ASS'Y DRAWING  
WOVP-0060F/0090F



### WOVP-0060F - 0090F PARTS LIST

Pos. No.	Description	60F Qty	90F Qty	Pos. No.	Description	60F Qty	90F Qty	Pos. No.	Description	60F Qty	90F Qty
1	Cylinder	1	1	137	Sealing ring	4	4	301	Allen bolt	3	3
15	Rotor	1	1	138	Allen bolt	4	4	223	Elbow hydraulic fitting	1	1
18	Sleeve, Bearing	2	2	139	Service cover	1	1	302	Spring lock washer	3	3
22	Vane	3	3	145	Exhaust cover (w/ threaded flange)	1	1	310	Coupling Set( 311 ~313), 1Ph	1	1
25	A-end plate	1	1	150	Gasket, Exhaust cover	1	1	311	Coupling, pump side	1	1
26	B-end plate	1	1	155	Allen bolt	4	4	312	Coupling insert	1	1
30	Bearing	2	2	156	Outlet screen	1	1	313	Coupling, Motor side	1	1
35	Shaft seal	2	2	159	Exhaust valve ass'y (159.1~159.6)	2	2	310A	Coupling Set( 311 ~313), 3Ph	1	1
42	Supporting ring	2	2	159-1	Exhaust valve fixed bolt	2	2	311A	Coupling, pump side	1	1
43	Hexagon head screw	4	4	159-2	Exhaust valvewasher	2	2	312A	Coupling, sleeve	1	1
47	Plug	1	1	159-3	Exhaust valve spring	2	2	313A	Coupling, Motor side	1	1
50	O-Ring, End plate	2	2	159-4	Exhaust valve plate	2	2	316	Set screw (pump side)	2	2
53	Hexagon head screw	6	6	159-5	Exhaust valve lock nut	2	2	317	Set screw ( Motor side)	2	2
54	Spring lock washer	6	6	159-6	Exhaust valve seat plate	2	2	321	Fan, Pump shaft end	1	1
60	Taper pin	4	4	185	Gasket, Cylinder	1	1	325	Washer, Spring lock	1	1
63	Plug	1	1	186	Stud	4	4	326	Washer, plain	1	1
65	A-Shaft key	1	1	187	Spring lock washer	4	4	327	Hexagon head screw	1	1
66	B-Shaft key	1	1	191	Hexagon nut	1	4	340	Fan hood	1	1
75	Oil sump	1	1	221	BSLM hydraulic fitting	1	1	341	Hexagon head screw	3	3
78	Steel demister	1	1	221S	Sealing Ring for 221	2	2	391	Eye bolt	1	1
83	Oil sight glass	1	1	222	Straight hydraulic fitting	1	1	400	Motor (IEC)-50Hz	1	1
84	Gasket, Oil sight glass	1	1	233	BSLM hydraulic fitting	1	1	400	Motor (IEC)-60Hz	1	1
88	Plug, Oil fill	1	1	230	Oil tube(A)	1	1	400.3	Motor Fan (IEC)	1	1
89	O-Ring, Oil fill plug	1	1	231	Oil tube(B)	1	1	400.4	Motor Fan Cover (IEC)	1	1
95	Plug, Oil drain	1	1	233	BSLM hydraulic fitting	1	1	401	Hexagon head screw	4	4
96	O-Ring, Oil drain plug	1	1	233S	Sealing ring for 233	2	2	402	Spring lock washer	4	4
99	Theaded fitting	1	1	251	Check valve plate	1	1	415	Hexagon nut	1	1
100	Oil filter	1	1	252	Check valve guide	1	1	416	Slotted set screw	1	1
105	Oil sump cover plate	1	1	253	O-Ring, Check valve plate	1	1	417	Slotted set screw	2	2
106	Gasket, Oil sump cover	1	1	254	Check valve spring	1	1	421	Rubber foot	3	3
107	Allen bolt	4	6	250	Inlet flange, lower housing	1	1	423	Spring lock washer	1	1
108	Sealing ring	4	4	255	O-Ring, Inlet part	2	2	425	Washer	1	1
120	Exhaust filter (NEW)	1	1	260	Inlet flange, upper housing	1	1	430	Name plate	1	1
120	Exhaust filter (OLD)	1	1	261	Inlet screen	1	1	431	Directional arrow label	1	1
121	O-Ring, Exhaust filter	1	1	265	Allen bolt	4	4	450	Float	1	1
125	Filter spring	1	1	266	Spring lock washer	4	4	451	Nozzle Assembly	1	1
126	Slotted cheese head screw	1	1	270*	Plug (For N Onry)	1	1	452	Bolt	2	2
136	Gasket, Service cover	1	1	300	Motor mounting bracket (IEC)	1	1	453	Bolt for Banjo Fitting, oil return	1	1

**WOVP-0060F - 0090F PARTS LIST**

Pos. No.	Description	60F Qty	90F Qty	Pos. No.	Description	60F Qty	90F Qty
454S	Sealing ring for 454	2	2	800	Inlet Air Filter	1	1
455	Oil Return tube with Banjo fitting	1	1	900	Pump Module	1	1
456	Elbow hydraulic fitting	1	1				
470	BSLM hydraulic fitting	1	1				
470S-1	Sealing ring for 470	1	1				
470S-2	Sealing ring for 470	1	1				
471	Oil tube©	1	1				
472	Non return valve	1	1				
474	Air filter	1	1				
480	Gas Ballast Kit	1	1				
490	Gasket Set	1	1				
500	Maintenance Kit	1	1				
510	Conversion kit, L Type	1	1				
520	Conversion kit, N Type	1	1				
530	Conversion kit, NM Type	1	1				
600	Motor(NEMA)	1	1				
600.3	Motor Fan(NEMA)	1	1				
600.4	Motor Fan Cover(NEMA)	1	1				
601	Hexagon head screw(NEMA)	1	1				
602	Spring lock washer(NEMA)	4	4				
612A	Coupling set (313A+312C=613),nema	1	1				
613	Coupling, Motor side(NEMA)	1	1				
630	Motor Mounting Bracket(NEMA)	1	1				

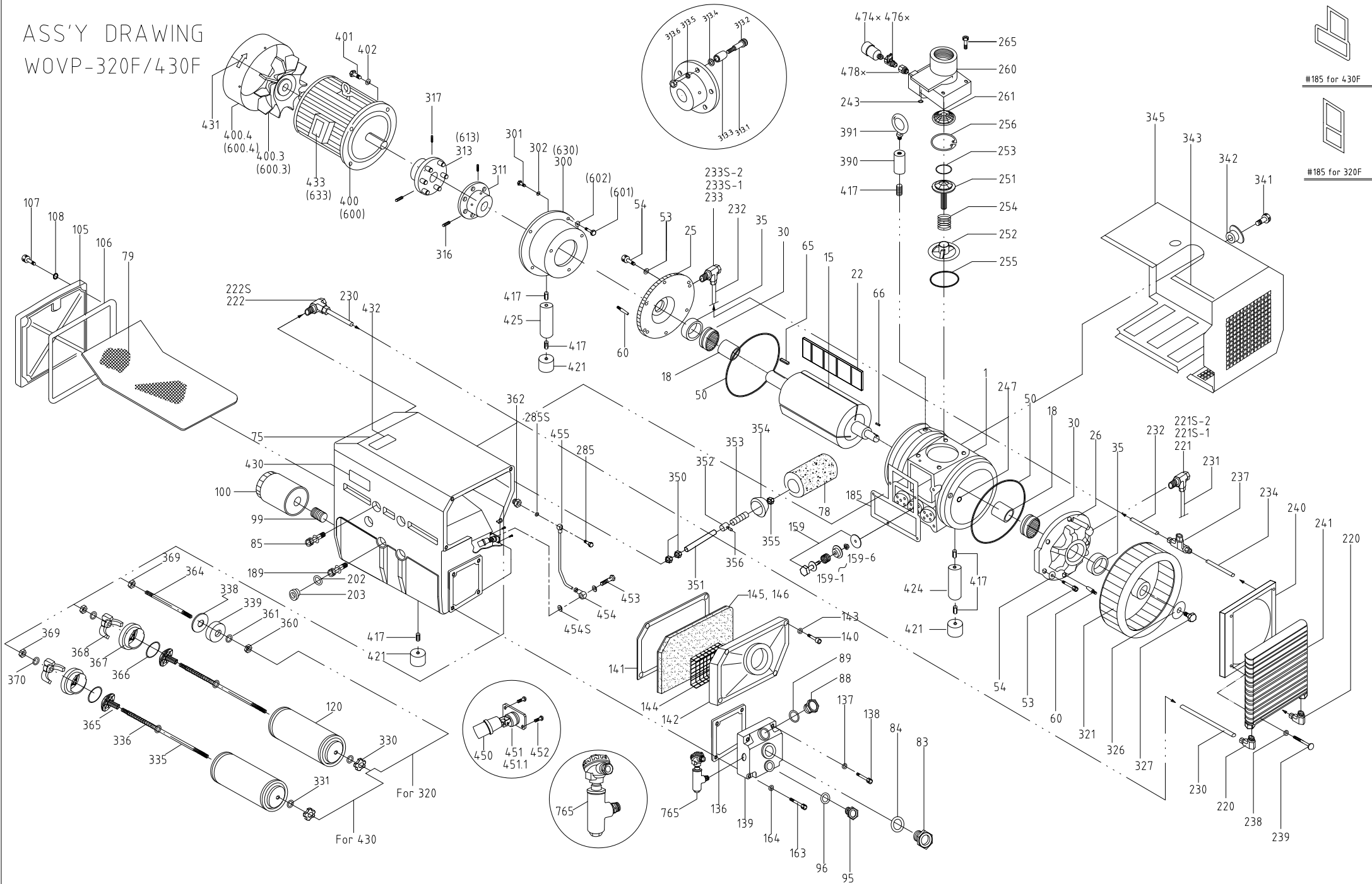


## WOVP- 0130F & 0200F PARTS LIST

Pos. No.	Description	130F Qty	200F Qty	Pos. No.	Description	130F Qty	200F Qty	Pos. No.	Description	130F Qty	200F Qty
1	Cylinder	1	1	137	Sealing ring	4	4	261	Inlet screen	1	1
15	Rotor	1	1	138	Allen bolt	4	4	265	Allen bolt	4	4
18	Sleeve, Bearing	2	2	139	Service cover	1	1	266	Spring lock washer	4	4
22	Vane	3	3	145	Exhaust cover ( threaded flange)	1	1	300	Motor mounting bracket (IEC)	1	1
25	A-end plate	1	1	148	Exhaust cover (Blocked)	1	1	301	Allen bolt	3	3
26	B-end plate	1	1	150	Gasket, Exhaust cover	2	2	302	Spring lock washer	3	3
30	Bearing	2	2	155	Allen bolt	8	8	310A	Coupling Set( 311 ~313)	1	1
35	Shaft seal	2	2	156	Outlet screen	1	1	311A	Coupling, pump side	1	1
42	Supporting ring	2	2	159	Exhaust valve ass'y( 159.1~ 159.6)	2	2	312A	Coupling, sleeve	1	1
43	Hexagon head screw	4	4	159.1	Exhaust valve fixed bolt	2	2	313A	Coupling, Motor side	1	1
47	Plug	1	1	159.2	Exhaust valve washer	2	2	316	Set screw (pump side)	2	2
50	O-Ring, End plate	2	2	159.3	Exhaust valve spring	2	2	317	Set screw ( Motor side)	2	2
53	Hexagon head screw	6	6	159.4	Exhaust valve plate	2	2	321	Fan, Pump shaft end	1	1
54	Spring lock washer	6	6	159.5	Exhaust valve lock nut	2	2	325	Washer, Spring lock	1	1
60	Taper pin	4	4	159.6	Exhaust valve seat plate	2	2	326	Washer, plain	1	1
63	Plug	1	1	185	Gasket, Cylinder	1	1	327	Hexagon bolt	1	1
65	A-Shaft key	1	1	186	Stud	4	4	340	Fan hood	1	1
66	B-Shaft key	1	1	187	Spring lock washer	4	4	341	Hexagon head screw	3	3
75	Oil Sump	1	1	191	Hexagon nut	4	4	391	Eye bolt	1	1
78	Steel demister	1	1	219	St hydraulic fit. WOVP-200 Only	0	1	400	Motor (IEC)-50Hz	1	1
79	Sheet metal baffle	1	1	220	St hydraulic fit. WOVP-200 only	0	1	400	Motor (IEC)-60	1	1
83	Oil sight glass	1	1	221	BSLM hydraulic fitting	1	1	400,3	Motor Fan (IEC)	1	0
84	Gasket, Oil sight glass	1	1	221S	Sealing Ring for 221	2	2	400,4	Motor Fan Cover (IEC)	1	0
88	Plug, Oil fill	1	1	222	Straight hydraulic fitting	1	1	401	Hexagon head screw	4	4
89	O-Ring, Oil fill plug	1	1	223	Elbow hydraulic fitting	1	0	402	Spring lock washer	4	4
95	Plug, Oil drain	1	1	230	Oil tube(A)	1	1	415	Hexagon nut	1	1
96	O-Ring, Oil drain plug	1	1	231	Oil tube(B)	1	1	416	Slotted set screw	1	1
99	Theaded fitting	1	1	232	A-Oil tubing (B) (WOVP-200 Only)	0	1	417	Slotted set screw	2	2
100	Oil filter	1	1	233	BSLM hydraulic fitting	1	1	421	Rubber foot	3	3
105	Oil sump cover plate	1	1	233S	Sealing Ring for 233	2	2	423	Spring lock washer	1	1
106	Gasket, Oil sump cover	1	1	240	Cooling Coil (WOVP-200 Only)+(219+220)	0	1	425	Washer	1	1
107	Allen bolt	8	8	250	Inlet flange, lower housing	1	1	430	Name plate	1	1
108	Sealing ring	8	8	251	Check valve plate	1	1	431	Directional arrow label	1	1
120	Exhaust filter	2	2	252	Check valve guide	1	1	450	Float	1	1
121	O-Ring, Exhaust filter	2	2	253	O-Ring, Check valve plate	1	1	451	Nozzle Assembly	1	1
125	Filter spring	2	2	254	Check valve spring	1	1	452	Bolt	2	2
126	Slotted cheese head screw	2	2	255	O-Ring, Inlet part	2	2	453	Bolt for Banjo Fitting, oil return	1	1
136	Gasket, Service cover	1	1	260	Inlet flange, upper housing	1	1	454S	Sealing ring for 454	2	2



ASS'Y DRAWING  
WOVP-320F/430F



#185 for 430F



#185 for 320F

## WOVP-320F & 430F PARTS LIST

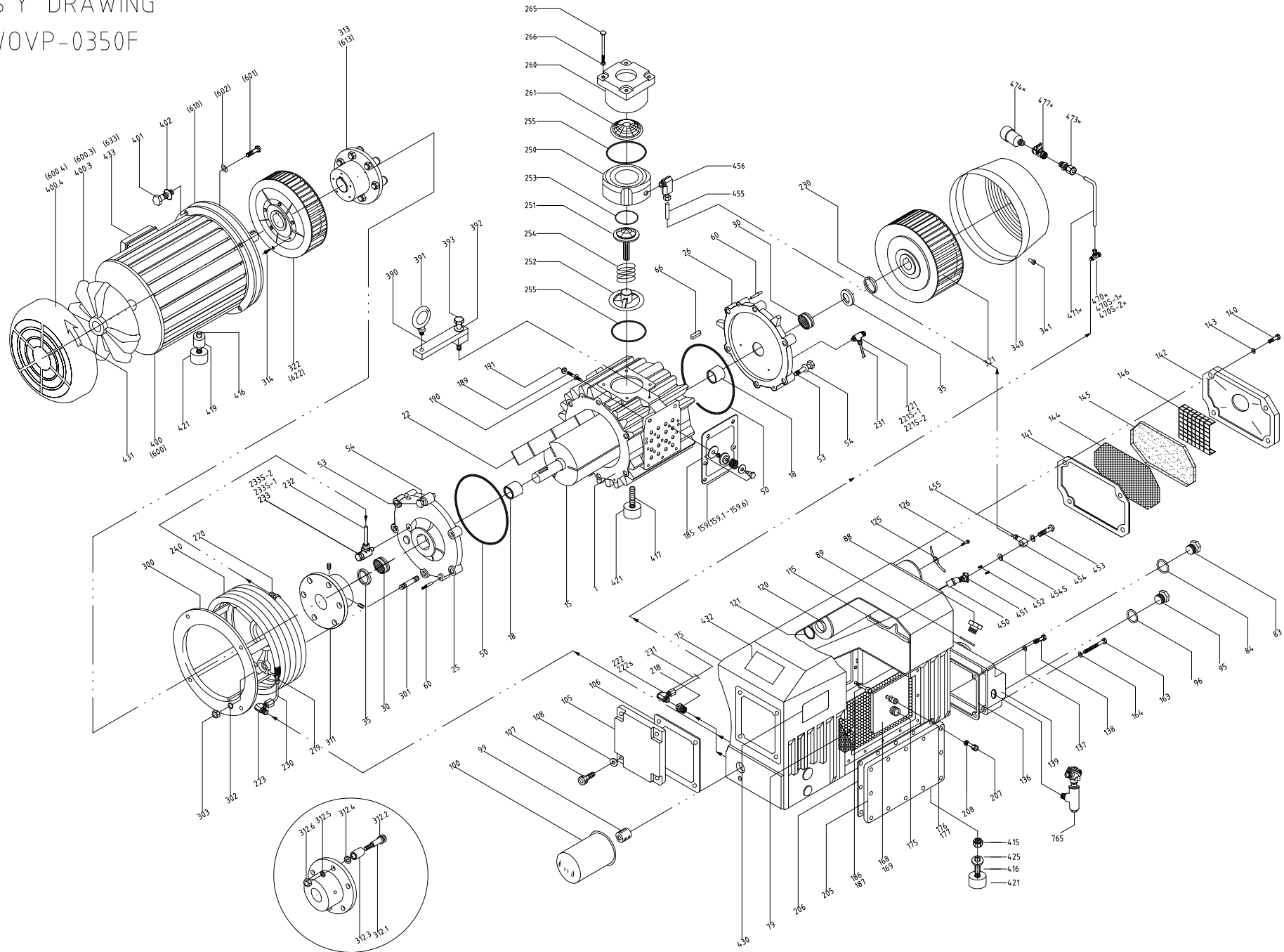
Pos. No.	Description	320F Qty	430F Qty	Pos. No.	Description	320F Qty	430F Qty	Pos. No.	Description	320F Qty	430F Qty
1	Cylinder	1	1	143	Sealing ring	4	4	248	Washer, for 242	4	4
15	Rotor	1	1	144	Perforated metal screen	1	1	251	Check valve plate	1	1
18	Sleeve, Bearing	2	2	145	Strainer, baffle	1	1	252	Check valve guide	1	1
22	Vane	3	3	146	Perforated metal screen	1	1	253	O-Ring, Check valve plate	1	1
25	A-end plate, motor side	1	1	159	Exhaust valve ass'y( 159.1~ 159.6)	2	3	254	Check valve spring	1	1
26	B-end plate, Fan side	1	1	159.1	Exhaust valve fixed bolt	2	3	255	O-Ring, Inlet part	1	1
30	Bearing	2	2	159.2	Exhaust valve washer	2	3	256	Snap Ring	1	1
35	Shaft seal	2	2	159.3	Exhaust valve spring	2	3	260	Inlet flange	1	1
50	O-Ring, End plate	2	2	159.4	Exhaust valve plate	2	3	261	Inlet screen	1	1
53	Allen bolt	12	12	159.5	Exhaust valve lock nut	2	3	265	Allen bolt	4	4
54	Spring Lock washer	12	12	159.6	Exhaust valve seat plate	2	3	285	Hollow-core screw	1	1
60	Taper pin	4	4	163	Allen bolt	2	2	285S	Sealing ring	1	1
65	A-shaft key	1	1	164	Sealing ring	2	2	300	Motor Mounting Bracket (IEC)	1	1
66	B-shaft key	1	1	185	Gasket, Cylinder	1	1	301	Allen bolt	3	3
75	Oil sump	1	1	189	Allen bolt	2	3	302	Spring lock washer	3	3
78	Steel demister	1	1	202	O- ring	5	5	310	Coupling set (311 ~313)	1	1
79	Steel metal baffle	1	1	203	Locking screw	5	5	311	Coupling Half, Pump Side	1	1
83	Oil sight glass	1	1	220	BSLM hydraulic fitting	2	2	312	Connection Bolt with rubber boot	6	6
84	Gasket, Oil sight glass	1	1	221	BSLM hydraulic fitting	1	1	312.3	Rubber Boot	6	6
85	Allen bolt	2	2	221S-1	Sealing Ring for 221	1	1	313	Coupling Half, Motor Side (IEC)	1	1
88	Plug, Oil fill	1	1	221S-2	Sealing Ring for 221	1	1	316	Set screw (pump side)	2	2
89	O-Ring, Oil fill plug	1	1	222	BSLM Hydraulic fitting	1	1	317	Set screw ( Motor side)	2	2
95	Plug, Oil drain	1	1	222S	Sealing Ring	2	2	321	Fan, Pump shaft end	1	1
96	O-Ring, Oil drain plug	1	1	230	Oil tube(A-1)	1	1	326	Washer	1	1
99	Threaded fitting	1	1	231	Oil tube(B-1)	1	1	327	Hexagon head screw	1	1
100	oil filter	1	1	232	Oil Tube(B-2)	1	1	330	Knob for Exhaust filter	1	2
105	Oil sump cover	1	1	233	BSLM hydraulic fitting	1	1	335	Separator valve stud Bolt	1	2
106	Gasket, Oil sump cover	1	1	233S-1	Sealing Ring for 233	1	1	336	Separator valve Spring	1	2
107	Allen bolt	8	8	233S-2	Sealing Ring for 233	1	1	338	Separator valve flat-ring	1	0
108	Sealing ring	8	8	234	Oil Tube(A-2)	1	1	339	Separator valve support	1	0
120	Exhaust filter	1	2	237	BLT Hydraulic fitting	1	1	341	Allen bolt	1	1
136	Gasket, Service cover	1	1	238	washer, Radiator	1	1	342	Cover holder	1	1
137	Sealing ring	2	2	239	Bolt, Radiator	1	1	343	Rubber insert, Fan hood	4	4
138	Allen bolt	2	2	240	Fan Guide for Radiator	1	1	345	Fan Hood	1	1
139	Servic cover	1	1	241	Radiator	1	1	350	Hexagon nut	2	2
140	Allen bolt	4	4	242	Bolt, Flat head	4	4	351	Stud	1	1
141	Gasket, Separator cover	1	1	243	O-Ring, Gas ballast	1	1	352	Adjusting ring	1	1
142	Separator cover plate	1	1	247	O-Ring, End plate for gas ballast	1	1	353	Deminster spring	1	1



## WOVP-320F & 430F PARTS LIST

Pos. No.	Description	320F Qty	430F Qty	Pos. No.	Description	320F Qty	430F Qty	Pos. No.	Description	320F Qty	430F Qty
354	Demister cover	1	1	430	Name plate	1	1	900	Pump Module	1	1
355	Hexagon nut	1	1	431	Directional Arrow	1	1	800	Inlet Air Filter	1	1
356	Set screw	1	1	450	Float	1	1				
360	Hexagon nut	1	0	451	Nozzle Assembly	1	1				
361	Washer	1	0	451.1	O-Ring for Nozzle assy	1	1				
362	Connecting bolt for oil return line	1	1	452	Bolt	2	2				
364	Separator locking valve stud Bolt	1	0	453	Bolt for Banjo Fitting	1	1				
365	Separator Valve plate	1	2	454	Banjo fitting	1	1				
366	O-ring, Separator valve plate	1	2	454S	Sealing ring for 454	2	2				
367	Adapter, Separator valve plate	1	2	455	Oil Return tube with Banjo fitting	1	1				
368	Separator Valve Supporter	1	2	474*	Gas ballast	1	1				
369	Hexagon nut	3	4	477*	Ball Valve	1	1				
370	Spring Lock washer	1	2	478*	Adapter, Reducer	1	1				
390	Adapter for eye bolt	1	1	480*	Gas Ballast Kit	1	1				
391	Eye bolt	1	1	500	Maintenance Kit	1	1				
400	Motor (IEC)-60Hz	1	1	540	Conversion kit, F Type	1	1				
400	Motor (IEC)-50Hz	1	1	550	Inlet Check Valve Kit (250 ~266)	1	1				
400.3	Motor Fan (IEC)	1	1	600	Motor(NEMA)	1	1				
400.4	Motor Fan Cover (IEC)	1	1	600.3	Motor Fan(NEMA)	1	1				
401	Hexagon head screw	4	4	600.4	Motor Fan Cover(NEMA)	1	1				
402	Spring lock washer	4	4	601	Hexagon head screw(NEMA)	4	4				
417	Slotted set screw	6	6	602	Spring lock washer(NEMA)	4	4				
421	Rubber foot	3	3	612	Coupling set (311 + 312 + 613), NEMA	1	1				
424	Rubber foot support	1	1	613	Coupling, Motor side(NEMA)	1	1				
425	Rubber foot support	1	1	630	Motor Mounting Bracket(NEMA)	1	1				

ASS'Y DRAWING  
WOVP-0350F



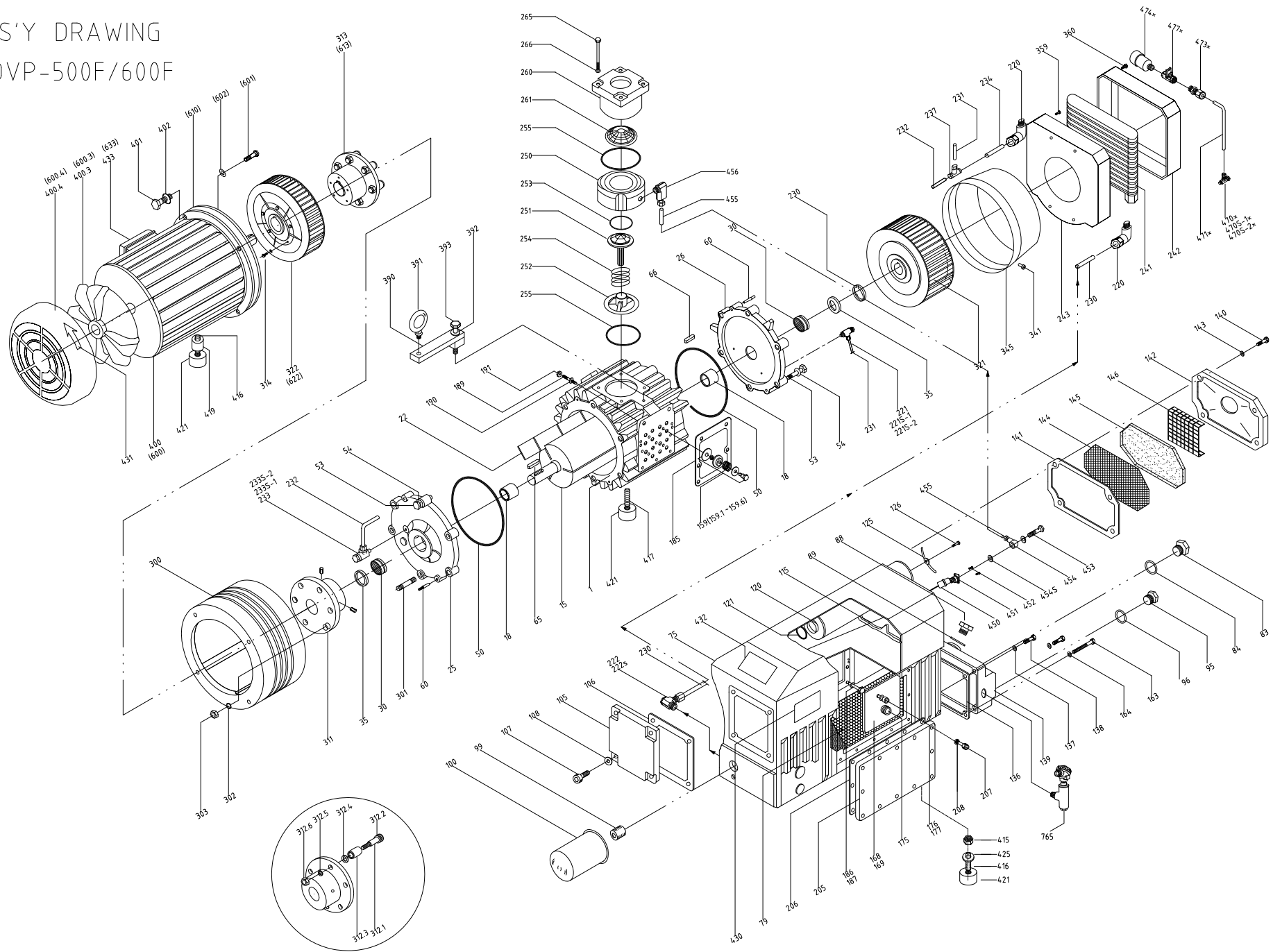
### WOVP- 0350F PARTS LIST

Pos. No.	Description	350 Qty	Pos. No.	Description	350 Qty	Pos. No.	Description	350 Qty
1	Cylinder	1	138	Allen bolt	2	221S-2	Sealing Ring for 221	1
15	Rotor	1	139	Servic cover	1	222	BSLM hydraulic fitting (NEW)	1
18	Sleeve, Bearing	2	140	Allen bolt	4	222S-1	Sealing Ring for 221	1
18	Sleeve, Bearing	2	141	Gasket, Separator cover	1	222S-2	Sealing Ring for 221	1
22	Vane	3	142	Separator cover / Exhaust Cover	1	223	Elbow Hydraulic fitting	1
25	A-End plate	1	143	Sealing ring	4	230	Oil tube (A)	1
26	B-End plate	1	144	Perforated metal screen	1	231	Oil tube (B)	1
30	Bearing	2	145	Strainer, baffle	1	232	Oil tube (A-1)	1
35	Shaft seal	2	146	Perforated metal screen	1	233	BSLM hydraulic fitting	1
42	Supporting ring	2	159	Exhaust valve ass'y( 159.1~ 159.6)	4	233S-1	Sealing Ring for 233	1
43	Hexagon head screw	4	159-1	Exhaust valve fixed bolt	4	233S-2	Sealing Ring for 233	1
50	O-Ring, End plate	2	159-2	Exhaust valve washer	4	233	BSLM hydraulic fitting	1
53	Hexagon head screw	9	159-3	Exhaust valve spring	4	240	Cooling spiral	1
54	Spring Lock washer	9	159-4	Exhaust valve plate	4	250	Inlet flange, Lower housing	1
60	Taper Pin	4	159-5	Exhaust valve lock nut	4	251	Check valve plate	1
65	A-Shaft key	1	159-6	Exhaust valve seat plate	4	252	Check valve guide	1
66	B-Shaft key	1	163	Allen bolt	2	253	O-Ring, Check valve plate	1
75	Oil sump	1	164	Sealing ring	2	254	Check valve spring	1
79	Sheet metal baffle	1	168	O-Ring, Valve cover plate	1	255	O-Ring, In-let part	2
83	Oil sight glass	1	169	Valve cover plate	1	260	Inlet flange , Upper housing	1
84	Gasket, Oil sight glass	1	175	Plug	1	261	Inlet screen (conical)	1
88	Plug, Oil fill	1	176	Hex nut	1	265	Allen bolt	4
89	O-Ring, Oil fill plug	1	177	Stud bolt	1	266	Spring Lock washer	4
95	Plug, Oil drain	1	185	Gasket, Cylinder	1	300	Motor mounting bracket (IEC)	1
96	O-Ring, Oil drain plug	1	186	Allen bolt	5	301	Stud	3
99	Threaded fitting	1	187	Spring Lock washer	5	302	Spring Lock washer	3
100	oil filter	1	189	Stud	2	303	Hex nut	3
105	Oil sump cover plate	1	190	Spring Lock washer	2	310(old)	Coupling set (311 ~313), IEC	1
106	Gasket, Oil sump cover	1	191	Hex nut	2	311	Coupling Half, Pump Side	1
107	Allen bolt	4	205	Side cover plate	1	312	Connection Bolt with rubber boot	6
108	Sealing ring	4	206	Gasket, Side cover plate	1	312.3	Rubber Boot	6
115	Filter bracket	1	207	Allen bolt	12	313	Coupling Half, IEC Motor Side	1
120	Exhaust filter	4	208	Sealing ring	12	314	Hexagon head screw for 50322B	5
121	O-Ring, Exhaust filter	4	218	Socket (NEW)	1	316	Set screw (pump side)	2
125	Filter spring	4	219	Straight hydraulic fitting	1	317	Set screw ( Motor side)	2
126	Slotted cheese head screw	4	220	Straight hydraulic fitting	1	320	Fan spacer	1
136	Gasket, Service cover	1	221	BSLM hydraulic fitting (NEW)	1	321	Pump shaft end fan	1
137	Sealing ring	2	221S-1	Sealing Ring for 221	1	322	Motor shaft end fan for IEC/ NEMA Motor	1

### WOVP- 0350F PARTS LIST

Pos. No.	Description	350 Qty	Pos. No.	Description	350 Qty	Pos. No.	Description	350 Qty
340	Fan hood	1	454S	Sealing ring for 454	2			
341	Hexagon head screw	3	455	Oil Return tube	1	800	Inlet Air Filter	1
390	Adapter for eye bolt	1	456	Elbow hydraulic fitting	1	900	Pump Module	1
391	Eye bolt	1	470*	BSLM hydraulic fitting	1			
392	Spring Lock washer	1	470S-1	Sealing ring for 470	1			
393	Hexagon head screw	1	470S-2	Sealing ring for 470	1			
400	Motor (IEC)-60Hz	1	471*	Oil tube(C)	1			
400	Motor (IEC)-50Hz	1	473*	Fitting	1			
400,3	Motor Fan (IEC)	1	474*	Gas ballast	1			
400,4	Motor Fan Cover (IEC)	1	477*	Ball Valve	1			
401	Hexagon head screw	4	480*	Gas Ballast Kit	1			
402	Spring Lock washer	4	490	Gasket Kit	1			
415	Hex nut	1	500	Maintenance Kit	1			
416	Slotted set screw	2	600	Motor(NEMA)	1			
417	Slotted set screw	1	600.3	Motor Fan(NEMA)	1			
419	Sleeve	1	600.4	Motor Fan Cover(NEMA)	1			
421	Rubber foot	3	601	Allen Bolt (NEMA)	4			
423	Spring Lock Washer	1	610	Motor Mounting Flange adapter (NEMA)	1			
425	Washer	1	612B	Coupling set (311 + 312 + 613B), NEMA	1			
430	Name plate	1	613B	Coupling half, Motor side(NEMA)	1			
431	Directional arrow label	1	623	Collar for fan(# 622), for NEMA motor	1			
450	Float	1	760	Temperature Switch	1			
451	Nozzle Assembly	1	761	Temperature Switch connector	1			
451.1	O-Ring for Nozzel assy	1	765	Level Switch	1			
452	Bolt	2	766	Level Switch housing	1			
453	Bolt for Banjo Fitting	1						
454	Banjo fitting	1						

ASS'Y DRAWING  
WOVP-500F/600F

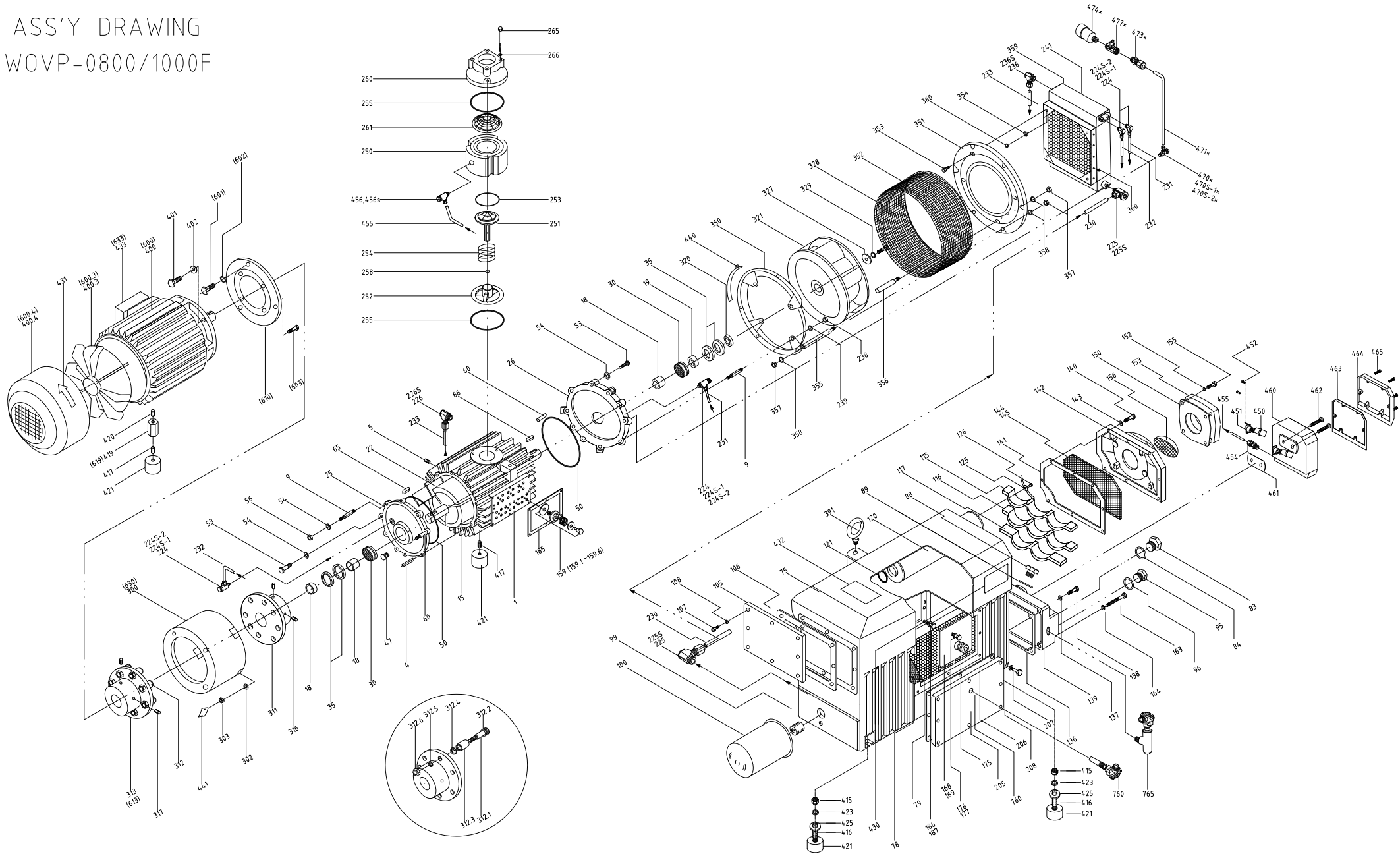


## WOVP- 600F - 0500F PARTS LIST

Pos. No.	Description	600F Qty	500F Qty	Pos. No.	Description	600F Qty	500F Qty	Pos. No.	Description	600F Qty	500F Qty
1	Cylinder	1	1	140	Allen bolt	4	4	230	Oil tube (A-1)	1	1
15	Rotor	1	1	141	Gasket, Separator cover	1	1	231	Oil tube (B-1)	1	1
18	Sleeve, Bearing	2	2	142	Separator cover / Exhaust Cover	1	1	232	Oil tube (B-2)	1	1
18	Sleeve, Bearing	2	2	143	Sealing ring	4	4	233	BSLM hydraulic fitting	1	1
22	Vane	3	3	144	Perforated metal screen	1	1	233S-1	Sealing Ring for 233	1	1
25	A-End plate	1	1	145	Strainer, baffle	1	1	233S-2	Sealing Ring for 233	1	1
26	B-End plate	1	1	146	Perforated metal screen	1	1	234	Oil Tube (A-2)	1	1
30	Bearing	2	2	159	Exhaust valve ass'y ( 159.1~ 159.6)	4	4	237	BLT Hydraulc fitting	1	1
35	Shaft seal	2	2	159-1	Exhaust valve fixed bolt	4	4	241	Radiator	1	1
50	O-Ring, End plate	2	2	159-2	Exhaust valve washer	4	4	242	Cover( front), radiator	1	1
53	Hexagon head screw	9	9	159-3	Exhaust valve spring	4	4	243	Cover( rear), radiator	1	1
54	Spring Lock washer	9	9	159-4	Exhaust valve plate	4	4	250	Inlet flange, Lower housing	1	1
60	Taper Pin	4	4	159-5	Exhaust valve lock nut	4	4	251	Check valve plate	1	1
65	A-Shaft key	1	1	159-6	Exhaust valve seat plate	4	4	252	Check valve guide	1	1
66	B-Shaft key	1	1	163	Allen bolt	2	2	253	O-Ring, Check valve plate	1	1
75	Oil sump	1	1	164	Sealing ring	2	2	254	Check valve spring	1	1
79	Sheet metal baffle	1	1	168	O-Ring, Valve cover plate	1	1	255	O-Ring, In-let part	2	2
83	Oil sight glass	1	1	169	Valve cover plate	1	1	260	Inlet flange , Upper housing	1	1
84	Gasket, Oil sight glass	1	1	175	Plug	1	1	261	Inlet screen (conical)	1	1
88	Plug, Oil fill	1	1	176	Hex nut	1	1	265	Allen bolt	4	4
89	O-Ring, Oil fill plug	1	1	177	Stud bolt	1	1	266	Spring Lock washer	4	4
95	Plug, Oil drain	1	1	185	Gasket, Cylinder	1	1	300	Motor mounting bracket	1	1
96	O-Ring, Oil drain plug	1	1	186	Allen bolt	5	5	301	Stud	3	3
99	Threaded fitting	1	1	187	Spring Lock washer	5	5	302	Spring Lock washer	3	3
100	oil filter	1	1	189	Stud	2	2	303	Hex nut	3	3
105	Oil sump cover plate	1	1	190	Spring Lock washer	2	2	310(old)	Coupling set (311 ~313)	1	1
106	Gasket, Oil sump cover	1	1	191	Hex nut	2	2	311	Coupling Half, Pump Side	1	1
107	Allen bolt	4	4	205	Side cover plate	1	1	312	Connection Bolt with rubber boot	6	6
108	Sealing ring	4	4	206	Gasket, Side cover plate	1	1	312.3	Rubber Boot	6	6
115	Filter bracket	1	1	207	Allen bolt	12	12	313	Coupling Half, IEC Motor Side	1	1
120	Exhaust filter	4	4	208	Sealing ring	12	12	314	Hexagon head screw for 50322B	5	5
121	O-Ring, Exhaust filter	4	4	219	Straight hydraulic fitting	1	1	316	Set screw (pump side)	2	2
125	Filter spring	4	4	220	BLM hydraulic fitting	2	2	317	Set screw ( Motor side)	2	2
126	Slotted cheese head screw	4	4	221	BSLM hydraulic fitting	1	1	320	Fan spacer	1	1
136	Gasket, Service cover	1	1	221S-1	Sealing Ring for 221	1	1	321	Pump shaft end fan	1	1
137	Sealing ring	2	2	221S-2	Sealing Ring for 221	1	1	322	Motor shaft end fan for IEC / NEMA Motor	1	1
138	Allen bolt	2	2	222	BSLM Hydraulic fitting	1	1	341	Hexagon head screw	3	3
139	Servic cover	1	1	222S	Sealing Ring	2	2	345	Fan Cover	1	1

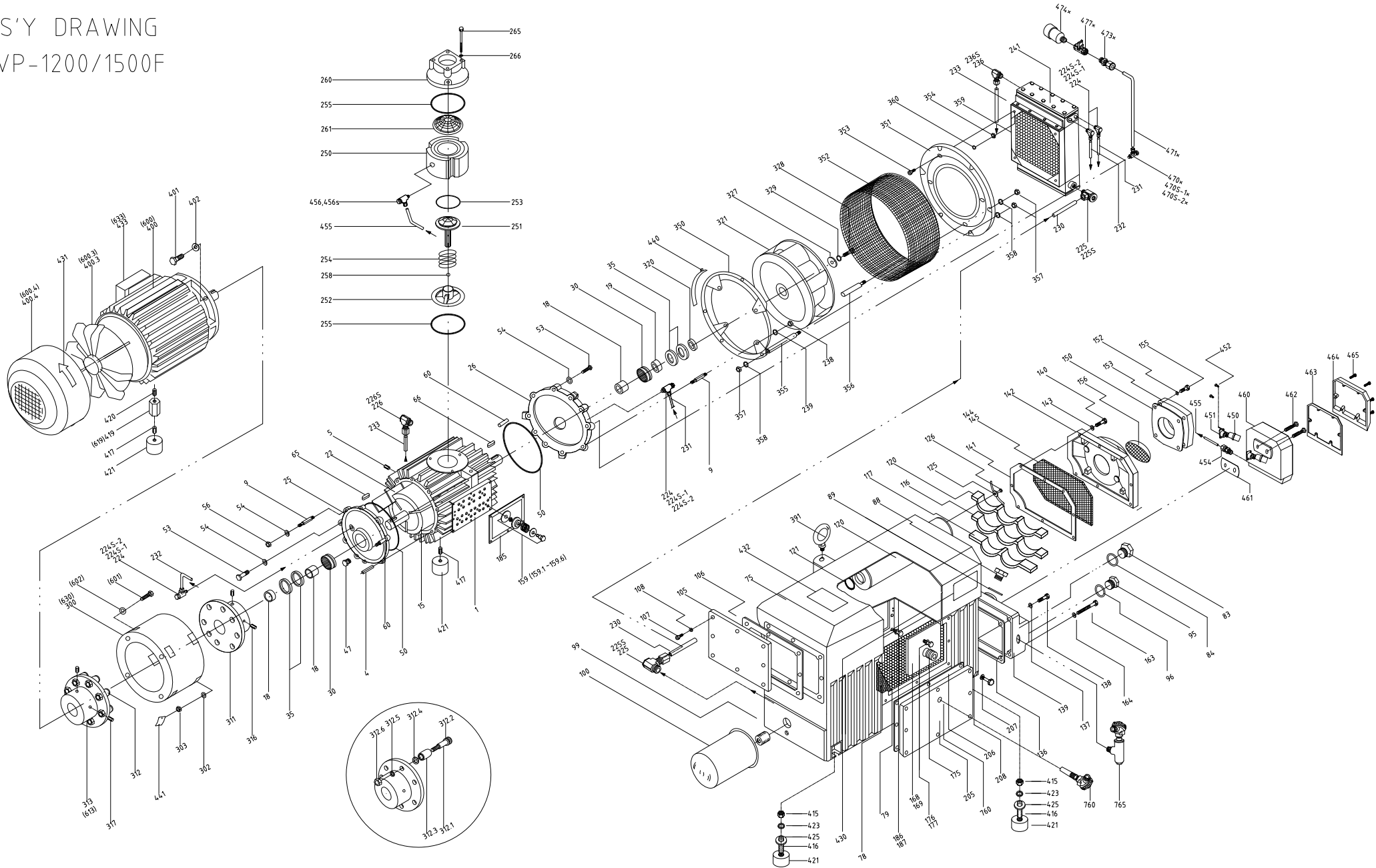


ASS'Y DRAWING  
WOVP-0800/1000F





ASS'Y DRAWING  
WOVP-1200/1500F



**WOVP- 0800 - 1000 - 1200 & 1500F PARTS LIST**

Pos. #	Description	800~1500F Qty	Pos. #	Description	800~1500F Qty	Pos. #	Description	800~1500F Qty
1	Cylinder	1	117	Exh. Filter bracket, Lower	1	206	Gasket, Oil sump Side cover plate	1
4	Stud	4	120	Exhaust filter	8	207	Allen Bolt (Socket Head Cap Screw)	9
5	Set screw	6	121	O-Ring, Exhaust filter	8	208	Sealing ring	9
9	Stud	6	125	Exh. Filter spring Assembly	8	224.1	Compression Ring	4
15	Rotor	1	126	Slotted cheese head machine screw	8	224S-2	Sealing Ring for 224	4
18	Sleeve, Bearing	2	136	Gasket, Service cover	1	224S-1	Sealing Ring for 224	4
			137	Sealing ring	2	224	BSLM, Hydraulic fitting	4
22	Vane	3	138	Allen bolt	2	225.1	Compression Ring	2
25	A-End plate, Motor side	1	139	Service cover	1	225S	Sealing Ring for 225	2
26	B-End plate, Fan Side	1	140	Allen bolt	8	225	BSLM, Hydraulic fitting	2
30	Bearing	2	141	Gasket, Separator cover	1	226.1	Compression Ring	2
35	Shaft seal, viton	4	142	Separator cover plate	1	226S	Sealing Ring for 226	2
47	Plug for Gas Ballast	1	143	Sealing ring	8	226	BSLM, Hydraulic Fitting	1
50	O-ring, End plate	2	144	Perforated metal screen	2	230	Oil tube (A)	1
53	Hexagon head cap screw	10	145	Strainer, baffle	1	231	Oil tube (B-1)	1
54	Spring Lock Washer	12	150	Gasket, Exhaust cover	1	232	Oil Tube (B-2)	1
56	Hex nut	2	152	Sealing ring	4	233	Oil Tube	1
60	Taper Pin	4	153	Exhaust Cover (threaded)	1	236.1	Compression Ring	1
65	A-Shaft key, Motor Side	1	155	Allen bolt	4	236S	Sealing Ring	1
66	B-Shaft key, Fan Side	1	156	Outlet screen	1	236	BSLM, Hydraulic fitting	1
75	Oil sump	1	159	Exhaust valve ass'y (159.1~ 159.6)	7	238	Hex Nut	1
78	Steel demister	1	159.1	Exhaust valve fixed bolt	7	239	Spring Lock Washer	1
79	Sheet metal baffle	1	159.2	Exhaust valve washer	7	241	Oil Cooler	1
83	Oil sight glass	1	159.3	Exhaust valve spring	7	241	Oil Cooler (Top& bottom opening)	1
84	Gasket, Oil sight glass	1	159.4	Exhaust valve plate	7	250	Inlet flange, Lower housing	1
88	Plug, Oil fill	1	159.5	Exhaust valve lock nut	7	251	Check valve plate	1
89	O-Ring, Oil fill plug	1	159.6	Exhaust valve seat plate	7	252	Check valve guide	1
90	Pressure gage	1	163	Allen bolt	2	253	O-Ring, Check valve plate	1
95	Plug, Oil drain	1	164	Sealing ring	2	254	Spring, Check valve	1
96	O-Ring, Oil drain plug	1	168	O-Ring, Exh. Valve cover plate	1	255	O-Ring, Inlet Flange	2
99	Pipe Nipple	1	169	Exh. Valve cover plate	1	258	Rubber Ball	1
100	Oil filter	1	175	Plug	1	260	Inlet flange, Upper Housing	1
105	Oil sump cover plate	1	176	Hex nut	1	261	Inlet screen (Conical )	1
106	Gasket, Oil sump cover	1	177	Stud bolt	1	265	Allen bolt	3
107	Allen bolt	8	185	Gasket, Cylinder	1	266	Spring Lock Washer	3
108	Sealing ring for oil sump cover plate	8	186	Allen bolt	8	300	Motor mounting bracket	1
115	Exh. Filter bracket, Upper	1	187	Spring Lock Washer	8	302	Spring Lock Washer	4
116	Exh. Filter bracket, Medium	1	205	Oil Sump Side cover plate	1	303	Hex nut	4

**WOVP- 0800 - 1000 - 1200 & 1500F PARTS LIST**

Pos. #	Description	800~1500F Qty	Pos. #	Description	800~1500F Qty	Pos. #	Description	800~1500F Qty
310	Coupling set (310 ~313)	1	415	Hex nut	2	474*	Gas Ballast	1
311	Coupling Half, Pump Side	1	416	Stud	2	477*	Ball Valve	1
312	Connection Bolt with rubber boot	8	417	Slotted set screw	2	480*	Gas Ballast Kit	1
312.3	Rubber Boot	8	419	Spacer for Foot, for IEC motor	1	490	Gasket Kit	1
313	Coupling Half, Motor Side	1	420	Slotted set screw	1	500	Maintenance Kit	1
316	Set screw (Pump side)	2	421	Rubber foot	4	541	Conversion Kit, F type (w/o GB Kit)	1
317	Set screw ( Motor side)	2	423	Spring Lock Washer	2	550	Inlet Check Valve Kit (250 ~266)	1
320	Spacer for fan	1	425	Washer	2	600	Motor ( NEMA) - 60Hz	1
321	Fan	1	430	Name plate	1	600.3	Motor fan blade	1
327	Locking Disc	1	431	Directional arrow label	1	600.4	Motor fan cover	1
328	Hex Head Cap Screw	1	450	Float	1	601	Hex head Bolt	4
329	Spring Lock Washer	1	451	Nozzle Assembly	1	603	Spring Lock Washer	4
350	Fan Support Ring (Pump Side)	1	451.1	O-Ring for Nozzle assy	1	610	Adapter only for WOVP-800	1
351	Fan Support Ring (Radiator Side)	1	452	Bolt	2	612	Coupling set (311A + 312A+ 613)	1
352	Fan Guard	1	454	Straight hydraulic fitting	1	613	Coupling Half, Motor Side	1
353	Allen Bolt	4	455	Oil Return tube	1	613	Coupling Half, Motor Side	1
354	Hex Nut	4	456	Hyd. fitting	1	619	Spacer for foot, for Nema Motor	2
355	Fan Supporting Bolt	5	456S	Sealing Ring	2	630	Motor mounting bracket	1
356	Fan Supporting Bolt	1	460	Float Valve Box Housing	1	760	Temperature Switch	1
357	Hex Nut	11	461	Gasket, between box and oil sump	1	761	Temperature Switch connector	1
358	Spring Lock Washer	11	462	Connecting bolt	2	765	Level Switch	1
359	Mounting Bracket for radiator	1	463	Gasket, cover of box	1	766	Level Switch housing	1
360	Cheese head Cap Screw	12	464	Float valve box, cover	1			
391	Eye bolt	1	465	Allen bolt	6			
400	Motor (IEC)-60Hz	1	465S	Sealing ring	6	800	Inlet Air Filter	1
400	Motor (IEC)-50Hz	1	470S*-2	Sealing ring	1	900	Pump Module	1
400.3	Motor fan blade	1	470S*-1	Sealing ring	1			
400.4	Motor fan cover	1	470*	Elbow, Hydraulic Fitting	1			
401	Hexagon head screw	4	471*	Oil tube(C)	1			
402	Spring Lock Washer	4	473*	Fitting	1			

# EC DECLARATION OF CONFORMITY

**We, Won Chang Vacuum Co., Ltd.**  
424-2, GahyunRi, TongjinEup, KimpoSi, KyunggiDo, Rep. of Korea

declare under our sole responsibility that the Vacuum Pumps machine

Product Name : Vacuum Pumps  
(Oil Sealed Rotary Vane Vacuum Pump)  
Model Name : WOVP-0800, WOVP-1000, WOVP-1200

To which this declaration relates are in conformity with essential requirements (Annex II) of the below mentioned European Directives and the following standard(s) or other normative document(s)

Test Report No. : BWS-10-SC-217

Machinery Directive 2006/42/EC, Annex I	: Essential health and safety requirements
EN ISO 12100-1:2003 / A1:2009	: Basic concepts, general principles for design Part 1: Basic terminology, methodology
EN ISO 12100-2:2003 / A1:2009	: Basic concepts, general principles for design Part 2: Technical principles
EN 60204-1:2006	: Electrical equipment of machines Part 1: General requirements
EN 1012-2:1996 / A1:2009	: Compressor and vacuum pumps – Safety requirements, Part 2. Vacuum pumps

following the provisions of Directive(s);

2006/42/EC

The above mentioned product complies with the requirements of the above standards. It fulfills the requirements of Directive 2006/42/EC.

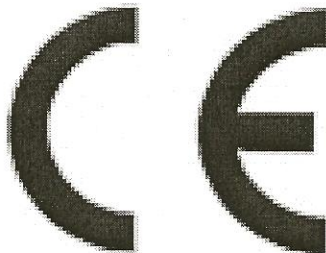
Above described products are fully complying with the essential requirements of the EU directives.

MANUFACTURER



(Signature)

HEE JONG ROH



# EC DECLARATION OF CONFORMITY

We, **Won Chang Vacuum Co., Ltd.**  
424-2, GahyunRi, TongjinEup, KimpoSi, KyunggiDo, Rep. of Korea

declare under our sole responsibility that the Vacuum Pumps machine

Product Name : Vacuum Pumps  
(Oil Sealed Rotary Vane Vacuum Pump)  
Model Name : WOVP-0200, WOVP-0320, WOVP-0350,  
WOVP-0430, WOVP-0500 and WOVP-0600

To which this declaration relates are in conformity with essential requirements (Annex II) of the below mentioned European Directives and the following standard(s) or other normative document(s)

Test Report No. : BWS-10-SC-216

Machinery Directive 2006/42/EC, Annex I	: Essential health and safety requirements
EN ISO 12100-1:2003 / A1:2009	: Basic concepts, general principles for design Part 1: Basic terminology, methodology
EN ISO 12100-2:2003 / A1:2009	: Basic concepts, general principles for design Part 2: Technical principles
EN 60204-1:2006	: Electrical equipment of machines Part 1: General requirements
EN 1012-2:1996 / A1:2009	: Compressor and vacuum pumps – Safety requirements, Part 2. Vacuum pumps

following the provisions of Directive(s);

2006/42/EC

The above mentioned product complies with the requirements of the above standards. It fulfills the requirements of Directive 2006/42/EC.

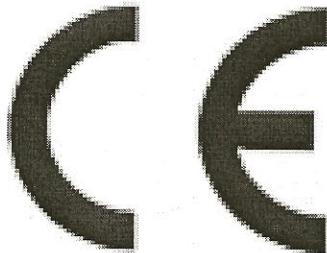
Above described products are fully complying with the essential requirements of the EU directives.

MANUFACTURER



(Signature)

HEE JONG ROH





# EC DECLARATION OF CONFORMITY

**We, Won Chang Vacuum Co., Ltd.**

**424-2, GahyunRi, TongjinEup, KimpoSi, KyunggiDo, Rep. of Korea**

*declare under our sole responsibility that the Vacuum Pumps machine*

**Product Name** : Vacuum Pumps  
(Oil Sealed Rotary Vane Vacuum Pump)  
**Model Name** : WOVP-0020, WOVP-0030, WOVP-0040,  
WOVP-0060, WOVP-0090 and WOVP-0130

*To which this declaration relates are in conformity with essential requirements (Annex II) of the below mentioned European Directives and the following standard(s) or other normative document(s)*

**Test Report No. : BWS-10-SC-215**

Machinery Directive 2006/42/EC, Annex I	: Essential health and safety requirements
EN ISO 12100-1:2003 / A1:2009	: Basic concepts, general principles for design Part 1: Basic terminology, methodology
EN ISO 12100-2:2003 / A1:2009	: Basic concepts, general principles for design Part 2: Technical principles
EN 60204-1:2006	: Electrical equipment of machines Part 1: General requirements
EN 1012-2:1996 / A1:2009	: Compressor and vacuum pumps – Safety requirements, Part 2. Vacuum pumps

*following the provisions of Directive(s);*

**2006/42/EC**

*The above mentioned product complies with the requirements of the above standards. It fulfills the requirements of Directive 2006/42/EC.*

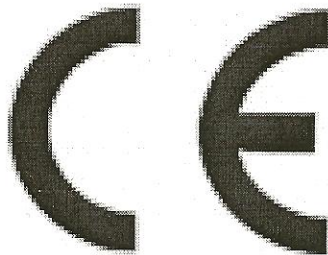
*Above described products are fully complying with the essential requirements of the EU directives.*

**MANUFACTURER**



(Signature)

HEE JONG ROH





**WON CHANG**  
**VACUUM CO.,LTD**

[www.wonchangvacuum.com](http://www.wonchangvacuum.com)