



Installation  
and  
Operating Manual  
(Rev. A)

L-Series Vacuum Pumps

Models L400C-L630C

## **INSTALLATION & OPERATING MANUAL**

### **L-SERIES SINGLE STAGE ROTARY VANE VACUUM PUMPS**

L400C-L630C

Please read the manual before operating the vacuum pump.

## **TABLE OF CONTENTS**

### **1.0 INSTALLATION**

- 1.1 Unpacking
- 1.2 Location
- 1.3 Power Requirements
- 1.4 Vacuum Connections
- 1.5 Oil Filling

### **2.0 OPERATION**

- 2.1 Start-up
- 2.2 Stopping the pump
- 2.3 Gas Ballast

### **3.0 MAINTENANCE**

- 3.1 Pump Oil (level/type/quantity/change)
- 3.2 Inline (inlet) Filter
- 3.3 Exhaust Filter
- 3.4 Maintenance Chart
- 3.5 Overhaul Kit and Accessories

### **4.0 PROBLEM SOLVING**

### **5.0 MOTOR AND ELECTRICAL DATA**

### **6.0 TECHNICAL DATA**

### **7.0 TYPICAL L-SERIES ASSEMBLY**

## INSTALLATION AND OPERATING MANUAL

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

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 the rubber feet of the pump. Remove the nuts from the underside of 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 is evenly supported on its rubber feet. Leave 12-18" 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.

#### 1.2 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.

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 Airtech for motor and starter information.

Correct direction of rotation is marked by an arrow on the motor fan housing and is counter clockwise 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**

#### 1.3 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 the 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 Airtech Inc. for recommendations.

The vacuum piping should be designed to ensure that no liquids such as 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 Airtech Inc. 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 Airtech pumps:

<b>Pump Model</b>	<b>Inlet Size</b>	<b>Exhaust Size</b>
L400C	3" NPT	3" NPT
L630C	3" NPT	3" NPT

#### 1.4 Oil Filling

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

Non-detergent oil should be used. Airtech recommends either ATO-1000 for normal duty operation or ATO 2000 and ATO 4000 for severe duty operation. ATO 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.

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

<b>Pump Model</b>	<b>OIL Capacity (Qt)</b>
L400C	19
L630C	19

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

## 2.0 OPERATION

2.1 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 ¼ mark 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.

## 2.2 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 shut down.

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

## 2.3 Gas Ballast

L-Series pumps are equipped with a 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 minutes in its normal operating temperature, prior to going on process. The pump should also be operated off process for 10 minutes prior to shut down. A slight air bleed (purge) is recommended during these 10-minute cycles to prevent the vapor from condensing in the pump.

## 3.0 MAINTENANCE

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

### 3.1 Pump Oil

#### 3.1.1 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. Oil must be added through the oil fill port only.

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

#### 3.1.2 Oil Type and Quantity

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

#### 3.1.3 Oil Change

When using ATO 1000 oil, it is recommended to change the oil every 500-750 operating hours.

When using ATO 2000 or ATO 4000 oil, it is recommended to change the oil every 750-1000 operating hours.

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.

### 3.1.4 Oil Spin-On Filter

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

Pump Model	Airtech Part No.
L400	12010.00
L630	12010.00

### 3.2 Inline (inlet) Filter

Check inline (inlet) filter on a weekly basis. The filter cartridge should be cleaned or replaced when dirty. Consult Airtech Inc. 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.**

### 3.3 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 reading of 3 psig or greater.

**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.**

### 3.4 Maintenance Chart

See the motor manufacturer's manual for the periodic motor maintenance.

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

**Weekly:** inspect inline (inlet) filter.

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

**Every 9-18 months:** replace exhaust filter elements and O-ring.

**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.**

### 3.5 Overhaul Kit and Accessories

An overhaul kit contains a set of gaskets, O-rings, vanes, bearing, bearing sleeves, shaft seals and taper pins. Please consult Airtech Inc. parts department for information.

## 4.0 PROBLEM SOLVING

### 4.1 Problem

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

#### 4.1.1 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.

#### **4.1.2 Possible Cause**

Inlet screen clogged with debris.

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

#### **4.1.3 Possible Cause**

Shaft seal leak

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

#### **4.1.4 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 Airtech for exchange program

#### **4.1.5 Possible Cause**

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

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

#### **4.1.6 Possible Cause**

No oil or low oil level in reservoir

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

#### **4.1.7 Possible Cause**

Vacuum fitting or hose is not leak tight.

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

#### **4.1.8 Possible Cause**

Radial clearance between rotor and cylinder are no longer adequate.

*Remedy:* overhaul pump or call Airtech Inc. for exchange program.

## **4.2 Problem**

Pump runs very noisy

#### **4.2.1 Possible Cause**

Coupling insert is worn

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

#### **4.2.2 Possible Cause**

Vanes stuck

*Remedy:* follow flush procedure from 4.1.4 or replace vane or call Airtech Inc. for exchange program.

#### **4.2.3 Possible Cause**

Bearing noise

*Remedy:* replace bearings or call Airtech Inc. for exchange program

### 4.3 Problem

Pump starts, but labors and draws high amperage

#### 4.3.1 Possible Cause

Oil is too viscous

*Remedy:* drain and change with fresh oil

#### 4.3.2 Possible Cause

Exhaust filter is clogged.

*Remedy:* replace exhaust filters, maintain proper oil condition, oil level and use ATO oil : make sure inlet filter is operational preventing particulate carryover

#### 4.3.3 Possible Cause

Loose connection in motor terminal box wired for wrong voltage.

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

#### 4.3.4 Possible Cause

Foreign particles in pump. Broken vanes or seized bearings

*Remedy:* overhaul pump or call Airtech Inc. for exchange program

#### 4.3.5 Possible Cause

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

*Remedy:* drain oil  
: use correct type of ATO oil

#### 4.3.6 Possible Cause

Pump runs in wrong direction

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

### 4.4 Problem

Pump will not start

#### 4.4.1 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 Airtech Inc. for exchange program.

### 4.5 Problem

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

#### 4.5.1 Possible Cause

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

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



#### **4.5.2 Possible Cause**

Exhaust filters are clogged with foreign particles

*Remedy:* replace filter and O-ring.

#### **4.5.3 Possible Cause**

Oil is not recirculating properly

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

### **4.6 Problem**

Pump is running too hot. (Typical operating temperature of the L-Series pumps is 120-200° Fahrenheit.)

#### **4.6.1 Possible Cause**

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

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

#### **4.6.2 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.

### **4.7 Problem**

Pump will not operate (seized up)

#### **4.7.1 Possible Cause**

Pump operated without oil and vanes broke

*Remedy:* Call Airtech Inc for exchange program

#### **4.7.2 Possible Cause**

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

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

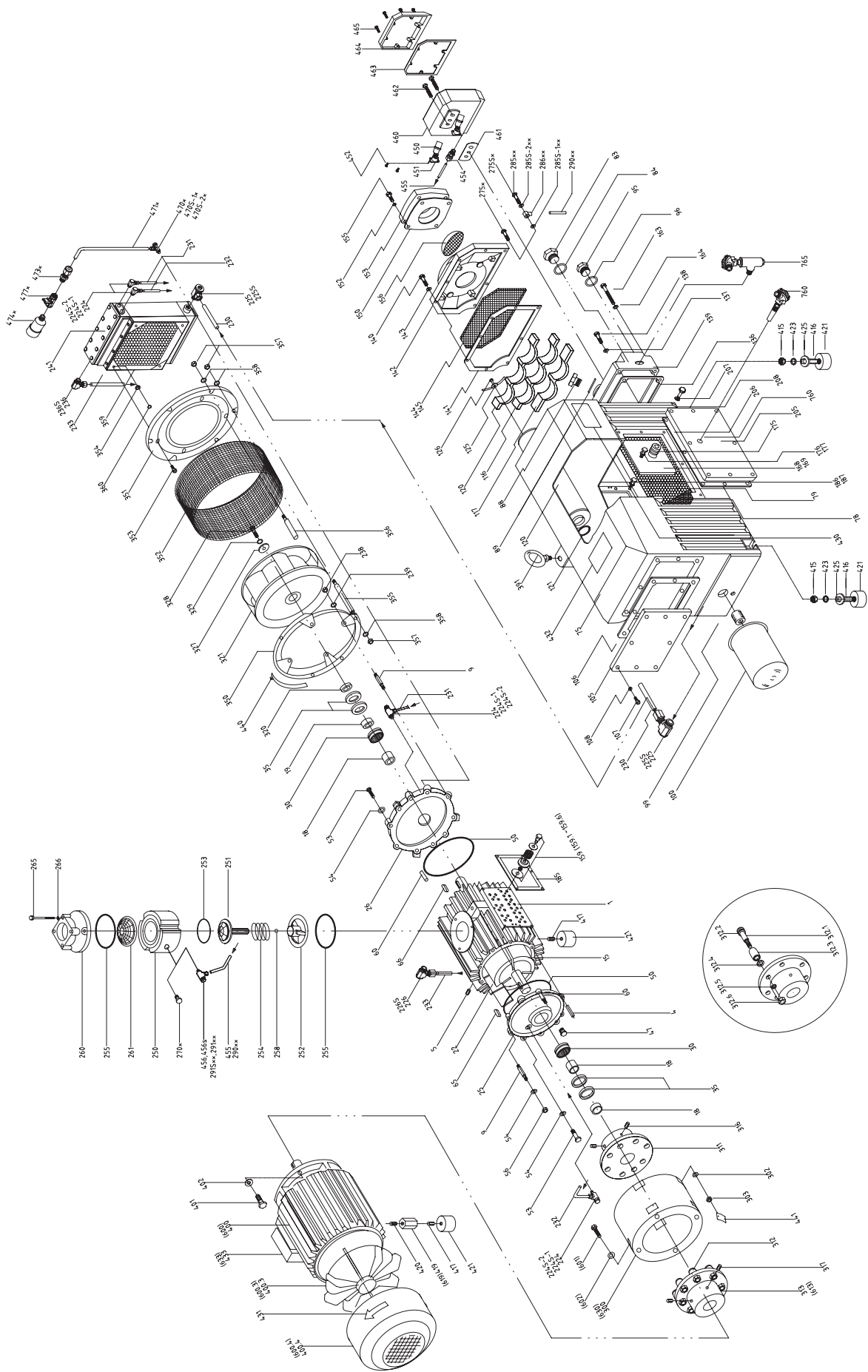
## 5.0 Motor and Electrical Data

Motor - 60 Hz 3PH	L400C	L630C
HP	15	25
RPM	1160	1160
Voltage	208/230/460	208/230/460
Full Load Amp	43/41/20.5	68/62/31

## 6.0 Technical Data

	Type	L400C	L630C
Displacement	CFM	330	460
End Vac-H	TORR	0.5	0.5
Max Sound-L	dB(A)	81	83
Motor Size	3PH	15	25
Pump Rotation Speed	RPM	1160	1160
Oil Capacity	Qt.	19	19
Inlet Connection	NPT - (inches)	3	3
Weight	LBS	1022	1342





# L630C

# L400C-L630C Parts List

Pos. #	Description	800-1500 Qty	Pos. #	Description	800-1500 Qty	Pos. #	Description	800-1500 Qty
1	Cylinder	1	117	Exh. Filter bracket, Lower	1	206	Gasket, Oil sump Side cover plate	1
4	Stu	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 Cooder	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	1
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	270*	Plug (For N Only)	1
115	Exh. Filter bracket, Upper	1	187	Spring Lock Washer	8	275*	Oil return valve (For N only)	2
116	Exh. Filter bracket, Medium	1	205	Oil Sump Side cover plate	1	275S*(276*)	Sealing ring (For N only) for 275	2

## L400C-L630C Parts List (cont'd)

Pos. #	Description	800-1500 Qty	Pos. #	Description	800-1500 Qty	Pos. #	Description	800-1500 Qty
285**	Oil Recirculation Screw (For L only)	1	359	Mounting Bracket for radiator	1	464	Floater valve box, cover	1
286**	BSLM Hyd. Fitting (For L only)	1	360	Cheese head Cap Screw	12	465	Allen bolt	6
285S-1**	Sealing ring for Pos # 285 (For L only)	1	391	Eye bolt	1	465S	Sealing ring	6
285S-2**	Sealing ring for Pos # 285 (For L only)	1	400	Motor (IEC)-60Hz	1	470S*-2	Sealing ring	1
290**	Oil Return tube (For L only)	1	400	Motor (IEC)-50Hz	1	470S*-1	Sealing ring	1
291**	BSLM hydraulic fitting (For L only)	1	400.3	Motor fan blade	1	470*	Elbow, Hydraulic Fitting	1
291S**	Sealing Ring, for 291 (For L Only)	2	400.4	Motor fan cover	1	471*	Oil tube(C)	1
300	Motor mounting bracket	1	401	Hexagon head screw	4	473*	Fitting	1
302	Spring Lock Washer	4	402	Spring Lock Washer	4	474*	Gas Ballast	1
303	Hex nut	4	415	Hex nut	2	477*	Ball Valve	1
310	Coupling set (310 ~313)	1	416	Slud	2	480*	Gas Ballast Kit	1
311	Coupling Half, Pump Side	1	417	Slotted set screw	2	490	Gasket Kit	1
312	Connection Bolt with rubber boot	8	419	Spacer for Foot, for IEC motor	1	500	Maintenance Kit	1
312.3	Rubber Boot	8	420	Slotted set screw	1	541	Conversion Kit, F type (w/o GB Kit)	1
313	Coupling Half, Motor Side	1	421	Rubber foot	4	550	Inlet Check Valve Kit (250 ~266)	1
316	Set screw (Pump side)	2	423	Spring Lock Washer	2	600	Motor ( NEMA) - 60Hz	1
317	Set screw ( Motor side)	2	425	Washer	2	600.3	Motor fan blade	1
320	Spacer for fan	1	430	Name plate	1	600.4	Motor fan cover	1
321	Fan	1	431	Directional arrow label	1	601	Hex head Bolt	4
327	Locking Disc	1	450	Floater	1	603	Spring Lock Washer	4
328	Hex Head Cap Screw	1	451	Nozzle Assembly	1	610	Adapter only for WOVF-800	1
329	Spring Lock Washer	1	451.1	O-Ring for Nozzle assy	1	612	Coupling set (311A + 312A+ 613)	1
350	Fan Support Ring (Pump Side)	1	452	Bolt	2	613	Coupling Half, Motor Side	1
351	Fan Support Ring (Radiator Side)	1	454	Straight hydraulic fitting	1	613	Coupling Half, Motor Side	1
352	Fan Guard	1	455	Oil Return tube	1	619	Spacer for foot, for Nema Motor	2
353	Allen Bolt	4	456	Hyd. fitting	1	630	Motor mounting bracket	1
354	Hex Nut	4	456S	Sealing Ring	2	760	Temperature Switch	1
355	Fan Supporting Bolt	5	460	Floater Valve Box Housing	1	761	Temperature Switch connector	1
356	Fan Supporting Bolt	1	461	Gasket, between box and oil sump	1	765	Level Switch	1
357	Hex Nut	11	462	Connecting bolt	2	766	Level Switch housing	1
358	Spring Lock Washer	11	463	Gasket, cover of box	1	800	Inlet Air Filter	1
						900	Pump Module	1