AIRTECH® VACUUM

Installation
and
Operating Manual

L-Series Vacuum Pumps

Models L/H400C - L/H630C

INSTALLATION & OPERATING MANUAL

L/H-SERIES SINGLE STAGE ROTARY VANE
VACUUM PUMPS

L/H400C-L/H630C

Please read the manual before operating the vacuum pump.

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INSTALLATION AND OPERATING MANUAL

This manual is written to cover L/H-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.

1.3 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.

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.

1.4 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 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:

Pump Model	Inlet Size	Exhaust Size
L/H400C	3" NPT	3" NPT
L/H630C	3" NPT	3" NPT

1.5 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
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.

When Airtech (ATO) oils are used in a new pump or an exchange pump, the warranty period is extended. Consult Airtech Inc. for time extension.

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

OIL

Pump Model	Capacity (Qt)
L/H400C	19
L/H630C	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 ¾ 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 shutdown.

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 to 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/H-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 ¼ 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 port.

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 oil, it is recommended to change the oil ever 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.
L/H400	ATOF-51820
L/H630	ATOF-51820

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 to 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 valve.

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 120-200º 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
Pump Model

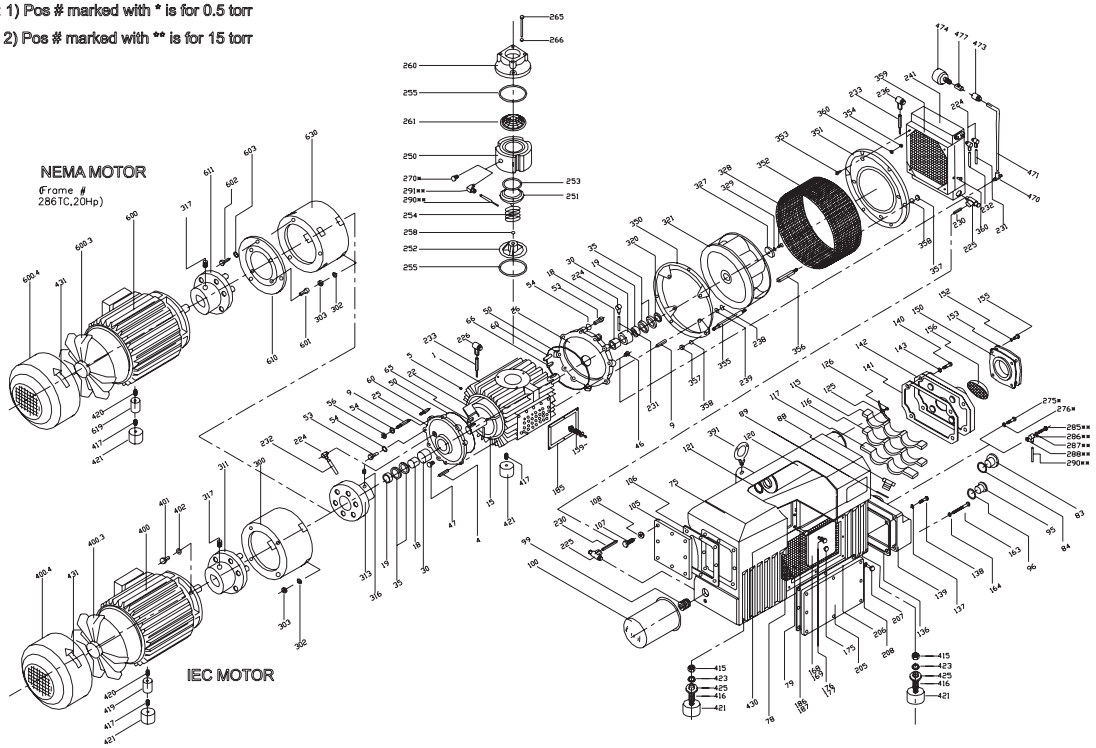
Motor - 60 Hz 3PH	400C	630C
HP	15	25
RPM	1160	1160
Voltage	208/230/460	208/230/460
Full Load Amp	43/41/20.5	68/62/31

6.0 Technical Data

	Type	400C	630C
Displacement	**CFM**	**330**	**460**
Guaranteed End Vac-L	**TORR**	**15**	**15**
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**

Remarks: 1) Pos # marked with * is for 0.5 torr

2) Pos # marked with ** is for 15 torr



7.0 TYPICAL L/H-SERIES ASSEMBLY

L/H400C & L/H630C

Pos.	L/H 400C	L/H 630C
1	Cylinder	Cylinder
4	Stud	Stud
5	Set Screw	Set Screw
9	Stud	Stud
15	Rotor	Rotor
18	Sleeve, Bearing	Sleeve, Bearing
22	Vane	Vane
25	A-End Plate, Motor Side	A-End Plate, Motor Side
26	B-End Plate, Fan Side	B-End Plate, Fan Side
30	Bearing	Bearing
35	Shaft Seal	Shaft Seal
47	Plug	Plug
50	O-Ring, End Plate	O-Ring, End Plate
53	Hex Head Cap Screw	Hex Head Cap Screw
54	Spring Lock Washer	Spring Lock Washer
56	Hex Nut	Hex Nut
60	Taper Pin	Taper Pin
65	A-Shaft Key, Motor Side	A-Shaft Key, Motor Side
66	B-Shaft Key, Fan Side	B-Shaft Key, Fan Side
75	Oil Sump	Oil Sump
78	Steel Demister	Steel Demister
79	Sheet Metal Baffle	Sheet Metal Baffle
83	Oil Sight Glass	Oil Sight Glass
84	Gasket, Oil Sight Glass	Gasket, Oil Sight Glass
88	Plug, Oil Fill	Plug, Oil Fill
89	O-Ring, Oil Fill Plug	O-Ring, Oil Fill Plug
90	Pressure Gauge	Pressure Gauge
95	Plug, Oil Drain	Plug, Oil Drain
96	O-Ring, Oil Drain Plug	O-Ring, Oil Drain Plug
99	Pipe Nipple	Pipe Nipple
100	Oil Filter	Oil Filter
105	Oil Sump Cover Plate	Oil Sump Cover Plate
106	Gasket, Oil Sump Cover	Gasket, Oil Sump Cover
107	Allen Bolt	Allen Bolt
108	Sealing Ring, Oil Sump Cover	Sealing Ring, Oil Sump Cover
115	Exhaust Filter Bracket, Upper	Exhaust Filter Bracket, Upper
116	Exhaust Filter Bracket, Middle	Exhaust Filter Bracket, Middle
117	Exhaust Filter Bracket, Lower	Exhaust Filter Bracket, Lower
120	Exhaust Filter	Exhaust Filter
121	O-Ring, Exhaust Filter	O-Ring, Exhaust Filter
125	Exhaust Filter Spring Assembly	Exhaust Filter Spring Assembly
126	Slotted Cheese Head Machine Screw	Slotted Cheese Head Machine Screw
136	Gasket, Service Cover	Gasket, Service Cover
137	Sealing Ring	Sealing Ring
138	Allen Bolt	Allen Bolt
139	Service Cover	Service Cover
140	Allen Bolt	Allen Bolt
141	Gasket, Separator Cover	Gasket, Separator Cover
142	Spearator Cover Plate	Spearator Cover Plate
143	Sealing Ring	Sealing Ring
150	Gasket, Exhaust Cover	Gasket, Exhaust Cover
152	Sealing Ring	Sealing Ring
153	Exhaust Cover (Threaded)	Exhaust Cover (Threaded)
155	Allen Bolt	Allen Bolt

Pos.	L/H 400C	L/H 630C
156	Outlet Screen	Outlet Screen
159	Exhaust Valve Assembly includes:	Exhaust Valve Assembly includes:
	Exhaust Valve Fixed Bolt	Exhaust Valve Fixed Bolt
	Exhaust Valve Washer	Exhaust Valve Washer
	Exhaust Valve Spring	Exhaust Valve Spring
	Exhaust Valve Plate	Exhaust Valve Plate
160	Exhaust Valve Lock Nut	Exhaust Valve Lock Nut
	Exhaust Valve Seat Plate	Exhaust Valve Seat Plate
163	Allen Bolt	Allen Bolt
164	Sealing Ring	Sealing Ring
168	O-Ring, Exhaust Valve Cover Plate	O-Ring, Exhaust Valve Cover Plate
169	Exhaust Valve Cover Plate	Exhaust Valve Cover Plate
174	Hex Head Cap Screw	Hex Head Cap Screw
175	Plug	Plug
176	Hex Nut	Hex Nut
177	Stud Bolt	Stud Bolt
185	Gasket, Cylinder	Gasket, Cylinder
186	Allen Bolt	Allen Bolt
187	Spring Lock Washer	Spring Lock Washer
205	Oil Sump Side Cover Plate	Oil Sump Side Cover Plate
206	Gasket, Oil Sump Side Cover Plate	Gasket, Oil Sump Side Cover Plate
207	Socket Head Cap Screw	Socket Head Cap Screw
208	Sealing Ring	Sealing Ring
224	Elbow, Hydraulic Fitting	Elbow, Hydraulic Fitting
225	Elbow, Hydraulic Fitting	Elbow, Hydraulic Fitting
226	Elbow, Hydraulic Fitting	Elbow, Hydraulic Fitting
230	Oil Tube (A)	Oil Tube (A)
231	Oil Tube (B-1)	Oil Tube (B-1)
232	Oil Tube (B-2)	Oil Tube (B-2)
233	Oil Tube	Oil Tube
236	Elbow, Hydraulic Fitting	Elbow, Hydraulic Fitting
241	Oil Cooler	Oil Cooler
242	Protect. Cover for Oil Cover, Upper	Protect. Cover for Oil Cover, Upper
243	Protect. Cover for Oil Cover, Lower	Protect. Cover for Oil Cover, Lower
250	Inlet Flange, Lower Housing	Inlet Flange, Lower Housing
251	Check Valve Plate	Check Valve Plate
252	Check Valve Guid	Check Valve Guid
253	O-Ring, Check Valve Plate	O-Ring, Check Valve Plate
254	Spring, Check Valve	Spring, Check Valve
255	O-Ring, Inlet Flange	O-Ring, Inlet Flange
258	Rubber Ball	Rubber Ball
260	Inlet Flange, Upper Housing	Inlet Flange, Upper Housing
261	Inlet Screen (Conical)	Inlet Screen (Conical)
265	Allen Bolt	Allen Bolt
266	Spring Lock Washer	Spring Lock Washer
270*	Plug	Plug
275*	Oil Return Valve	Oil Return Valve
276*	Sealing Ring	Sealing Ring
285**	Oil Recirculation Screw (Hollow)	Oil Recirculation Screw (Hollow)
286**	Banjo Fitting	Banjo Fitting
288**	Sealing Ring	Sealing Ring
290**	Oil Return Tube	Oil Return Tube
291**	Elbow, Hydraulic Fitting	Elbow, Hydraulic Fitting
300	Motor Mounting Bracket	Motor Mounting Bracket

Pos.	L/H 400C	L/H 630C
302	Spring Lock Washer	Spring Lock Washer
303	Hex Nut	Hex Nut
311	Coupling Half, Motor Side	Coupling Half, Motor Side
312	Coupling Housing	Coupling Housing
313	Coupling Half, Pump Side	Coupling Half, Pump Side
316	Set Screw	Set Screw
317	Set Screw	Set Screw
320	Spacer for Fan	Spacer for Fan
321	Fan	Fan
327	Locking Disc	Locking Disc
328	Hex Head Cap Screw	Hex Head Cap Screw
329	Spring Lock Washer	Spring Lock Washer
350	Fan Support Ring (Pump Side)	Fan Support Ring (Pump Side)
351	Fan Support Ring (Radiator Side)	Fan Support Ring (Radiator Side)
352	Fan Guard	Fan Guard
353	Allen Bolt	Allen Bolt
354	Hex Nut	Hex Nut
355	Fan Supporting Bolt	Fan Supporting Bolt
356	Fan Supporting Bolt	Fan Supporting Bolt
357	Hex Nut	Hex Nut
358	Spring Lock Washer	Spring Lock Washer
359	Mounting Bracket for Radiator	Mounting Bracket for Radiator
360	Chese Head Cap Screw	Chese Head Cap Screw
391	Eye Bolt	Eye Bolt
400	Motor (IEC)	Motor (IEC)
400.3	Motor Fan Blade (IEC)	Motor Fan Blade (IEC)
400.4	Motor Fan Cover (IEC)	Motor Fan Cover (IEC)
401	Hex Head Cap Screw	Hex Head Cap Screw

Pos.	L/H 400C	L/H 630C
402	Spring Lock Washer	Spring Lock Washer
415	Hex Nut	Hex Nut
416	Stud	Stud
417	Slotted Set Screw	Slotted Set Screw
419	Spacer for Foot	Spacer for Foot
420	Slotted Set Screw	Slotted Set Screw
421	Rubber Foot	Rubber Foot
423	Spring Lock Washer	Spring Lock Washer
425	Washer	Washer
430	Name Plate	Name Plate
431	Directional Arrow Label	Directional Arrow Label
470	BSLM Hydraulic Fitting	BSLM Hydraulic Fitting
471	Oil Tube [C]	Oil Tube [C]
473	Fitting	Fitting
474	Gas Ballast Ass'y	Gas Ballast Ass'y
475	Bracket for Tube	Bracket for Tube
477	Valve	Valve
478	Hex Head Bolt	Hex Head Bolt
479	Spring Lock Washer	Spring Lock Washer
500	Maintenance Kit	Maintenance Kit
501	Gasket Kit	Gasket Kit
600	Motor (NEMA)	Motor (NEMA)
600.3	Motor Fan Blade (NEMA)	Motor Fan Blade (NEMA)
600.4	Motor Fan Cover (NEMA)	Motor Fan Cover (NEMA)
601	Hex Head Bolt (NEMA)	Hex Head Bolt (NEMA)
603	Spring Lock Washer	Spring Lock Washer
611	Coupling Half, Motor Side (NEMA)	Coupling Half, Motor Side (NEMA)
630	Motor Mounting Bracket (NEMA)	Motor Mounting Bracket (NEMA)

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