VAC-U-LIFT®

IP LIFTERS

operation, maintenance & parts manual

Model No. _____

Owner _____

P.O. Number _____

Shop Order Number _____

Reference Number _____

ACCO

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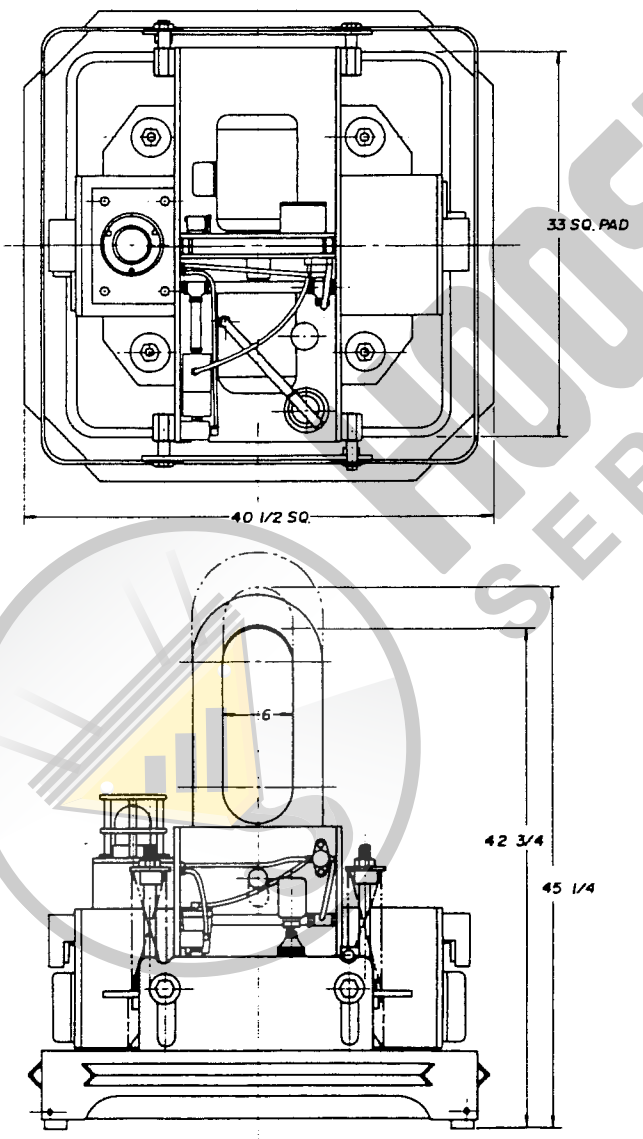
INDEX



IP LIFTER

INTRODUCTION

The Acco Vac-U-Lift IP Lifter has been carefully designed to provide highly-dependable service on a wide variety of demanding material handling applications. The operating instructions included in this manual will help you obtain maximum operating performance and safety from your IP unit. Reading and following the directions in the maintenance section will ensure that your unit will provide a long and productive service life.

Equipment Description

The IP Lifter supplies and controls the vacuum used to attach the lifting pad to the material being handled. It houses a vacuum pump, vacuum reserve tank, a solenoid-operated pilot valve which controls the main vacuum-control valve, filter, muffler, indicator light and vacuum gauges, as well as other necessary controls for the effective operation of the unit.

The vacuum pad is articulated and mounted on spring-loaded ball bolts, which allows the seal ring to seal properly, even on a bowed or curved surface. The seal ring is protected by a guard which also serves as a storage stand for the unit when locks mounted on opposite corners of the main frame are engaged.

Operating Procedure

The IP Lifter is attached to the surface of the load by creating a partial vacuum over the area covered by the vacuum pad. Figure 1 illustrates the system that creates and controls the vacuum. The electrical control system is shown in Figures 2A and 2B.

When the pump is actuated, it evacuates air from the vacuum pad and reserve tank through a filter and check-valve arrangement. The pump then vents to the atmosphere through a muffler. The check valve prevents air from re-entering the pads, in case the vacuum pump should stop due to a power failure. Once the load has been positioned, it can be released by merely "bottoming-out" the bail of the lifter.

The bail closes a limit switch and energizes a stepping relay, which actuates the solenoid of the vacuum pilot valve governing the control valve. This latter valve then closes the vacuum system and opens the vacuum pad to atmospheric pressure.

Because the control valve is in the line leading from the reserve tank to the vacuum pad, it is not necessary to evacuate the reserve tank for each lift. Due to the high degree of vacuum generated and the volume (surface area?) of the seal ring, the attachment time is reduced to a minimum.

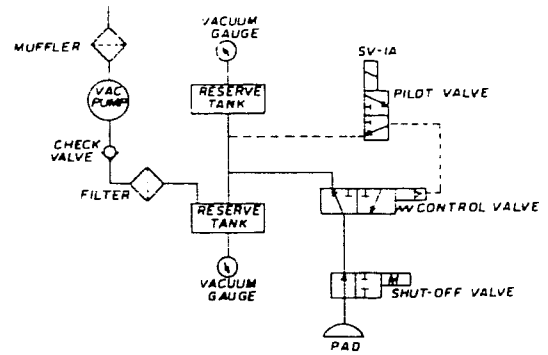


Figure 1

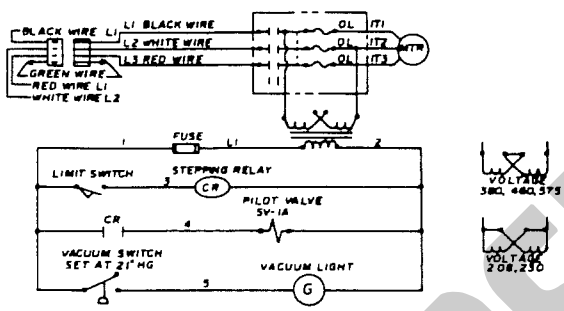


Figure 2A

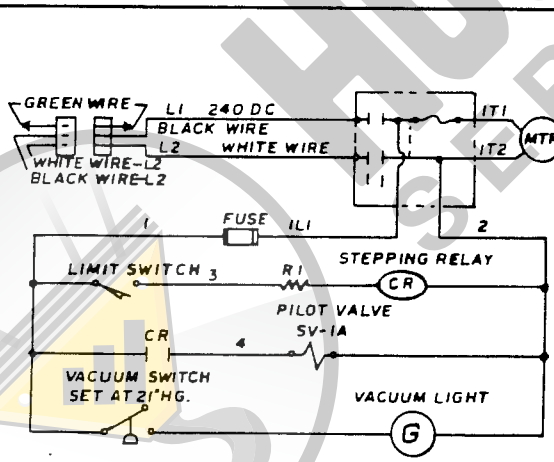


Figure 2B

Inspection and Testing

Your IP Lifter should be checked on arrival for any possible shipping damage. Report any such damage immediately to the carrier's agent.

Prior to putting the IP Lifter into operation, read the following operating instructions and perform the Proof Load Test described on page 4.

Operating Instructions

1. Connect the power cord to an outlet supplying the proper voltage, phase and cycle: check nameplate on unit for proper voltage, phase and cycle. Any extension power cord used should be of the grounding type to insure operator safety, and it should be heavy enough to carry the amperes drawn by the IP Lifter, without excessive voltage drop.
2. If the IP Lifter unit is extremely cold, bring it to room temperature before attempting to start it.
3. Lift lid on top of IP Lifter, check oil level in oil reservoir and fill if necessary. Use of the correct oil and proper amount of oil is important. For installations in warm climates, or where room temperatures are high, increase viscosity equivalent to SAE 20. For installations below freezing, dilute oil with one-fourth kerosene. Reuse of oil is not recommended.

Recommended Lubricating Oils

Brand	SAE NO. 10 For Ambients Below 100 Degrees F°	SAE NO. 20 For Ambients Above 100 Degrees F°
GAST	*AD220*	
AMERICAN	*S-1 No. 10*	*S-1 No. 20*
CITGO	*C-310*	*C-320*
GULF	*Gulflube HD-10*	*Gulflube HD-20*
HUMBLE	*Encolube HDX-10*	*Encolube HDX-20*
MOBIL	*Delvac 1110*	*Delvac 1120*
SHELL	*Rotella No. 10*	*Rotella No. 20*
SINCLAIR	*Super TBT No. 10*	*Super TBT No. 20*
SUN	*Sunvis 610*	*Sunvis 620*
TEXACO	*URSA S-1 No. 10*	*URSA S-1 No. 20*

Do not fill above equalizer hole in reservoir's stem. If oil enters stem, allow pump to operate several minutes before replacing cap, or an air lock may develop in the reservoir that prevents oil from flowing to the pump.

Both bearings and vanes are lubricated from this oil reservoir. *Do not allow pump to operate dry,* since this may damage vanes or pump body.

4. If oil reservoir is full, start unit and check rotation of pump. It must rotate in directon of arrow on top of pump. Stop pump and correct, if necessary, by reversing the wires in the electrical outlet receptacle. If correction is necessary, check rotation of pump after correcting.

CAUTION:

If unit is moved to a different location, check pump rotation.

5. Check the IP Lifter for excessive noise or vibration. If the pump fails to start or hums loudly, stop the unit and refer to the troubleshooting section of this manual.
6. Start unit and position over material to be lifted. Lower unit onto the material (be sure bail bottoms-out). When the vacuum reaches 21" Hg, the green light will indicate that load may be lifted.

CAUTION:

Do not attempt to lift load if green light does not come on.

7. When the load has been positioned, lower unit and load. As soon as bail bottoms-out, control valve will open, green light will go out, and unit may be lifted.

Storage

DO NOT store your IP Lifter by allowing it to rest on the vacuum pad. To do so will shorten the life of the seal ring. The unit must be supported by the bail or storage stand.

Periodic Maintenance

Performing the few simple steps in the following maintenance table will help prolong the life of your IP Lifter and promote greater operating safety. It is recommended that this schedule be followed closely.

Daily

Perform Proof Load Test.

Check oil reservoir and fill if necessary.

Weekly

Replace filter and clean muffler.

Check seal rings, hose and fittings.

Check for loose bolts and nuts as well as for structural damage.

Quarterly

Clean or replace filter element and clean muffler.

Performing Proof Load Test

The Proof Load Test should be conducted daily to verify that the IP Lifter safety features are operating properly. In effect, the test simulates an electrical power failure so that the performance of the vacuum reserve system can be checked:

1. Position the lifter over a sheet of non-porous material such as steel or aluminum and lower onto material.
2. Wait until the green lamp lights, indicating that it is safe to lift the load. Note the reading of the vacuum gauge. It should stabilize at 25" Hg or greater, at sea level.
3. Lift the vacuum unit and the material so that the load is between 1 and 2 inches above its rest position.

   Simulate a power failure by stopping the unit. Observe the vacuum gauge. If the reading drops more than 1" Hg in two (2) minutes, there is a leak in the vacuum system. Refer to the troubleshooting section of this manual for guidance in locating leaks.

Filter and Muffler

It is important to keep both the filter and the muffler clean and foreign particles from entering the pump chamber. The presence of any of these foreign materials can interfere with ence of any of these foreign materials can interfere with the action of the pump vanes or even cause them to break. In addition, maximum system performance can be attained only when the filter is kept clean, as a clogged filter will impede the flow of air into the pump. *The filter should be cleaned or replaced weekly.*

Component Description

The following paragraphs provide data on the components and sub-assemblies that make up your IP Lifter unit. Instructions for performing adjustments and repairs are included.

1.0 Vacuum System

1.1 Vacuum Pump

The Vacuum pump incorporated in your IP Lifter is a rotary-vane, oil-type pump. It is a precision product with only .0015" - .0065" total clearance at the ends and top of the rotor. The vanes feature builtin wear compensation and should last from 5,000 to 15,000 operating hours, depending upon the application. Because of its steel and cast-iro construction, *the pump should only be operated on a clean, dry air supply.* Every effort should be made to protect the pump against entrance of dirt particles and excessive moisture.

Pump vanes can be readily removed for cleaning or replacement by removing the end plate opposite the drive shaft end. The original body gaskets are onionskin, only .001" - .005" thick. If replacement is necessary, follow exact thickness specifications. Thicker gaskets will greatly reduce pump efficiency.

The pump may be cleaned by flushing, as follows. Stop pump and remove intake line and muffler. With pump running, allow several teaspoonfuls of solvent to be drawn into the pump at the intake. After solvent has passed through the pump, immediately re-lubricate it with a shot of oil. Stop pump and replace intake line and muffler. Cleaning solvent can be kerosene, Loctite Safety Solvent, Inhibisol Safety Solvent, or Dow Chemical Chlorathane. Flushing should be done in a well-ventilated area where there is **no open flame.**

NOTE: DO NOT run pump for any length of time on vacuum level below 4" Hg. Lubrication system requires a minimum vacuum of 4" Hg to operate.

1.2 Check Valve

The check valve is located between the vacuum pump and reserve tank. It is installed to permit air to be pumped from reserve tank and vacuum pads, and to prevent air from entering the system in case of a malfunction of the unit on a lift.

1.3 Filter

The filter is located in the reserve tank, and due to its location, it filters all air to the vacuum pump. It prevents dirt and foreign material from entering pump. It should be replaced when dirty or vacuum system will be sluggish.

1.4 Muffler

The muffler is located on the exhaust side of the vacuum pump. Its purpose is to cut down the noise level and catch any excess oil from the pump. For best results, empty bowl before oil or moisture reaches felt element. Element must be replaced or cleaned as it will cause a back pressure on vacuum pump which reduces efficiency.

1.5 Control Valve

The control valve is located between the reserve tank and vacuum pad. It is a vacuum pilot-operated three-way valve, and due to its large openings when it is open to atmosphere, the vacuum is released from the vacuum pad with a minimum of time.

1.6 Pilot Valve

The pilot valve is located between reserve vacuum tank and control, parallel to the main vacuum line. It is a three-way solenoid valve and controls the control valve. As a safety feature in the de-energized state, it is opened from reserve vacuum tank to control valve, thereby holding vacuum on vacuum pad in case of a power failure.

2.0 Control Monitoring System
2.1 Motor Starter

The motor starter is manually-operated and contains overload coils. It is located under the side cover of the motor.

2.2 Fuse

A properly-rated control circuit fuse is mounted in the electrical box.

2.3 Vacuum Switch and Indicator Light

A vacuum switch is mounted in the electrical box and monitors the vacuum line from control valve to vacuum pad. It controls the green indicator light, which it switches "on" when vacuum reaches 21" Hg. The switch may be adjusted, if necessary, by turning the adjusting nut as shown in Figure 3, below.

2.4 Vacuum Gauge

A vacuum gauge is mounted on each reserve tank. The vacuum gauge serves as a diagnostic instrument during testing and maintenance of the unit and provides a means of checking vacuum level in case of equipment failure.

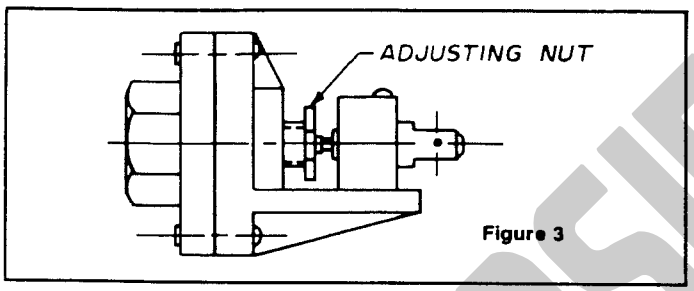


Figure 3

Troubleshooting and Repairs

Troubleshooting is always easier if one has a good understanding of how the equipment is intended to operate. A review of the IP Lifter operating principles can be found on page 3. Piping and wiring diagrams, which should be useful in servicing the unit, are also shown.

1.0 Testing for Leaks

To insure operating safety, a Proof Load Test should be performed daily; see page 4. A test failure indicates a leak somewhere in the vacuum system. The location of the leak can be most readily determined by a process of elimination, starting with the power unit. If this test is satisfactory, then the pad and vacuum line leading to the pad should be checked, as follows:

Close the hand valve between the vacuum control valve and the pad. Perform the power-off vacuum test in the same manner as outlined for the Proof Load Test. If the reading drops more than 1" Hg in two minutes, the leak is located in the power unit. If not, the leak is in the piping leading to the pad, or in the pad itself. Continue this process of eliminating possible trouble spots until the location of the leak is pinpointed.

The following components should be checked as possible sources of vacuum leaks:

(1) seal ring -- check for cracks, cuts, or other damage;
(2) vacuum pad -- check for cracks and loose bolts;
(3) vacuum hoses -- check for breaks, cuts or pinch marks;
(4) vacuum gauge -- look for faulty or loose connection or internal damage;
(5) filter cover -- check for loose bolts or damaged seal.

2.0 Tracing Power Unit Leaks

If the tests have shown that leakage is occurring within the power unit, the same process of elimination may be used to trace the problem to its source. A power-off vacuum test is performed as each portion of the vacuum system is disconnected. Refer to page 4.

2.1 The filter covers may leak because of a damaged or an improper seal between the cover and the reserve tank housing. Refer to parts list on page 9.

2.2 The check valve located between the vacuum pump and the reserve tanks can be tested by starting the pump and allowing full vacuum to build up. Stop the pump and place a hand over the open port of the muffler. If any vacuum draw can be felt, the check valve is defective.

2.3 The vacuum-control valve located between the vacuum reserve tanks and the pad can be tested by starting the pump and allowing full vacuum to build up with unit attached to a plate. Place a hand or a piece of closed cell sponge rubber over the exhaust port of the valve. If any vacuum draw can be felt, the control valve is defective.

2.4 All threaded connections should be drawn up tight using pipe dope. Care should be taken to prevent pipe dope and other foreign materials from entering the vacuum system.

IP Lifter Troubleshooting Guide

Successful troubleshooting involves, first, careful observation of the symptoms, and then elimination, one by one, of the possible causes of the trouble. The following table provides a logical approach to troubleshooting on your IP Lifter. It is intended as a starting point to help isolate damaged or defective parts or improper operating procedures. The paragraph numbers shown in the right-hand column of the table refer to the paragraphs under "Component Description" on pages 4 and 5, where you will find detailed information on the component in question.

Note: Also see procedure on testing for leaks described on page 5.

TROUBLE	CAUSE	REMEDY	SEE PARAGRAPH NUMBER UNDER COMPONENT DESCRIPTION
1. Vacuum pump will not run	1. No power to unit	1. Check power source voltage and frequency	2.1
	2. Blown overload coils	2. Check and replace if needed	2.1
	3. Defective On-Off Switch	3. Check and replace if needed	2.1
	4. Loose or damaged wiring	4. Make visual or meter check	1
	5. Defective pump	5. Check vacuum pump	1.1
	6. Defective motor	6. Return vacuum pump for repairs	2.1
	7. Unit extremely low temperature	7. Bring unit to room temperature before starting	2
2. Vacuum pump runs hot (Above 230 degrees)	1. Excessive foreign matter in pump	1. Flush pump assembly. Replace vanes if necessary.	1.1
	2. Worn vanes	2. Replace vanes	1.1
	3. Pump vanes hanging up	3. Check vanes and replace if necessary. Flush pump assembly.	1.1
	4. Low incoming voltage	4. Check and correct as required	1
3. No or low vacuum reading on vacuum gauge	1. Improper vacuum pad seal	1. Make visual check	
	2. Clogged filter or muffler	2. Check, clean or replace as required	1.3-1.4
	3. Damaged vacuum pad or seal rings	3. Make visual check	
	4. Defective gauge	4. Check or replace as required	
	5. Loose or damaged hoses or fittings	5. Make visual check and repair or replace as required	
	6. Clogged vacuum lines	6. Check and clean as required	
	7. Clogged or damaged gauge line	7. Check, clean or replace as required	
	8. Porous material	8. Check unit on non-porous material such as steel, aluminum	
	9. Defective control valve	9. Check, clean or replace as required	
	10. Pump vanes hanging up	10. Flush pump assembly. Replace vanes if necessary.	

TROUBLE	CAUSE	REMEDY	SEE PARAGRAPH NUMBER UNDER COMPONENT DESCRIPTION
	11. Defective pump	11. Return pump for repair	
4. Green lamp will not light	1. Burned out bulb	1. Check and replace if needed	
	2. Blown fuse	2. Check and replace if needed	2.2
	3. Defective vacuum switch	3. Check and replace as required	2.3
	4. Loose or damaged wiring	4. Check or replace as required	
	5. Vacuum switch not adjusted properly	5. Check and adjust as needed	2.3
	6. Unit remained on "Vacuum Off" Cycle	6. (See Trouble No. 6) Unit remains on "Vacuum Off" cycle	
	7. All items listed under "3. No or low vacuum reading on vacuum gauge" (except items No. 4 and No. 7)		
5. Unit remains in "Vacuum On" Cycle	1. Blown fuse	1. Check and replace if needed	2.2
	2. Loose or damaged wiring	2. Check and replace as required	
	3. Defective control valve coil	3. Check and replace as required	1.5
	4. Control valve hanging up	4. Check, clean or replace as required	1.5
	5. Limit switch	5. Check and adjust, replace if necessary	
6. Unit remains in "Vacuum Off" cycle	1. Control valve hanging up	1. Check, clean or replace as required	1.5
	2. Short in wiring	2. Check and correct	
	3. Limit switch	3. Check and adjust-replace if necessary	
	4. No vacuum	4. See item 3	
7. Excessive attach time	1. Clogged filter or muffler	1. Check, clean or replace as required	2.2
	2. Improper pad seal	2. Make visual check	
	3. Damaged vacuum pad or seal rings	3. Check for cracks, loose or broken bolts, cut or torn seal rings or excessive seal ring wear	
	4. Clogged, loose or damaged hoses or fittings	4. Clean or replace as required	
	5. Loose or damaged wiring	5. Check or replace as required	
	6. Defective control valve	6. Check, clean or replace as required	1.5
	7. Vacuum pump vanes hanging up	7. Check and replace vanes if necessary. Flush pump assembly	1.1
	8. Worn vacuum pump	8. Replace vanes or entire pump as needed	1.1
	9. Porous material	9. Test unit on non-porous material such as steel or aluminum	

TROUBLE	CAUSE	REMEDY	SEE PARAGRAPH NUMBER UNDER COMPONENT DESCRIPTION
8. Excessive release time	1. Clogged, loose or damaged hoses or fittings	1. Make visual check	
	2. Loose or damaged wiring on vacuum pilot valve	2. Check or replace as required	
	3. Defective control valve	3. Check, clean or replace as required	1.5
	4. Hand valve partially closed	4. Open	
9. Unit blows fuse	1. Low incoming voltage	1. Check and correct as required	
	2. Short in electrical circuit	2. Check and correct as required	
	3. Clogged filter or muffler	3. Check, clean or replace as required	
	4. Vacuum pump freezing up	4. Check for broken vanes or foreign matter in assembly	1.1
10. Excessive vacuum loss during Proof Load Test Procedure		1. See Proof Load Test	
11. Noisy Vacuum Pump	1. Sticking vanes	1. Allow pump to run for a short period. If noise continues, replace vane	1.1

IP LIFTER POWER UNIT

The following PART NUMBERS have been changed as follows:

OLD NO.	NEW NO.
29884 "O" Ring	50038
29873	22809
29882	29873
29884 Switch	22897
29883	22945

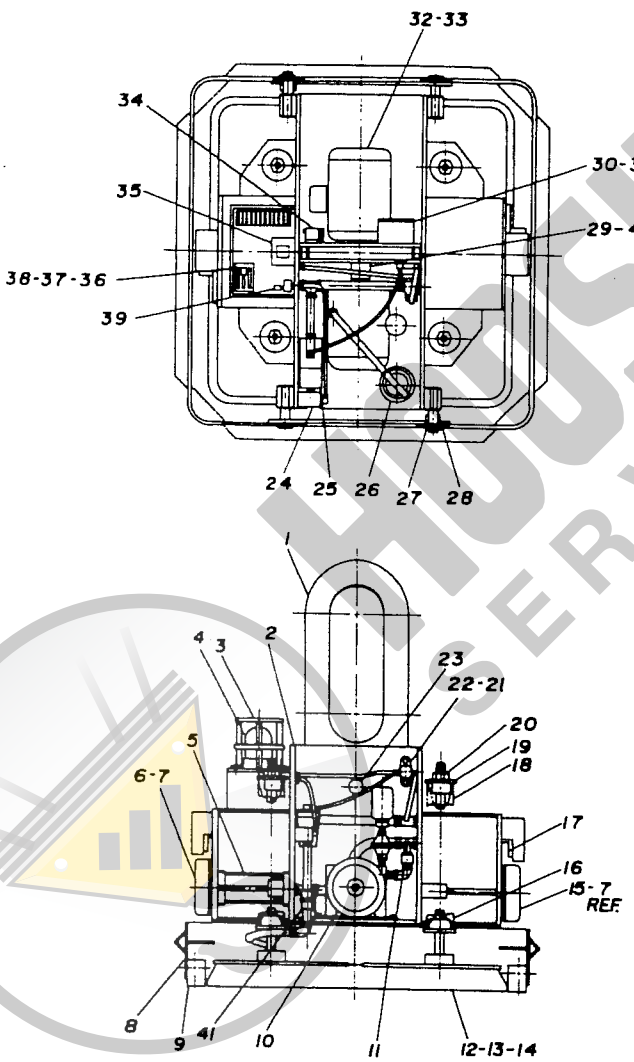
Parts List and Ordering Information

Be sure to include the description of the part and its part number, if any, as well as the model and serial numbers of your IP Lifter. In the parts lists which follow, those parts of an assembly for which no stock number is given **cannot** be ordered separately from the assembly itself.

Recommended Spare Parts

Item	Description	Part Number	Quantity
1	Repair Kit For Vacuum Pump	26501	1
2	Vacuum Gauge	50040	2
3	Filter	50012	4
4	Muffler Cartridge	26102	1
5	Check Valve	27824	1

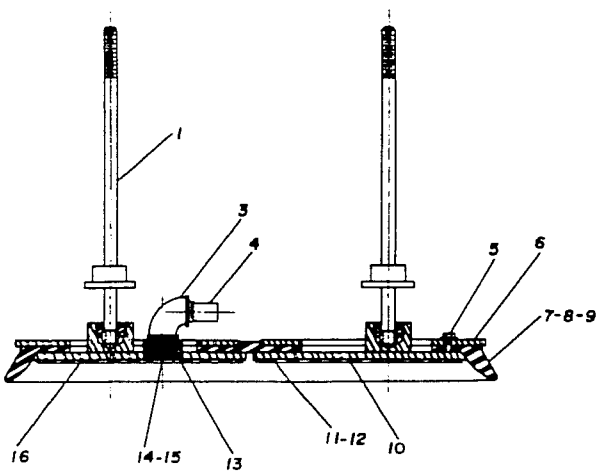
IP Lifter Power Unit



REF. NO.	PART NO.	DESCRIPTION	QUANTITY
1	29823	Bail	1
2	29807	Frame	1
3	29827	Light Guard	1
4	29881	Light Assembly	1
5	50012	Filter	1
6	29831	Filter Cover	1
7	29884	O-Ring	2
8	29847	Guard	1
9	29840	Pad Rest Foot	4
10	31132	Vacuum Pump	1
11	27824	Check Valve	1
12*	29849	Pad Ass'y. 30 "A" Neoprene	
13*	29864	Pad Ass'y. 50 "A" Neoprene	
14*	29865	Pad Ass'y. Silicone	
15	29830	Clean Out Cover	1
16	28959	Spring - Cushion	4
17	50040	Vacuum Gauge	2
18	29860	Spring - Load	4
19	29857	Washer - Spring Ret.	4
20		Nut	8
21	27529	Valve Pilot (A.C.)	1
22	27530	Valve Pilot (D.C.) 230v	1
23	29825	Bail Pin	1
24	29824	Bracket - Valve Mtg.	1
25	50201	Valve (Warfel) Control	1
26	26268	Muffler	1
27		Screw	4
28	29827	Guard Lock	2
29	29885	Coupling (A.C. Only)	1
30	29873	Motor Starter (A.C.)	1
31	29882	Motor Starter (D.C.)	1
32	33336	Motor 230/460/3 (A.C.)	1
33	33326	Motor 230 (D.C.)	1
34	29884	Switch, Limit	1
35	29883	Transformer (A.C. Only)	1
36	29876	Relay (A.C.)	1
37	29871	Relay (D.C.)	1
38	29872	Resistor (D.C.)	1
39	22883	Vacuum Switch	1
40	29889	Coupling (D.C. Only)	1
41	24844	Hand Valve	

*Optional

Pad Assembly

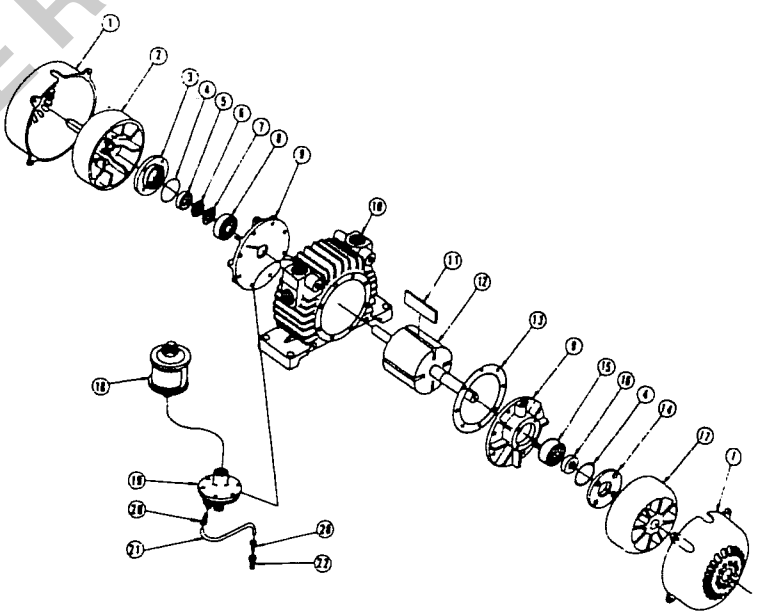


REF. NO.	PART NO.	DESCRIPTION	QTY.
0	29849	Pad Complete Neoprene "30"	1
0	29864	Pad Complete Neoprene "50"	1
0	29865	Pad Complete Silicone	1
1	29848	Pad Stem	4
3		Elbow "1"	1
4	29832	Hose Stem	1
5		3/8-16 Hex Nut	64
6	29837	Clamping Ring	4
7	29855	Seal Ring Neoprene "30"	1
8	29862	Seal Ring Neoprene "50"	1
9	29863	Seal Ring Silicone	1
10	29846	Lift Plate	3
11	29879	Scuff Pad Neoprene	4
12	29880	Scuff Pad Silicone	4
13		Brass Nipple "1"	1
14	29868	Screen-Vac. Hose	1
15	29867	Retaining Ring	1
16	29845	Lift Plate-With Boss	1

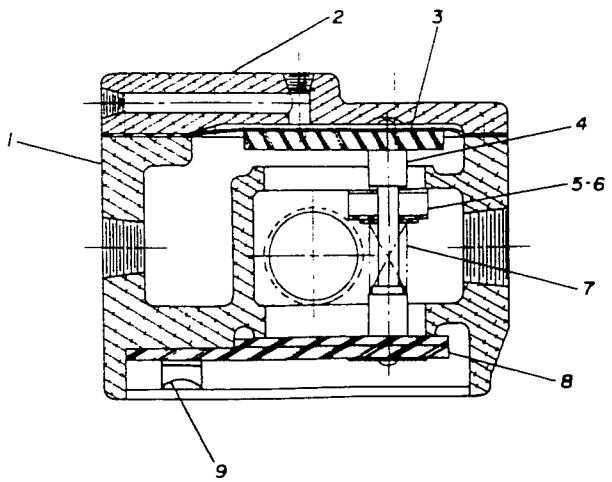
Vacuum Pump

REF. NO.	PART NO.	DESCRIPTION	QTY.
0	31132	Complete Pump	1
1		Fan Guard	2
2		Fan, Dead End	1
3		End Cap, Dead End	1
4*		"O" Ring	2
5*		Shaft Seal, Dead End	1
6		Lock Nut	1
7		Lock Washer	1
8*		Bearing, Dead End	1
9		End Plate	2
10		Body	1
11*	26456	Vane	4
12	26334	Rotor Assembly	1
13*		Body (Spacer) Gasket	1
14		End Cap, Drive End	1
15*		Bearing, Drive End	1
16*		Shaft Seal, Drive End	1
17		Fan, Drive End	1
18	26308	Oil Reservoir	1
19	26263	Vacuum Lubricator	1
20		Compression Fittings	4
21		Oil Tube	2
22		Connector	2

*Repair Kit No. 26501 contains items 4, 5, 8, -- Set of Vanes Items 11, 13, 15, and 16.

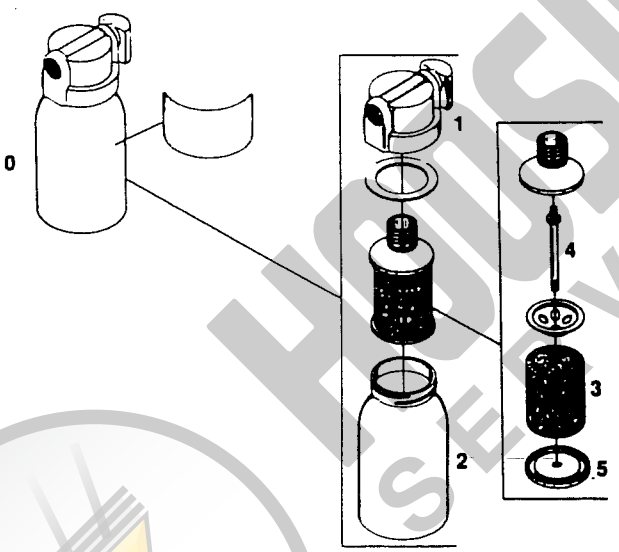


Control Valve (Warfel Type)



REF. NO.	PART NO.	DESCRIPTION	QTY.
0	50201	Valve Complete	1
1	50202	Body	1
2	50203	Cover	1
3	50104	Diaphragm	1
4	50208	Stem	1
5	50209	Spring Seat	1
6	50210	Spring Seat	1
7	50212	Spring	1
8	50107	Release	1
9	50211	Clamp Valve	1

Muffler



REF. NO.	PART NO.	DESCRIPTION	QTY.
0	26268	Complete Muffler	1
1		Cover	1
2		Bowl	1
3	26128	Muffler Element	1
4		Stud	1
5		End Cap	1
	26102	Complete Cartridge	