MANUAL OF INSTALLATION, OPERATION AND MAINTENANCE

PUMPS VACCUM – BVI

ISO 9001
BUREAU VERITAS
Certification

"ISO 9001:2015 Quality Management System"

IMBIL®
Pumping Solutions

Mr. Proprietary

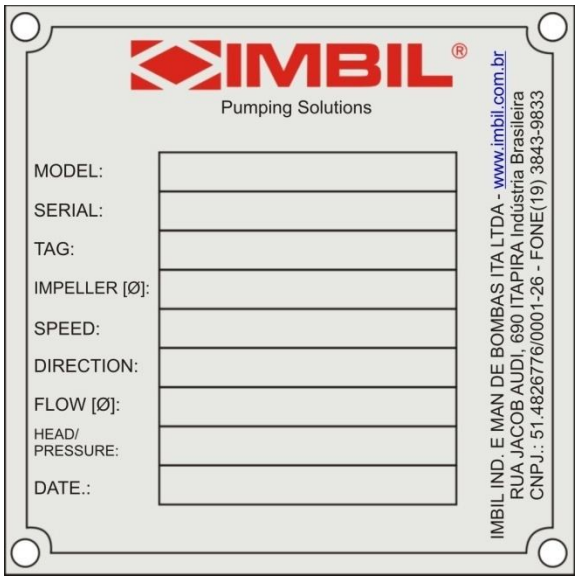
Congratulations! You just buy a simple construction equipment, designed and manufactured with the latest technology, excellent performance and easy maintenance.

This manual details the report on building, correct procedures for installation, operation and maintenance, and care should be observed so that the equipment has prolonged life, playing its role in the most efficient way to the application which was intended.

The IMBIL recommends that the equipment is installed and maintained as required by good technique and with the instructions contained in this Manual is not responsible for damages resulting from breach of the provisions contained therein.

The IMBIL also recommends that this manual is used by personnel trained and responsible for installation, operation and maintenance of equipment.

For queries on the ordering of equipment or spare parts, please indicate the code of the piece, type of bomb, number of test indicated on the nameplate for identification and stored in low relief on the suction flange.



The IMBIL that calls to you as soon as receive The guarantee of your equipment, fill out and send the data to the left IMBIL, facilitating the exchange of information between the User and IMBIL.

ÍNDICE

IMBIL®
Soluções em Bombeamento

1. HOW THE WORK VACUUM PUMP IMBIL

1.1. Principle of Operation:

The vacuum pumps are manufactured by IMBIL rotary-ring type of liquid having a single set girante (Rotor-axis) without any contact between solid materials, with only the friction between liquid and metal, which guarantees them non-aggressive in terms of use, extremely long life.

The working principle is based on the existence of cameras distributed in a rotor eccentrically positioned cylindrical body called a carcass or body. The spaces between the rotor blades flat, the body and side covers forming chambers are filled with liquid (or liquid compressor seals), which under the action of the centrifugal force imposed by rotation of the rotor, causing the change in volume of each cell, due to the displacement of the liquid against the body, drawing and compressing gas in the chambers, a similar action performed by pistons.

With the rotation of the rotor, the liquid compressor driven against the wall inside the cylindrical body, takes the form of a ring, from which comes the name "Ring of vacuum pump fluid.

Inside the vacuum pump as two distinct areas of action occurs where the aspiration of the gases in the zone of expansion and expulsion in the same area of compression respectively.

Gases reach the chambers of the rotor, through the windows of the larger cones followed by smaller windows to the same ex-pump vacuum.

The liquid or Sealing Compressor through the cones, being introduced through the existing connections in the side covers of the equipment.

By the nozzle into the sides or simply called Covers, Side air, gases or vapors enter the vacuum pump, and expelled through the nozzles to discharge (output) with the fluid compressor.

The figure below shows the working principle of generator equipment for Liquid Ring Vacuum type.

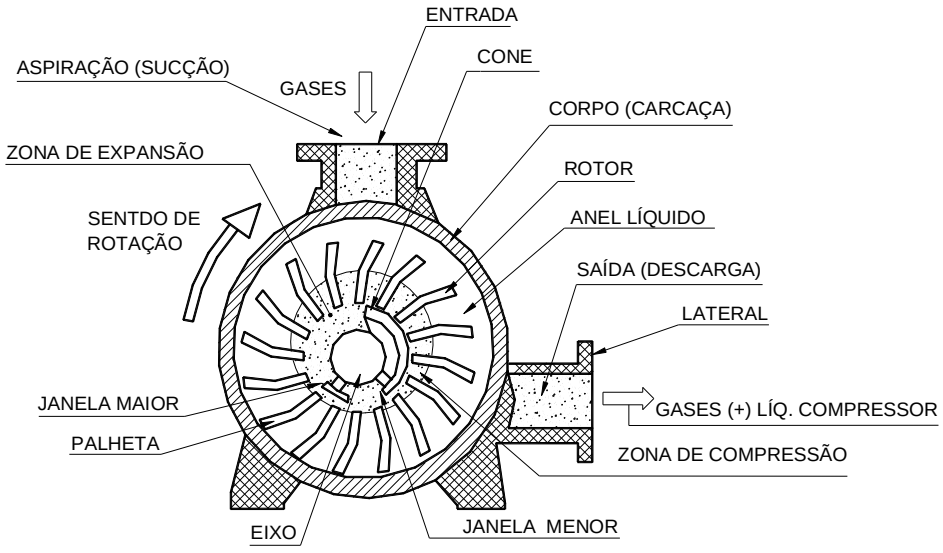


Figura 1

2. RECEIPT AND SURVEY

2.1 PRELIMINARY INSPECTION:

2.1.1. Upon the receipt of any supply IMBIL, you should inspect each equipment, garment, accessory or assembly related (s) in the list (s) of Material (s) according to (s) Note (s) Tax (s).
Vacuum pumps with their drive motors, are generally shipped assembled and coupled on a common basis.
Transfers through games of Pulleys or Elastic gloves, is provided packed the party, not to suffer damage during transport.

2.2 . INITIAL CARE:

2.2.1. Both electric motors as the axis of vacuum pumps may be misaligned at the time of arrival to you, with the same run the correct alignment and engagement with your installation.

2.2.2. The sets should preferably be transported or moved through four or more points of support or base or handle packaging.

2.3 . STORAGE:

2.3.1. If the vacuum pump be installed and put into operation soon after their arrival, there should be storage in the clean and dry. It is advisable to rotate the axis of the pump manually every 10 days or 15 days, for lubrication of bearings and avoid crashes of all-girante, due to possible oxidation or corrosion of the same. Every vacuum pump is immersed in oil soluble, to protect the set-girante and the same before its release for shipment. Prolonged storage should follow the instructions in this manual for the period you need

2.3.2. As usually the Games Pulleys, Elastic gloves for direct coupling, Electrical Panels, etc.., Is provided packed, it is advisable to be kept under the same conditions the receipt, not to suffer damage during storage.

2.3.3. During storage it is desirable that all equipment is properly covered with tarpaulins or plastic for adequate protection against weather or external agents.

3. INSTALLATION OF VACUUM PUMP

3.1. Choice of Venue:

Vacuum pumps of Liquid Ring must be installed in places closest possible point of demand. Must also be settled near sources of water supply, electricity, besides the places of destination of the liquid compressors, gas, air and vapor.

3.2. Preparation of Foundation:

The foundation must be designed and implemented in accordance with local conditions exist for you to support all loads that will be imposed without allowing displacements of equipment on which it will be settled.

The foundation concrete is the most used, not only for its rigidity, as well as the simplicity of implementation.

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The top of the foundation should be placed at a depth of 12mm to 30mm of the floor level.

In the introduction of chumbadores in particular, you should provide sufficient time for the same points that allow for the placement of shorts, base, washers, nuts and implementation of the final surface with mortar

It is advisable to place a tube of about 75mm at the tip of each anchor bolts in concrete, to facilitate the alignment of these holes with the metal base on which the equipment will be seated figures 2, 3 and 4 show in detail the forms of implementation. The diameters of the holes in the base metal should be slightly larger than the anchor.

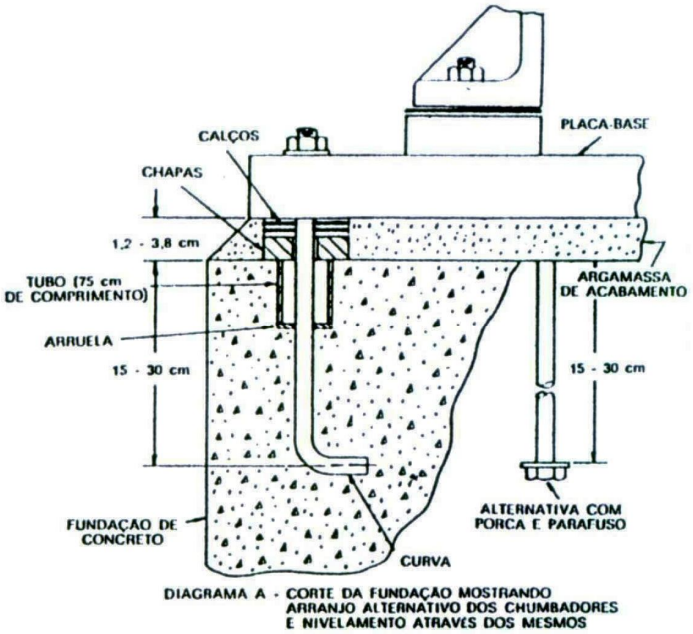

Figura 2

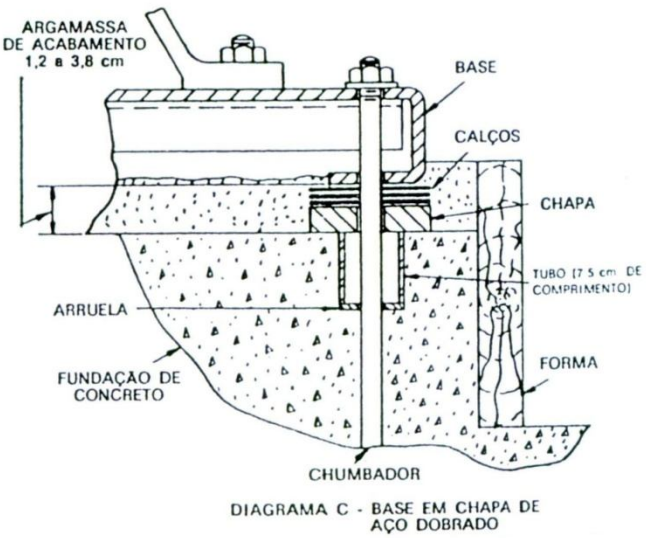

Figura 3

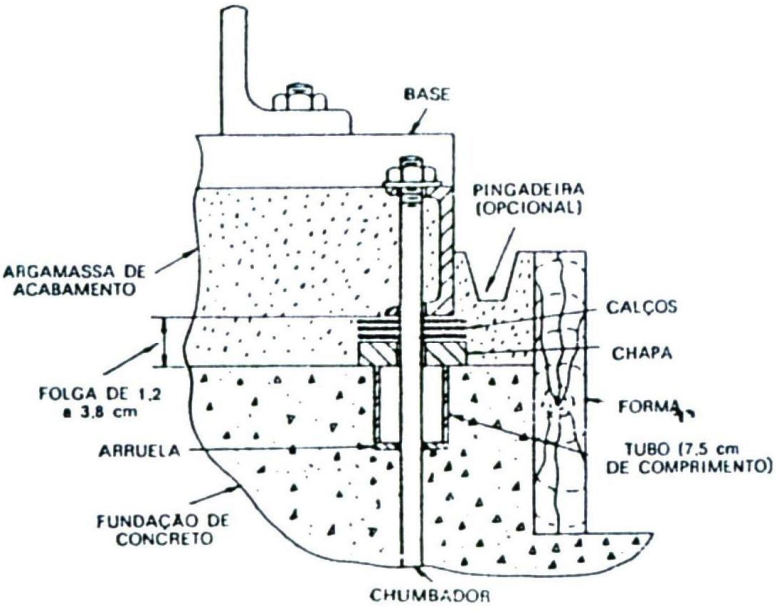

Figura 4

For the positions where they are located chumbadores the flat between them, it is suggested that metal plates put lead in the finishing mortar with the aid of "levels", as shown in Figures 5 and 6.

Loads in the concrete should not exceed 20 kgf/cm2, so there should be metal plates whose surfaces do not allow this pressure on the concert is over.

For alignment, leveling and final assembly of the equipment, it is important that the concrete is cured to reach its full working conditions.

Even if the cure last few days, it is preferable to await the total cure of the concrete, than to anticipate the settlement of charges that may cause misalignments future results.

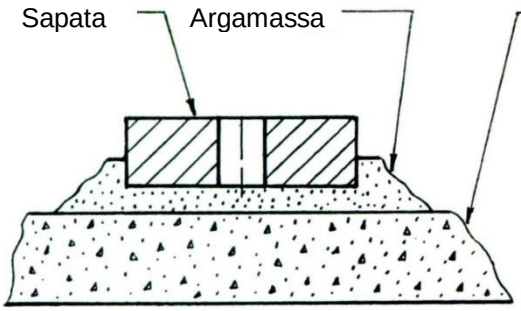

Figura 5

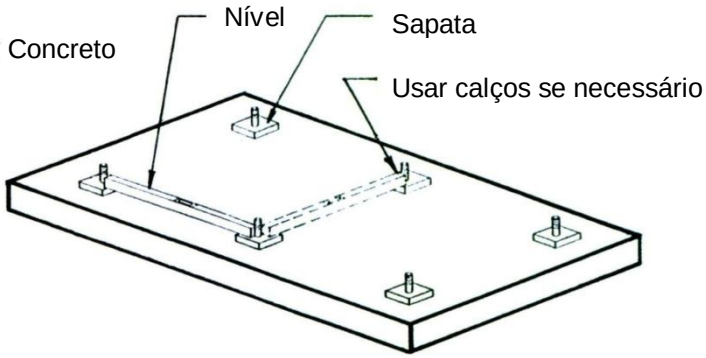

Figura 6

3.3. Settlement and Leveling:

In support of vacuum pumps or assemblies (Pump-Motor), bases or base plates are designed to be fixed with the rigidity chumbadores.

Pumps that are not mounted on base plate or base must be settled directly on flat surfaces and capped. The nuts of chumbadores be expected to be tightened firmly placing the flat washers and pressure. The race is perfect for precision alignment of couplings, pulleys or games of any of the reducing.

3.4. Transmission:

3.4.1. Transmission by Direct Coupling:

When the rotation that should print the vacuum pump of the element coincides with the drive motor is electric, or turbine engine stationary, USA is Direct Coupling of elastic glove. To implement the coupling must be carried as follows:

- ✓ The elastic sleeve must be heated in (oil bath or oven at 100 º C) should not be forced on the axis of the pump. Should not hit the glove on the axis of the pump or the motor assembly to perform a risk of damaging the bearings or internal parts of equipment. Should be avoided on the other hand, the couplings are wide causing excessive efforts in braces. Usually the sets (Pump-Motor) are delivered already assembled and aligned on a common basis.

- ✓ For perfect alignment you use the clock comparator or, failing that, scale and size of metal blades. Radial and axial alignment and implemented that prevent abnormal vibration can interfere with the useful life of equipment.

- ✓ Both the axial and radial alignment should remain within the tolerance of 0.15 mm, following the clearance between the faces of the tips of the axes of the pump and the motor drive according to the manufacturer's specification of the coupling, see figura 7.

- ✓ completed the operations of coupling and alignment, it is recommended in accordance with safety standards, the installation of the Protector Coupling.

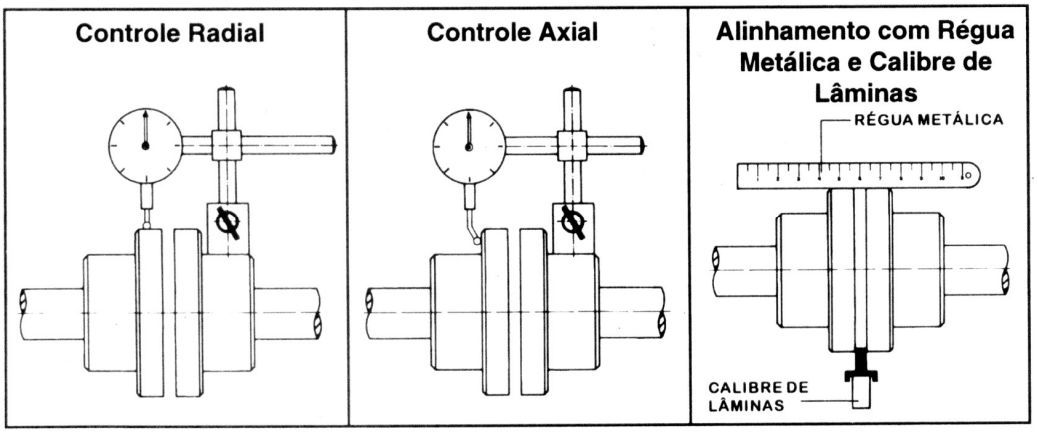

Figura 7

NOTAS:

a. Eventually, a coupling can operate with a slight misalignment caused by changes in temperature or vibration. Even Aluvi elastic is well lubricated, a sharp misalignment can cause wear, vibration, loads in the bearings, thereby reducing the life of them, to trincamento of mechanical seals or locking up the vacuum pump.

b. Misalignments can be angular, parallel or combined in both the vertical and horizontal.

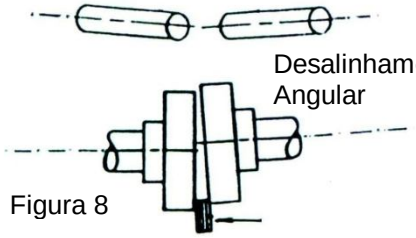

Figura 8

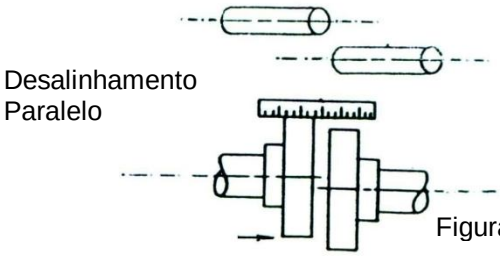

Figura 9

c. It is recommended that the final alignment is performed moving up both lines simultaneously (Pump - Motor) and footwear is the engine until the cubes of the elastic sleeve are positioned within the stated tolerances. It should be noted that all measurements must be taken with sows of chumbadores tightly.

d. The position of the engine should be adjusted until the cubes of the coupling are aligned within the 0.1 mm total indicator reading (or at most 0.05 mm for each side). This holds for the parallel and angular alignment

3.4.2. Set of Transmission by Belts and Pulle:

Transmission through the game of pulleys with grooves, you should proceed as follows:

- ✓ Place the belt pulleys in the grooves without forcing them.
- ✓ Align the pulleys 4 points by the method of using a ruler. The alignment is guaranteed when the 4 points (the closer and further away) to play by the same ruler as Figures 10 and 11.

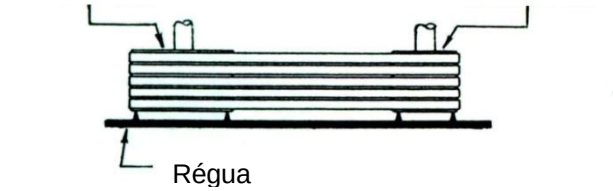

Figura 10

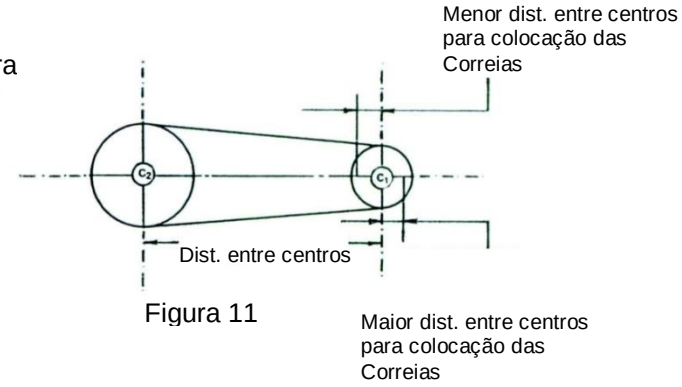

Figura 11

- ✓ The tension is ideal, can trigger the pump when the conditions of maximum load without the belts skated.
- ✓ Check the belt tension frequently during the first 48 hours of operation.
- ✓ voltages above the normal decrease the life of the belts can also harm the bearings.
- ✓ The belts should always be kept clean.

- ✓ You should periodically inspect the belts and pulleys.

- ✓ To correct the tension of belts, it is suggested the following practical:

1. Measure the distance between centers "L", Figure 12
2. Apply a perpendicular force on each belt at the midpoint equidistant between the center to produce an arrow around 15mm for every meter of distance "L"
3. Compare the voltage applied to the values recommended by the manufacturer of belts.
   Repeat the procedure after 02 days of operation there is still the values of transmission in accordance with the recommended parameters
   .

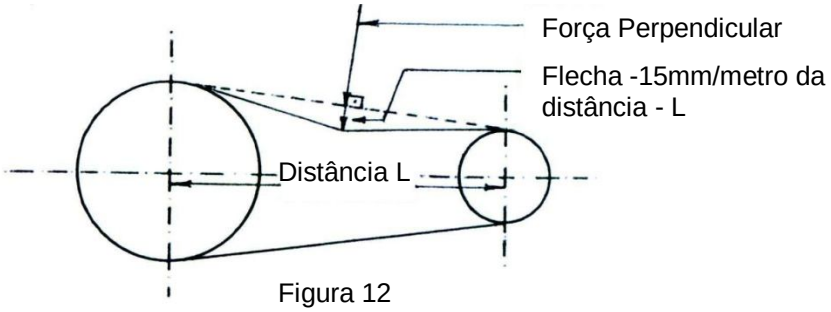

Figura 12

NOTAS: Completed the alignment of services pulleys and tension of belts make sure the pump turns freely and if the engine turns in the correct direction marked by arrow guidance located in the vacuum pump.

3.5. PIPE DISTRIBUTORS AND COLLECTORS:

3.5.1. Distributor Tube Input:

Vacuum Pumps Liquid Ring of the series IMBIL BVI - BVI 1000 a - 9000 has two input flanged nozzles through which the gases are aspirated, located on the upper lids of both sides or simply called Side. These entries can be individually connected to a suction pipe or connected by a tube made in cast iron or carbon steel, called Pipe Distributor Input.

NOTAS: When a vacuum pump is installed, should be placed at each of its entries, protective metal screens in an interim or permanent if necessary, to prevent the entry of foreign bodies inside. Remains of solder, nuts, tow and other solid material may result from the crash damage to the pump when this simple precaution is not taken.

All pumps are supplied with Vacuum IMBIL their protective metal screens, which can be removed so that there is absolute certainty that no foreign body may enter the equipment.

Figures 13, 14 and 15 illustrate the various formats of tubes Distributors of Entry and the location of the metal screens Protection.

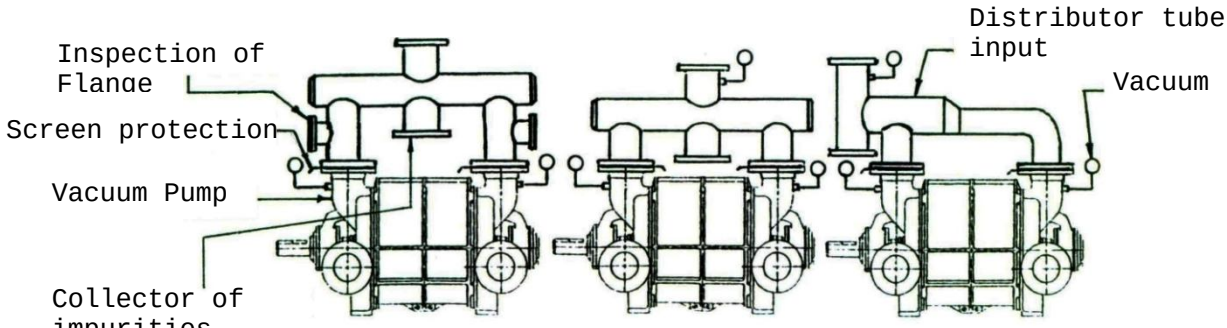

Figura 13 Figura 14 Figura 15

3.5.2. TUBE COLLECTOR OUTPUT:

Each side of the vacuum pumps IMIBIL series of BVI 200 and BVI in 700 is 01 (a) to discharge or flanged nozzle exit located at its bottom.

The vacuum pumps of the series 1000 BVI and 9000 BVI is 02 (two) to discharge or flanged nozzle exit located in its bottom through which the gases leave with the aspirated fluid they injected compressor.

These nozzles can be connected to discharge regardless of the discharge pipes or silencers, separators, discharge, or linked by a common collector pipe constructed of cast iron or carbon steel, known as tube or pipe Collector Output Collector of Discharge.

Figuras 16, 17 e 18 illustrate the various formats of Collectors Pipes Output

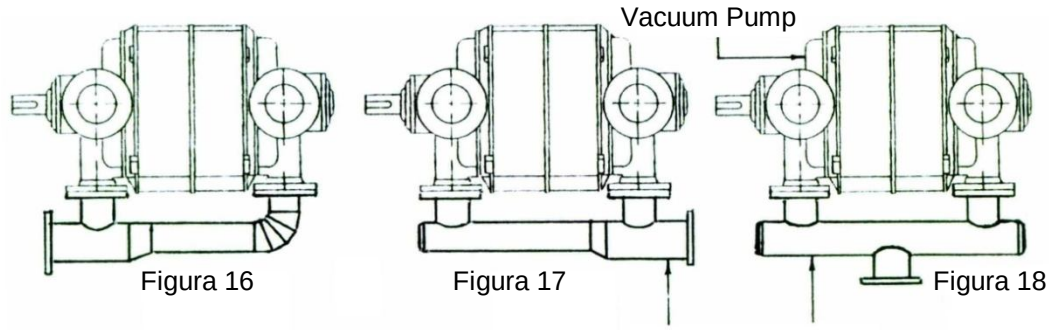

Figura 16 Figura 17 Figura 18

Tubo Coletor de Saída

3.6. PIPES:

3.6.1. Tubing or vacuum suction:

- ✓ What does not impair the performance of the vacuum pump in its perfect operation should be taken with some care with the tubing and connections
- ✓ Never the Vacuum gauges of tubing may be less than the inlets of the suction pumps or nozzles of the tubes leading Distributors of Entry.
- ✓ When you connect the tubing to the vacuum pump, you should avoid any tension in the connections, whether in or f º f º carbon steel, under risk, once the vacuum pump into operation, vibrations occur, or misalignments of coupling transmission , displacement of the sides with possible damage to equipment or the tubing itself Vacuum.

- ✓ The tubing must be mounted and aligned to be connected to vacuum pump without compressing it or pull it.
- ✓ It is recommended the use of flexible joints or mangotes in order to ensure cancellation of any estorços that may damage the vacuum pump or the facility as a whole.
- ✓ The suction pipe must meet technical criteria based on the characteristics of cases that meet, taking in mind that can never make sifonamentos, points of accumulation of solid materials or liquids.
- ✓ paths must be well designed and excessive deviations should be avoided in order to minimize the effects of loss of load distribution and natural respectively.

Figures 19, 20 and 21, illustrating positions of joints flexible and mangotes in Vacuum tubes.

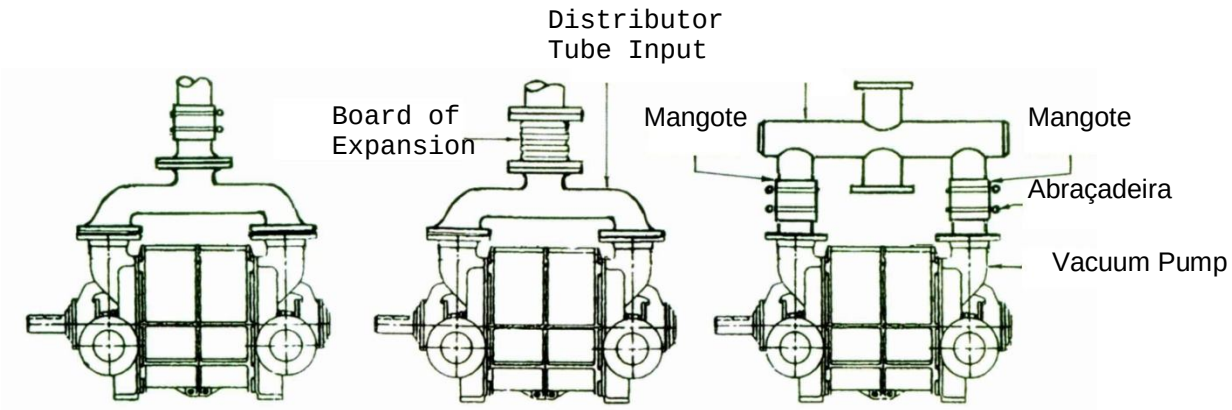

Figura 19 Figura 20 Figura 21

3.6.2. Pipe Output of discharge or:

The recommendations described above are valid in the pipe for the discharge or exit of the vacuum pump.

However depending on the characteristics of the process to which the vacuum pump is designed, it may be necessary to install a peripheral accessory called Silencer - Tab Downloads.

This device and exits the liquid-gas compressor and independent, should have their connections connected to gas pipe and tubing hydraulic respectively. In the case of hydraulic tubing shall be observed the same recommendations given for the gas pipe.

3.6.3. Silencer - Tab Downloads:

It is a peripheral device manufactured in carbon steel plates welded, cylindrical body with internal chicane, whose basic function is not only to reduce or eliminate the noise emitted by the vacuum pump when in operation, but also to separate the liquid compressor of the gas aspirated by the pump.

The Silence - tab to download is always positioned between the exit of the vacuum pump and the discharge pipes of the gas and liquid compressor.

In principle all of Ring Vacuum Pump Liquid should be provided with their silence - the download tab, but this is an optional accessory, the user buy it or not.

Figures 22, 23, 24, 25, 26, 27, show the various ways of connecting the vacuum pumps in the discharge piping, with or without their Silencers - Tabs..

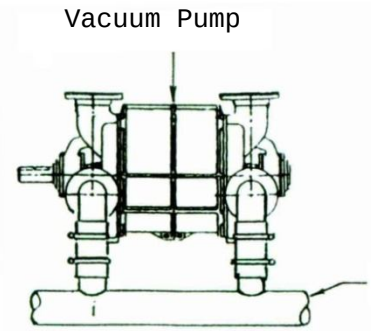

Figura 22

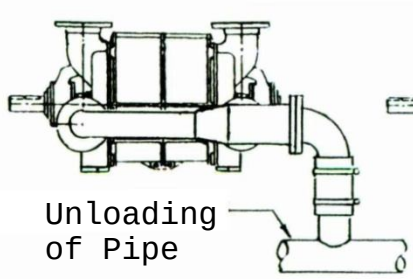

Figura 23

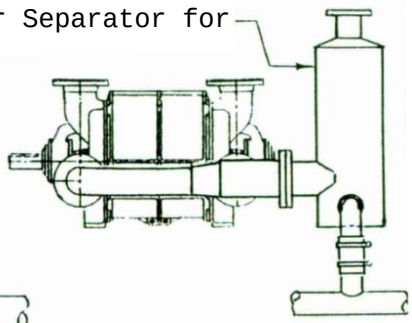

Figura 24

Figura 25

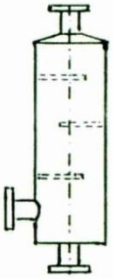

Figura 26

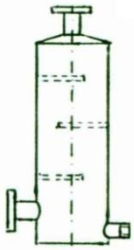

Figura 27

NOTAS: a. Each Side of the Ring Vacuum Pumps Liquid IMBIL models of BVI 200 and BVI in 700 have only 01 (a) flanged outlet through which the gas is discharged liquid and the compressor while.

b. The vacuum pumps of Liquid Ring IMBIL models and BVI 1000 BVI 9000 have in their sides 02 (two) outputs flanged you may choose to discharge the gas and the liquid aspirated compressor to the side it is more convenient. Figures 28, 29, 30, 31, 32 and 33

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BVI 200 e BVI 700

Figura 28

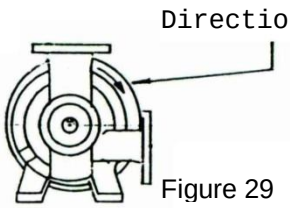


Figure 29

Figure 30

BVI 1000 e BVI 9000

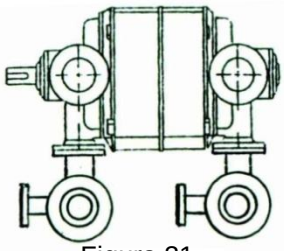


Figura 31
Silenciador Separador de Descarga

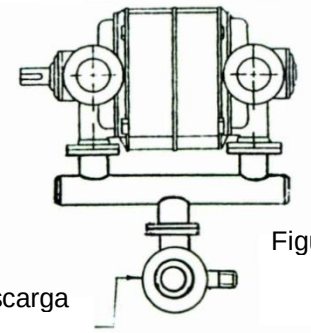


Figura 32

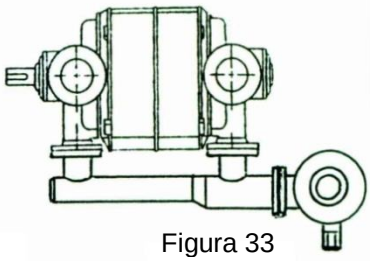


Figura 33

4. The vacuum CONTROLS AND LIQUID COMPRESSOR

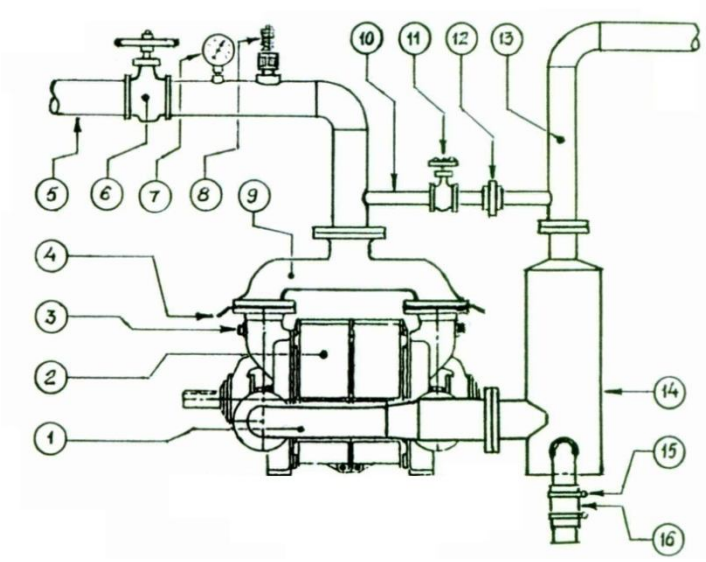
4.1. Control and adjustment of vacuum levels:

The levels produced by the vacuum pumps Vacuum IMBIL can be controlled mainly in two ways:

1. Opening up or closing records are installed on the lines of Vacuum.

2. It is part of the recirculated gases aspirated for discharge of vacuum pumps as shown in Figure 34.

1	Tube Collector Output (Discharge)
2	Vacuum pump of liquid ring
3	Plug the nozzle of the suction side
4	Screen Protection
5	Suction pipe
6	Gate Valve
7	Vacuum
8	Break Valve - Vacuum
9	Distributor Tube Input
10	Tubing for Relief
11	World record
12	Union
13	Unloading of Pipe
14	Silencer-separator of Discharge
15	Abraçadeira
16	Flexible Mangote



NOTA: BREAKING VALVE Vacuum:

The vacuum break valve has a basic purpose to protect the vacuum pump so that when in operation, not exceeding their limit of pressure, from which the phenomenon of cavitation occurs.

Exceeding the maximum vacuum that the pump is capable of achieving, it will operate under cavitation, which is detrimental to their performance and their life

This is a safety device that should not be used as a controller of the Vacuum. For users who might use this valve for this purpose, we remember the inconvenience of this option, due to operate with wasting energy when not suck air from the process.

4.2. CONTROL AND ADJUSTMENT OF NET COMPRESSOR:

The Flow of Liquid compressor needed for each type of vacuum pumps in series BVI is given in Table 2, immediately below.

Through a record of control (recommend globe valve), which, together with the aid of a union of hole and the installation of a pressure gauge, you can maintain a constant flow supplying the needs of Vacuum Pumps.

The pressure of the liquid feed compressor should not exceed 1 kgf/cm2 .

"Flow of Liquid Compressor"

VACUUM PUMP SERIES	LIQUID COMPRESSOR (l/min)	SUPPLY PRESSURE lbf/pol^2 (max.)
BVI 701	38	5
BVI 702	68	10
BVI 703	76	15
BVI 1001	57	5
BVI 1002	76	10
BVI 1003	115	15
BVI 2001	76	5
BVI 2002	95	10
BVI 2003	190	20
BVI 3001	95	5
BVI 3002	150	10
BVI 3003	265	20
BVI 4001	152	5
BVI 4002	190	10
BVI 4003	380	20
BVI 6001	228	5
BVI 6002	380	10
BVI 6003	532	20
BVI 9001	437	5
BVI 9002	456	10
BVI 9003	760	20

Tabela 3

4.2.1. Union of hole Calibrated:

The most practical way to control the liquid seal is the installation of the line power of a union card equipped with a calibrated hole, which according to the pressure differential established, ensures the correct flow of coolant compressor Vacuum Pump.

Table 4 shows the gauges of the Unions and the diameters of the holes for each of the vacuum pump series BVI.

BOMBA DE VÁCUO SÉRIE BV	UNIÃO Ø	ORIFÍCIO DA PLACA DE ORIFÍCIO
BVI 700	1"	½"
BVI 1000	1 ½"	$^{19}/_{32}$"
BVI 2000	1 ½"	$^{11}/_{16}$"
BVI 3000	2"	$^{13}/_{16}$"

Tabela 4

Other Controls**:** Other forms of control can be implemented through the installation of flowmeter or flow indicators of the hydraulic power piping, enabling the real abservação of the liquid flow compressor.

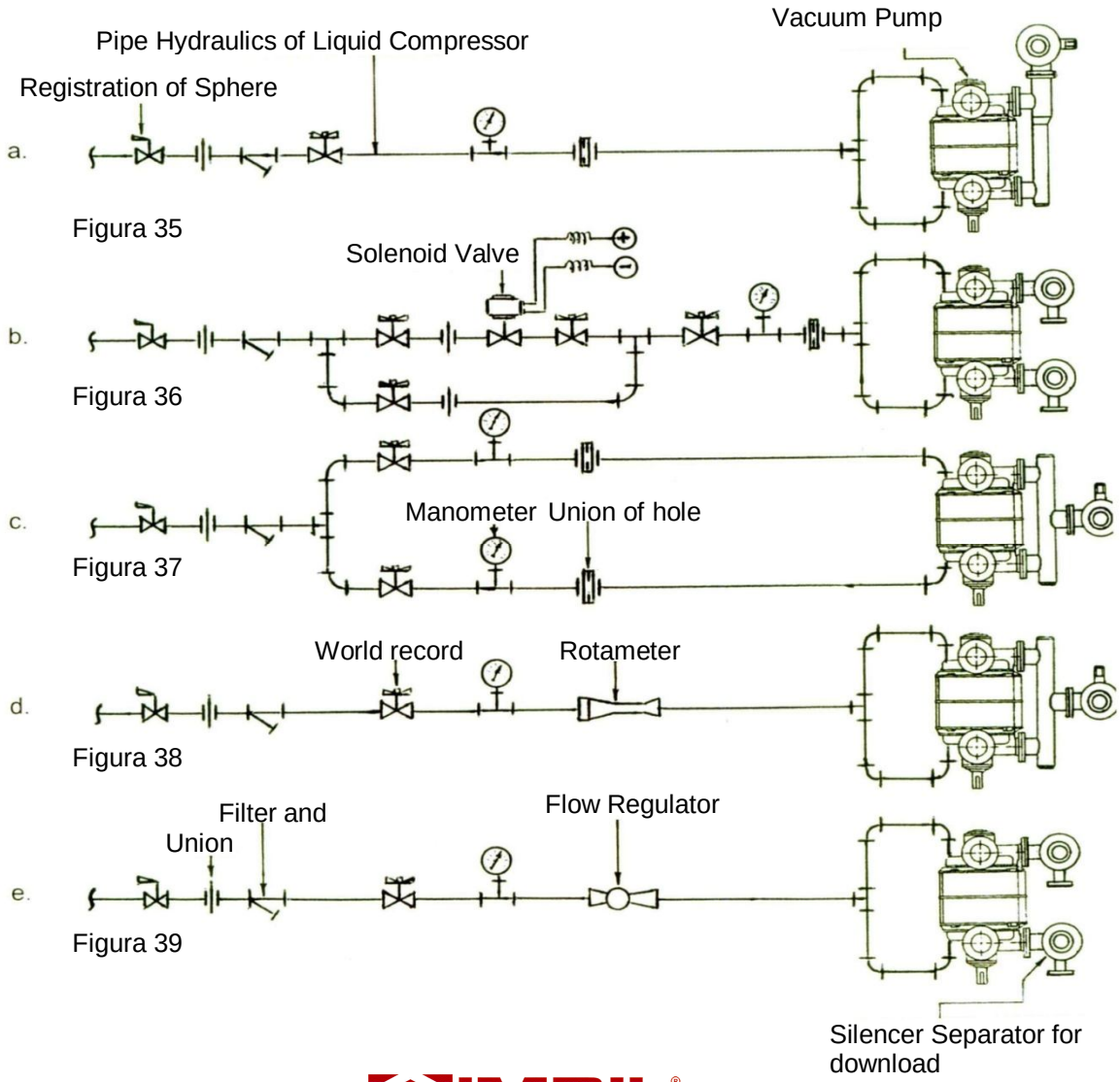
4.2.3. Regulation of the Net Compressor:

The adjustment of the liquid compressor can be made by manual adjustment by opening or closing of the record world.

It is recommended that the registry is fully open before starting the vacuum pump and is gradually closed until the vacuum is affected. When the fall of the vacuum, you should increase the supply of liquid compressor until reaching the maximum vacuum that the pump is capable of providing.

NOTA: It is advisable (with the vacuum pump in operation), if you adjust the supply of liquid for sealing with a ammeter indicating the current drawn by the electric motor so as to never exceed the rated current indicated on the nameplate to identify the same.

4.3. Diagrams of Lines in Hydraulic Fluid Power Compressor:



5. SYSTEMS OF SEALING IN VACUUM PUMP

5.1. Set of gasket for sealing:

Every vacuum pump is 02 (two) boxes of gasket. Each box should accommodate from 6 to 7 ring gasket to prevent the removal of liquid by the axis of the compressor pump.

When you install each ring the ends must be joined with successive deviations from 120 °, thus providing the cooling of the tip of the axis in the regions where the gasket is housed.

5.2. Drip:

With each box, gasket and full vacuum pump running, you must press the overlapped until the liquid from leaking compressor is reduced to a constant drip. This ensures not only the drip cooling the tips of the axis, but also the oil regions of the boxes, avoiding the burning of the gasket and premature wear of the axis in the local packing.

In cases considered normal (non-aggressive), the durability of the gasket is around 02 (two) years from 03 (three) years of operation (24 h / day).

When you replace the gasket, you should remove all solid particles and other waste, cleaning up the boxes carefully.

The return games of gasket should occur when the tightness of the overlap can no longer keep the drip, allowing the removal of large quantities of liquid sealing of the boxes to accommodate the gasket.

5.3. Hydraulic Sealing by sealing:

The hydraulic sealing is recommended when the boxes of gasket should not allow the occurrence of leakage or dripping of liquid compressor.

This is the introduction of a Ceramic Ring (Ring - Flashlight) drilled between gaming gasket, so that fluid is entering the high pressure of the gasket in the boxes, avoiding any possibility of removal of liquids or gases regions of packing.

`Figure 40` shows the appearance of the fence by Hydraulic Sealing:

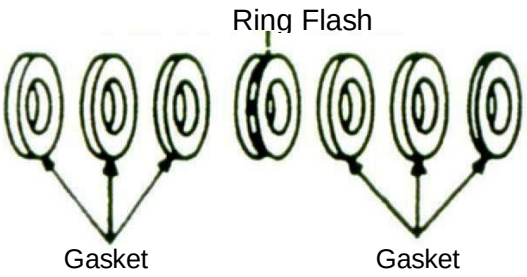


Figura 40

5.4. Sealing by mechanical seal:

The Mechanical Sealing is the installation of Mechanical Seals in place gasket of the games. This type of fence is recommended for specific applications where there

is need for total tightness of the vacuum pump. The sealing of Mechanical Seal does not cause friction on the tips of axes.

6. DOWNLOAD AND DRAINAGE OF vacuum pump

- ✓ All the Vacuum Pumps Liquid Ring IMBIL should or could be alleviated or drained depending on the case.

- ✓ Vacuum pumps operating in high vacuums, thus consuming larger quantities of liquids compressors are equipped with hydraulic lines relieved by connecting the sides of their discharges. These lines have a relief valve retention giving passage to the exit of the pump allowing the sealing liquid is discharged, when the vacuum suddenly hits lowest level. This check valve closes automatically when the vacuum pump reaches its operating.

- ✓ The vacuum pumps have also bujões drainage located in various points of the sides and bottom of the same Corps.

  Bujões allows removal of:

  a. Drain the liquid from compressor pumps Vacuum.

  b. Permanent removal of foreign materials that may enter the pump during its operation

  c. Removal of large volumes of liquid that can be aspirated by vacuum pumps

See figure 41 e 42:

Vacuum Pump

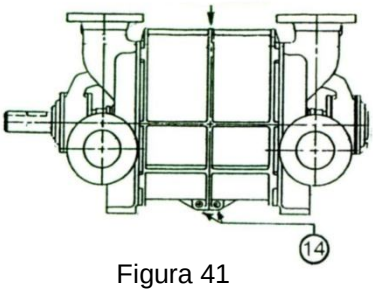


Figura 41

Pipe Hydraulics of Liquid Compressor

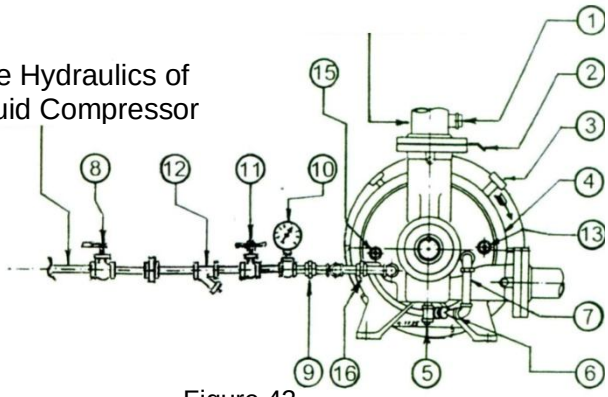


Figure 42

1	**Window Inspection**	**7**	**Tubing for Relief**	**13**	**Plug the drain**
2	**Screen Protection**	**8**	**Registration of Sphere**	**14**	**Bujões of drain**
3	**Body**	**9**	**Union of hole**	**15**	**The plug side**
4	**Side**	**10**	**Manometer**	**16**	**União.**
5	**Plug the drain**	**11**	**Registration Globe Control**		
6	**Check valves**	**12**	**Y Filter**		

7. PARADAS PROLONG AND STORAGE.

7.1. Paradas prolonged:

- ✓ It is understood by prolonged shutdown, the equipment turned off for more than 20 days when placed in its local operation. As the liquid supplied to the compressor vacuum pump is usually "water", is usual internal oxidation of the equipment.

- ✓ Vacuum pumps manufactured in f º f º or carbon steel are likely to stop because of the formation of layers of rust preventing the movement of all-girante. For the release of all girante you can try to introduce within the anti-corrosive pump solutions and manually seek their release. There are situations, however that the dismantling of internal cleansing with subsequent vacuum pump can not be avoided, which results in costs in most cases unnecessary.

- ✓ It is therefore prolonged stops whenever the following actions:

1. Remove all bujões sides of the drainage and the dischargers bujões of the body of the pump.

2. Open water supply to the sealing of letting it run through the drains before leaving clean water through them.

3. Close to food and water is manually rotating the shaft of the pump, make sure that it is fully drained.

4. Replace all bujões using the sealing material in the threads.

5. Enter soluble in oil pump vacuum nozzle through the input, moving the set-girante, to lubricate the inside of the equipment.

6. Tampa, both the input and the nozzle output with blind flanges (disks - buffers) of wood or plastic.

7.2. Storage:

Receiving the item has already been referred to the original procedures for Storage.

So if the intention is to store the equipment, it should be do the following:

1. Make sure the caps of the nozzle in and out of the vacuum pump and are tied (by screws (+) nuts, or wire), so it will not move or loosen with any handling of equipment.

2. Look clean and dry where the equipment can be deposited.

3. Make sure the pump is lubricated internally. If in doubt, remove the existing bujões coming from the nozzle into the sides and pour oil soluble, the hypothesis of a protective buffers have already been posted in them. Then replace the seal material bujões with the threads.

4. Vacuum pump to protect against dust, weather or external agents, covering it with canvas or plastic, allowing easy access to the same end of the shaft to turn it manually every 10 days or 15 days. Thus it provides the lubrication of bearings and to avoid possible crashes of all possible oxidation by-girante.

5. Choose from local storage to facilitate easy installation and removal of equipment.

8. LIST OF PARTS

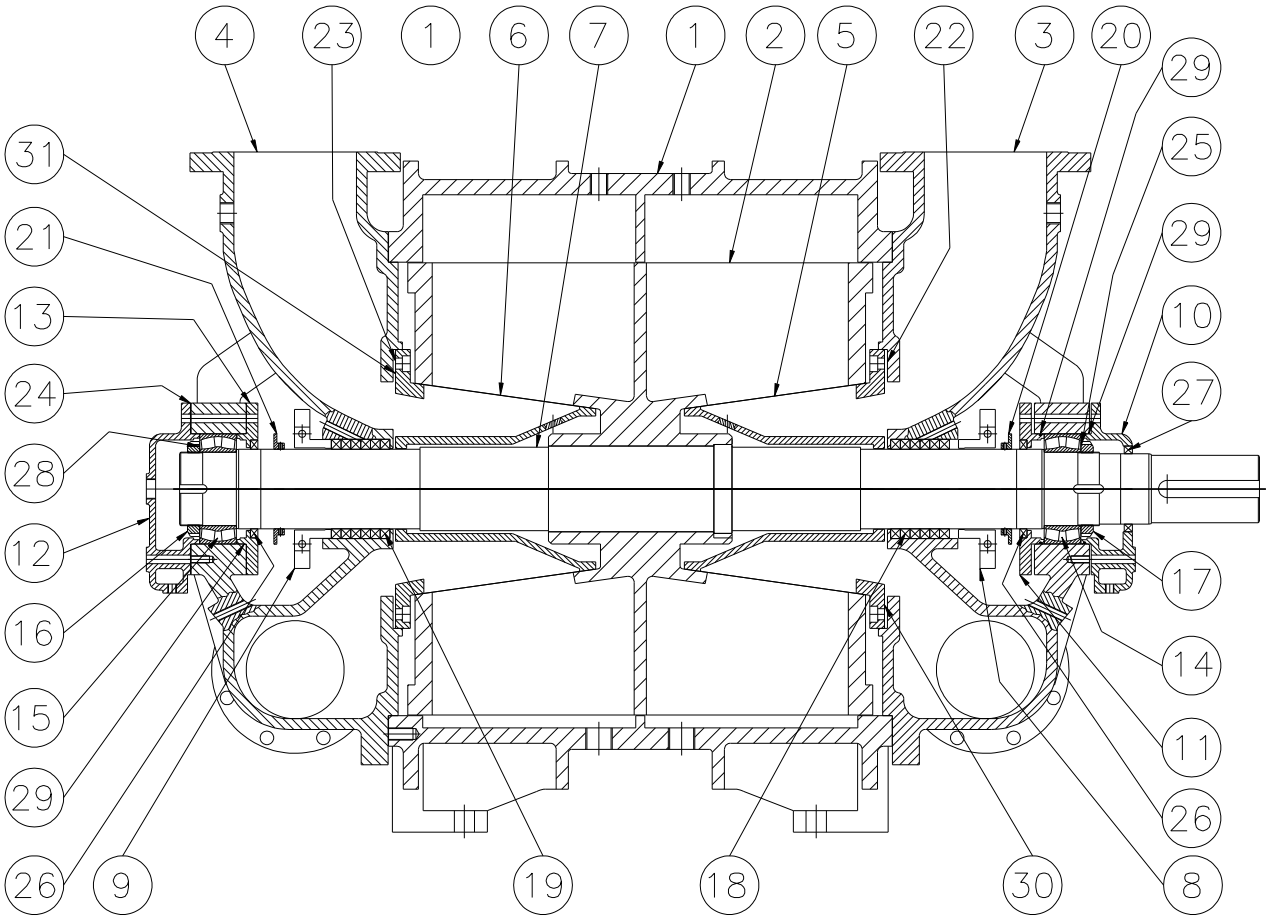


Figura 45

1	Body	13	Tampa ext. Bearing (L.B.)	25	Lock Washer (L.A.)
2	Impeller	14	Roller (L.A.)	26	Retainer (L.A/L.B) Nr. 1
3	Side - Nr. 1	15	Roller (L.B.)	27	Retainer (L.A.) Nr. 2
4	Side- Nr. 2	16	Lock Nut (L.B.)	28	Lock Washer (L.B.)
5	Cone - Nr. 1	17	Lock Nut (L.A.)	29	Ring "O"
6	Cone - Nr. 2	18	Gasket (L.A.)	30	Join of Cone (L.A.)
7	Axis	19	Gasket (L.B.)	31	Join of Cone (L.B.)
8	Superimposed (L.A.)	20	Desgotador (L.A.)	L.A	Driven side
9	Superimposed (L.B.)	21	Desgotador (L.B.)	L.B	Blocked side
10	Tampa Ext bearing (L.A)	22	Join the Corps (L.A.)		
11	Tampa int. Bearing (L.A)	23	Join the Corps (L.B.)		
12	Tampa ext. Bearing (L.B)	24	JoinTp Mn. Ext. (L.B)		

9. DISMANTLING AND ASSEMBLING

9.1 Disassembly:

9.1.1 Preparation for Disassembly:

Before starting the disassembly you should follow the following procedi:

1. Have on hand all the resources, tools and devices suitable for manipulating the equipment, parts light and heavy.

2. Check the weights of the main parts shown in Table 6.

3. Look clean, well lit and spacious enough to be carried around all the equipment with safety and freedom of movement.

4. Place the vacuum pump on a table (height (±) 85 cm) rigid and strong enough to withstand the weight of the equipment and any movements that have to be imposed on Pump.

5. Choose trained technician to proceed with the disassembly of at least 01 (one) assistant.

6. Drain the vacuum pump removing the bujões located in the lower body of the same.

7. During disassembly, to be careful (no hurry) and organized, you should "mark" each part or parts of game, putting them in an orderly fashion in place of easy access and viewing, to ensure easy and correct it later reassembly.

9.1.2 Top of Disassembly:

Disassembly should be started from the lake bearing blocked (of adjustment) following the procedures below:

1. Remove the screws of the bearing cap foreign-locked.

2. Remove the cap-foreign, exposing the roller adjustable.

3. Remove the grease the bearing, if lubricated with grease or oil, where is the oil lubricated.

4. Remove desgotador.

5. Remove the Washer-Lock, desentortando the rebound of the same concerns that the notch in the Nut-Lock.

6. Remove the nuts from removing these overlapping.

7. Remove the ring gasket.

Note: If the fences have axis of Mechanical Seals, removal of mobile and fixed components of the same shall be executed with the utmost care.

8. Side prey for prisoners with screws fixed in the body, remove the nuts from them. Pumps without prisoners have their prey just by Side screws.

9.1.3 Extraction of Bearings:

For extraction of bearings is recommended that tirante and prepare to run the special service. Having the appropriate tools available, you should follow the procedure below:

a. Enter 3 tirante pass through the holes of the bearing box (the rod should go well just by holes), fixing them with nuts on the flat face of the external device support and the bearing Tampa International.

b. Place a hydraulic jack between the tip and shaft support system as in Figure 46.

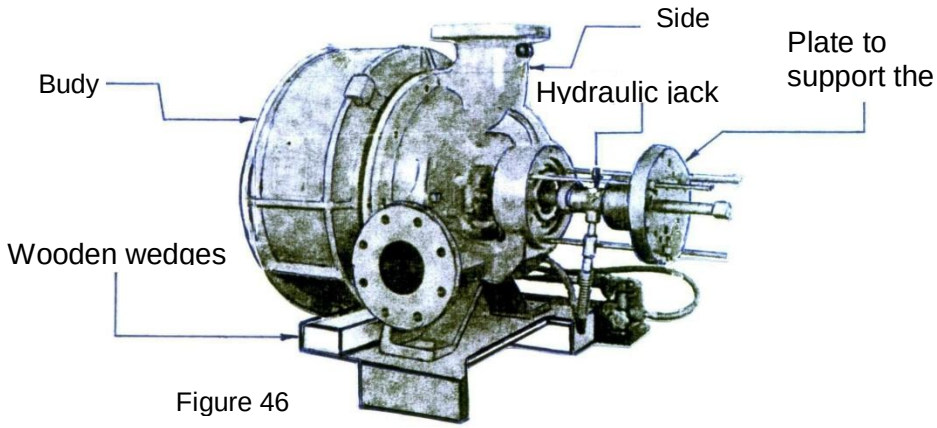


Figure 46

c. Before Removing the Side, trousers the body (carcass) of the pump to be fixed.

d. Triggers the hydraulic jack to pull the bearing axis, while the Side of Body.

e. the bearing on the activated using a roller-bag as Figure 47.

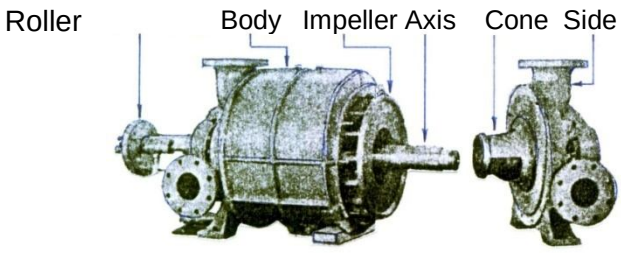


Figura 47

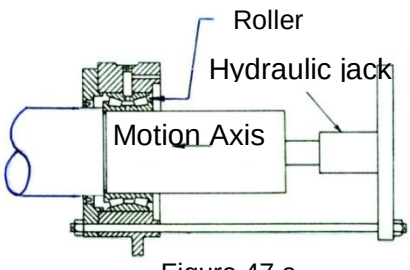


Figura 47 a.

f. Vacuum pumps in which bearings are mounted "hot" and not "by interference", the bearings should be heated, keeping it cold while the axes and then using the bag-bearings, you can extract them with facility is of course taking care that all necessary..

9.1.4 Removal of Cones:

To remove the cones from vacuum pumps to large, you should put the sides lying on the table for dismantling and applied to a pair of hooks in the openings of the same.

9.1.5 Assembly-disassembly of Girante (Rotor-axis):

It is very important to make clear that disassembly is only possible in the rotor iron.

The set-Axle Rotor must be raised by a girdle (belt width), placed around the midrib of the rotor is driven to a press capable of accommodating the entire set for implementing the extraction of the axis of the rotor.

Place a bush whose internal diameter is sufficient to pass through the axis. One of the ends of the bushing to pull only the pressing of the rotor hub and be supported by the back plate of the press.

The rotor can be locked by wedges and ropes fixed by bystanders through the spaces between its blades.

It is advisable to provide a support for supporting the shaft in that it is being extracted from Impeller.

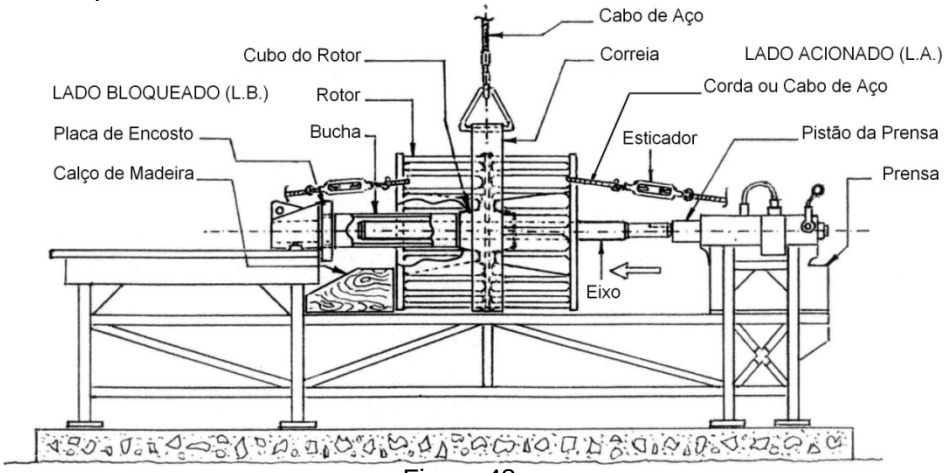


Figura 48

9.1.6 Internal Inspection:

After the disassembly you should carefully inspect all pieces regarding possible I wear damage due to the effects of erosion, corrosion or foreign materials from entering the equipment. If foreign materials have intensity of damage, which determine the possibility of repair, or scrap of parts inspected.

9.2 Mounting:

9.2.1 Assembly of the Joint Girante (Rotor-axis):

Only in rotor-Cast Iron. For rotors Stainless Steel Girante the set has been assembled from factory.

The process of assembly is somewhat similar to the dismantling of course in reverse, in which USA is the same press which is made to withdraw the rotor axis.

The assembly of the vacuum pump of liquid ring IMBIL begins with the preparation of the components that constitute the Joint-Girante (Rotor-axis). Thus, you should remove any burrs going to be a file in the edges of the cube of the rotor in conical sections of the rotor blades and their extremities, so that eliminated any interference, to ensure perfect assembly.

Rectified if the seats in the axis for positioning the rotor and the bearings are scratched or with teeth, it is desirable to move a fine sandpaper is removing any irregularities. Surface rectified these seats should be applied desengripantes like "Molycote-Graphited" or similar to prevent the action of pressing engripamentos.

For pressing the Set-Girante, you must suspend it with a wide belt, passing it around the midrib of the rotor is set to lead the press. The axle should be positioned within the hub of the rotor through a pressing force of between 0.75 to 7.5 Tonf. And 18 to 50 Tonf. According to the size of the vacuum pump.

9.2.2 Settlement of Cones:

For the settlement of each cone should be placed on their side of the table assembly and after examination trifle of suction and discharge openings in the side, you can hold the cone with the corresponding screws Allen.

Before the settlement of the cone should be made to move the platform fillister Side of the joint paper previously calibrated shoeshine. The tightness of the screws that follows, to culminate the perfect faceamento flange of the cone with the platform side of the circular.

9.2.3 Mounting Position:

Under the direction of curvature of Vane Vacuum Pump, the nozzles out of it and the position of the tip of the shaft Powered hand, there are several mounting positions to be observed in the assembly operation Set-Rotating, as Figures 49, 50, 51, 52, 53, 54, 55 e 56.

1. **For the Series Vacuum Pumps BVI** – 200 a BVI – 700:

Position Nr. 1

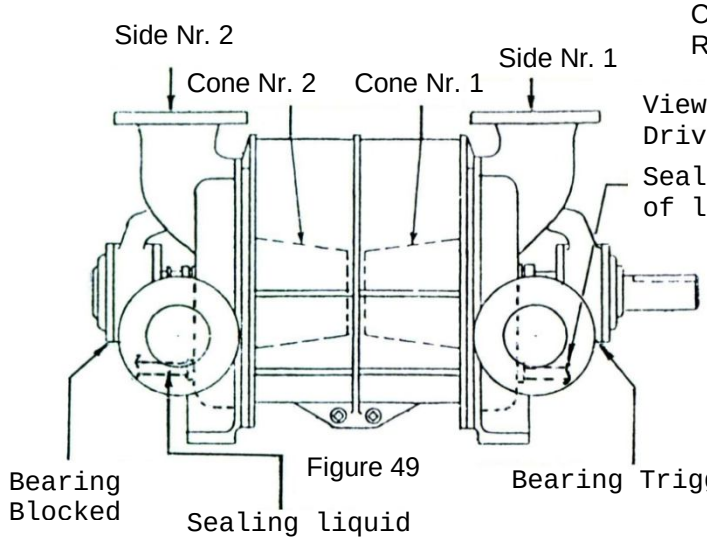


Figure 49

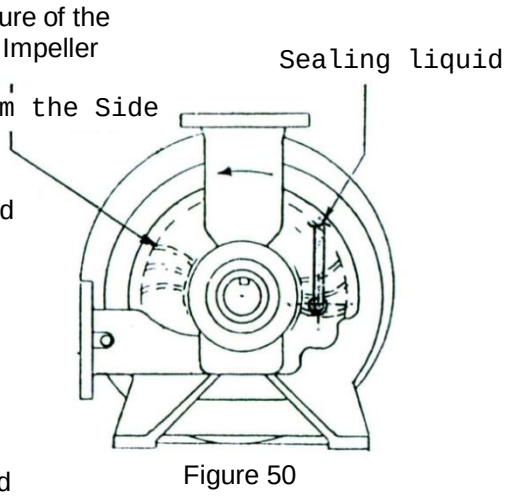


Figure 50

Position Nr. 2

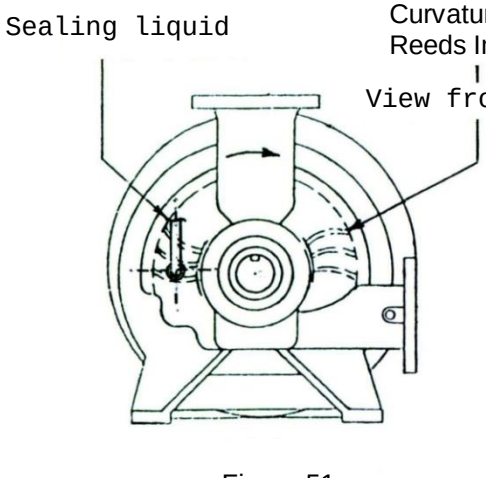


Figure 51

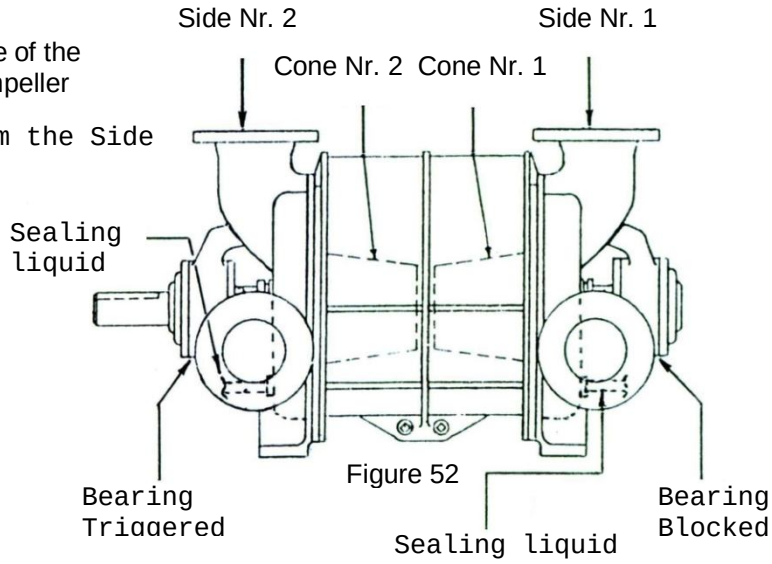


Figure 52

2. **For the Series Vacuum Pumps BVI** I-1000 e BVI-9000:

Position Nr. 1

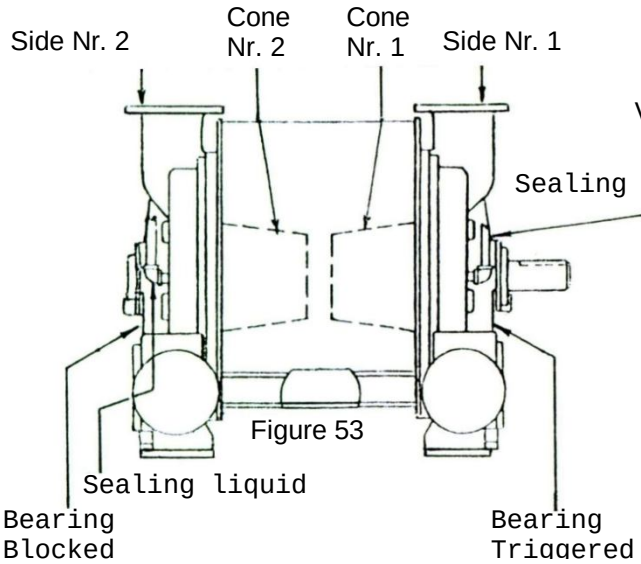


Figure 53

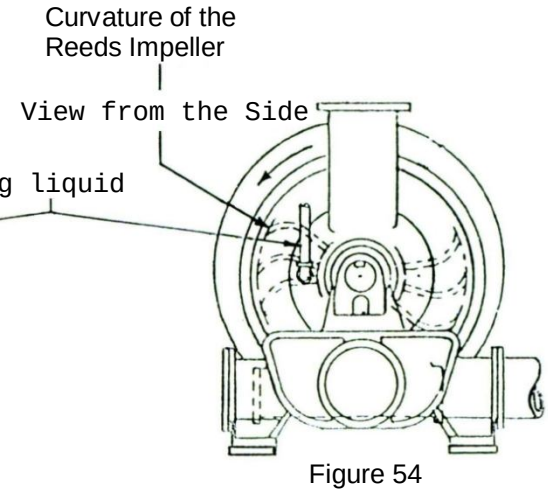


Figure 54

Posição Nr. 2

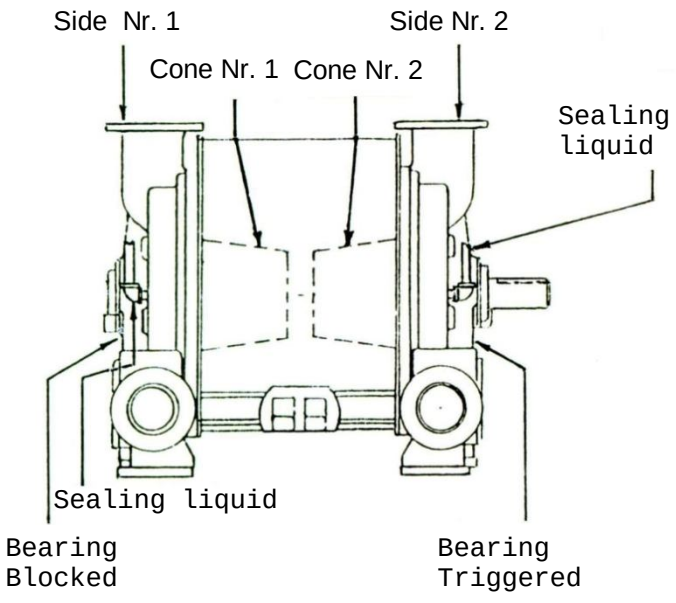


Figure 55

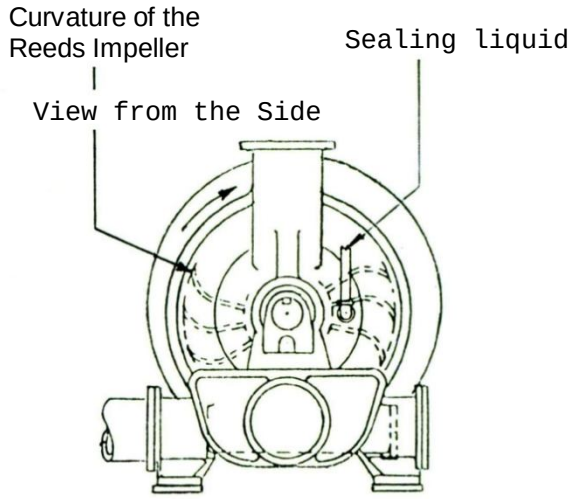


Figure 56

9.2.4 Mounting of Body, Set-Girante and Side:

To implement this step, you must put your body on the table assembly supported by and locked block and wooden wedges, using the same support sitema used in disassembly. Then you should enter the set-Girante (Rotor-axis) in the body with the aid of the tackle or traveler opposite side driven by the disassembly, positioning it to allow the closing of the vacuum pump with the Covers sides (sides).

Like any weight is borne by the feet Covers Side, it is necessary that the assembly is carried on a table absolutely flat and level. Before you attach the sides to the game of prisoner's nuts to the bolts or set screws Corps, you must place their joints (shoeshine) at each end of the seat body (housing) and then proceed to setting the sides.

9.2.5 Placing of Bearings:

In this step, the vacuum pump is closed. The placement of the bearings should be started by hand blocked. Once the game against Tampa shoeshine joints of Internal bearing on that side, you should put the ring "O" when the case in Tampa's Internal bearings. Use a device or a metal tube that touches the internal and external diameters of the bearing, do the latter reaches the back of the axis.

Once the bearing reaches the back of Axis, you should put the Washer and Nut-Lock-Lock respectively, see the suggestion of the device, Figure 57. The Roller Side of Driven to be mounted in the same way as the side Blocked.

:

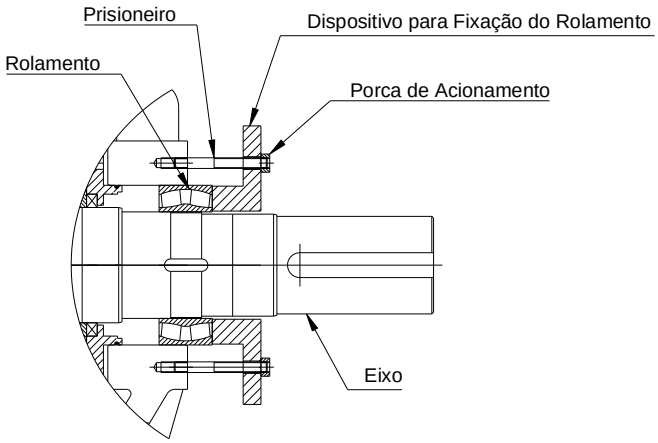


Figure 57

9.2.6 Axial adjustment and Folga:

This step to be the most important and delicate process of fitting, we recommend that qualified to run the assembler, aided by 02 (two) assistants .

The adjustment consists of the following:

1. Check the axial clearance is moving the Joint Girante-hand side toward the locked until the rotor begins to scratch the side of Cone. Continue to drive until you feel light-blocking of the Joint Girante. This operation must be performed with one of the Helpers hear the noise of scraping the top, while the assembler performs the longitudinal movement of the second set-Girante Helper continuously print the whole manual rotation-axis rotor (with a special key). With a size of Folga should be measuring the distance between the bearing cap foreign locked box and the Roller
   .

Repeat the above procedure to move along the assembly Girante-Driven toward the side. Again with a size of Folga should be measuring the distance between the bearing cap and the bearing box. The Axial clearance is the difference between the distances measured. Table 11 shows the Axial clearances of the various models of vacuum pumps.

2. Repeat the above procedure to move along the assembly Girante-Driven toward the side. Again with a size of Folga should be measuring the distance between the bearing cap and the bearing box. The Axial clearance is the difference between the distances measured. Table 11 shows the Axial clearances of the various models of vacuum pumps.

Vacuum Pump Series	BVI 200	BVI 300	BVI 400	BVI 700	BVI 1000	BVI 2000	BVI 3000	BVI 4000	BVI 6000	BVI 9000
F°Fº	1,52	1,52	1,52	2,03	2,03	3,05	3,56	4,06	4,82	6,35
INOX	3,30	3,30	3,56	4,06	4,57	6,60	7,12	8,12	9,64	12,79

3. The thickness of the game of Shoe-calibrated adjustment indicate that their quantity and measures should be from the measurement of axial clearance.

9.2.7 Closing and locking of the vacuum pump:

The locking of the pump running in side locked, ensures total immobilization of the joint-Girante by placing shoes-calibrated.

Corresponding to the Axial Gap, who will be stuck with mounting the Tampa side of the foreign-locked. (L.B.).

The final closing of the vacuum pump, is the placement of the gasket sets of two boxes in the pump with their games of overlap, installation of tubing of relief (when appropriate), and the placing of Bujões plugs in nozzle entry and exit respectively

.

Notas: The selection and placement of gasket recommend the following care:

1. Check the amount and type of gasket to be used to ensure a correct sealing.

2. The material of the gasket should be suitable for the gas and the liquid aspirated compressor.

3. To cut the gasket of the Rings, it is advisable to use a simple device that we as Figure 57.

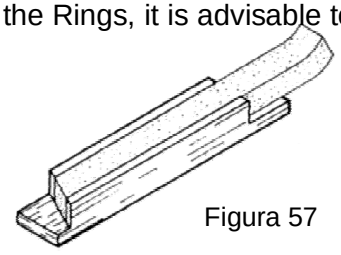


Figura 57

4. Before placing the ring gasket of the accommodation that the behavior should be thoroughly cleaned.

5. Table 12 shows the steps and quantities of-Graphite gasket to be placed under the various models of vacuum pumps.

Vacuum Pump Series	BVI 200	BVI 300	BVI 400	BVI 700	BVI 1000	BVI 2000	BVI 3000	BVI 4000	BVI 6000	BVI 9000
Gasket Dimensions	1/4	7/16	3/8	3/8	1/2	1/2	5/8	3/4	3/4	3/4
Number of Rings for Lodging	5	5	5	5	6	6	6	5	7	6

Table12

6. Gasket Graphited Recommended: a) Tipo: 2002 FIOS DE CARBONO E GRAFITE FLEXIVEL
b) Tipo: 2019 FIBRA ACRILICA PTFE

10. LUBRICATION

10.1 Care Bearings:

The vacuum pumps of Liquid Ring IMBIL are lubricated only in Bearings. The pumps Series BV-700, BV-1000 BV-2000 and are lubricated with grease, while the BV-3000 Series are lubricated with oil.

Table 13, shows marks and lubricants recommended for perfect lubrication of bearings.

Tabela 13

MANUFACTURER	GRAX	OIL
ATLANTIC	Litholine 2	
CASTROL	LM 2	HYSPIN AWS 68
ESSO	Beacon 2	NUTO H 68
IPIRANGA	Isaflex 2	IPITUR AW 68
MOBIL OIL	Mobil grase 77	
PETROBRÁS	Lubrax Indl GM – A 2	LUBRAX IND. HR 68 – EP
SHELL	Alvania R2	TELLUS 68
TEXACO	Marfak MP 2	RANDO HD 68

The application of grease missing, and in excess is harmful to the bearings. The correct application is essential to ensure long life to them.

In the case of vacuum pumps that take grease, it is recommended to fill 1 / 3 to ½ of the free internal space of the bearing box.

For Vacuum Pumps with oil lubricated, it applies it to their level to reach half of the display of oil.

To keep the bearings well lubricated, it is advisable to inspect them every 6 months of operation. Usually after 6 months of continuous operation (24h/day), you should clean the outside of the bearing with clean solvent. Removing the cover is the box of each bearing should be inspecting the amount of grease inside. If you notice any irregularities, simply replace the lid and continue to pump in operation.

In the event of excessive elevation of the bearing temperature, around 20 º C above the ambient temperature or if the grease contamination present, it is clear both the bearing and the box that houses clean with solvent, then washing it with fine oil.

The grease you should be passed in both the lakes Roller (using clean spatula) until it is flush with the face of the bearing box.

The lids should be filled with grease before the half and then replaced.

When the vacuum pump operating in corrosive atmosphere, or is filled with liquid water to the other compressor, it is desirable that the bearings are lubricated at intervals of time shorter.

Note:

1. It is advisable that the observed behavior of the bearings during the first hours of operation, to be sure the bearings are operating correctly.

2. A continuous or sudden elevation of temperature of the bearings, certainly indicates that some irregularity is occurring. In this case you should immediately suspend the operation of vacuum pump and investigate the causes.

3. It is common that the bearings have some elevation of temperature after being lubricated. If the temperature does not return to normal after 4 to 8 hours of operation, there may be excess grease to be removed.

4. The frequency with which to replace the bearings of grease or oil, in cases where non-aggressive to the vacuum pump also depends on the intensity of their.
   Recalling that the vacuum pumps of Liquid Ring IMBIL Pumps for Industrial Processes are therefore for uninterrupted operation (24 h / day), the lubrificações must be renewed every 6 months. If, however, the system of operation is not continuous, the replacement of lubricants can be done once a year.

5. To replace the lubricant in the bearings of pumps Vacuum leading grease, simply remove the cap on foreign bearings (LA) and (LB) and a spatula to perform maintenance. In leading oil pumps, you should drain the body of the bearing and remove the top plug, replace the oil necessary.

11.POSSIBLE FAILURE OF OPERATION

The vacuum pumps of Liquid Ring IMBIL Series "BV" require very little attention, apart from the lubrication of bearings.

Of course more or less depending on the aggressiveness of the cases, the vacuum pumps are required to live with corrosive agents, abrasive, flammable, explosive, etc.. causing the most damage possible unpredictable or predictable.

In most cases, simply cleaning or washing with solvent is sufficient to rescue the ideal conditions of operation of the pumps. It is rarely necessary to inspect the interior of vacuum pumps, pointing out that the rotor is the only moving part of the equipment and that the greatest friction is between continuous, liquid with solid.

If, after the departure of equipment, note if any irregularity in obtaining the vacuum expected and desired, it is advisable, before opening the vacuum pump causes the demand for more serious, check the following items:

1. Verificar se as Telas de Proteção dos Bocais de entrada das Laterais da Bomba de Vácuo não estão entupidas. Partidas de Instalações novas, não raro, podem conter nas Tubulações de Vácuo, impurezas, restos de soldas, cavacos estopas, que poderão ser aspirados pelo Vácuo gerado pela Bomba.

2. Check direction of rotation of the vacuum pump. Rotate in the opposite direction to that shown in relief in the bottom of the lids or sides of the body pump, prevents the liquid ring vacuum that produces the vacuum pump is capable of generating.

3. Check that the rotation of the pump matches what is shown on the nameplate of the identification.

4. Check the flow of liquid Compressor. Very low flow of liquid sealing of the rupture can lead to liquid ring pump and does not generate more vacuum. Depending on reducing the supply of Liquid Compressor, is the substantial increase of the temperature of the vacuum pump (easily observable when the hand pull the body of the pump) that can first produce intense noise by scraping in the Rotor Cones, and locking of Rotor broken Palheta (s), with consequent possibility of trincamento Body until the axis of shear. Therefore, it should be made "clear" that the Ring Vacuum Pumps Liquid, "never" can operate without the "Liquid Compressor" (in almost all of the time of the ring vacuum pumps are fed with liquid water).

5. Moreover, the introduction of excess liquid Compressor is not as harmful and can easily be corrected by observing the following effects:

    a. The power consumed by the motor drive can cause the fall of Electrical Switch.

    b. The liquid ring can break (Stohl), causing the vacuum pump does not produce any.

c. Both the pump suction and the Pipe can begin to vibrate, caused by the attempt of the vacuum pump to expel the excess of liquid injected compressor her.

d. The medium or long term, there is a reduction of the useful life of vacuum pump according to the submission of the equipment Hydraulic Erosion (Erosion Hidrolic).

6. Check that some sort of obstruction in the discharge of the vacuum pump is affecting the vacuum, or by increasing the amperage of the electric motor drive. This item is of "paramount importance". Counter-pressure in the discharge of the vacuum pump and reduces the level of vacuum, causes an increase in power absorbed axis, can decrease the electric switch, vibration in the pump and tubing in vacuum, to the shear axis of the engine and even burning of Engine Electrical.

   Obs.: The vacuum pumps of Liquid Ring must download the gases aspirated with their liquids Compressors preferably atmospheric pressure. Lets in the maximum "to pressure" up to "0.6 mca. Even with this back pressure will be noted slight increase in energy consumption.

7. Verify that the (s) vacuum (s) is (are) working and properly calibrated (s).

8. Check if there is any restriction in the vacuum line, such as clogging, records sealed, holes or bottlenecks in the suction pipe or under-sizing of the same.

9. If required the disassembly of the vacuum pump, you should check if it was installed correctly, paying particular attention to the placement of cones on the Side Covers.

10. If after all the above findings related to (s) fail (s) was (were) resolved (s), it is advisable to call a Technical IMBIL, which certainly help in the solution (s) (s) Problem (s).

11. We note that while the vacuum pump is under warranty, you must not disassemble it on pain of losing this privilege. Please however, that if the interest of the Customer IMBIL, the vacuum pump can be disassembled in its presence, with the agreement previously established.

12. TECHNICAL ASSISTANCE AND SPARE PARTS

12.1 Technical Assistance:

The IMBIL account with a framework for its Department of Technical Service, which operates both in the factory located in the municipality Itapira / SP, as in the Field.

They are highly qualified and warble, ensuring the "User" total peace in the certainty that both before sale after sale at any equipment manufactured by IMBIL he has any support, collaboration, and any situation requiring attention.

12.2 Spare Parts:

For 01 (A) year of operation of any vacuum pump IMBIL, we recommend only the following spare parts:

1. For the Series Vacuum Pumps BVI – 200, BV a BVI – 2000

a)

- ✓ Set of joints of Cones.
- ✓ Set of joints of the covers of External bearings
- ✓ Set of joints of the internal bearing caps
- ✓ Set of Bearings
- ✓ Set of joints of the body
- ✓ Set of gasket

b) When used:

- ✓ Lantern Ring
- ✓ Ring “O”

2. For the Series Vacuum Pumps BVI – 3000 A BVI - 9000

a)

- ✓ Set of joints of Cones.
- ✓ Set of joints of the covers of External bearings
- ✓ Set of joints of the internal bearing caps
- ✓ Set of Bearings
- ✓ Set of joints of the body
- ✓ Set of gasket
- ✓ Gallon Oil Lubricant
- ✓ Ring “O”

b) When used:

- ✓ Lantern Ring

13. WARNING - CARE AND PRECAUTIONS

After the assembly of vacuum pump and before putting it into operation, it is mandatory to stick some care and precautions, which are not taken, could endanger not only the performance of the equipment as to subject it to damage irreversible.

We therefore focus on the following topics:

1. Familializar with the contents of this manual, read it carefully.

2. Check the power source that feeds the unit Motriz that trigger the pump Vacuum.

   If the drive is through the steam turbine, stationary motors, Axis of Tractor or Truck, you should check whether the transmission is shown in the rotation compatible Platelets Identification of Vacuum Pump, alignment of the pulleys, the belt tension of the Game Pulleys, reliability of the Protectors of Pulleys.

3. Check direction of rotation of the vacuum pump giving a "blink" in the key for the electric motor. If turning in the opposite direction, simply reverse the polarity of the spinning, the vacuum pump should turn in the rotation shown on the nameplate on your ID or Casting.

4. Before you put the vacuum pump in operation, you must have absolute certainty that it is through the Net Compressor. With this assured, you can break the pump.

5. To disconnect the vacuum pump, turns off the electric switch first, then cutting up the supply of Liquid Compressor.

6. If overheating occurs the vacuum pump without any reasons, you must immediately stop its operation to identifying the possible causes.

7. If after the assembly, the vacuum pump must remain inactive for a long time, it is absolutely necessary to protect it with oil soluble and the User guide to move it manually by turning a whole-Girante through the tip axis (LA) to every 10 or 15 days.

   This addition to providing the lubrication of bearings, prevent the accumulation of rust from the surface of the cones of Reeds and taper of the rotor, preventing the vacuum pump any engripamento.

CAUTION:

The **Liquid Compressor**, and be responsible for the suction, compression and expansion of gases, making the role of both Piston and mobile Straw, is responsible for cooling the vacuum pump and possible condensation of vapor aspirated. **The Liquid Compressor** can be considered

as a part of the pump, without which, the vacuum pump **OF LIQUID RING, DOES NOT WORK.**

CAUTION:

NEVER under any **circumstances**, the vacuum pump should come into operation without first connecting it to the liquid source Compressor and be completely satisfied. **Never** the vacuum pump can operate **OF LIQUID RING dry** under penalty of damage it or destroy it**.**

14. TECHNICAL ADVICE

MESSAGE**:**

Although our atmosphere is essential for the survival of all living beings, it due to its oxidizing property is a major obstacle to the achievement of a huge number of achievements of human beings, both in the processing industry and in large part on their personal activities.

She is therefore a broad technology, known as the Vacuum Technology, able to solve a no less vast universe of cases that will achieve a myriad of goals.

The IMBIL has worked for many years in this industry with enthusiasm, feeling secure in offering permanent and free technical advice to all clients who used its products.

Therefore, if V Sas. have a project in mind, and if appropriate to consider our contribution to accompany him, placed us at your entire disposal.

The IMBIL - Vacuum Division looks forward to the any and all consultation if you need, always aiming to meet the best possible way their customers.

15. CUSTOMER SERVICE

SUPPLY**:**
APPLICATIONS AND APPLICATION OF TECHNICAL IMBIL to be addressed directly to the factory in Itapira / SP.

Address: Jacob Audi, 690 – Vila Izaura
CEP.: 13.971-045
ITAPIRA SP

PABX: (19) 3863 9833
FAX: (19) 3863 0714

Sales : (19) 3863 1675
Engineering : (19) 3863 3947
Administration : (19) 3863 5343

Customer Service: DDG: 0800-148-500

NOTE:

When you need to order Replacement Parts can be mentioned in the application: The Series, Model Number and the Test of Vacuum Pump in Platelets in its identification.

WARNING:

This manual is subject to partial changes without prior notice.

ORIGINAL

WARRANTY CERTIFICATE

WARRANTY TERM

The present "**Warranty Term"** has as objective to guarantee to the user all equipment shipments and/or the materials produced by the manufacturer, under the following conditions:

This term is valid for 12 (twelve) months from the effective start-up date of the equipment or 18 (eighteen) months from the invoicing date to the original user, whichever happens first.

The equipments and materials are covered by this warranty in regards to the repair or substitution of parts by IMBIL factory or by the authorized IMBIL technical assistance service against materials or fabrication defects, as long as there is evidence of these defects and against invoice presentation, with the following restrictions:

- All the material / equipment made by IMBIL or substituted part removed against warranty will become property of the manufacturer.
- Any repair, modification or exchanges against warranty will not prorogate the original equipment or substituted part warranty term.
- The manufacturer cannot be held responsible for losses caused by the equipment stop (Loss or Damage to Property).

The warranty does not cover:
- Transportation of the defective materials from the facility where they are installed to the manufacturer plant / technical assistance service and the later return to the original costumer facilities.
- Travel and hotel expenses from the manufacturer technician, which will be charged according to the current pricing at the time of the repair service, when this it is performed at the installation site.

This warranty loses effect if the problem happens due to the following cases:
- Operational conditions that differ from the indicated by the manufacturer.
- Normal wear caused by the use or by erosion, abrasion or corrosion.
- Incorrect use, lack of knowledge from the operator, improper use, inadequate transportation, movement or stocking, assembly or operation other than the recommended by the technical manual provided by the manufacturer.

The equipments, due to constant improvements, are subject to changes without previous notice. The warranty is effective only if this slip is sent to the manufacturer.

COSTUMER WARRANTY CONTROL

Serial No._____ Invoice _____ Date _____/_____/_____

Name: _____

Address: _____

ZIP Code: _____ City: _____ State: _____ Country: _____

IMBIL®

Pumping Solutions

_____

Reseller – Stamp and Signature

TOLL FREE NUMBER – COSTUMER SERVICE CENTER (BRAZIL): 0800 14 8500

MANUFACTURER WARRANTY CONTROL

Serial No. _____ Invoice _____ Date ____/____/____

Name: _____ City _____ State: _____ Country: _____

Address: _____

Zip code _____

IMBIL® Pumping Solutions

Owner Signature

Reseller – Stamp and Signature

Please fill out this form, detach it and send it to the manufacturer.

IMBIL®
Soluções em Bombeamento
(Pumping Solutions)

CUSTOMER SATISFACTION SURVEY

Dear Customer,
The biggest concern of IMBIL Group is to offer the best Customer Service, Product, Associated Services and Technical Support. For us, it is very important to know your opinion about the IMBIL´s Quality. In knowing so IMBIL Group will be able to continually improve its quality.
You can contribute by filling out this Customer Satisfaction Survey.

IMBIL GROUP thanks for your help.

Customer: _____

Address: _____

City: _____ State: _____ Zip Code: _____

Contact: _____ Date: / /

Department: _____ Function: _____

Phone: ( ) - _____ E-mail: _____

Region:

BRAZIL
- ☐ North
- ☐ Northeast
- ☐ South
- ☐ Southeast
- ☐ West Central

WORLDWIDE
- ☐ Africa
- ☐ Central America
- ☐ North America
- ☐ South America
- ☐ Asia
- ☐ Europe
- ☐ Oceania

Application:
- ☐ Sugar and Ethanol Industry
- ☐ Distilleries
- ☐ Mining / Steel Industry
- ☐ Sanitation
- ☐ Pulp and Paper
- ☐ Irrigation
- ☐ Valve
- ☐ Air Conditioning
- ☐ Chemical / Petrochemical / Naval
- ☐ Food Industry / Textile
- ☐ Steam Generation / Cogeneration
- ☐ Fire Fighting
- ☐ Other _____

Product purchased: (Please indicate product's description and/ or serial numb _____

Acquisition of product: ☐ IMBIL ☐ Authorized Distributor _____ ☐ Representative _____

	Complety Satisfied	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
1. CUSTOMER SERVICES QUALITY					
* Facility for contact, agility and efficiency in providing the information requested.	☐	☐	☐	☐	☐
2. COMMERCIAL CONDITIONS	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Meeting your expectations related to commercial conditions.	☐	☐	☐	☐	☐
3. DELIVERY TIME	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Meeting your expectations related to delivery time.	☐	☐	☐	☐	☐
4. TECHNICAL INFORMATION	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Meeting your expectations related to technical data provided with the product.	☐	☐	☐	☐	☐
5. DELIVERY QUALITY	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Meeting your expectations related to product shipping conditions (packaging, visual aspects).	☐	☐	☐	☐	☐
6. OPERATION QUALITY	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Meeting your expectations related to product and operation conditions promised.	☐	☐	☐	☐	☐
7. POST SALES	*Complety Satisfied*	*Very Satisfied*	*Satisfied*	*Dissatisfied*	*Completely Dissatisfied*
* Efficiency on services performed	☐	☐	☐	☐	☐

Would you have any suggestion on how to increase customer satisfaction on IMBIL's Products / Service?

Phones for Contacts

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Post Sales: +55 (19) 3843-9830 e-Mail: assistenciatecnica@imbil.com.br
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