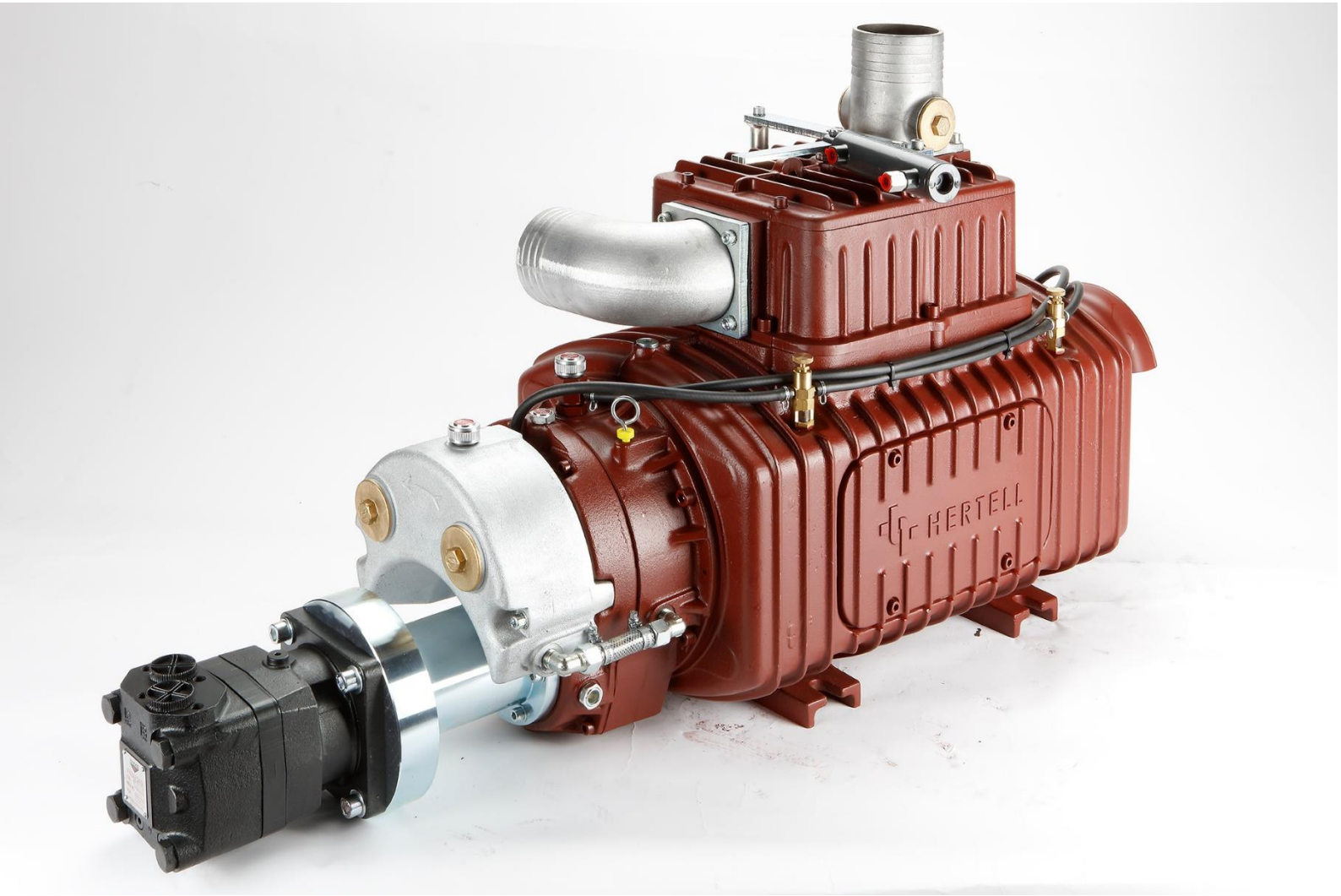
HERTELL S.COOP

KL-18

USER´S MANUAL



KL-18 VACUUM PUMP_____

_____ HERTELL S.COOP.

INDEX.

1. Introduction.

1.1. Previous considerations

Safety symbol. This symbol on the present document states that the point described thereafter involves very important information regarding the safety of the vacuum pump operation

The vacuum pump is one component of the vacuum unit (tanker). It is totally necessary to read the operation booklet provided by the tank manufacturer before operating with the pump and the tanker.

The non-observance of the advised safety indications may cause injury to the pump operator.

Take special care of the distance to be kept to any mobile part of the vacuum pump. Read carefully all the information related to this point on the tank manufacturer booklet.

Never use the vacuum pump in inflammable atmospheres in order to prevent the risk of explosion due to the working temperature of the vacuum pump.

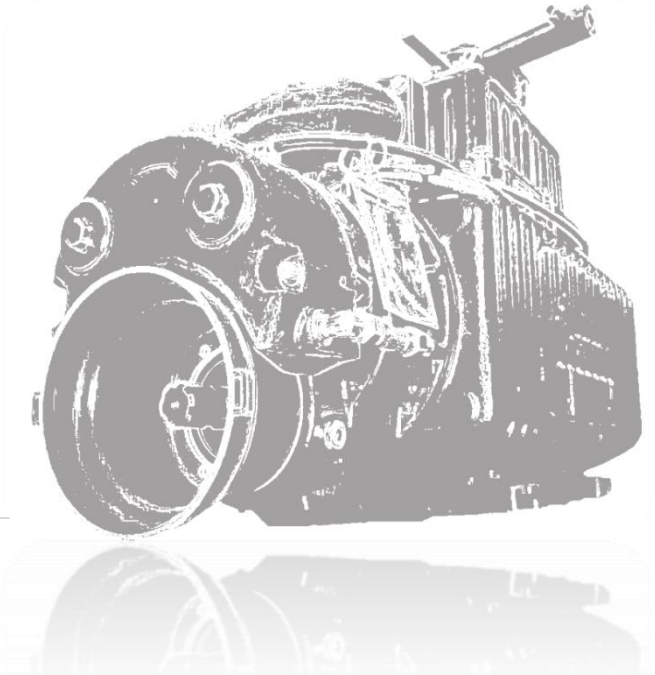
1.2. General description

The KL-18 vacuum pump is a rotary blade pump on eccentric rotor indicated for vacuum tankers. Its double body distributor together with the big displacement and the cooling system with an incorporated and external water pump configure an ideal set to work with big volume tankers and heavy-duty operations.

1.3. Models

Cardan drive (DIN 9611 1” 3/8). Counter-clockwise rotation sense. Optional hydraulic drive at 540 rpm.

1.3.1 540 r.p.m.
1.3.2 1000 r.p.m.



2. Setting up.

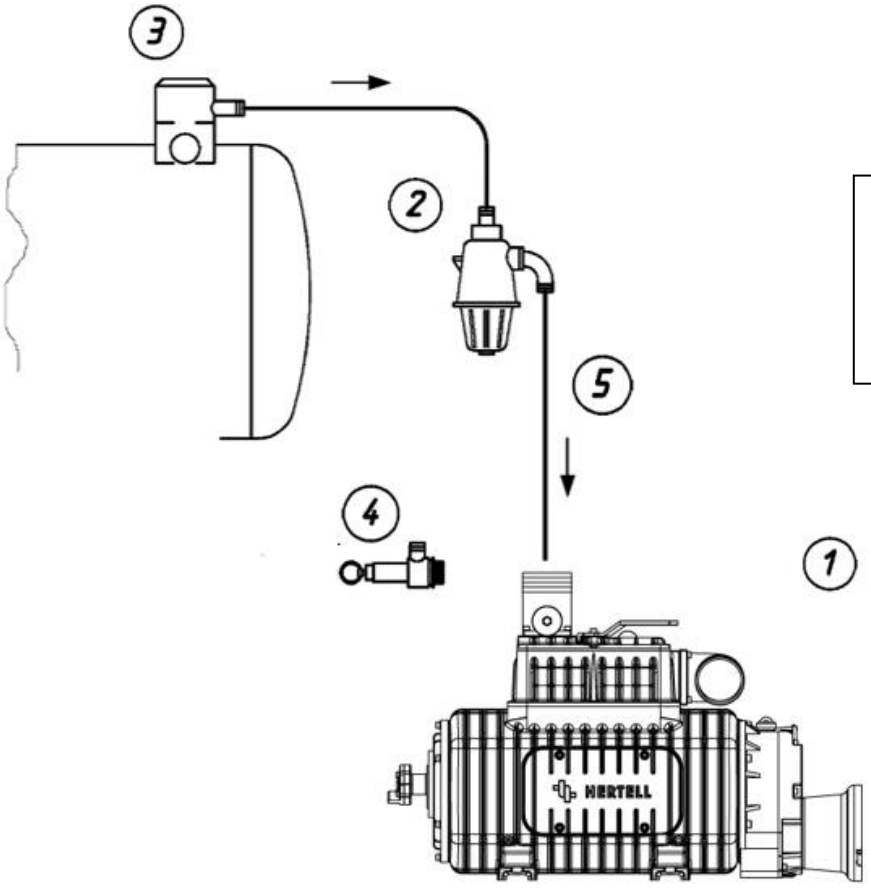
Always be careful by hanging the vacuum pump. Use the hole situated at the top of the pump body to lift the pump, keeping always the safety distance to avoid injuries due to a sudden fall down of the pump.

2.1. Setting up description.

Enclosed there is a basic setting-up schema of the vacuum pump on the vacuum tanker. End montage may vary from this basic description, which only shows the non-dispensable parts of the system.

Some accessories of the pump are packed in one cardboard box to make easier the process of palletizing and transporting the vacuum pumps.

Never manipulate the pump when the cardan shaft or driven system of the vacuum pump is connected.



1.- Vacuum Pump.
2.- Siphon valve.
3.- Overflow valve.
4.- Safety Valve.
5.- Vacuum pipe.

The overflow valve (3) guarantees that while filling up the tank the liquid cannot get into the vacuum pump. Anyway, a setting up of one siphon valve (2) is highly recommended in order to be sure that no liquid comes into the vacuum pump.

The vacuum pipe must be of Ø 100 mm. To install a narrower pipe as the recommended one, can follow to an overheating of the air sucked and may damage the pump.

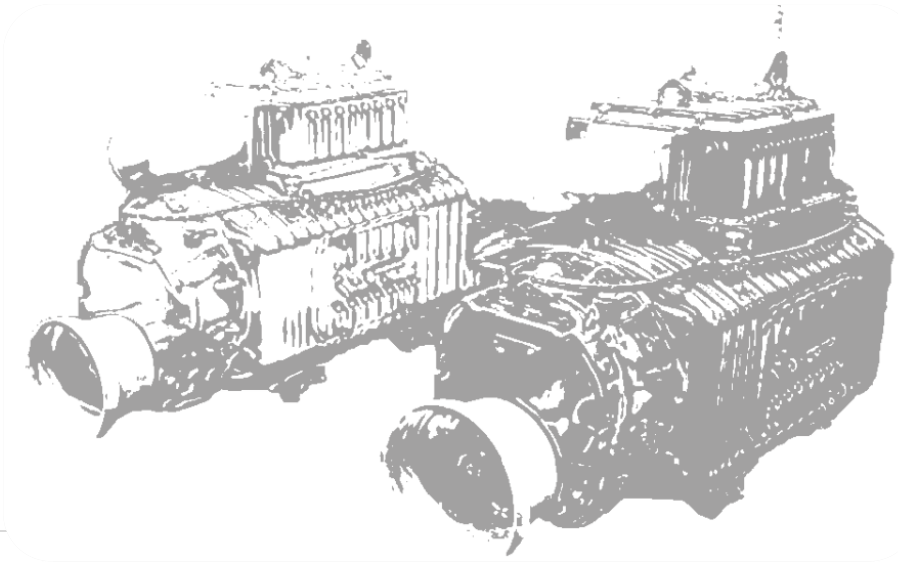
In order to prevent the over pressure and the rupture risk of the tanker it is necessary to install a pressure safety valve (4) on the system. It is strongly recommended to install at least one of these valves on the vacuum pump.

Always be sure that the pressure safety valve is in good working conditions, particularly while installing a new pump in an old tanker.

Depending on the vacuum installation a vacuum relief valve (4 too) can be installed on the vacuum pump to limit the maximal vacuum level. The fact of decreasing the vacuum level increases the operation time of the pump. All these variables depend on the working conditions of the vacuum tanker.

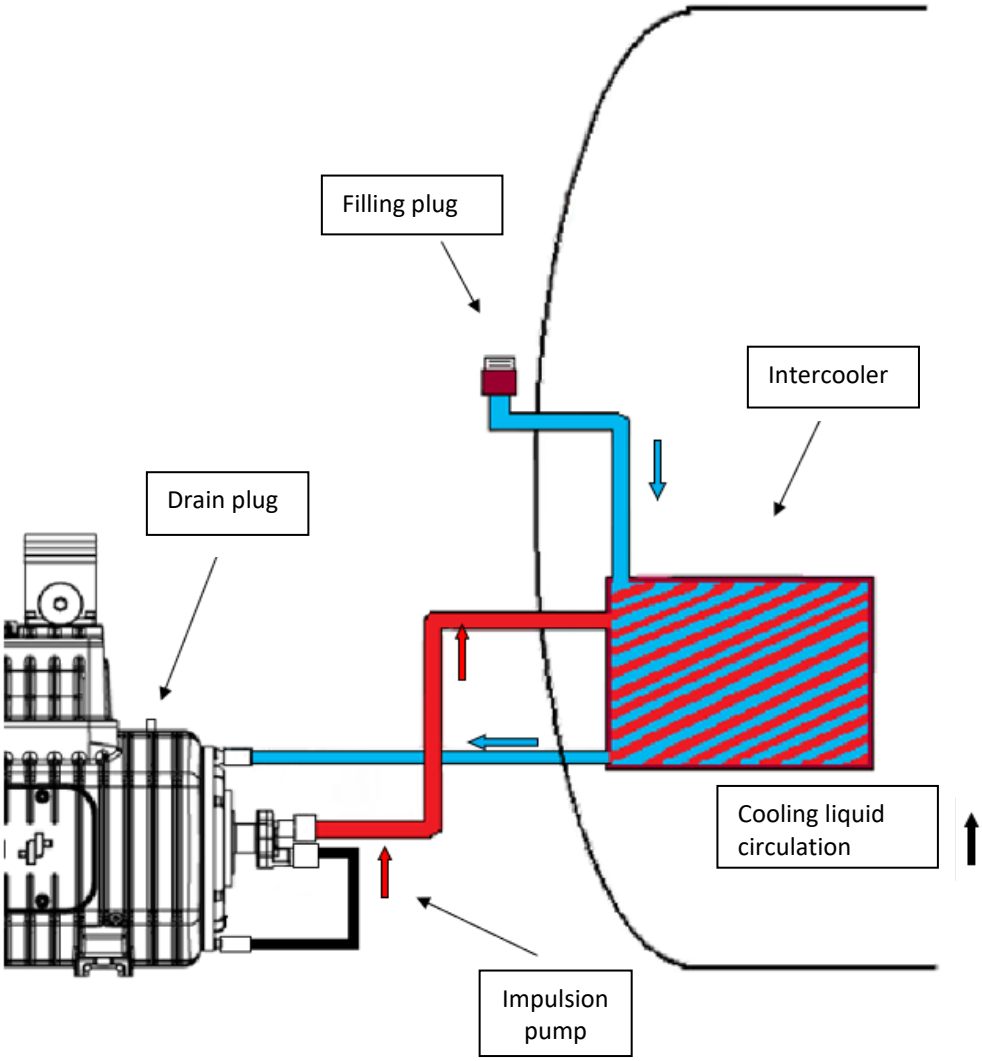
It is the decision of the tank manufacturer to choose the dimension of the pump the same way as the other accessories of the tanker.

No manipulations of the vacuum pump are permitted without the supervision of the tank manufacturer or his authorized technical service.



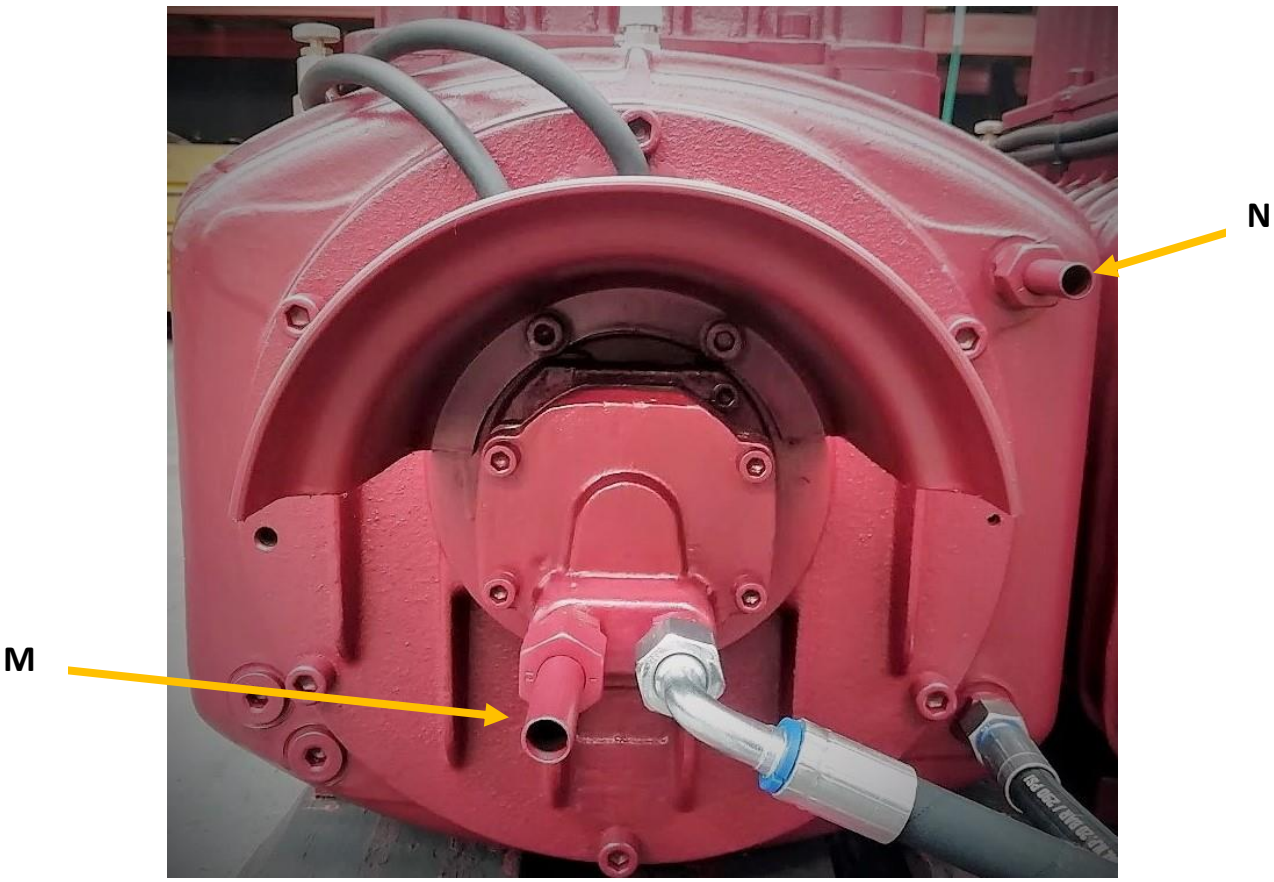
2.2 Cooling circuit description.

In order to guarantee the best working conditions of the KL-18 vacuum pump, it is necessary to install a cooling circuit similar to the one shown in the following diagram:



The cooling chamber capacity of the KL-18 is around 17 liters. It is recommended to install a circuit of around 100 liters. The cooling liquid has to be a Monetilenglicol watered to a 31 %.

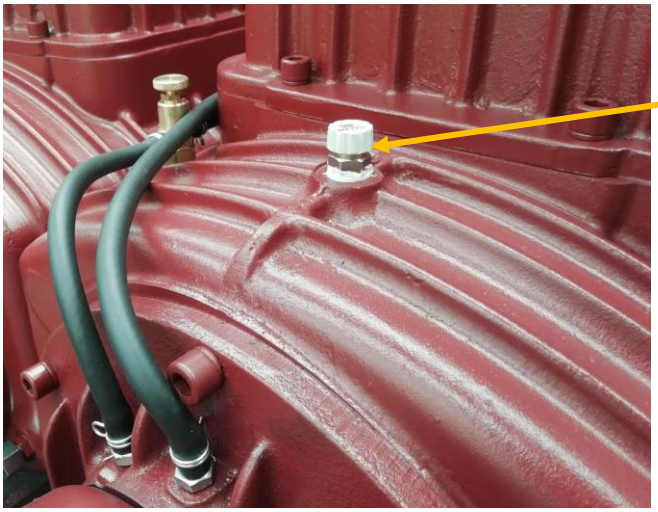
The impulsion pump flow is 10 l/min at 1 bar pressure. The pipe (M) is the one connecting the impulsion pump output to the highest point of the cooling circuit. The pipe N represents the return of the cooling liquid to the vacuum pump cooling chamber.



The Intercooler has to guarantee the correct cooling of the cooling liquid. Each tank manufacturer can find the alternative that fits better with his tank configuration, like an external reservoir with or without radiator or an internal reservoir for cooling thanks to the contact between the reservoir and the liquid to be filled on the vacuum tanker.

Warning! It is not recommended to use the KL-18 without any cooling liquid on the chamber, as this can damage the vacuum pump body.

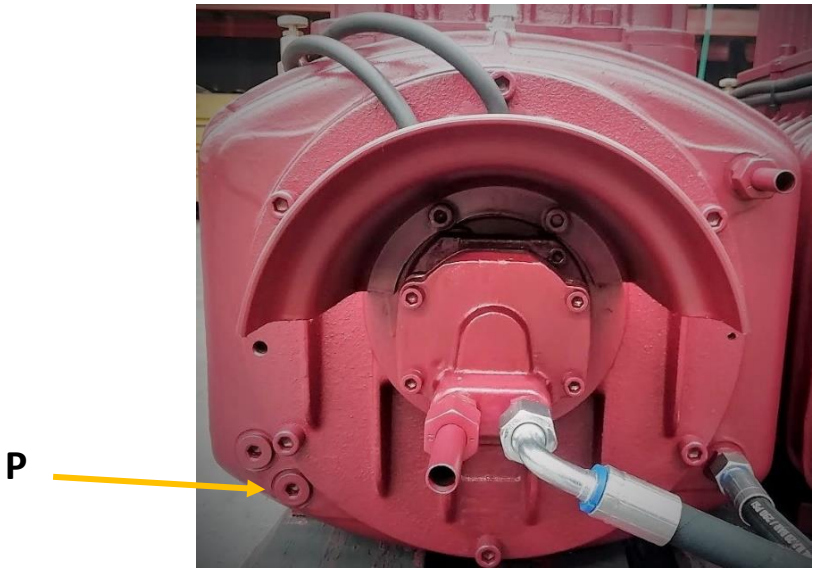
In order to drain the air of the cooling chamber, the vacuum pump has a drain plug at the top of the body.



This plug allows the air drainage while first filling and must not be manipulated thereafter: it has to stay at close position.

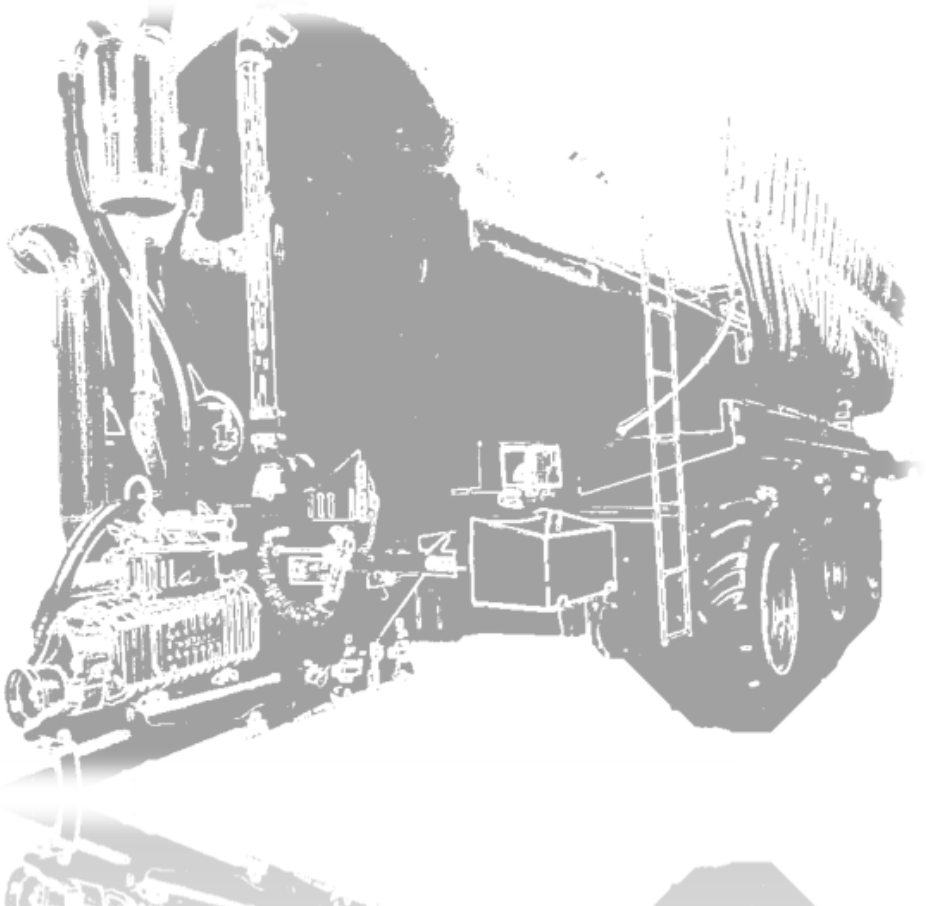
Warning! The cooling chamber can come to very high temperature, close to 100 º, so a safety distance to the plug has to be kept just in case of some liquid damp expulsion through the plug.

The cooling chamber can be emptied through the P plug before any pump maintenance procedure.



Final consideration: The continuous working time of a KL-18 vacuum pump is similar to the continuous working time of a normal rotary vanes vacuum pump. Once the pump has come to its maximal vacuum rate (close to 95% - 40 mm Hg) it has to be stopped in order to prevent any damage due to an overheating.

The aim of this cooled vacuum pump is to be mounted in tankers of big volume where the working time to the maximal vacuum rate is longer than usual or in tankers working under quite tough conditions, that is, very short vacuum / pressure phase sequences, as the cooled system guarantees a longer vanes life and therefore a longer pump life.



3. Pump operation.

Maximal angle between cardan shaft axe and pump shaft should not exceed 15º for 540 rpm pumps and 7º for 1000 rpm pumps.

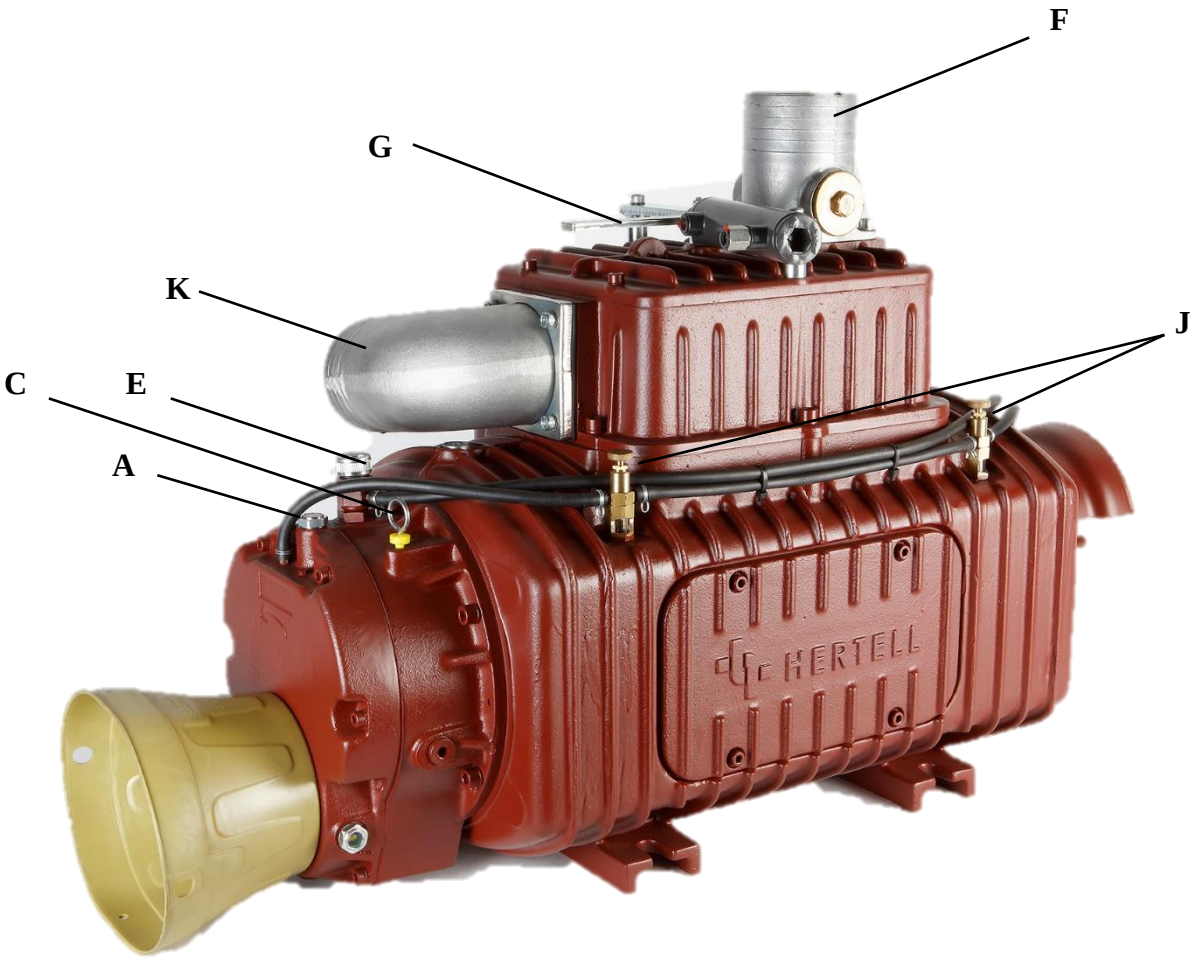
Never manipulate the pump when the cardan shaft or driven system is connected to the vacuum pump.

Vacuum / pressure phases are regulated by handle J. The vacuum tanker has to guarantee that the manipulation of this is possible without any risk for the operator.

Maximal working time at maximal vacuum level (with no vacuum relief valve on the system) must not exceed 8 minutes or 90º temperature. The non-observance of these indication can damage seriously the pump.

To stop operating with the pump, first stop the cardan shaft before manipulating the pump.

(Picture 1)



3.1 First operation.

KL-18 pumps always run counter-clockwise sense, as stated at the front cover. Be sure that driven system (cardan shaft or similar) turns on the right sense. Pump coupling F has to be connected and secured to the vacuum pipe. For the first operation, just prepare the tanker for vacuum operation, turn the handle (G) clockwise (vacuum) of ant-clockwise (pressure) and let the pump run at the estimated turning speed. Drop feeders (J) will start lubricating after some seconds.

Check that the minimal distance between the out-let K and any object in risk of being sucked into the pump is at least 100 cm.

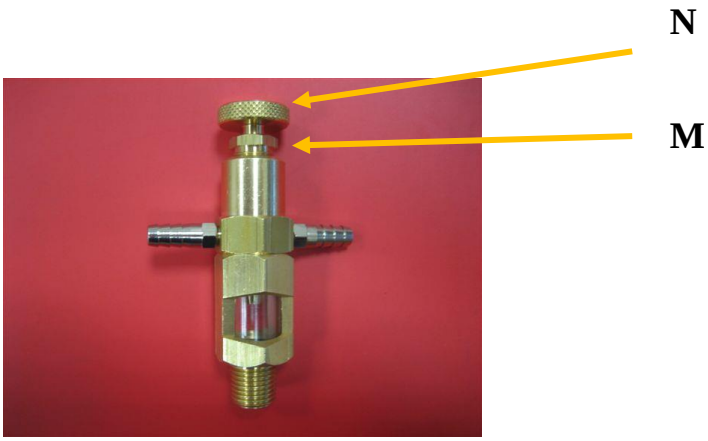
3.2 Lubrication.

3.2.1 Vanes lubrication.

While the pump is operating the vanes have to be lubricated. The vanes lubrication oil is filled up through plug E and controlled with the oil lever indicator C (see picture 1). This level has to be controlled each day to be sure that the pump is not running dry. Oil tank capacity allows 4 hours of working time.

Each vacuum pump has been tested and therefore the drop feeders (H) have been regulated before leaving the Works. The normal lubrication flow is between 15 and 20 drop per minute. Should the drop feeders need to be adjusted, then release set screw M and adjust turning the nipple N (Picture 2). If the nipple is turned in clockwise sense, the oil flow decreases, and it increases with the opposite operation. After adjusting, tighten the set screw M again.

(Picture 2)



Viscosity of the vanes lubrication oil: ISO VG - 68

3.2.2 Gearbox lubrication.

The gearbox is filled to its maximal level (sight glass D) when the pump is delivered. Never fill up over this maximum level. To fill up the gearbox oil, use the plug A, and to empty use the plug B. The gearbox oil has to be exchanged after 500 operation or at least once a year

Viscosity of the gearbox oil: ISO VG - 220

3.3 Maintenance.

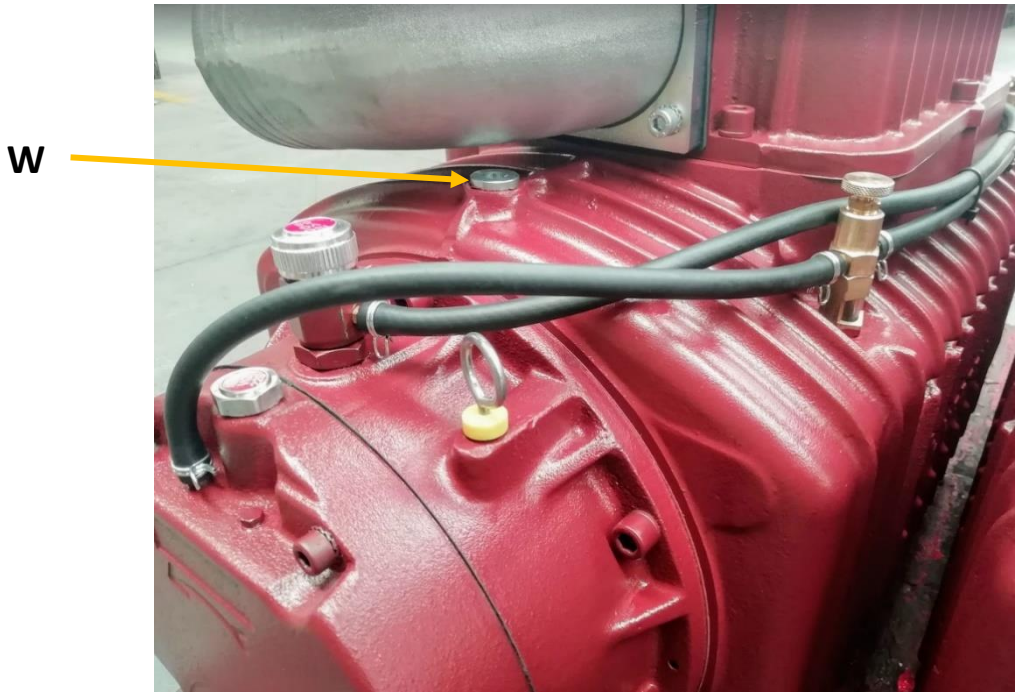
The interior of the pump must be cleaned each time when any liquid of the tanker comes into the vacuum pump or, at least, once a year. It is highly recommended to do that when pump is going to stay for a long time without usage. For this operation, release the vacuum pipe on coupling F, put the handle G in vacuum position, drive the pump at low speed and give some detergent through the coupling F.

The vanes have to be controlled after 1000 hours of effective working time and have to be changed it the waste comes up to 10% of the original dimension:

KL-18 (600 x 70 x 7,5) mm - 6 Un.

VANES CHECKING

It is possible to check the wearing of the pump vanes without dismantling the pump thanks the plug W place at the top of the pump body.



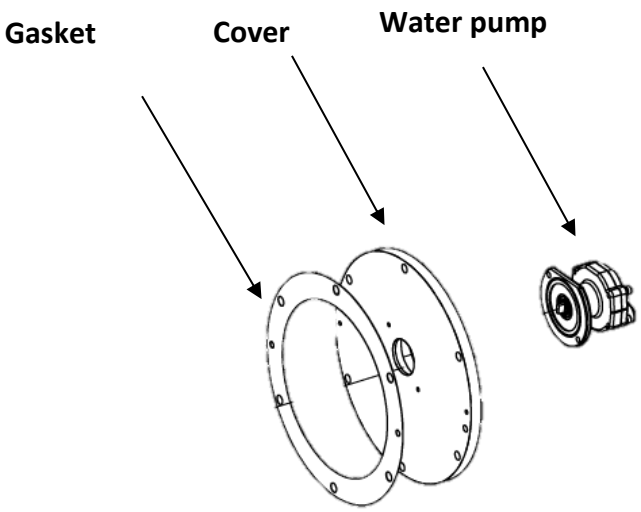
To do that, unscrew the plug W and turn manually the pump rotor to a point where a vane channel comes to the hole which is open now. Take the oil level indicator and measure the depth till the vane edge. Then turn a little bit more the pump rotor and repeat the measure operation till the rotor lateral surface in order to obtain the vanes wearing after both measurements' subtraction.

VANES CHANGE:

1.- Take out cooling circuit pipes.

2.- Dismantle cover and gasket. Once you did it, take out the water pump from the cover.

3.- Exchange the vanes.



4.- Exchange de gasket.

5.- Mount the cover.

6.- Set the water pump up, fixing rotors intern Groove with the flange.

7.- Lastly, tie cooling circuit pipes to their initial points.

3.4. Troubles and solutions.

The pump is part of the vacuum tanker. So, check that all the rest of the vacuum circuit is in good condition before checking the pump. It is advised to take apart vacuum pipe and make turn the pump to check if the pump is transferring air before start manipulating the interior of the pump. Always read the tank manufacturer instructions beforehand.

TROUBLE	LIKELY ORIGIN	SOLUTION
Pumps is not turning	One vane is out.	Open the cover and place the vane
	One object from the exterior has got into the pump.	Open the cover and get out the object.
No vacuum or pressure	Non-correct turning sense.	Turn in correct sense.
	Low turning speed.	Turn at right speed.
	Pump body is damaged / wavy.	Change the pump body.
	Conic distributor is not in right position.	Place in right position.
No lubrication	No lubrication	Check pipes and nipples.
	Oil pump is broken.	Take apart oil tubes and check turning the shaft even by hand. I necessary, change the oil pump.
No retention of pressure	Retention flap is damaged	Change retention flap.

3.5. Repairing description.

Enclosed advised repairing description for the most usual maintenance operation and the recommended working time.

BASIC REPARATION AND MAINTENANCE.
KL-18 VACUUM PUMP.

(See picture page number 23)

0. To make any repair at the KL18, previously take apart the water pump N.34 as follows:

0.1 Take apart water cooling circuit.
0.2 Empty the cooling liquid.
0.3 Release water pump N.34.
0.4 Set up water pump N.34 taking care while connecting rotor and water pump axe. In order to prevent further damages, place both at vertical position
0.5 While refilling the cooling liquid the circuit air has to be drain through the plug placed at the top of the vacuum pump body. Capacity of vacuum pump body cooling camera: 17 l. Advised capacity of cooling circuit: up from 100 lt

Tiempo de trabajo aconsejado: 1 hora .

1. Vanes change

1.1 Take apart cover N.74.
1.2 Exchange vanes N.44.
1.3 Put a new gasket N.46.
1.4 Set up cover N.74.

Advised working time: 30 Minutes.

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2. Flap change (N.40) / Conic distributor change (N.22).

2.1 Flap change (N.40).

2.1.1 Unscrew cover N.29.
2.1.2 Unscrew screw N.31. Exchange Flap. Put screw N.31.
2.1.3 Change Gasket N.30.
2.1.4 Set up cover N.29.

Advised working time: 20 Minutes.

2.2 Conic distributor change (N.22).

2.2.1 The same as 2.1.1.
2.2.2 Unscrew handle N.28.
2.2.3 Take apart conic distributor N.22 and exchange.
2.2.4 The same as 2.1.3 to 2.1.4.

Advised working time: 20 Minutes.

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3. Seal change (N.5) / Gears change (N.8 - N .56) / Oil pump change (N.48-N.49-N.50-N.51).

3.1 Seal change (N.5).

3.1.1. Empty gearbox oil (Screw N.4 at cover N.54).
3.1.2 Empty lubrication oil (Screw N.4 at Gearbox N.47)
3.1.3 Take apart Guard N.59.
3.1.4 Take apart lubrication tube N.12.
3.1.5 Unscrew cover N.54. Gear N.8 will come together.
3.1.6 Take apart bearing N.7 and / or seal N.5 and exchange.
3.1.7 Change gasket N.53.
3.1.8 Set up cover N.54. Take care while connecting rotor and oil pump axe. In order to prevent further damages, place both at vertical position.
3.1.9 Fill up gearbox and lubrication oil tanks.
3.1.10 Set up oil lubrication tube.
3.1.11 Set up Guard N.59.

Advised working time: 45 Minutes.

3.2 Gears change (N.8 – N.56).

3.2.1 The same as 3.1.1 to 3.1.5.
3.2.2 Unscrew set screw N.52.
3.2.3 Extract gear N.56 and exchange.
3.2.4 Screw set screw N.52.
3.2.5 The same as 3.1.7 to 3.1.11.

Advised working time: 1 hour.

3.3 Oil pump change (N.48 – N.49 – N-50 – N.51)

3.3.1 The same as 3.1.1 till 3.1.5.
3.3.2 Unscrew cover N.48 and extract and change gears N.50 and N.51.
3.3.3 Exchange gasket N.49.
3.3.4 Set up cover N.48.
3.3.5 The same as 3.1.7 to 3.1.11.

Advised working time: 45 Minutes.

4. Rotor - Body change (N.45 – N.43) / Rotor bearing - Seal change(N.35 – N.36).

4.1 Rotor - Body change (N.44 – N.43).

4.1.1 The same as 1.1
4.1.2 The same as 3.2.1 to 3.2.3.
4.1.3 Take apart oil tube N.12 and unscrew drop feeders N.15.
4.1.4 Unscrew Gearbox N.47.
4.1.5 Take apart rotor N.45 and body N.43, exchange and set up new ones. It is necessary to change vanes N.44. Set up drop feeders N.15.
4.1.6 Change gasket N.46 and set up gearbox N.47.
4.1.7 Set up gear N.56.
4.1.8 The same as 3.2.4. to 3.2.5.
4.1.9 The same as 1.3 to 1.4.

Advised working time: 1 hour and 30 Minutes.

4.2 Rotor bearing / seals exchange (N.35 – N.36).

4.2.1 The same as 4.1.1 to 4.1.4.
4.2.2 Extract bearing N.35 and seal N.36 and exchange for new ones.
4.2.3 Take apart cover N.34.
4.2.4 The same as 4.2.2. (Rear ones).
4.2.5 The same as 4.1.5 to 4.1.9.

Advised working time: 1 hour and 30 Minutes.

4. Technical specifications.

4.1. Material.

4.1.1. Foundry

Both vacuum pump body and rotor are manufactured in steel-like GGG-60 cast. This material is three times more resistant than the usual GG cast iron. This material guarantees that the pump will not break or burst even when pumps blocks due to the entrance of one exterior object. Furthermore, the vacuum pumps rotor IS hollow and balanced. This reduction on the weight decreases the inertia forces suffered on the pump.

By request one certificate of the composition of the pump material is available at any time.

4.1.2. Gears and Vanes

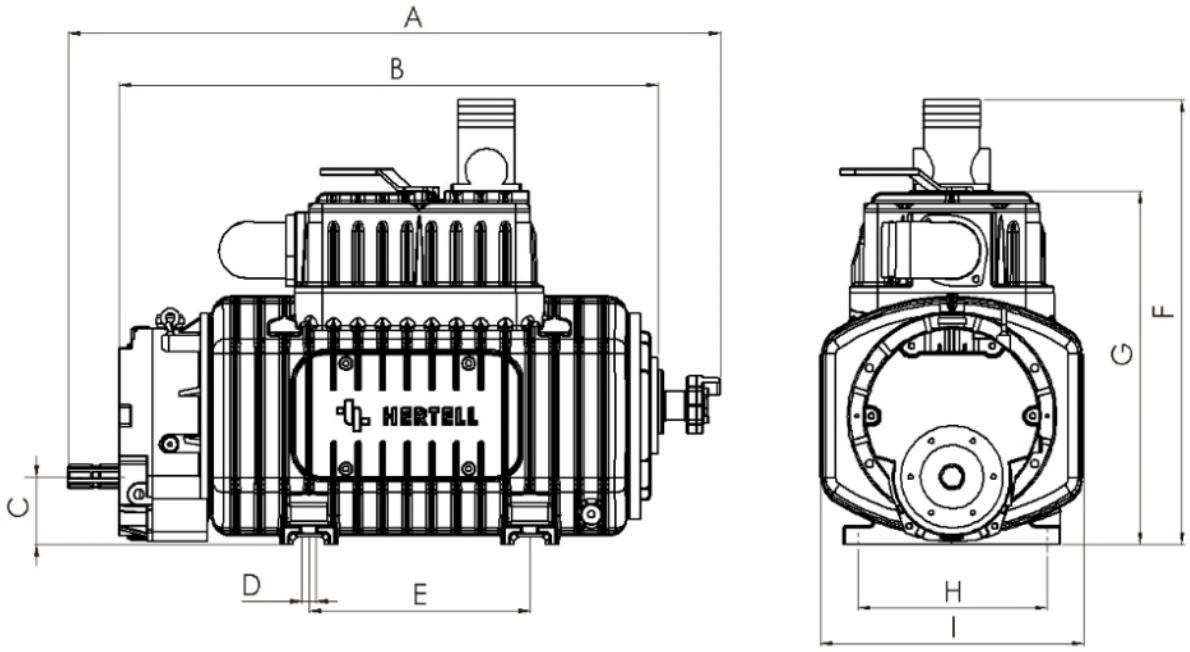
Both small gear and attack gear are tempered and ground. The vanes are made of special material and are complete free of asbestos.

Gears dimensions:

KL-18 **540 rpm**	**28 TEETH** **∅ Int.: 32 mm**	**55 TEETH**

KL-18 **1.000 rpm**	**34 TEETH** **∅ Int.: 32 mm**	**49 TEETH**

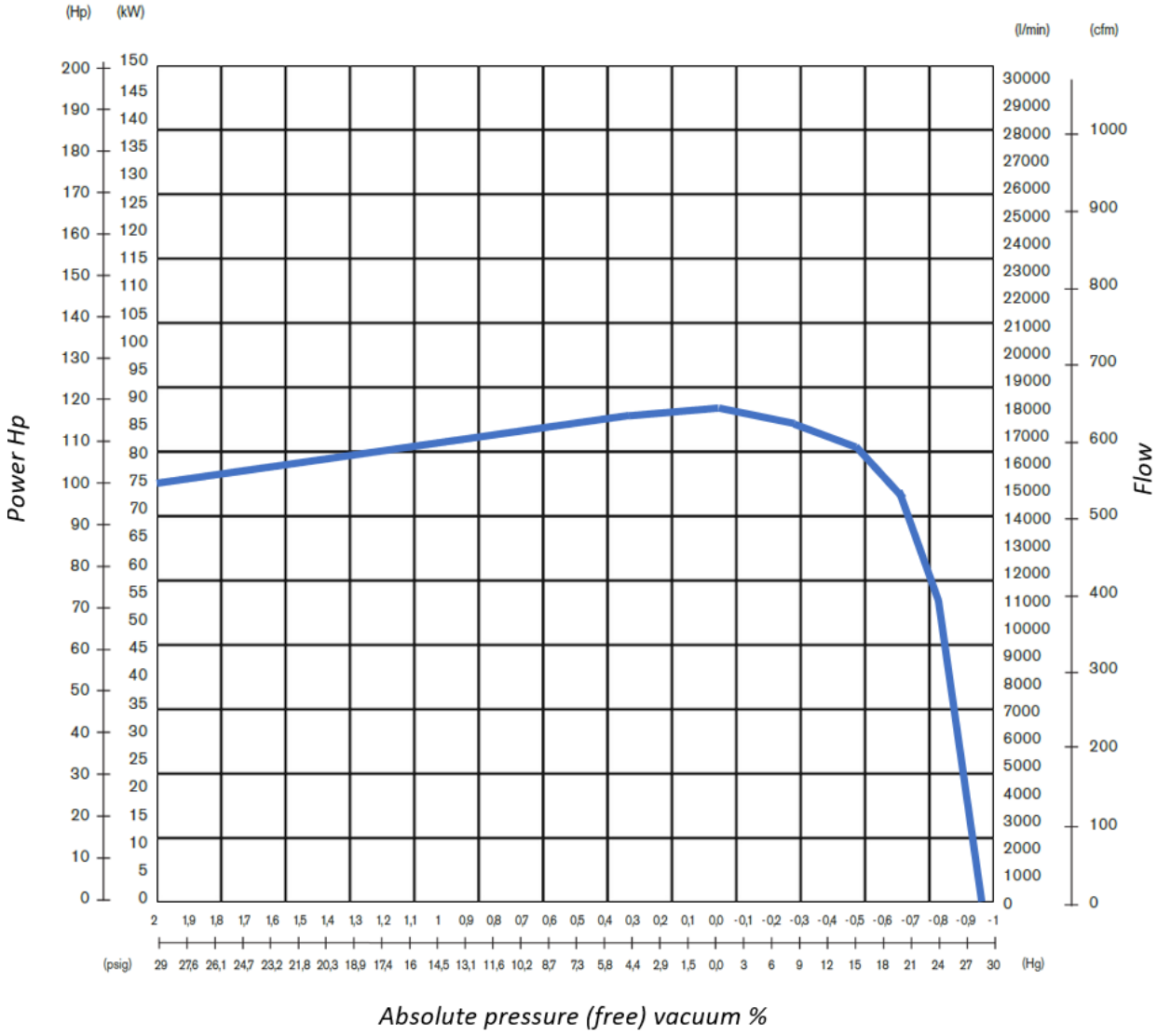
4.2. Dimensions.



Mod.	A	B	C	D	E	F	G	H	I
KL-18	930	769	97	20	315	663	503	270	375

4.3. Air flow.

Air flow related to the vacuum / pressure level and at 1450 rotor rpm:



4.4. Other specifications.

Mod.	KL-18
Rpm.	540 1.000
Max. Vacuum level (%)	95
Max. Operation pressure (bar)	1,5
Weight. (kG)	240
Noise level. (dB)	92
Energy consumption. (kW)	34

Power consumption and noise level at maximum pressure.

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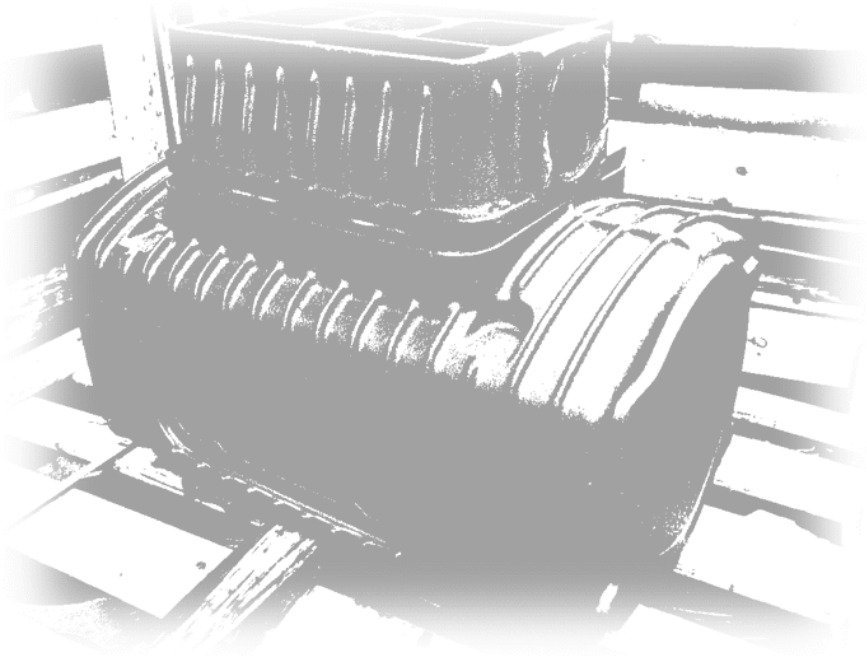
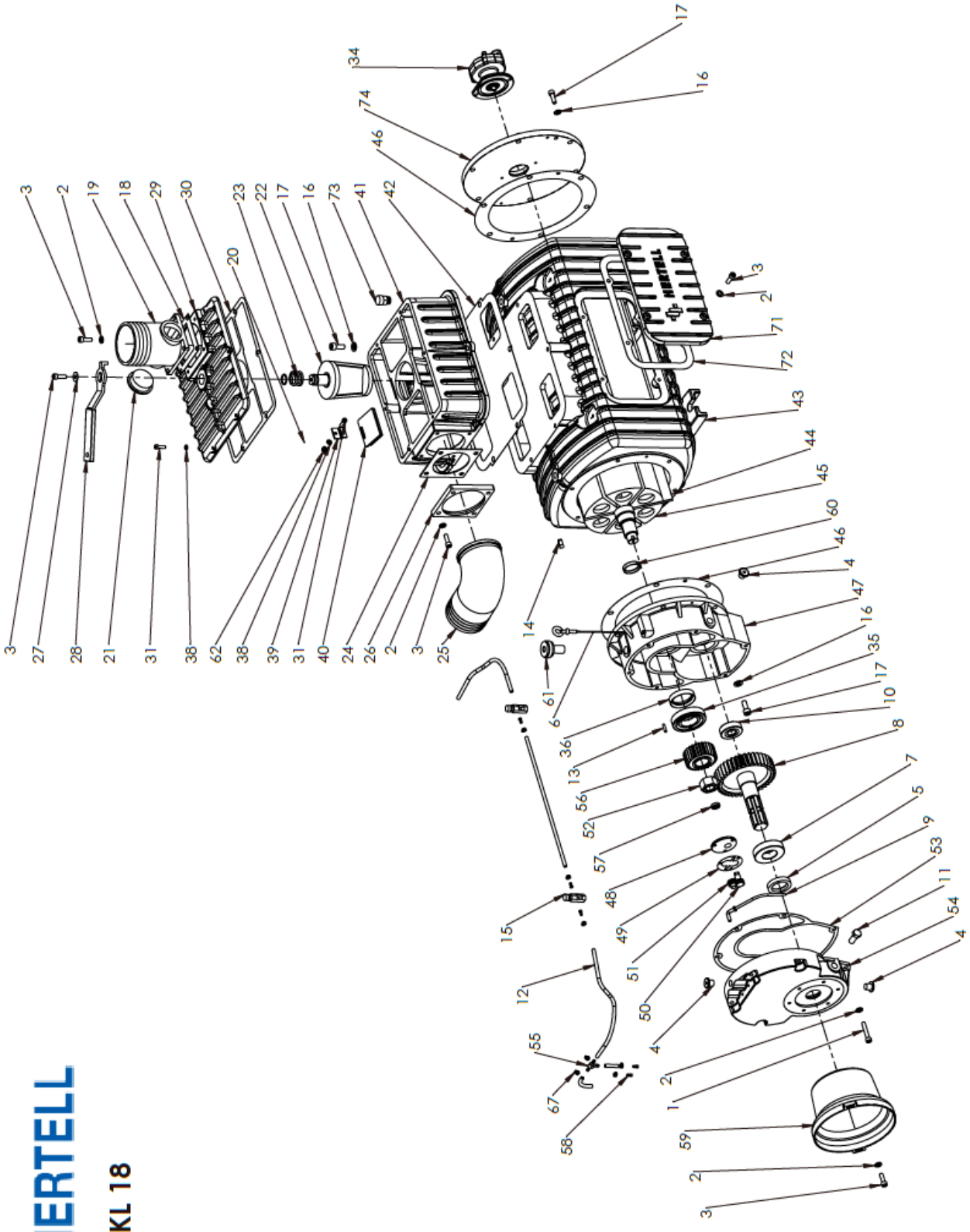


5. Spare parts.

The following list and drawings identify the spare parts of any KL 18:



Reference	Denomination
01KL180001	N. 1. Screw for KL-18
01KL180002	N. 2. Washer for KL-18
01KL180003	N. 3. Screw for KL-18
01KL180004	N. 4. Plug for KL-18
01KL180005	N. 5. Seal for KL-18 35x55x10
01KL180006	N. 6. Oil level indicator for KL-18
01KL180007	N. 7. Bearing for KL-18 6307
01KL180008	N. 8. Attack gear Z= 55 for KL-18
01KL181008	N. 8. Attack gear for 1000 rpm KL-18
01KL180009	N. 9. NIppel 90º for KL-18
01KL180010	N.10. Bearing for KL-18 6304
01KL180011	N.11. Sightglass for KL-18
01KL180012	N.12. Oil tube for KL-18
01KL180013	N.13. Elastic pin for KL-18
01KL180014	N.14. Key for KL-18
01KL180015	N.15. Drop feeder for KL-18
01KL180016	N.16. Washer for KL-18
01KL180017	N.17. Screw for KL-18
01KL180018	N.18. Gasket for KL-18
01KL180019	N.19. Outlet Ø 100 for KL-18
01KL180020	N.20. O-ring for KL-18
01KL180021	N.21. Plug for KL-18
01KL180022	N.22. Conic distributor for KL-18
01KL180023	N.23. Spring for KL-18
01KL180024	N.24. Uutlet gasket for KL-18
01KL180025	N.25. Outlet for KL-18
01KL180026	N.26. Flange for KL-18
01KL180027	N.27. Washer for KL-18
01KL180028	N.28. Manilla para KL-18
01KL180029	N.29. Distributor cover for KL-18
01KL180030	N.30. Gasket for KL-18
01KL180031	N.31. Screw for KL-18
01KL180032	N.32. Washer for KL-18
01KL180034	N.34. Water pump for KL-18
01KL180035	N.35. Bearing for KL-18 6208
01KL180036	N.36. Seal for KL-18 45x60x12
01KL180038	N.38. Copper washer for KL-18
01KL180039	N.39. Hinge for KL-18
01KL180040	N.40. Retention flpa for KL-18
01KL180041	N.41. Distributor for KL-18
01KL180042	N.42. Gasket for KL-18
01KL180043	N.43. Body for KL-18
01KL180044	N.44. Vane for KL-18 (600x70x7,5) 6
01KL180045	N.45. Rotor for KL-18
01KL180046	N.46. Gasket for KL-18
01KL180047	N.47. Gearbox for KL-18
01KL180048	N.48. Oil pump cover for KL-18
01KL180049	N.49. Oil pump gasket for KL-18
01KL180050	N.50. Oil pump attack gear for KL-18
01KL180051	N.51. Oil pump gear for KL-18
01KL180052	N.52. Lock nut for KL-18
01KL180053	N.53. Gasket for KL-18
01KL180054	N.54. Gearbox cover for KL-18
01KL180055	N.55. T-connection for KL-18
01KL180056	N.56. Small gear 28 teeth for KL-18
01KL181056	N.56. Smal gear for 1000 rpm KL-18
01KL180057	N.57. Seal for KL-18 12x20x5
01KL180058	N.58. Pipette for KL-18
01KL180059	N.59. PTO Guard for KL-18
01KL180060	N.60. Rotor plug for KL-18
01KL180061	N.61. Plug 1/2" for KL-18
01KL180062	N.62. Nut for KL-18
01KL180063	N.63. Screw for KL-18
01KL180067	N.67. Bracket for KL-18
01KL180071	N.71. Cover for KL-18
01KL180072	N.72. Cover gasket for KL-18
01KL180073	N.73. Purge plug for KL-18
01KL180074	N.74. Rear cover for KL-18
01KL180099	N.99. Accessories kit for KL-18

6. Warranty.

Each pump is checked in our Test-bank by vacuum and pressure before leaving our Works, being the oil system regulated as well. Thereafter each vacuum pump is identified with a manufacture number. (Plate at the front of the pump).

Our pumps have one year warranty after delivery against defects of material or assembly. HERTELL S.COOP is not responsible of direct or indirect costs caused by the pump misuse. In case of reclamation, it is decision of Hertell S.Coop. to verify the origin of the claim. It is the responsibility of the tank manufacturer to verify that the pump is going to be used according to the advised instructions.

The vacuum pumps fulfil the 89/392/CEE directive about machines and its posterior modifications 98/37/CEE and 2006/42/CEE, according to the norms concerning vacuum pumps and compressors UNE – EN 1012-1 and UNE – EN 1012-2. By request a certificate according to this directive is available.

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