HERTELL S.COOP.

HUMANITY AT WORK MONDRAGON

KDP 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 KDP vacuum pump is a rotary blade pump on eccentric rotor indicate for vacuum tankers.

The compact and on-line disposition of the pump (Patent Nº ES8603.099) allows:

.- Reduction of noise level.

.- Safer manipulation.

1.3.- Models.

- ***KDP - 3/12000.***

  .- .- Drive at 1.400 rpm maximum, clockwise rotation sense.

2.- SETTING UP.

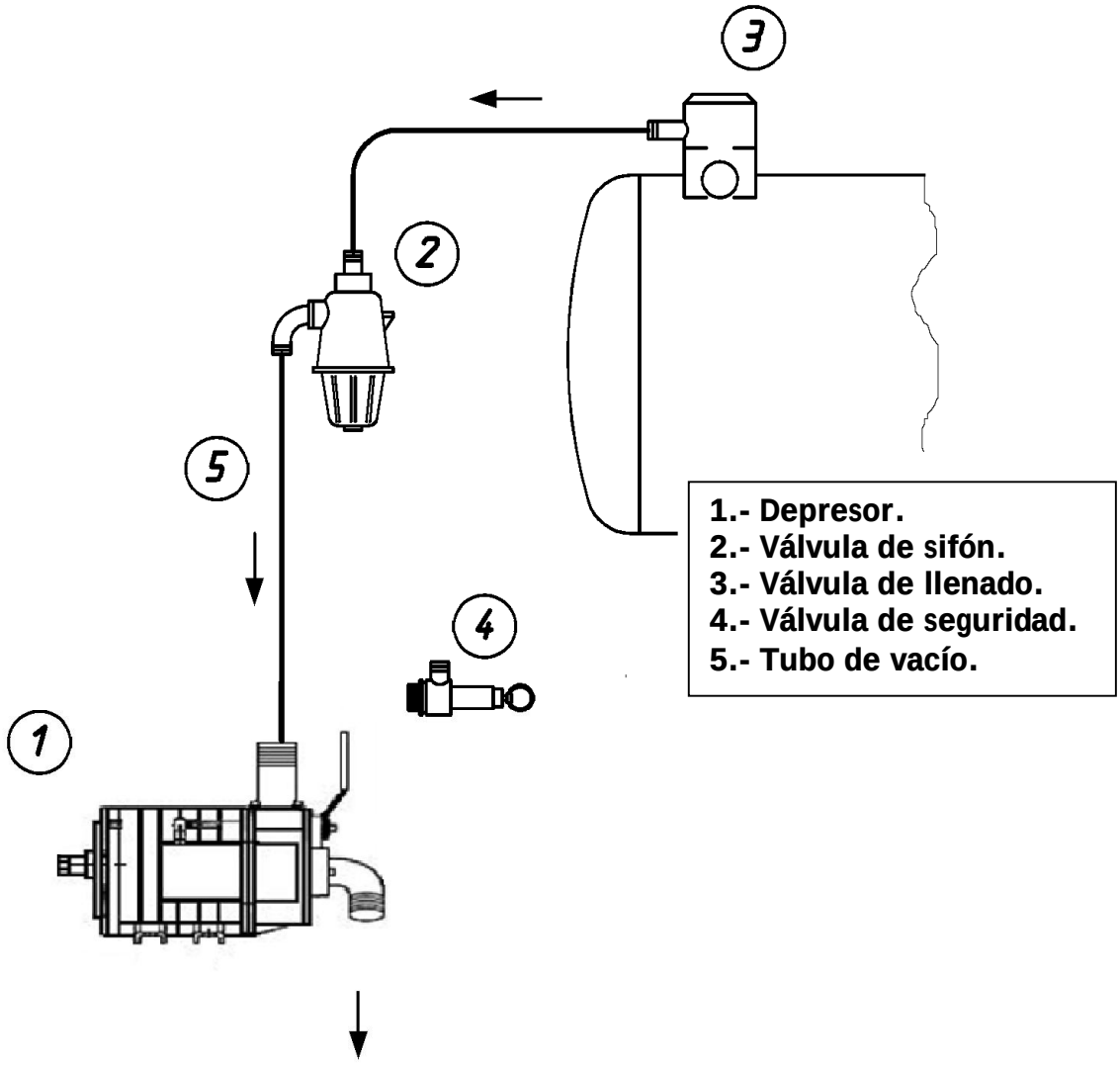
Always be careful by hanging the vacuum pump. Use the hole situated at the top of the pump body to lift the pump, keeping always the safety distance to avoid injuries due to a sudden fall down of the pump.

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 cartoon box to make easier the process of palletising and transporting the vacuum pumps.

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



1.- Depresor.
2.- Válvula de sifón.
3.- Válvula de llenado.
4.- Válvula de seguridad.
5.- Tubo de vacío.

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.

It is recommended to use an Ø 60 mm pipe (5) till pumps up to 6500 l/min and a Ø 80 mm pipe up form there. 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.

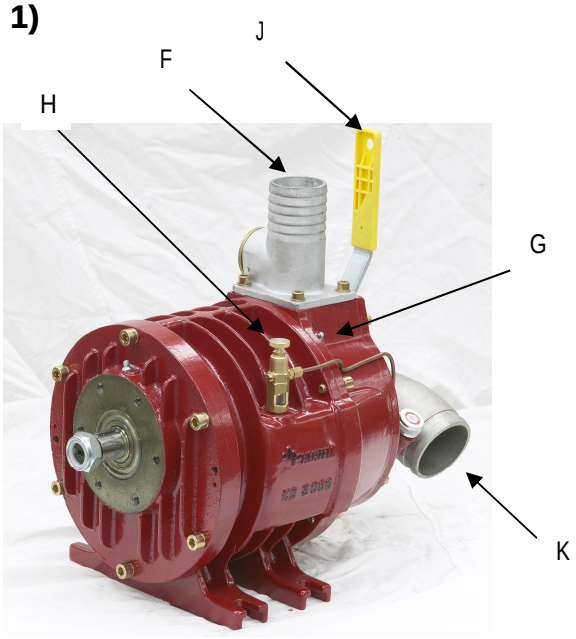
Depending on the vacuum installation a vacuum relief valve (4 too) can be installed on the vacuum pump to limit the maximal vacuum level. The fact of decreasing the vacuum level increases the operation time of the pump. All these variables depend on the working conditions of the vacuum tanker.

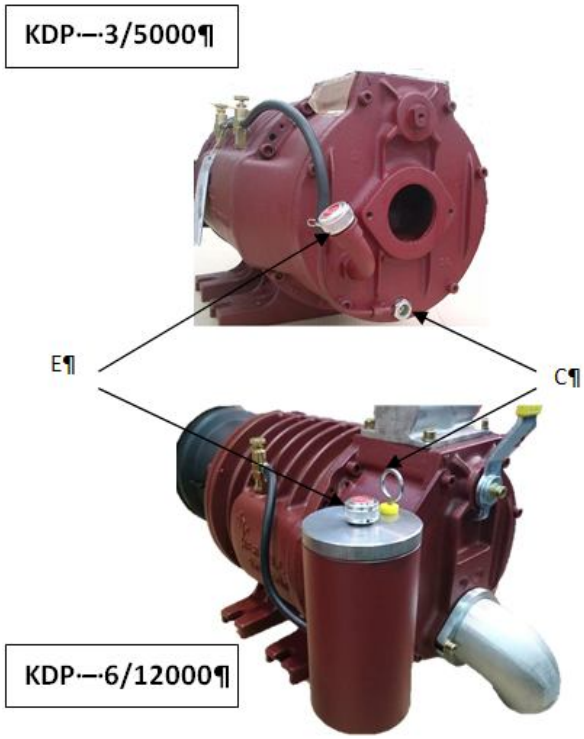
It is the decision of the tank manufacturer to choose the dimension of the pump the same way as the other accessories of the tanker.

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

3.- PUMP OPERATION.

(Fig. 1)





3.1.- First operation

Maximal angle between drive shaft axe and pump shaft should not exceed 7º.

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

KDP pumps always run clockwise sense, as stated at the front cover. Be sure that driven system (cardan shaft, pulley, hydraulic motor…) turns on the right sense. Pump coupling F has to be connected and secure to the vacuum pipe. For the first operation, just prepare the tanker for vacuum operation, put the handle (J) on "V" vacuum position and let the pump run at the estimated turning speed. Drop feeders (H) will be start lubricating after some seconds. Check that the minimal distance between the outlet K and any object in risk of being sucked into the pump is at least 100 cm.

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.

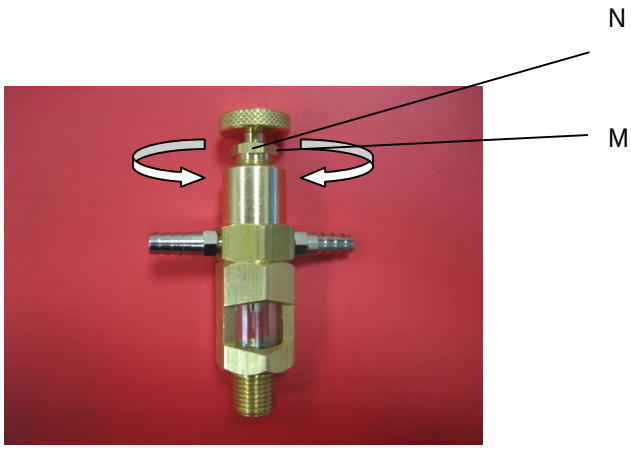
3.2.- Lubrication.

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 sight glass/indicator level 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 2 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

3.3.-Maintenance.

The rear bearing has to be lubricated at least once a month through oilier G. Use normal grease till the gap from bearing to the oilier is filled up.

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 J 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.

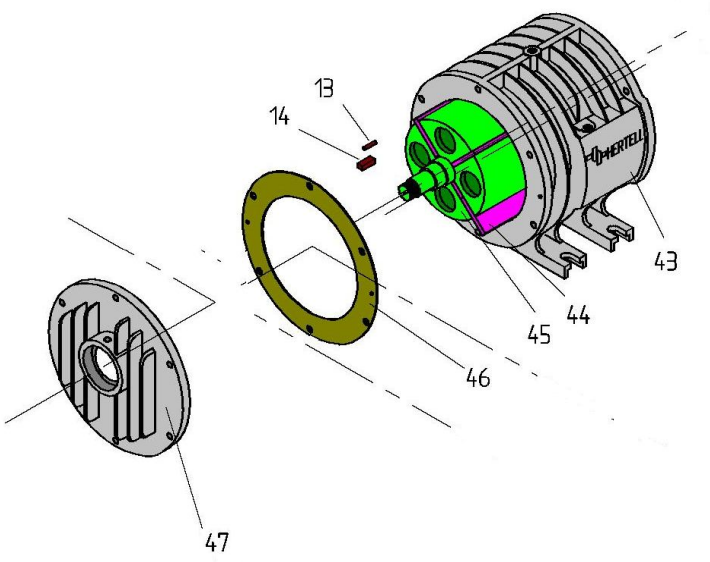
VANES CHANGE :

1.- Unscrew the cover N.47 using the two extraction holes.

2.- Remove the gasket N.46.

3.- Change the vanes.

4.- Before setting up, replace the gasket.



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.	Take apart the front cover and place the vanes.
	One object from the exterior has got into the pump.	Take apart and get our 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	Air aspiration on the lubrication pies.	Check pipes and nipples.
No retention of pressure	Retention flap is damaged	Change retention flap.

4.- TECHNICAL SPECIFICATIONS.

4.1. Material.

4.1.1. Cast

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 are hollow and balanced. This reduction on the weight decreases the inertia forces suffered on the pump.

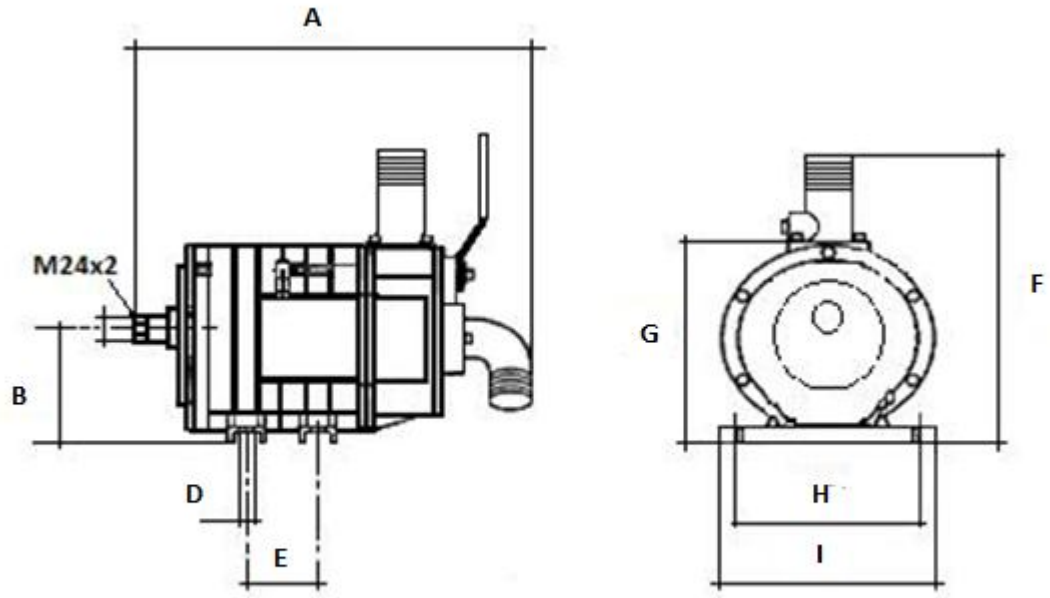
By request one certificate of the composition of the pump material is available at any time.

4.1.2. Vanes

The vanes are made of special material and are complete free of asbestos.

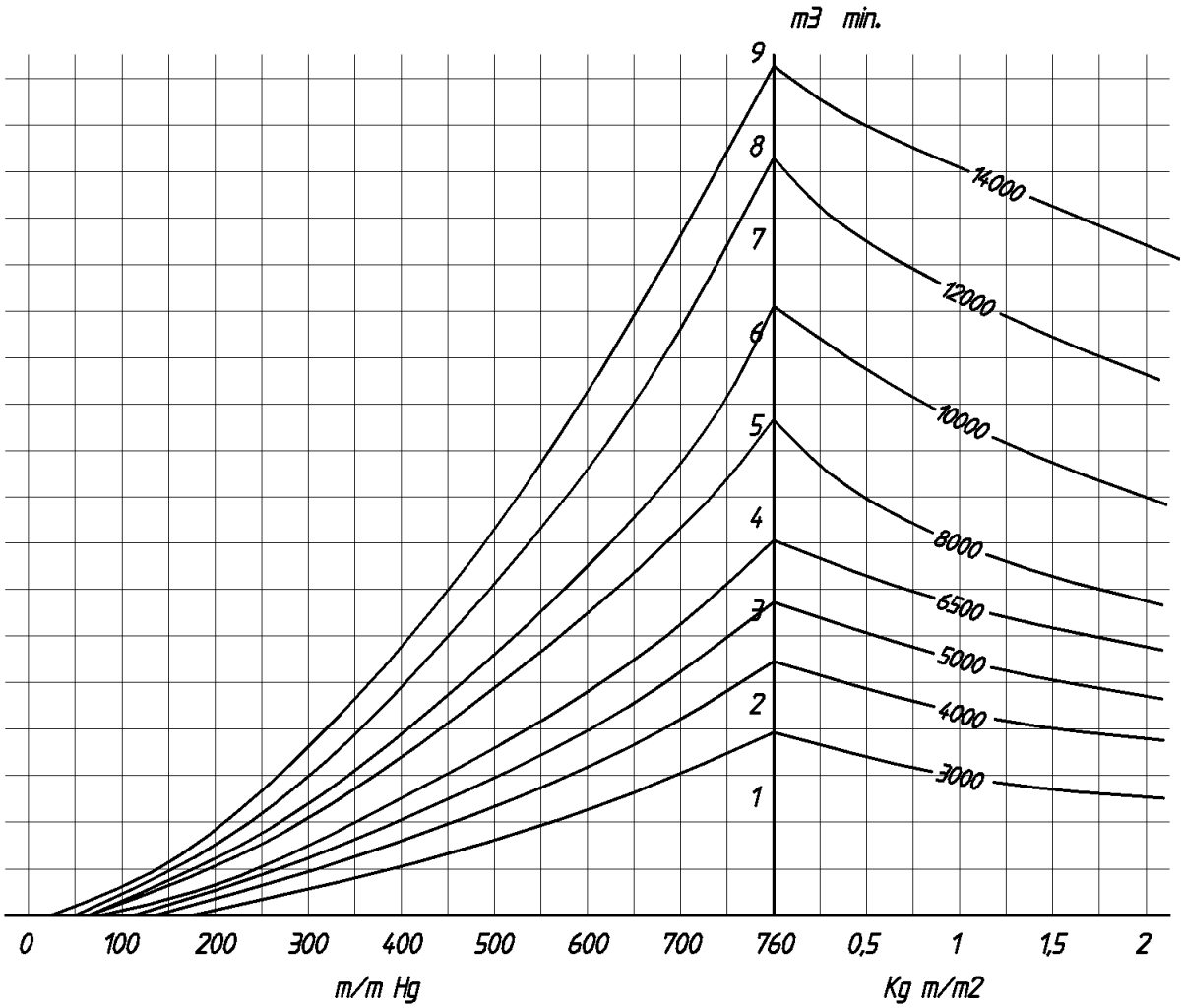
4.2.- Dimensions.

Mod.	A	B	D	E	F	G	H	I
KDP-3.000	451	169,5	16	88	410	290	240	260
KDP-4.000	506	169,5	16	88	410	290	240	260
KDP-5.000	556	169,5	16	88	410	290	240	260
KDP-6.500	589	200	20	140	460	340	280	310
KDP-8.000	649	200	20	140	460	340	280	310
KDP-10.000	709	200	20	140	460	340	280	310
KDP-12.000	774	200	20	140	460	340	280	310

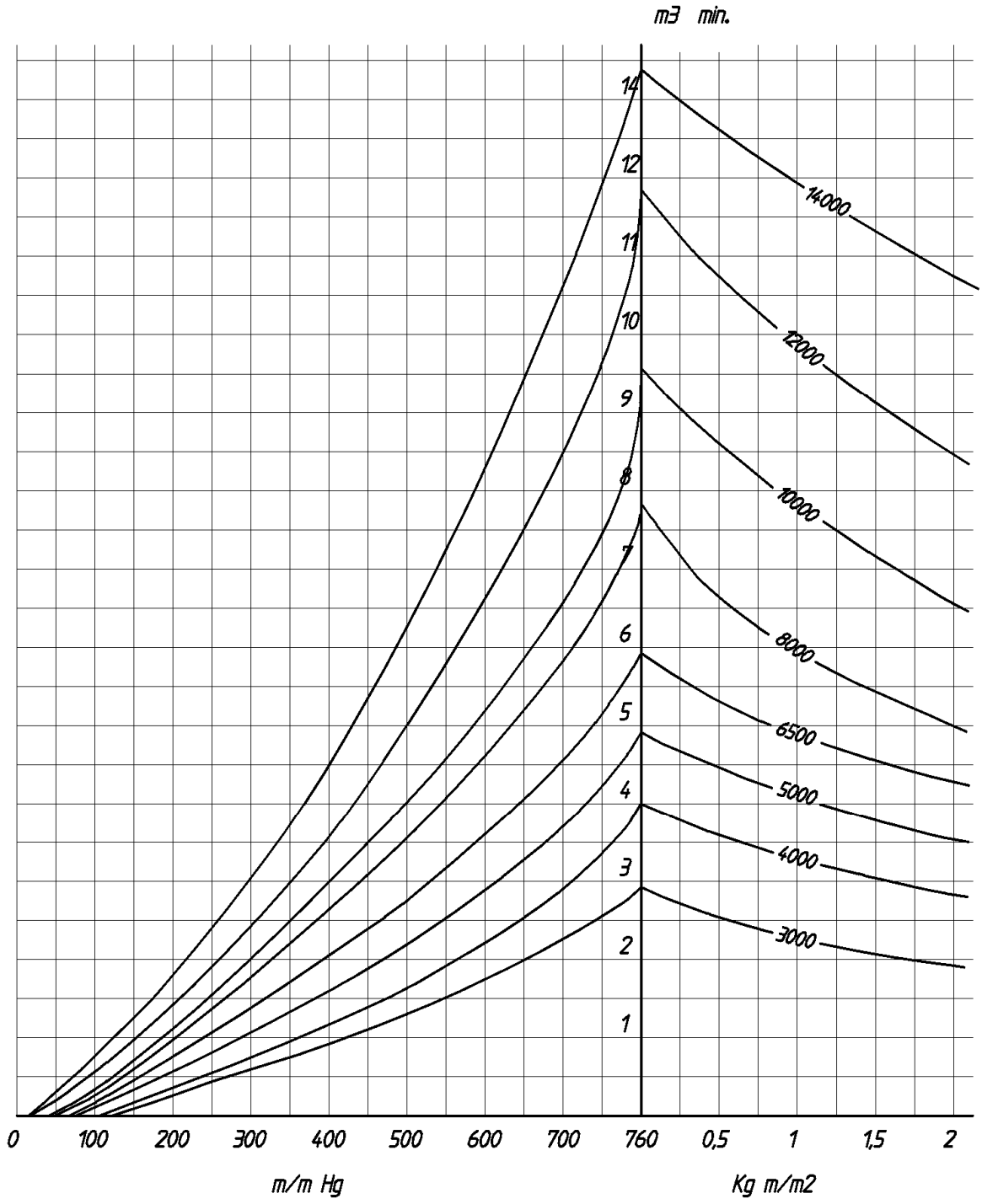


4.3. Air flow.

Air flow depending on the rotor turning speed:



Cubic meter/ minute. Rotor turning speed: 1.000 rpm.



Cubic meter/ minute. Rotor turning speed: 1.450 rpm.

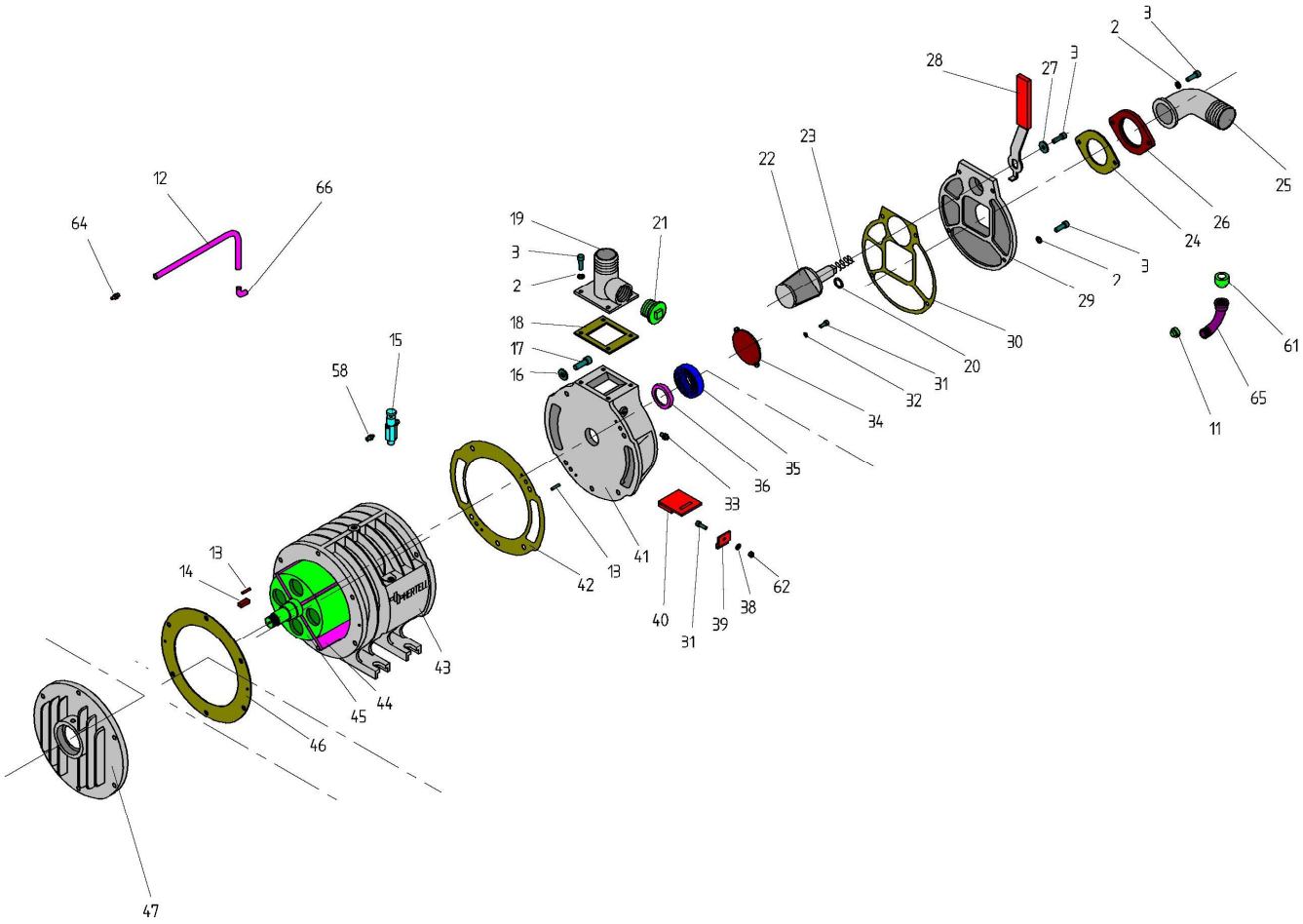
4.4. Other specifications.

Mod.	KDP-3000	KDP-4000	KDP-5000	KDP-6500	KDP-8000	KDP-10000	KDP-12000
Rpm.	1.400	1.400	1.400	1.400	1.400	1.400	1.400
Maximum vacuum (%)	90	90	90	90	90	90	90
Maximum pressure (bar)	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Wieght (kG)	56	62	67	87	98	111	122
Noise level (dB)	85	86	86	87	87	87	88
Power consumption (kW)	8	10	12	15	18	22	25

Power consumption and noise level at maximum pressure.

5. Parts list. Drawings

Following list and drawing identifies any KDP spare part:



KD-KDP Spare parts:

Refer.	Article
01KD050001	N. 1. Screw for KD-3000/5000
01KD140001	N. 1. Screw for KD-6500/14000
01KD140002	N. 2. Washer for KD-3000/14000
01KD140003	N. 3. Screw for KD-3000/14000
01KD140004	N. 4. Plug for KD-3000/14000
01KD140005	N. 5. Seal for KD-3000/14000 35x55x10
01KD140006	N. 6. Oil level indicator KD-3000/14000
01KD050007	N. 7. Bearing for KD-3000/5000 6207
01KD140007	N. 7. Bearing for KD-6500/14000 6307
01KD050008	N. 8. Attack gear 49 teeth KD-3000/5000
01KD140008	N. 8. Attack gear 55 teeth KD-6500/14000
01KD141008	N. 8. Attack gear 1000 rpm KD-6500/14000
01KD140009	N. 9. Nipple 90 for KD-3000/14000
01KD140010	N.10. Bearing for KD-3000/14000 6304
01KD140011	N.11. Oil sight glass KD-3000/14000
01KD030012	N.12. Oil tube for KD- 3000
01KD040012	N.12. Oil tube for KD- 4000
01KD050012	N.12. Oil tube for KD- 5000
01KD060012	N.12. Oil tube for KD- 6500
01KD080012	N.12. Oil tube for KD- 8000
01KD100012	N.12. Oil tube for KD-10000
01KD120012	N.12. Oil tube for KD-12000
01KD140012	N.12. Oil tube for KD-14000
01KD140013	N.13. Elastic pin for KD-3000/14000
01KD050014	N.14. Key for KD-3000/5000
01KD140014	N.14. Key for KD-6500/14000
01KD140015	N.15. Drop feeder for KD-3000/14000
01KD140016	N.16. Washer for KD-3000/14000
01KD140017	N.17. Screw for KD-3000/14000
01KD050018	N.18. Gasket for KD-3000/5000
01KD140018	N.18. Gasket for KD-6500/14000
01KD050019	N.19. Outlet Ø 60 KD-3000/5000
01KD060019	N.19. Outlet Ø 60 KD-6500
01KD140019	N.19. Outlet Ø 80 KD-6500/14000
01KD141019	N.19. Outlet Ø 100 KD-14000
01KD052019	N.19. Double outlet Ø 60 KD-3000/5000
01KD062019	N.19. Double outlet Ø 60 KD-6500
01KD142019	N.19. Double outlet Ø 80 KD-6500/14000
01KD140020	N.20. O-Ring for KD-3000/14000
01KD140021	N.21. Plug for KD-3000/14000
01KD050022	N.22. Conic distributor for KD-3000/5000
01KD140022	N.22. Conic distributor for KD-6500/14000
01KD140023	N.23. Spring for KD-3000/14000

01KD140024	N.24. Outlet gasket KD-3000/14000
01KD140025	N.25. Outlet for KD-3000/14000
01KD140026	N.26. Flange for KD-3000/14000
01KD140027	N.27. Washer for KD-3000/14000
01KD140028	N.28. Handle for KD-3000/14000
01KD050029	N.29. Distributor cover KD- 3000/5000
01KD120029	N.29. Distributor cover KD- 6500/12000
01KD140029	N.29. Distributor cover KD-14000
01KD050030	N.30. Gasket for KD-3000/5000
01KD140030	N.30. Gasket for KD-6500/14000
01KD140031	N.31. Screw for KD-3000/14000
01KD140032	N.32. Washer for KD-3000/14000
01KD140033	N.33. Lubrication nipple for KD-3000/14000
01KD140034	N.34. Bearing cover for KD-6500/14000
01KD050034	N.34. Bearing cover for KD-3000/5000
01KD141034	N.34. Water pump for KD-14000
01KD050035	N.35. Bearing for KD-3000/5000 6207
01KD140035	N.35. Bearing for KD-6500/14000 6208
01KD050036	N.36. Seal for KD-3000/5000 40x55x8
01KD140036	N.36. Seal for KD-6500/14000 45x60x12
01KD140038	N.38. Copper washer KD-3000/14000
01KD140039	N.39. Hinge for KD-3000/14000
01KD050040	N.40. Plug forKD-3000/5000
01KD140040	N.40. Plug for KD-6500/14000
01KD050041	N.41. Distributor for KD- 3000/5000
01KD120041	N.41. Distributor for KD- 6500/12000
01KD140041	N.41. Distributor for KD-14000
01KD050042	N.42. Gasket for KD-3000/5000
01KD140042	N.42. Gasket for KD-6500/14000
01KD030043	N.43. Body for KD- 3000
01KD040043	N.43. Body for KD- 4000
01KD050043	N.43. Body for KD- 5000
01KD060043	N.43. Body for KD- 6500
01KD080043	N.43. Body for KD- 8000
01KD100043	N.43. Body for KD-10000
01KD140043	N.43. Body for KD-12000
01KD120043	N.43. Body for KD-12000
01KD030044	N.44. Vane for KD- 3000 (160x57x7,5) 4
01KD040044	N.44. Vane for KD- 4000 (210x57x7,5) 4
01KD050044	N.44. Vane for KD- 5000 (265x57x7,5) 4
01KD060044	N.44. Vane for KD- 6500 (240x64x7,5) 6
01KD080044	N.44. Vane for KD- 8000 (300x64x7,5) 6
01KD100044	N.44. Vane for KD-10000 (360x64x7,5) 6
01KD140044	N.44. Vane for KD-12/14000 (425x64x7,5) 6
01KD030045	N.45. Rotor for KD- 3000
01KD040045	N.45. Rotor for KD- 4000
01KD050045	N.45. Rotor for KD- 5000

01KD060045	N.45. Rotor for KD- 6500
01KD080045	N.45. Rotor for KD- 8000
01KD100045	N.45. Rotor for KD-10000
01KD120045	N.45. Rotor for KD-12000
01KD140045	N.45. Rotor for KD-14000
01KD050046	N.46. Gasket for KD-3000/5000
01KD140046	N.46. Gasket for KD-6500/14000
01KD050047	N.47. Gearbox for KD-3000/5000
01KD140047	N.47. Gearbox for KD-6500/14000
01KP050047	N.47. End cover for KDP-3000/5000
01KP120047	N.47. End cover for KDP-6500/12000
01KD140048	N.48. Oil pump cover KD-3000/14000
01KD140049	N.49. Oil pump gasket KD-3000/14000
01KD140050	N.50. Oil pump attack gear KD-3000/14000
01KD140051	N.51. Oil pump gear KD-3000/14000
01KD140052	N.52. Lock nut for KD-3000/14000
01KD050053	N.53. Gasket for KD-3000/5000
01KD140053	N.53. Gasket for KD-6500/14000
01KD050054	N.54. Gearbox cover for KD-3000/5000
01KD140054	N.54. Gearbox cover for KD-6500/14000
01KD140055	N.55. T-connection for KD-3000/14000
01KD050056	N.56. Small gear 19 teeth KD-3000/5000
01KD140056	N.56. Small gear 28 teeth KD-6500/14000
01KD141056	N.56. Small gear 1000 rpm KD-6500/14000
01KD140057	N.57. Seal for KD-3000/14000 12x20x5
01KD140058	N.58. Pipette for KD-3000/14000
01KP120058	N.58. Nipple for KDP-3000/12000
01KD140059	N.59. PTO Guard for KD-3000/14000
01KD140060	N.60. Rotor plug for KD-3000/14000
01KD140061	N.61. 1/2" plug para KD-3000/14000
01KD140062	N.62. Nut for KD-3000/14000
01KD140063	N.63. PTO Guard screw KD-3000/14000
01KP120064	N.64. Nipple for KDP-3000/12000
01KP120065	N.65. Elbow 1/2 for KDP-3000/12000
01KP120066	N.66. Nipple 1/8K for KDP-3000/12000
01KD140067	N.67. Bracket for KD-3000/14000
01KD050099	N.99. Accessories kit for KD-3000/5000
01KD060099	N.99. Accessories kit for KD-6500
01KD140099	N.99. Accessories kit for KD-6500/14000

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.

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 modification 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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