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国家产品质量免检 | 中国著名品牌

ZJQ系列真空泵

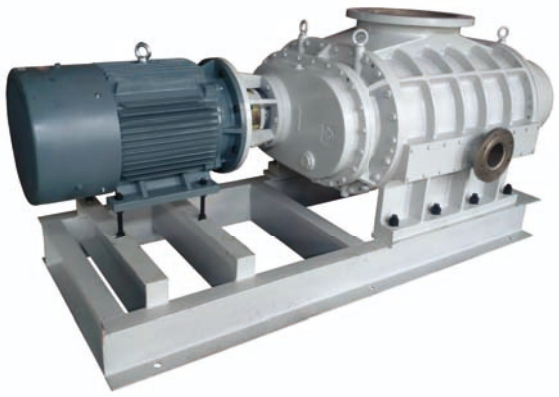
ZJQ Series Vacuum Pump

Product Catalog 2020

ZJQ series Roots vacuum pumps with air-cooling

Summary:

ZJQ Series air-cooling roots vacuum pump is designed based on the ZJ Roots series vacuum pump to increase the bypass gas cooling system. Because of its special structural design, make its can run reliably for a long time under the high pressure. Under normal circumstances are in the pump outlet or back flow are installed in the piping for heat exchanger. Cooling gas from both sides of the pump body into the pump cavity and cooling of the rotor and the pump cavity, but the pump pumping performance did not affect. Pump can be used alone can also multiple used in tandem, or with liquid ring vacuum pump in series to form a unit and achieve higher vacuum degree to meet the technological requirements.



ZJQ Roots series vacuum pump has the following characteristics:

- Enable to be directly discharged into the atmosphere, no waste water discharge;
- Enable to be connected in series with the former pump composed of Roots unit, energy saving effect is remarkable. Compared with the ordinary Roots pump, the ZJQ Roots pump vacuum can work under high pressure difference, can appropriately reduce the fore pump so as to achieve energy saving effect.
- Wide range of application. Due to the exhaust side can withstand high pressure, effectively solve the ordinary vacuum pump Roots pressure difference is too large, the vacuum degree of the former pump caused by overload, overheating;
- Enable to work under higher inlet pressure series.ZJQ air cooled vacuum pump Roots theory can work under the condition of the entrance to the atmospheric pressure;
- The motor power is not sure. ZJQ series Roots vacuum pump should be confirm the motor power by calculating the maximum differential pressure according to the actual situation.

Main technology specification of the ZJQ series Roots vacuum pumps

Type	Suction Speed （L/s）	Limited pressure （Pa）	Max. pressure tolerance （Pa）	Speed （r/min）	Inlet DN （mm）	Outlet DN （mm）	Return port DN (mm)	Power （kW）
ZJQ15	15	3h 10^4	8.5h 10^4	1390	50	40	20	0.55~2.2
ZJQ30	30	2h 10^4	8.5h 10^4	2825	50	40	20	0.75~4
ZJQ70	70	2h 10^4	8.5h 10^4	2840	80	50	25	1.5~7.5
ZJQ150	150	1.6h 10^4	8.5h 10^4	2880	100	100	40	3~15
ZJQ300	300	1.6h 10^4	8.5h 10^4	1440	150	150	65	4~30
ZJQ600	600	1.6h 10^4	8.5h 10^4	2900	150	150	65	7.5~55
ZJQ1200	1200	1.3h 10^4	8.8h 10^4	1460	300	300	100	15~132
ZJQ2500	2500	1.3h 10^4	8.8h 10^4	1470	400	300	100	22~250
ZJQ5000	5000	-	4h 10^4	1480	400	300	150	37~250
ZJQ10000	10000	-	4h 10^4	1480	500	400	200	55~500
ZJQ20000	20000	-	4h 10^4	990	800	800	300	90~1000
ZJQ30000	30000	-	3h 10^4	990	1000	1000	300	110~1500

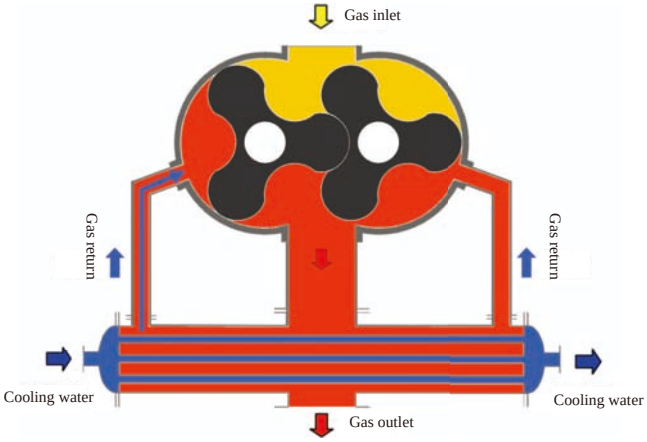
Notes:

The data of the limited vacuum listed in the above table are obtained when the Roots pump assembles with the proper rotary vacuum pump or slide valve vacuum pump. If the water ring vacuum pump or the oil ring vacuum pump as the fore pump, the limited vacuum will higher than these data. Please refer to the information of the Roots Liquid Ring Vacuum Units.

>> As the cartoon display of the work principle, please refer to the address: *http://www.hanthing.com*

Work principle of the Roots vacuum pump:

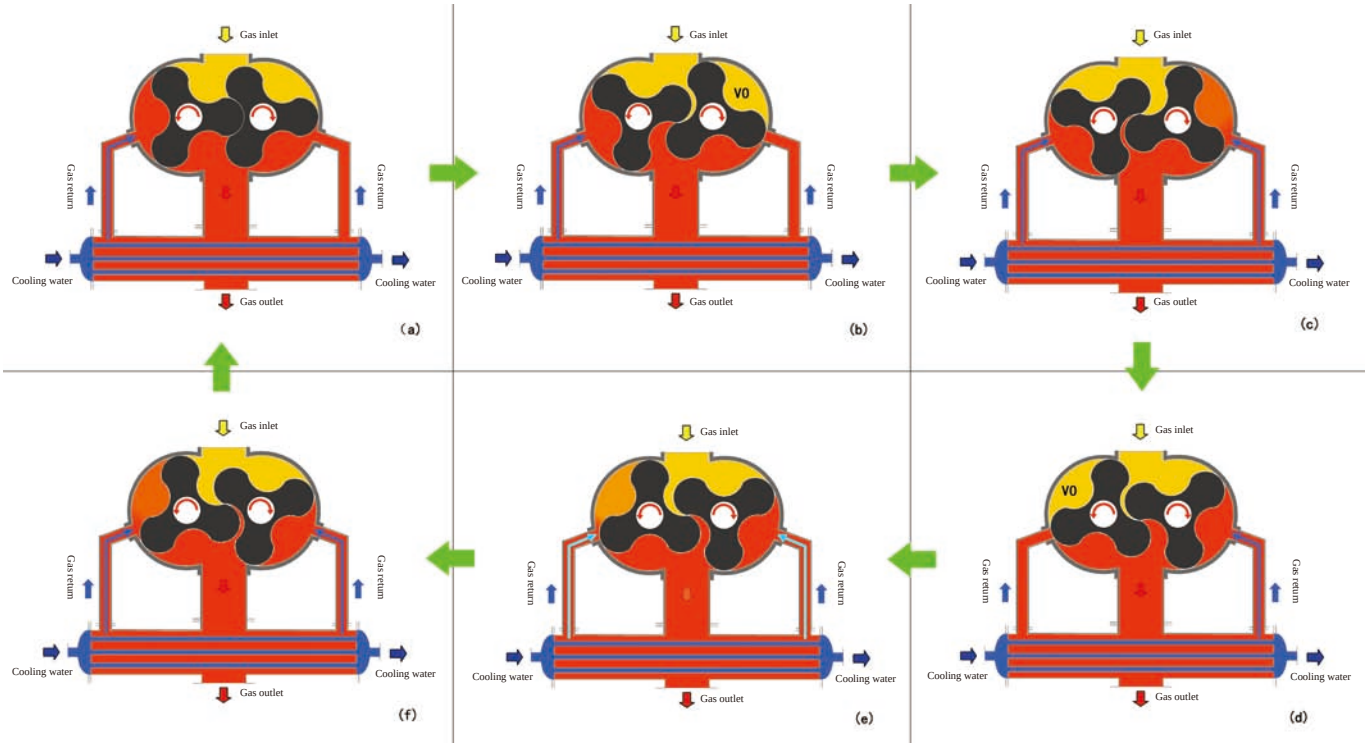
The structure of ZJQ series air-cooled Roots vacuum pumps is as shown in the Figure. In the pump cavity, two rotor (two blades or multi blades) mounted on a pair of parallel axes, the transmission ratio is 1 for a pair of gears with synchronous rotation opposite to each other. In between the rotor and the rotor, between the inner wall the pump shell, maintaining a certain gap, can achieve high speed operation. Compared with the ZJ series Roots vacuum pump, ZJQ series air-cooled Roots vacuum pump with reflux in the side of the pump body position design, the gas into the pump chamber cooling to cool the rotor, the rotor temperature is maintained within the specified scope the ZJQ series of air-cooled Roots vacuum pump can withstand higher pressure (up to 90kPa) without overheating.



Figures (a) ~ (f) ZJQ are working process of air-cooled Roots vacuum pump:

As Figure (a), in the rotation process, the top of the pump cavity becomes larger, the gas is inhaled; when rotating to the Figure (b), right from the entrance into the V0 rotor pump gas volume; when transferred to the Figure (c), right V0 cavity and the return line is connected, the exhaust side pressure higher than the V0 cavity, so the exhaust gas is cooled after heat exchanger flow to the V0 cavity; when transferred to the Figure (d), a V0 volume of gas left rotor; when transferred to the Figure (e) and (f), the left side of the V0 cavity and the return line is connected, V0 cavity cooled gas return flow to the left; when to continue to Figure (a), the reflux cavity communicates with the exhaust port on the right side of the Figure to continue; (c) when the initial gas discharged from the pump with the right rotor enclosed gas reflux together.

The rotor spindle rotates a circle, 6 gases in volume of V0 are discharged.



ZJN Series Air-cooling Stainless Steel Roots Vacuum Pump

Summary:

ZJN series vacuum pump Roots is on the basis of ZJQ air cooled vacuum pump, all the flow components are changed to stainless steel material or other corrosive materials.

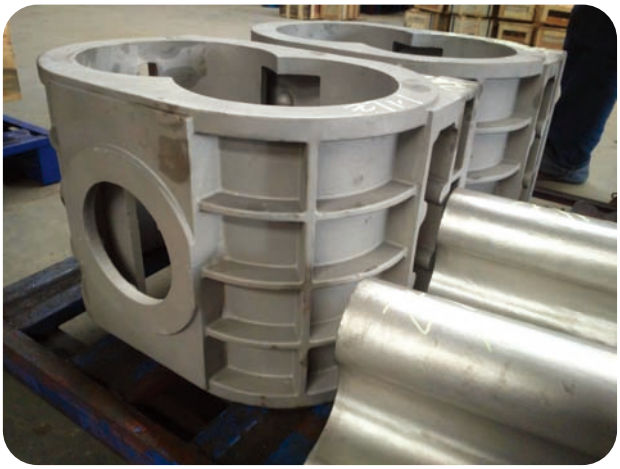
ZJN series air cooling type stainless steel vacuum pump Roots work characteristics, technical parameters, principle working and so on can refer to series ZJQ air cooling type vacuum pump Roots.

The material of ZJN series air cooling type stainless steel vacuum pump Roots over current component can be chosen:

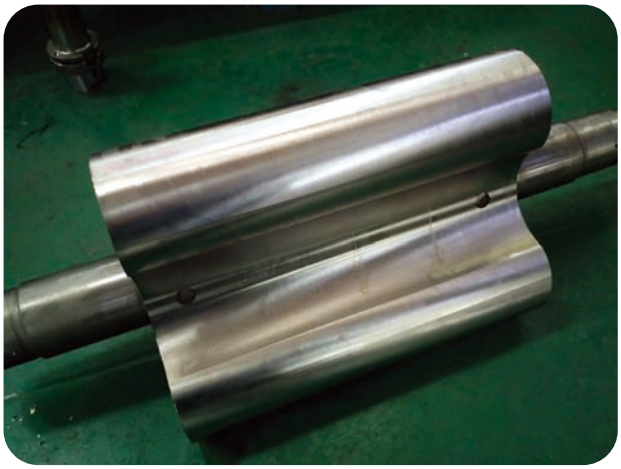
S30408 (old brand 0Cr18Ni9, new brand 06Cr19Ni10)

S31603 (old brand 00Cr17Ni12Mo2, new brand 022Cr17Ni11Mo2)

S31803 (SAF2205, new brand 022Cr22Ni5Mo3N)



▶ ZJN series stainless steel pump body



▶ ZJN series stainless steel rotor

LG series Screw Vacuum pumps

Summary:

LG series screw vacuum pump (also known as twin screw vacuum pump, no oil dry screw vacuum pump) is my company according to the market demand, independent research and development of advanced technology of dry vacuum pump. Because screw vacuum pump without oil lubrication or water seal, pump chamber completely without oil, so screw vacuum pump in the semiconductor, electronics industry requirements without oil clean vacuum occasions and pharmaceutical and chemical solvent recovery process and has incomparable advantage, can be widely used to replace rotary vane vacuum pumps, rotary piston vacuum pump, water ring vacuum pump, water jet vacuum pump, reciprocating vacuum pump, roots water ring vacuum unit.

Screw vacuum pump of a guide process is equivalent to the level of pump, a plurality of guide screw vacuum pump the equivalent of multistage pump series, relative to the claw type vacuum pump, multi-stage Roots vacuum pump and multistage tandem dry vacuum pump, because no internal channel between the screw vacuum pump pump at all levels, but directly to the gas from the suction side push to send to the exhaust side, so in the pumping condensable gas, dust and particles in the gas with uneasy blockage and convenient cleaning.

Technology parameters:

Model	LG-30	LG-70	LG-100	LG-180
Maximum suction rate (L/s)	30	70	100	180
Extreme pressure (mbar)	0.3	0.3	0.1	0.05
Maximum exhaust pressure (bar)	1.3	1.3	1.3	1.3
Motor power (kW)	4	7.5	15	22
Speed (r/min)	2890	2900	2930	2940
Inlet port diameter (mm)	DN40	DN50	DN65	DN100
Outlet port diameter (mm)	DN40	DN50	DN65	DN65
Gear oil consumption (L)	1.3	1.6	4.0	4.0
Cooling water content (L/h)	120	210	400	600
Cooling water allows maximum pressure (MPa)	0.6	0.6	0.6	0.6
Cooling gas volume (m^3/h)	18	25	30	30
Suction end seal type	O-Ring			
Exhaust end seal type	Mechanical Seals			
Shaft seal type	Frame seal			
Noise（dB）	82	85	85	85
Weight（kg）	260	370	600	680

Notes:

The screw vacuum pump is developing and improving by us. Any changes of the above data would not be informed rapidly in the brochure. The up to date details refers to the website: http://www.hanthing.com.

Summary:

- The structure is compact and the floor area is small.
- The structure is simple, the maintenance is convenient; the maintenance and the maintenance of the pump need not special tools.
- Single pump can reach the limit pressure of 30Pa~5Pa, the working range is wider.
- According to the condition system equipped with appropriate roots vacuum pump can be composed of a dry vacuum pump unit, greatly improving the area of low pressure pumping speed and reduce power consumption.
- Pump cavity without oil, no pollution to the pumping system, can get a clean vacuum.
- Pump cavity without oil, it is very easy to achieve the recovery of the solvent.
- The pump cavity and the screw surface are provided with nickel coating or PTFE coating for selection, which can be used to remove a large amount of water vapor and a variety of corrosive media.
- Because of no oil in the work process, waste water discharge, no pollution to the environment.
- The requirement for cooling water is lower, and the normal circulating water can meet the requirements of the pump, and the cooling water is smaller.
- Easy cleaning. Such as pump cavity into the dirt need cleaning, simply open the pump suction port, and the pump is opened from the pump suction port adding amount of water or cleaning agent can pump clean, no need to disassemble the pump.

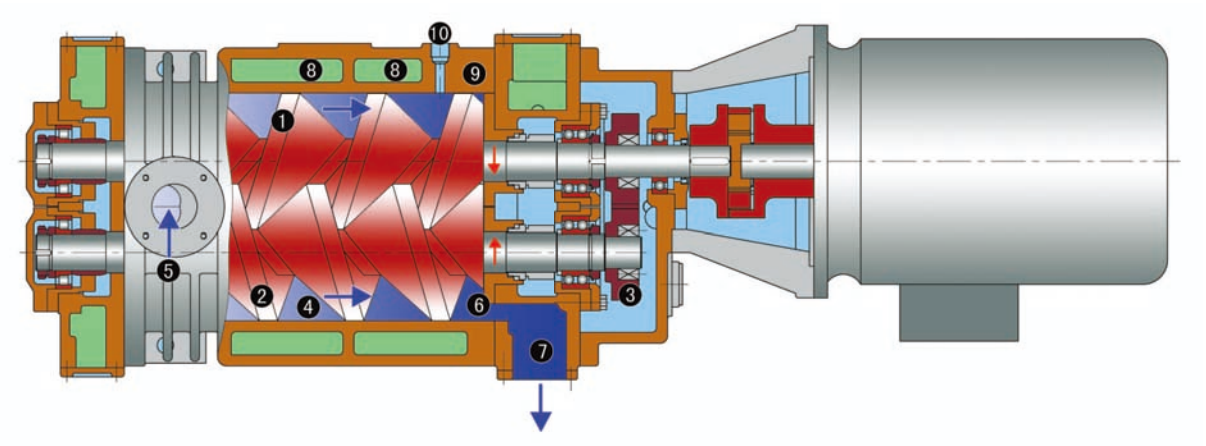
Working principle:

As shown in the figure, screw vacuum pump is arranged in a pair of parallel spiral rotor (1 and 2), which in the direction of rotation of a rotor dextral, another thing is left. Two rotor in the pump body (9) through a pair of gear (3) keep synchronous reverse rotation. Between the rotor and the rotor, between the rotor and the pump body without abrasions and to maintain a certain gap, between two rotors and pump body formed seal cavity (4), the rotor coil number equal to the number of seal cavity.

Two rotors in according to the map in the direction of rotation, with the suction port (5) connected to the sealing cavity space becomes larger, gas is inhaled and is transmitted to the exhaust side, the exhaust side of the sealing cavity space (6) in the rotation process becomes small, the gas is compressed to vent (7).

A long time to pump the pump body and the end cover of the jacket (8) in the appropriate amount of cooling water to the pump for cooling.

Because of the heat of compression mainly in exhaust side (6) to generate, in order to fully cooled rotor, in most cases can be the amount of air or other suitable gas by mixing air outlet (10) into the pump chamber.



↘ The performance curve of the LG screw vacuum pump on page 85.
The overall dimension of the LG screw vacuum pump on page 84.

JZJLG Series Roots Screw Vacuum Unit

Summary:

JZJLG Roots series screw dry vacuum pump unit is consists of ZJ type roots pump as the main pump, LG series screw vacuum pump as a fore pump is composed of dry without oil vacuum unit. JZJLG Roots series screw dry vacuum pump unit than single screw vacuum pump is more suitable to work under low pressure, such as a vacuum distillation process to pumping rate 150L / s, work pressure is 2000Pa, choose JZJLG150-2 vacuum unit (10.5kw), than the selection of single LG180 screw vacuum pump (22KW) more energy-saving and the unit can reach the lower limit pressure.

As the main pump and the former pump are used to dry pump JZJLG, so Roots series vacuum screw dry pump vacuum unit with the following main features:

- The pump cavity has no oil, no pollution of the pumping system, can achieve clean vacuum.
- The pump cavity has no oil, very easy to achieve solvent recovery.
- Roots pump cavity all the nickel plating layer processing, screw pump cavity of the nickel plating and PTFE processing, smoke removing water vapor, solvent gas and other corrosive medium.
- Because no oil in the work process, wastewater discharge, no pollution to the environment.
- The requirements for cooling water pump for low cooling circulating water can meet the requirements of the ordinary, and the cooling water is small.

The primary pump adopts the company self-developed ZJ Roots series vacuum pump, our company will pump cavity and the bearing cavity sealing was improved after the ZJ Roots series vacuum pump in the pumping process of a large number of water vapor and various solvents oil pump is not easy to be emulsified.

Pre stage pump adopts the company self-developed LG series screw vacuum pump, stable and reliable operation, because between the pump chamber and a gear chamber adopts mechanical seal, LG series screw vacuum pump in not filled with nitrogen protection can still stable.

Model representation method

Example: J Z J L G 1 5 0 — 2

J	-	denotes the first letter of the unit.
ZJ	-	denotes the main pump is ZJ series Roots series vacuum pump
LG	-	denotes the fore pump LG series screw pump vacuum
150	-	denotes main pump (Roots pump) pumping speed L/s
2	-	denotes pumping speed ratio code (that is, pumping speed ratio of the main pump and the former pump is 2)

The technology parameters of the JZJLG series Roots-Screw package unit:

Unit Type	Type of the pump		Suction Capacity (L/s)	Max. Inhaling pressure (Pa)	Limited pressure (Pa)	Total power (kW)
	Main pump	fore pump				
JZJLG70-2	ZJ70	LG30	70	6000	1Pa	5.5
JZJLG150-4	ZJ150	LG30	150	2000		7
JZJLG150-2	ZJ150	LG70	150	6000		10.5
JZJLG300-4	ZJ300	LG70	300	1500		11.5
JZJLG300-2A	ZJ300	LG100	300	2000		19
JZJLG300-2B	ZJ300	LG180	300	4000		26
JZJLG600-4A	ZJ600	LG100	600	1000		22.5
JZJLG600-4B	ZJ600	LG180	600	1500		29.5
JZJLG1200-8	ZJ1200	LG180	1200	400		37

Notes:

1, the types listed in the above table are the standards products. In the actual situation, the changes of the pressure is various. When choose the unit should be calculated precisely and confirmed the type according to the real situations, such as the suction process, the discharge process, the condensation of the gas and the time changes of the inhaling gas etc..

2, the technology parameters of each pump refers to their tables in the relative page.

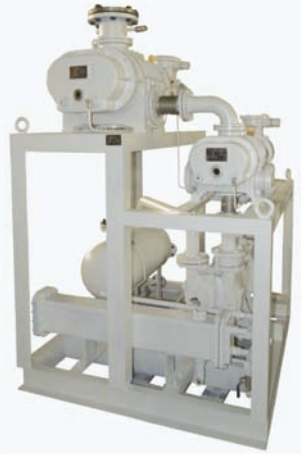
3, The Max. Inhaling pressure indicates the highest pressure of the main pump to start.

4, When place an order, please give the technical information details such as the pumping medium, working pressure and whether it is explore-proof of the motors.

Application Site of LG Series Vacuum Screw Pump

JZJ2B Series Roots Water Ring Vacuum Unit

One Roots pump＋ one water ring vacuum pump packaged unit



Two Roots pumps＋ one water ring vacuum pump package unit

Summary:

JZJ2B Roots series water ring unit is consists of ZJ type roots pump as the main pump, composition 2BV/2BE1 series of water ring pump or Roots--water ring unit as a fore pump pumping unit. It can be used to pumping gas in addition to, can also aspirate containing water, compared to organic solvent or a small amount of dust gas. And general mechanical vacuum pump, not afraid of oil pollution, not afraid of water, gas and dust, and compared with the general water ring vacuum pump, with vacuum high and pump speed characteristics under high vacuum condition.

Due to the adoption of the high efficiency and energy saving of 2BV series water ring pump before the class, so JZJ2B series vacuum unit than jzj2s series with high efficiency, compact structure, no leakage (2BV pump mechanical seal design, different to 2SK series packing seal) resistance to corrosion (2BV adopts stainless steel or aluminum bronze impeller), protection grade higher merit.

Three Roots pumps＋ one water ring vacuum pump package unit

Roots vacuum pump using the company's own R & D ZJ Roots series vacuum pump, our company will pump cavity and the bearing cavity sealing was improved after the ZJ Roots series vacuum pump in the pumping process of a large number of water vapor and various solvents oil pump is not easy to be emulsified.

Roots water ring vacuum unit of pump working fluid with water, can also be used in organic solvents (methanol, alcohol, xylene, acetone and other organic solvent or other liquid, using pre - pump as a closed circulation system, can greatly reduce the pollution to the environment, and greatly improve the recovery of the organic solvent. The limit vacuum degree by the working fluid saturated vapor pressure.

Roots unit selection considerations:

- Learn to be pumping gas composition, gas containing excluding condensable vapor, dust particles, there is no corrosion. The choice of vacuum pump and need to know the gas composition, the selection of the corresponding pump was pumping gas. If the gas containing steam, particles, and corrosive gases should be the consideration in the pump inlet pipe to install auxiliary equipment, such as condensers, dust collector.

- Roots vacuum unit of the working pressure should meet the requirements of vacuum equipment vacuum and pressure. Such as a vacuum drying process requirements 10mmhg (absolute pressure) of the working pressure, the selection of vacuum pump limit pressure at least 2mmhg, preferably below. Usually choose the limit pressure of the pump is higher than that of vacuum pressure equipment of one half to one order of magnitude.
- Correctly choose the normal operating range of the working point of the roots vacuum units. Roots vacuum unit for maximum suction pressure limit pressure *. Example: the normal operating range of JZJ2B150-2.1Roots water ring vacuum unit for: 6000Pa~125Pa. The scope of work as the main pump is turned on normal working pressure range, the unit in the scope of work within the best efficiency.
- Under the pressure of the vacuum unit, the vacuum unit should be able to discharge all the gas generated in the process of vacuum equipment.
- Choose the appropriate unit configuration. According to the practical conditions. For example: JZJ2B300-4.1 unit and JZJ2B300-2.1 unit maximum pumping speed and ultimate pressure is the same, the difference is their work scope and power consumption, the normal working range of JZJ2B300-4.1 unit is 2000Pa~125Pa, and the normal working range of JZJ2B300-2.1 unit 5000Pa~125Pa. obviously JZJ2B300-2.1 units work in a wider range, but its power consumption is greater. If we can confirm the pumping system working pressure is less than 2000Pa, should be preferred JZJ2B300-4.1 group to save energy. But if there is a strong demand for fore pumping unit and unit takes a long time to work at high pressure the system is used JZJ2B300-2.1 the fore pump unit has more appropriate.

Model representation method

For example: J Z J 2 B 1 5 0 — 2 . 1

J - denotes the first letter of the unit
ZJ - denotes the main pump using ZJ Roots series vacuum pump
2B - denotes the fore pump using the 2BV/2BE series water(or liquid) ring vacuum pump
("2S" denotes the fore pump using the 2SK series water (or liquid) ring vacuum pump
150 - denotes the suction speed of the main pump (Roots pump) L/s
2.1-denotes code of the suction speed ratio
(i.e. the suction speed ratio between the main pump and the secondary pump is 2; the suction speed ratio between the secondary pump and the fore pump is 1.)

Model representation method

Unit type	Pump type		Suction capacity L/s	Max. Inlet Pressure Pa	Limited vacuum Pa(abs.)		Total power kW
	Main pump	Fore pump			Water ring	Oil ring	
JZJ2B15-2	ZJ15	2BV2060	15	8000			1.65
JZJ2B30-2	ZJ30	2BV2061	30	8000			2.25
JZJ2B30-1	ZJ30	2BV5110	30	12000			4.75
JZJ2B70-2	ZJ70	2BV5110	70	6000			5.5
JZJ2B70-1	ZJ70	2BV5111	70	12000			7
JZJ2B150-2A	ZJ150	2BV5111	150	6000			8.5
JZJ2B150-2B	ZJ150	2BV5121	150	8000			10.5
JZJ2B150-1	ZJ150	2BV5131	150	10000	267	80	14
JZJ2B300-2A	ZJ300	2BV5131	300	4000			15
JZJ2B300-2B	ZJ300	2BV5161	300	5000			19
JZJ2B300-1	ZJ300	2BE1 202	300	10000			26
JZJ2B600-2A	ZJ600	2BE1 202	600	4000			29.5
JZJ2B600-2B	ZJ600	2BE1 203	600	5000			44.5
JZJ2B600-1	ZJ600	2BE1 252	600	12000			52.5
JZJ2B1200-2A	ZJ1200	2BE1 252	1200	2500			60

Model representation method

Unit type	Pump type		Suction capacity L/s	Max. Inlet Pressure Pa	Limited vacuum Pa(abs.)		Total power kW
	Main pump	Fore pump			Water ring	Oil ring	
JZJ2B1200-2B	ZJ1200	2BE1 253	1200	4000	267	80	90
JZJ2B1200-1	ZJ1200	2BE1 303	1200	8000			125
JZJ2B2500-2	ZJ2500	2BE1 303	2500	3000			132
JZJ2B30-2.1	ZJ30	ZJ15/2BV2061	30	8000	25	0.8	2.8
JZJ2B70-2.1	ZJ70	ZJ30/2BV5110	70	6000			6.25
JZJ2B150-2.1	ZJ150	ZJ70/2BV5111	150	6000			10
JZJ2B150-4.1	ZJ150	ZJ30/2BV5110	150	3000			7.75
JZJ2B300-2.1	ZJ300	ZJ150/2BV5131	300	5000			18
JZJ2B300-2.2	ZJ300	ZJ150/2BV5121	300	4000			14.5
JZJ2B300-4.1	ZJ300	ZJ70/2BV5111	300	2000			11
JZJ2B600-4.1	ZJ600	ZJ150/2BV5131	600	1500			21.5
JZJ2B600-2.2	ZJ600	ZJ300/2BV5161	600	2000			26.5
JZJ2B1200-4.2	ZJ1200	ZJ300/2BV5161	1200	1000			34
JZJ2B1200-4.1	ZJ1200	ZJ300/2BE1 202	1200	1200			41
JZJ2B1200-2.2	ZJ1200	ZJ600/2BE1 203	1200	2500			59.5
JZJ2B1200-2.1	ZJ1200	ZJ600/2BE1 252	1200	3000			67.5
JZJ2B2500-4.1	ZJ2500	ZJ600/2BE1 252	2500	1000			74.5
JZJ2B30-2.1.1	ZJ30	ZJ15/ZJ15/2BV2061	30	8000	0.5	0.05	3.35
JZJ2B70-2.2.1	ZJ70	ZJ30/ZJ15/2BV2061	70	4000			4.3
JZJ2B70-2.1.1	ZJ70	ZJ30/ZJ30/2BV5110	70	6000			7
JZJ2B150-2.2.1	ZJ150	ZJ70/ZJ30/2BV5110	150	3000			9.25
JZJ2B300-2.2.1	ZJ300	ZJ150/ZJ70/2BV5111	300	3000			14
JZJ2B300-4.2.1	ZJ300	ZJ70/ZJ30/2BV5110	300	1200			10.25
JZJ2B600-2.2.1	ZJ600	ZJ300/ZJ150/2BV5131	600	2500			25.5
JZJ2B600-4.2.1	ZJ600	ZJ150/ZJ70/2BV5111	600	1200			17.5
JZJ2B1200-4.2.1	ZJ1200	ZJ300/ZJ150/2BV5131	1200	1000			33
JZJ2B2500-4.2.1	ZJ2500	ZJ600/ZJ300/2BE1 202	2500	1000			55.5
JZJ2B5000-4.2.1	ZJ5000	ZJ1200/ZJ600/2BE1 252	5000	800			104.5
JZJ2B10000-4.2.1	ZJ10000	ZJ2500/ZJ1200/2BE1 303	10000	800			202
JZJ2B20000-4.2.1	ZJ20000	ZJ2500/ZJ1200/2BE1 353	20000	800			309
JZJ2B30000-4.2.1	ZJ30000	ZJ2500/ZJ1200/2BE1 353	30000	600			329

Notes:

1, the types listed in the above table are the standards products. In the actual situation, the changes of the pressure is various. When choose the unit should be calculated precisely and confirmed the type according to the real situations, such as the suction process, the discharge process, the condensation of the gas and the time changes of the inhaling gas etc..

2, The technology parameters of each pump refers to their tables in the relative page.

3, The max. Inlet Pressure (Pa) indicates the highest pressure to start the main pump. If the vacuum unit work for a long time under the max. Inlet pressure, it will arise overload of the main pump.

4, If it is required of the explore-proof motors, the vacuum gauge and the electric controller, please tell us while you place an order. Then the type 2BV2 and 2BV5 series vacuum pump should be corresponding replaced by the 2BV2-EX and 2BV6 series.

ZF series package unit

Structure with upright vacuum container

Structure with horizontal vacuum container

Summary:

ZF series package unit (also known as a vacuum generating device, vacuum station) is composed of one or two sets of water ring vacuum pumps as the device for obtaining vacuum and the vacuum container as the device for storing vacuum. . When the vacuum resource is required constantly and the suction capacity is not required a lot, to use the ZF package unit can save more energy than to use the vacuum pump directly and this can improve the vacuum pump lifetime efficiently.

The ZF series package units are used as the vacuum resource in the large or middle domestic hospitals. They are used extensively as the vacuum station in the chemical and pharmacy, or the canning system in the light industry, or the negative molding of the rubber object in automobile area, or the vacuum sorking of the flammable resistant transmission in mine coal, or the vacuum resource for the molding area etc.

Work principle

1. Two vacuum pumps
   1.1. Set the highest and the lowest vacuum limit of the vacuum system（For example: the highest vacuum is set at-0.08MPa and the lowest vacuum is set at -0.06MPa). When the ZF unit starts, one pump begins to work. Till the vacuum in the container reaches -0.08MPa， the vacuum pump stops automatically and the vacuum status of the container is stored temporary by the non-return valve stopping automatically. If the vacuum in the container is lower than -0.06MPa， another pump works automatically till the vacuum in the container increases to -0.08MPa. By repeating this process, the vacuum in the container always maintains between the highest and the lowest value. If the suction capacity is required stronger, or the vacuum in the container becomes lower than the lowest limited for a period, so the single vacuum pump is not able to reach the lowest limit and the other pump will start automatically till the vacuum in the container becoming even higher than the highest limit.
   1.2. These two pumps can also be switched to manual control for on and off.

2. One vacuum pump
   At first, to set the highest and the lowest vacuum limit of the vacuum system (for example: the highest vacuum is set at -0.08MPa and the lowest vacuum is set at -0.06MPa. When the ZF unit starts , the vacuum pump works till the vacuum in the container reaching the highest vacuum. And when the vacuum in the container is lower than the lowest vacuum, the vacuum pump works again automatically. The vacuum pump can also be switched to manual control for on and off.

Performance characteristics:

- The device after the first start, all run process can realize the automatic control. In the process of working, everywhere in the vacuum system of the vacuum degree always within the allowable range fluctuations, and the fluctuation of range can be adjusted according to the requirements of users. If the vacuum is lower than the setting value, the alarm will be issued a warning.
- The device can automatically control the system when the power is cut off, and the vacuum system can be automatically closed during power failure.
- The device is equipped with a gas water separator, which can save water and reduce environmental pollution.
- If the recycling waste water couldn't drained directly, the device should be assembled a heat exchanger to realize the closed-loop circulation of the operating liquid. So the volume of the waste water is reduced much efficiently.
- The vacuum tank of the device can be designed for horizontal and vertical structure according to the site, and the installation is more flexible.

The technology parameters of the ZF series package units

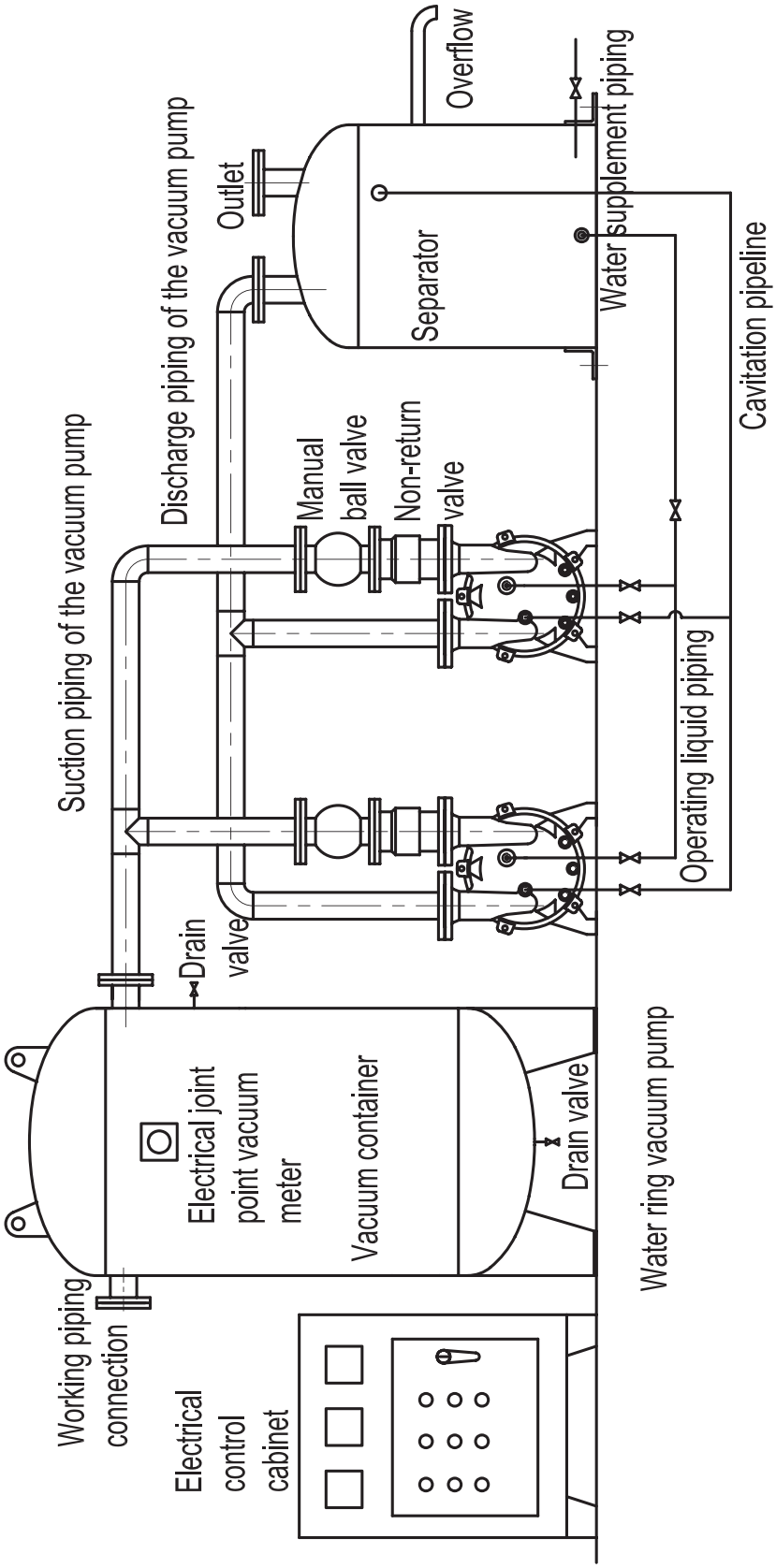
Volume of the vacuum container m^3	Vacuum container volume m^3	Recommend pump（Water ring vacuum pump）	Output kW	Working vacuum Range MPa	Limited vacuum MPa	Connection DN mm
0.3	ZF－0.3A	2BV2060*2sets	1.1kW*2	0~－0.09	－0.098	40
	ZF－0.3B	2BV2061*2sets	1.5 kW*2			
0.5	ZF－0.5A	2BV2061*2sets	1.5 kW*2			50
	ZF－0.5B	2BV2070*2sets	3kW*2			
1	ZF－1A	2BV2061*2sets	1.5kW*2			80
	ZF－1B	2BV2070*2sets	3kW*2			
	ZF－1C	2BV5110*2sets	4 kW*2			
1.5	ZF－1.5A	2BV5110*2sets	4 kW*2			80
	ZF－1.5B	2BV5111*2sets	5.5 kW*2			
	ZF－1.5C	2BV5121*2sets	7.5 kW*2			
2	ZF－2A	2BV5111*2sets	5.5 kW*2			100
	ZF－2B	2BV5121*2sets	7.5 kW*2			
	ZF－2C	2BV5131*2sets	11kW*2			
3	ZF－3A	2BV5121*2sets	7.5 kW*2			100
	ZF－3B	2BV5131*2sets	11kW*2			
	ZF－3C	2BV5161*2sets	15kW*2			
5	ZF－5A	2BV5131*2sets	11kW*2			150
	ZF－5B	2BV5161*2sets	15kW*2			
	ZF－5C	2BV5161*3sets	15kW*3			

Notes:

1,These pumps listed in the above table are recommended, and they can also be chosen by the actual conditions.

2,These types are standard products of our company and they can also be manufactured by the customer's requirements for the special vacuum container, other type pump, or the different connection DN of the flanges.

3,The structure of the device can be designed as upright or horizontal type by your requirements when place an order.



The sketch map of the ZF series package unit

ZGP series harrow vacuum driers

Summary:

ZGP harrow vacuum drier is improved and produced by our company on the basis of the technology of the domestic harrow vacuum drier. According to the various materials, such as, plasm, grease, granule, powder, fibre, the transmitted part is used the column gear box which works steadily and wears well, the active shaft is used the solid shaft of the over-striking stainless steel, and the harrow teeth are made of the high strength foundry stainless steel. By these measures, it can ensure that the harrow vacuum drier works steadily in various rigorous conditions.

Main usage and characteristics:

The ZGP series harrow vacuum drier is mainly used in the drying process of the granular, powder, pulpiness materials in the chemical, pharmacy, food industries etc.. The ZGP harrow vacuum drier is the ideal device especially drying for the heat sensitive materials or easy oxidizing materials.

Features:

- The device has extensive and strong application and fast drying speed. Because the ZGP harrow vacuum drier uses the jacket heating style and with higher discharge vacuum, it is suitable to all the materials with differ character or status, such as plasm, granule, powder, especially for the paste materials.
- The device has good quality. During the drying process, the teeth of harrow constantly rotate clockwise or counter-clockwise to stir the materials evenly. So the the dried product with fine granularity can be packed directly without any smashing operation.
- The device needs low consumption of the steam.
- The device is operated easy and conveniently to reduce the labor intensity and decrease of the overflow materials.
- If the evaporated solvent need to reclaim, the Drier should assemble a condenser or a tank.

Disadvantages:

- The device couldn't avoid to leave the bottom materials while discharge.
- It is inconvenient to clean the drier. When the materials is often changes, the device is not suitable.

The Dry Theory :

The ZGP harrow vacuum drier covers with a heat jacket where the hot steam, hot water or hot oil flows. The heat conducted from the jacket evaporates the materials, and the steam and solvent is discharged rapidly under the higher vacuum. Therefore, the drier is suitable for those materials that afraid the high temperature, easy oxidizing, easy powdering (like some dye), or other reclaiming the steam and solvent process.

The materials filled from the top inlet is stirred by the teeth constantly. Then the heat exchange area between the materials and the jacket inner surface is renewed constantly. The water is gasified and discharged by the vacuum pump.

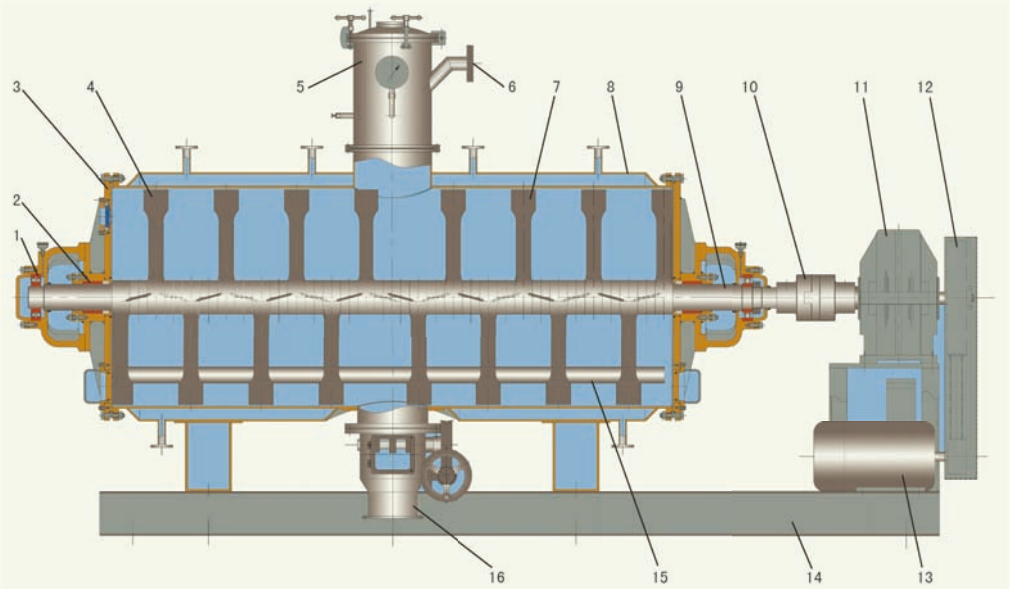
Because the operation vacuum degree is higher, the pressure of dried material surface is much bigger than of the drier inner space. It is benefit to discharge the inner space water and material surface water. And it is benefit to the water molecules movement, too. The dry speed is more quickly.

The main parameters of the ZGP series harrow vacuum driers

Model	Effective Volume（L）	Working volume（L）	Heated area（m^2）	Rake gear Speed（rpm）	Transmission Power（kW）	The allowed max. Ratio of the leaked pressure under empty load（1000Pa.L/s）
ZGP-100	100	50	1	10	1.5	the leakage value<0.036MPa/h
ZGP-200	200	100	1.6	10	2.2	the leakage value<0.018MPa/h
ZGP-500	500	250	3.14	10	4	the leakage value<0.0072MPa/h
ZGP-1000	1000	500	5.02	10	7.5	the leakage value<0.0036MPa/h
ZGP-2000	2000	1000	8.01	7	11	the leakage value<0.0018MPa/h
ZGP-3000	3000	1500	10.02	7	15	the leakage value<0.0012MPa/h
ZGP-4000	4000	2000	11.87	7	15	the leakage value<0.0009MPa/h
ZGP-6000	6000	3000	15.57	7	22	the leakage value<0.0006MPa/h
ZGP-8000	8000	4000	19.2	7	30	the leakage value<0.0004MPa/h
ZGP-10000	10000	5000	22.6	7	37	the leakage value<0.0003MPa/h

Notes:

1. The types listed in the above table is the normal products, but the special types ordered by the customer aren't included in.
2. The vacuum pump or the Roots vacuum unit that assembled with the ZGP harrow vacuum drier should be selected according to the calculation of the moisture contained volume, the jacket temperature, the working degree, the condenser area and the cooling water temperature. Because the actual application is various, the vacuum pump type and vacuum degree is different much.

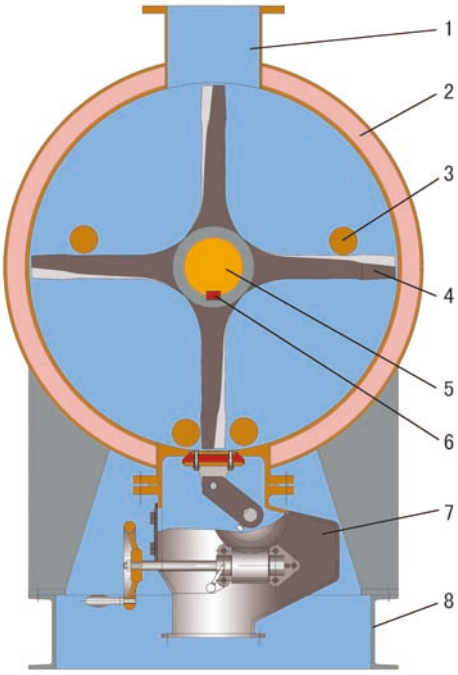


Picture 1: the vertical sketch of the ZGP series vacuum rake dry

1. Bearings
2. Seal
3. End-shield
4. Left teeth
5. Material inlet
6. Suction port
7. Right teeth
8. Casing
9. Shaft
10. Coupling
11. decelerating motors
12. Pulley
13. Motor
14. Frame
15. Knocking stick
16. Material outlet

Working Principle:

The harrow vacuum drier is a kind of dryness equipment which uses the decrease of the boiling point of the water containing in the material in the vacuum. This drier uses the indirect heating style with the double casings to heat the water and pump the vapor out in time. In the inner casing, the harrow teeth are driven by the transmission shaft, and a definite angle is designed between the harrow teeth and the shaft line. The active shaft turns in positive and negative direction to make the materials move towards the axial direction till pushed out. By this method, the material can be dried and discharged out efficiently. The heating medium can be used by the steam, heat conduction oil and hot water.



1. Material inlet
2. Jacket
3. Knocking stick
4. Teeth
5. Shaft
6. Key
7. Material outlet
8. Frame

Picture 2: the cross section sketch of the dry

Structure characteristics:

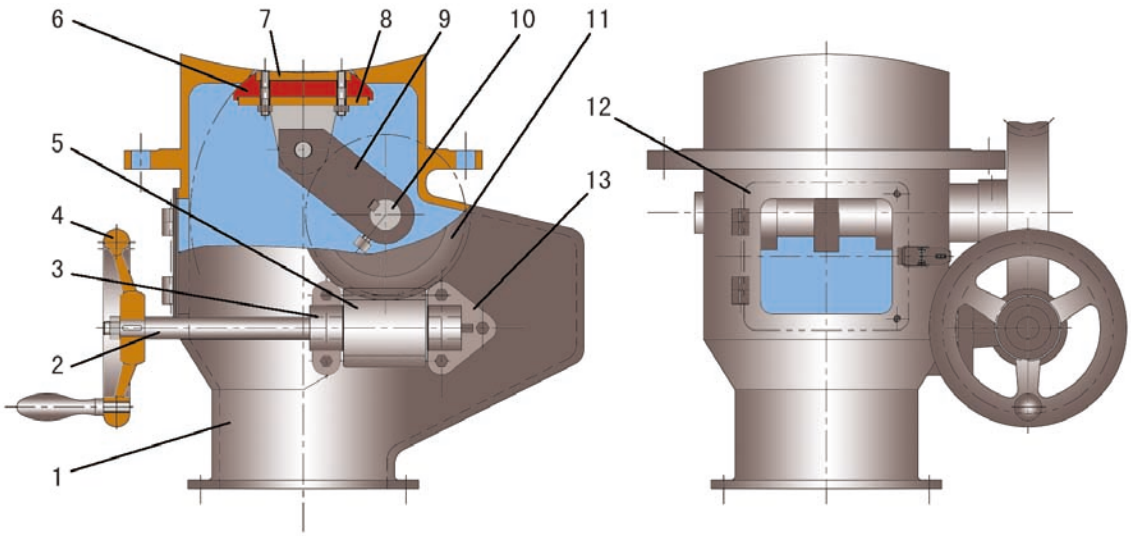
- The solid stainless steel shaft is different with the hollow stick which is used in other factories. Because the status of the dried materials is very complicated and the material will become sticky in the dryness process, the best performance of the solid stainless steel shaft is just able to guarantee the steady dryness process.
- The drier body uses the sticker steel board and the normal pressure of the double casing is 0.5MPa. It also can be designed and manufactured according to the different requirements of the customers.
- Cast stainless steel harrow teeth. Most manufactures use the hollow pipe welding harrow teeth which are easy to curve during the dryness process especially to add the knocking sticks in the drier, so the hollow pipe welding harrow teeth have higher failure rate and are easy to be curved and broken. But we design the knocking sticks made of the stainless steel pipes with hollow wall which are approximately as long as the casing length. In the drier casing, the knocking sticks move freely. Normally, there are two or four knocking sticks in the casing to knock the materials constantly till the materials are smashed. So the dryness process is shortened and the finished products are better. The high strength and stability of the cast stainless steel harrow teeth leads to the steadily working environment when add the knocking sticks. The advantages have been proved in the practice.
- The humanism design of the inlet and outlet parts. The inlet part uses the quick unloading flange so that the loading is convenient and quick. The outlet part uses closed discharge structure of the worm wheel which leads to convenient discharge and simple operation and easy pack without residual materials.
- The advanced shaft seal makes the lest leakage. This type of seals is proved better in the process of the solid sodium methoxide which requires the seal highly.
- The drier uses the rolling bearings to ensure the steady work and convenient maintenance.
- The drier uses the bag dust catcher which assembles a back blow device to avoid the pipeline jam.

Picture 3, solid stainless steel shaft

Picture 4, the combination of the teeth and shaft

Picture 5, Cast stainless steel teeth

Picture 6, Assembly workshop for harrow vacuum drier



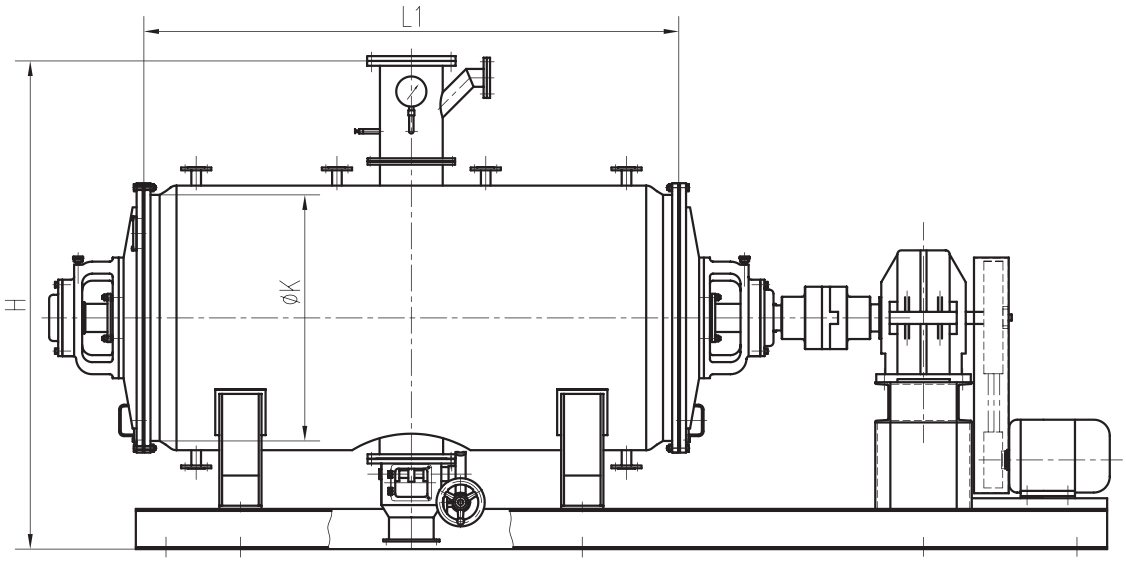
Sketch map of the structure of the worm wheel of the outlet parts

1. Casing of the outlet parts
2. Worm gear shaft
3. Front gear box of the worm gear
4. Handle pulley
5. Worm gear
6. Seal pad
7. The up cover of seal pad
8. The bottom cover of seal pad
9. Shake hands
10. Worm wheel shaft
11. Worm wheel
12. Inspection window
13. Back gear box of worm gear

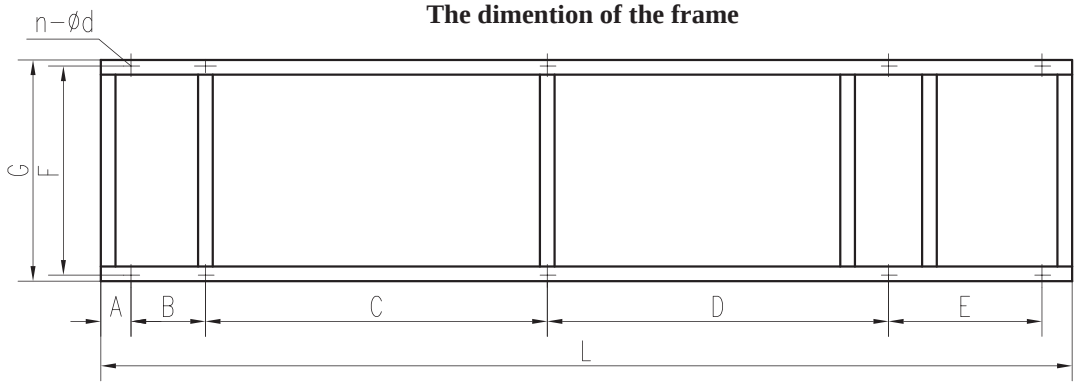
Notes:

This structure is only used in the ZGP-1000 and other types whose volume is larger than ZGP-1000. As the driers with small volume, their structure is quick downloaded structure.

The dementions of the ZGP series harrow vacuum driers



The dimention of the frame



Model	A	B	C	D	E	F	G	H	K	L1	L	n	d
ZGP－100	155	945	413	—	—	370	450	1500	400	800	1692	6	18
ZGP－200	150	900	627	—	—	400	500	1634	500	1020	1877	6	18
ZGP－500	100	-	1150	940	—	590	640	1880	650	1540	2850	6	18
ZGP－1000	160	-	1440	1160	—	710	760	1900	800	2000	3500	6	22
ZGP－2000	150	345	1680	1510	—	940	1000	2400	1000	2550	4400	8	22
ZGP－3000	150	370	1700	1697	763	1040	1100	2500	1200	2660	5300	10	22
ZGP－4000	200	450	1820	1725	735	1120	1200	2700	1350	2800	5470	10	22
ZGP－6000	200	450	1895	1000	955	1320	1400	3150	1550	3200	5400	10	22
ZGP－8000	160	530	2720	915	915	1500	1580	3650	1700	3600	5400	10	22
ZGP－10000	160	530	4120	915	915	1600	1680	3750	1800	4000	5800	10	22

Note: the size listed in the above table only for reference, the actual dimension should be confirmed while place an order.