

济南金桥通精密机械有限公司

JINAN GOLDEN BRIDGE PRECISION MACHINERY CO., LTD

真空泵使用说明书

OPERATION SPECIFICATION FOR VACUUM PUMP



|精|益|求|精|品|质|保|障|

EXCELLENCE AND QUALITY ASSURANCE

旋片式真空泵

ROTARY VANE VACUUM PUMP

W1系列

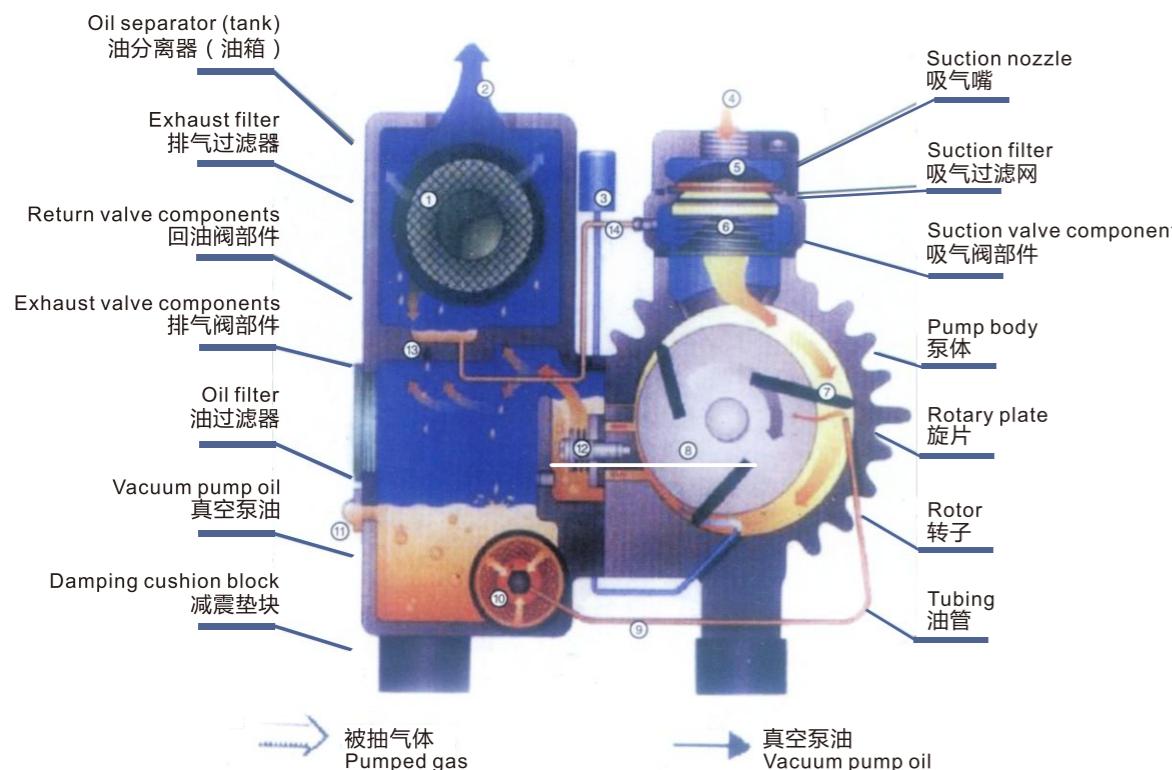
W1 SERIES

在安装使用前, 请仔细阅读本说明书, 保留本说明书以备将来参考

Please read this manual carefully before installation and use, and keep this manual for future reference

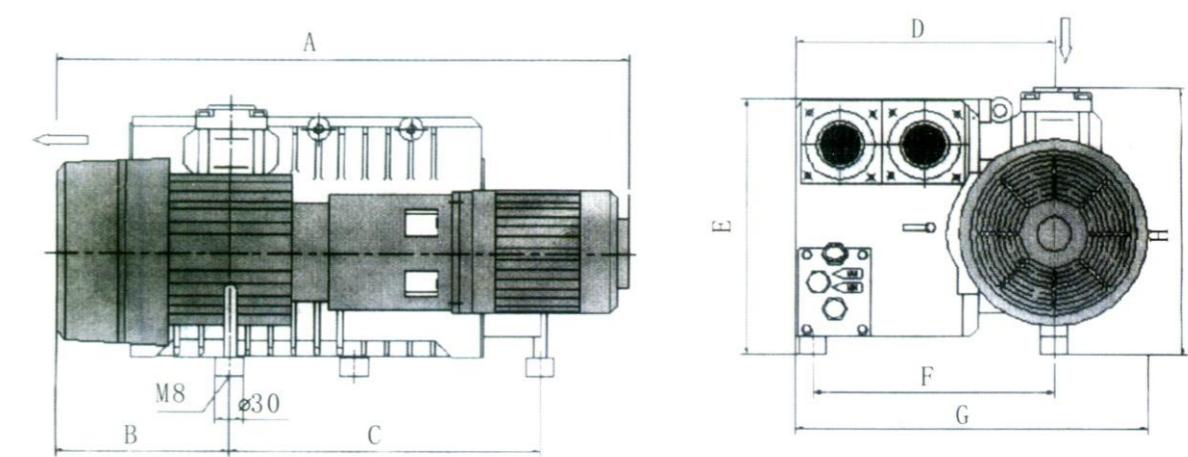
◎ 单级旋片油封式真空泵原理图

Schematic diagram of single-stage rotary vane oil seal vacuum pump



◎ 安装尺寸/Installation size

尺寸 Dimensions	A	B	C	D	E	F	G	H
W1-020	460	115	215	220	180	135	240	175
W1-040	650	150	345/325	200	270	240	300	270
W1-063	670	150	335	295	285	285	420	300
W1-100	710	160	360	290	285	270	400	290

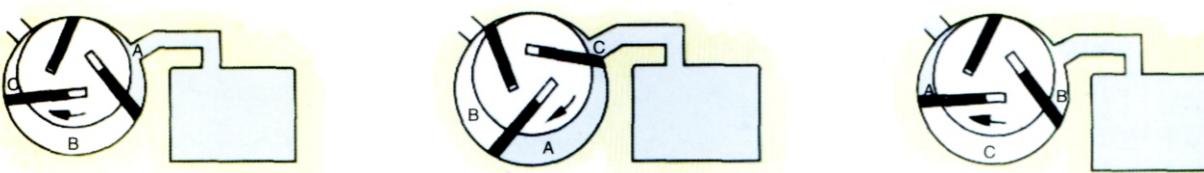


◎ W1-020-040-063-100单机旋片真空泵技术参数

W1-020-040-063-100Technical parameter for single-stage rotary vane vacuum pump

项目 ITEMS	型号 MODEL	单位 Units	W1-020	W1-040	W1-063	W1-100
额定抽速/Rated speed	m ³ /h	20	40	63	100	
极限压力/Extreme pressure	mbar	0.1-0.5	0.1-0.5	0.1-0.5	0.1-0.5	0.1-0.5
噪音/Noise	dB(A)	63	65	77	68	
工作温度/working temperature	°C	83	84	85	86	
用油量/Oil consumption	L	0.5	1.5	2	2	
水蒸气允许压力/vapor permitted pressure	mbar	40	40	40	40	
水蒸气抽除率/Steam extraction rate	kg/h	0.3	0.6	1	1.6	
吸气口螺纹/Suction mouth thread	inch	G1½"	G1¼"	G1¼"	G1¼"	
电机额定功率/Motor rated power	kW	0.75	1.5	2.2	3	
电机额定转速/Motor rated speed	rpm	2880	1440	1440	1440	

★ 正常情况下改变技术规格参数，恕不另行通知



吸入过程 / INHALATION PROCESS

压缩过程 / COMPRESSION PROCESS

排出过程 / DISCHARGE PROCESS

在带有吸气阀和排气阀的圆形泵体(定子)内，装有一个偏心转子和在转子槽中靠离心力运动的三片叶片，这些叶片将泵分离成三部分，它们的容积随着转子的转动，周期性地变化，完成气体的抽吸、压缩、排出过程，从而使吸口处的气体被抽吸，形成真空。

In the circular pump body (stator) with suction valve and exhaust valve, there is an eccentric rotor and three blades moving in centrifugal force in the rotor slot. These blades separate the pump into three parts, and their volume changes periodically with the rotation of the rotor, completing the suction, compression and discharge of the gas. The gas at the suction port is sucked to form a vacuum.

◎ W1-140-160/202/250/302单机旋片真空泵技术参数

W1-140-160/202/250/302Technical parameter for single-stage rotary vane vacuum pump

项目ITEMS 型号MODEL	单位 Units	W1-140	W1-160	W1-202	W1-250	W1-302
额定抽速/Rated speed	m ³ /h	140	160	200	250	300
极限压力/Extreme pressure	mbar	0.1	0.1	0.1	0.1	1.1
噪音/Noise	dB(A)	68	71	72	72	72
工作温度/working temperature	°C	75	75	75	83	85
用油量/Oil consumption	L	4.5	5	5	7	7
水蒸气允许压力/vapor permitted pressure	mbar	40	40	40	40	40
水蒸气抽除率/Steam extraction rate	kg/h	2.3	2.5	4	4.5	5
进气口螺纹/Conection of inlet	inch	G1 ^{1/2}	G2 ^{1/2}	G2 ^{1/2}	G2 ^{1/2}	G2 ^{1/2}
电机额定功率/Motor rated power	kW	3.5	4.5	4.5	5.5	7.5
电机额定转速/Motor rated speed	rpm	1440	1440	1440	1440	1440
整机重量/Total weight	kg	126	157	157	195	211

★ 正常情况下改变技术规格参数，恕不另行通知

◎ 安装尺寸Installation size

尺寸 Dimensions	A	B	C	D	E	F	G	H	I
W1-140	755	210	32	240	315	450	325	305	300
W1-160	855	225	35	240	420	495	345	435	310
W1-202	855	225	35	240	420	495	345	435	310
W1-250	9880	260	40	300	390	560	385	440	355
W1-302	1010	260	40	300	390	560	385	440	355

◎ 换算表Conversion table

	mbar(hPa)	bar	Pa(N/m ²)	kPa	atm	kp/cm ² (at)	mmH ₂ O
1 mbar(hPa)	1	1x10 ³	10 ²	0.1	9.869x10 ⁻⁴	1.02x10 ⁻³	10.197
1 bar	10 ³	1	1x10 ⁵	100	0.987	1.02	1.012x10 ⁴
1 Pa(N/m ²)	0.01	1x10 ⁻⁵	1	0.001	9.869x10 ⁻⁶	1.02x10 ⁻⁵	0.102
1 kPa	10	0.01	10 ³	1	9.869x10 ⁻³	1.02x10 ⁻²	1.02x10 ²
1 atm	1.013x10 ³	1.013	1.013x10 ⁵	1.013x10 ²	1	1.033	1.033x10 ⁴
1 kp/cm ² (at)	9.807x10 ²	0.981	9.807x10 ⁴	98.07	0.968	1	10 ⁴
1mmH ₂ O	9.807x10 ⁻²	9.807x10 ⁻⁵	9.807	9.807x10 ⁻³	9.677x10 ⁻⁵	10 ⁻⁴	1
1Torr(mm Hg)	1.333	1.333x10 ⁻³	1.333x10 ²	1.333x10 ⁻¹	1.316x10	1.36x10 ⁻³	13.59
1 micron	9.807x10 ⁻³	1.333x10 ⁻⁶	1.333x10 ⁻¹	1.333x10 ⁻⁴	1.316x10	1.36x10 ⁻⁶	1.359x10 ⁻²
1 in.Hg	33.86	3.368x10 ⁻²	3.386x10 ³	3.386	3.342x10	3.453x10 ⁻²	3.45x10 ²
1 in.H ₂ O	2.491	2.491x10 ⁻³	2.491x10 ²	0.249	2.458x10	2.54x10 ⁻³	25.4
1 Ib/in ² (psi)	68.95	6.895x10 ⁻²	6.895x10 ³	6.895	6.805x10	7.03x10 ⁻²	7.03x10 ²

	Torr(mm Hg)	micron	in.Hg	in.H ₂ O	Ib/in ² (psi)		
1 mbar(hPa)	0.5	750	2.953x10 ⁻²	0.402	1.45x10 ⁻²		
1 bar	7.5x10 ²	7.5x10 ⁵	29.53	4.015x10 ²	14.5		
1 Pa(N/m ²)	7.5x10 ⁻³	7.5	2.953x10 ⁻⁴	4.015x10 ⁻³	1.45x10 ⁻⁴		
1 kPa	7.5	7.5x10 ³	0.295	4.015	0.145		
1 atm	7.6x10 ²	7.6x10 ⁵	29.92	4.068x10 ²	14.7		
1 kp/cm ² (at)	7.356x10 ²	7.356x10 ⁵	28.96	3.973x10 ²	14.22		
1mm H ₂ O	7.354x10 ⁻²	73.54	2.896x10 ⁻³	3.394x10 ⁻²	1.42x10 ⁻³		
1Torr(mm Hg)	1	10	3.937x10 ⁻²	0.535	1.934x10 ⁻²		
1 micron	10 ⁻³	1	3.937x10 ⁻⁵	5.35x10 ⁻⁴	1.934x10 ⁻⁵		
1 in.Hg	25.4	2.54x10 ⁴	1	13.6	0.491		
1 in.H ₂ O	1.868	1.868x10 ³	7.356x10 ⁻²	1	3.613x10 ⁻²		
1 Ib/in ² (psi)	51.71	5.171x10 ⁴	2.036	27.68	1		

● 真空换算 / Vacuum conversion

极限压力P (mbar绝对压) 能换算成为压力差 ΔP (inches Hg)基于

大气压力为1013mbar 绝对压(=760)Tor= 29.92 in Hg绝对压)

可以用以下方程式 $29.92 - 2.953 \times 10 \times P(\text{mbar绝对压}) = \Delta P(\text{inches Hg})$

$1013 - 33.86 \times \Delta P(\text{inches Hg}) = P(\text{mbar绝对压})$

The limit pressure P (mbar absolute pressure) can be converted into the pressure difference ΔP (inches HQ) based on Atmospheric pressure is 1013mbar absolute pressure (= 760) tor = 29.92in hg absolute pressure)

The following equation $29.92 - 2.953 \times 10 \times P(\text{mbar absolute pressure}) = \Delta P(\text{inches HQ})$ can be used

$1013 - 33.86 \times \Delta P(\text{inches HQ}) = P(\text{mbar absolute pressure})$

◎ 故障排除Troubleshooting

故障形式 Fault form	可能的原因 Possible causes	解决方法 Resolvent
到达真空间的时间太长达不到需要的真空间 The time to reach the vacuum is too long to reach the required vacuum	吸气管路有泄漏 There is a leak in the suction line	检查管路，更换有问题的部件 Check the pipeline and replace the defective parts
	管路上的放气阀或调节阀，调节错误或损坏 The vent valve or regulating valve on the pipeline is adjusted incorrectly or damaged	调整或更换新零件，尤其注意管路上单向阀的安装方向 Adjust or replace with new parts, especially pay attention to the installation direction of the check valve on the pipeline
	油被污染(最常见原因) Oil contamination (most common cause)	换油(具体参见“维护”) Oil change (see "maintenance" for details)
	油箱内无油或缺油 There is no oil or lack of oil in the oil tank	加油(具体参见“维护”) Refuel (see "maintenance" for details)
	排气过滤器堵塞，排气背压过高 The exhaust filter is blocked and the exhaust back pressure is too high	更换排气过滤器(具体参见“维护”) Replace the exhaust filter (see "maintenance" for details)
	油滤堵塞(油通过滤清器的旁路流动，未经过过滤) The oil filter is blocked (the oil flows through the bypass of the filter and is not filtered)	更换油滤(具体参见“维护”) Replace the oil filter (see "maintenance" for details)
	吸气口过滤器被粉尘或异物堵塞 The suction filter is blocked by dust or foreign matters	清理或更换滤芯 Clean or replace the filter element
	进气、排气管路堵塞。或直径太大，太小或太长 The air inlet and exhaust pipes are blocked. Or the diameter is too large, too small or too long	排除堵塞物或更换符合要求的管道 Remove the blockage or replace the pipe that meets the requirements
	油管损坏或泄漏 Damaged or leaking oil pipe	拧紧油路接头或更换损坏部件 Tighten the oil circuit connector or replace the damaged parts
	回油阀浮子浮起后未复位 The oil return valve float did not reset after floating	拆下并清理回油阀，确保回油阀浮子打开关闭灵活 Remove and clean the oil return valve to ensure that the float of the oil return valve can be opened and closed flexibly
	油封泄漏 Oil seal leakage	更换新油封(建议联系供应商) Replace with a new oil seal (it is recommended to contact the supplier)
	因长期使用磨损造成的内泄漏 Internal leakage caused by long-term service wear	修理真空泵(建议联系供应商) Repair the vacuum pump (it is recommended to contact the supplier)
	电源电压不正确或过载 Incorrect supply voltage or overload	提供合适的电源 Provide proper power supply
	电机接线接法错误 Motor wiring error	根据电机铭牌指示接线，或咨询供货商 Wire according to the motor nameplate or consult the supplier
	电机启动过载保护设定值太低 The setting value of motor starting overload protection is too low	电机过载保护的设定数据参照电机铭牌 The setting data of motor overload protection shall refer to the motor nameplate
泵不能启动或启动即停机 The pump fails to start or stops immediately after starting	电源线太小 The power cord is too small	使用大小合适的电缆线 Use cable wires of appropriate size
		确认电机已切断电源后拆开电机风扇罩 After confirming that the power supply of the motor has been cut off, disassemble the fan cover of the motor
	真空泵头或电机卡死 The vacuum pump head or motor is stuck	用手转动电机和真空泵。如手转不动，拆下电机，分别检查泵和电机，如泵卡死，建议联系供应商。 Turn the motor and vacuum pump by hand. If the hand cannot rotate, remove the motor and check the pump and motor respectively. If the pump is stuck, it is recommended to contact the supplier.
	电机损坏 Motor damage	更换电机 Replace the motor
	泵启动无力 Weak pump start	立即停机并检查电源第一相的电压及检查电源线与电机接线柱是否有松脱 Stop the machine immediately and check the voltage of the first phase of the power supply and check whether the power line and the motor terminal are loose
	真空泵转向错误 Vacuum pump steering error	根据转向箭头指示改变电机转向 Change the motor direction according to the direction arrow
	泵超过几个星期未使用，叶片粘住无法甩出 The pump has not been used for more than several weeks, and the blade is stuck and cannot be thrown out	封闭真空泵的进气口运转，待泵油的温度升高后叶片可自行甩出。 Close the air inlet of the vacuum pump for operation, and the blade can be thrown out by itself after the temperature of the pump oil rises.
泵有异常噪音 Abnormal pump noise	环境温度太高，油温过高 The ambient temperature is too high and the oil temperature is too high	用合成油，或用低一档粘度的油(注意:用粘度过低的油会导致泵腔内产生划痕) Use synthetic oil or oil with low viscosity (Note: using oil with low viscosity will cause scratches in the pump cavity)
	长时间未换油，油变质 The oil has not been changed for a long time, and the oil is deteriorated	换油，包括清洗泵和更换油过滤器 Oil change, including cleaning the pump and changing the oil filter
	外来物质进入泵体内，损坏叶片或轴承 Foreign substances enter the pump body and damage the blades or bearings	修理真空泵(建议联系供应商) Repair the vacuum pump (it is recommended to contact the supplier)

◎ 故障排除Troubleshooting

故障形式 Fault form	可能的原因 Possible causes	解决方法 Resolvent
泵卡死 Pump stuck	泵吸入了外来固体物质 The pump sucked in foreign solids	维修真空泵(建议联系供货商) Maintenance of vacuum pump (it is recommended to contact the supplier)
	泵长期未使用，冷凝物引起泵腔内生锈 The pump has not been used for a long time, and the condensate causes rust in the pump cavity	维修真空泵(建议联系供货商) Maintenance of vacuum pump (it is recommended to contact the supplier)
	泵反转造成叶片损坏造成泵卡死 The reverse rotation of the pump causes damage to the blades and the pump is stuck	更换叶片，选择正确的转向 Replace the blade and select the correct steering
	叶片折断 Blade break	更换叶片，找到叶片折断的故障原因并排除。(建议联系供货商) Replace the blade, find out the fault cause of blade fracture and eliminate it. (it is recommended to contact the supplier)
电机转，泵头不转 The motor rotates and the pump head does not rotate	联轴器损坏 Coupling damage	更换联轴器套或整套联轴器 Replace the coupling sleeve or complete coupling
	泵卡死造成联轴器损坏 Coupling damage caused by pump jamming	维修真空泵，更换联轴器 Repair the vacuum pump and replace the coupling
泵有异常噪音 Abnormal pump noise	风叶碰擦护罩(泵端和电机端均有可能) Blade rubbing shield (both pump end and motor end are possible)	松动风叶护罩螺丝，略调整位置即可 Loosen the screws of the fan blade shield and slightly adjust the position
	轴承损坏 Bearing damage	修理真空泵(建议联系供应商) Repair the vacuum pump (it is recommended to contact the supplier)
	联轴器松动后沿轴向窜动或联轴器套损坏 The coupling moves axially after loosening or the coupling sleeve is damaged	紧固联轴器，更换联轴器套 Tighten the coupling and replace the coupling sleeve
	叶片损坏 Blade damage	修理真空泵(建议联系供应商) Repair the vacuum pump (it is recommended to contact the supplier)
泵温太高 Pump temperature too high	空气流通不够 Insufficient air circulation	确保泵的通风，清洁泵表面，风扇，罩壳及冷却翅片 Ensure the ventilation of the pump and clean the pump surface, fan, housing and cooling fins
	环境温度过高 Ambient temperature too high	按真空泵操作环境温度范围要求 According to the requirements of operating ambient temperature range of vacuum pump
	进气气体温度过高 Intake gas temperature too high	按进气气体温度范围要求 According to the requirements of inlet gas temperature range
	排气过滤器堵塞或油过滤器堵塞 Exhaust filter blocked or oil filter blocked	更换排气过滤器或油过滤器 Replace the exhaust filter or oil filter
	缺油 Lack of oil	加油 Come on
	油过热变质，粘度太大 The oil is overheated and deteriorated, and the viscosity is too high	清洗真空泵。换油，更换油过滤器，更换排气过滤器 Clean the vacuum pump. Change the oil, replace the oil filter and replace the exhaust filter
真空泵冒白烟 White smoke from vacuum pump	过滤器或滤网堵塞。进、排气管道堵塞 The filter or screen is blocked. The air inlet and exhaust pipes are blocked	排除堵塞物 Remove obstructions
	排气过滤器寿命到失效 Exhaust filter life to failure	更换新排气过滤器 Replace the exhaust filter with a new one
	气体含水气量高且泵温与室温相差较大 The water content of the gas is high, and the pump temperature is quite different from the room temperature	真空泵排除水汽的正常现象 Normal phenomenon of removing water vapor by vacuum pump
排气有油滴溅出 Oil droplets spilled from exhaust	排气过滤器未安装好或“O”型圈密封面有异物 The exhaust filter is not installed properly or there is foreign matter on the sealing surface of "O" ring	检查排气过滤器是否安装好;去除密封面的异物 Check whether the exhaust filter is installed properly and remove foreign matters on the sealing surface
	排气过滤器破裂 Exhaust filter rupture	更换排气过滤器 Replace the exhaust filter
	泵运行时间过短即停机造成泵无法回油 If the pump runs for too short, it stops, resulting in the pump unable to return oil	咨询供货商 Consult vendor
	回油阀失效 Oil return valve failure	清洗或更换回油阀 Clean or replace the oil return valve
油含水、乳化及浑浊 Water content, emulsification and turbidity of oil	油过热，烧油 Oil overheating, oil burning	更换油过滤器，更换排气过滤器，换油 Replace oil filter, exhaust filter and oil
	有水及大量水汽吸进入泵内并凝结 Water and a large amount of water vapor are sucked into the pump and condensed	清洗真空泵，换油，更换新油滤。抽吸水汽问题请咨询供货商 Clean the vacuum pump, change the oil and replace the oil filter. Please consult the supplier for water vapor suction
	泵温度过高造成 Caused by high pump temperature	查看前文<泵温太高> Check the previous text < pump temperature too high >
油变粘稠 The oil becomes viscous	油的品种不正确 Incorrect type of oil	清洗真空泵，换入合适的油，更换油过滤器 Clean the vacuum pump, replace with appropriate oil and replace the oil filter
	混用不同类型的油 Mix different types of oil	将油放尽，注入合适新油。(具体做法请参见“维护”) Drain the oil and fill with appropriate new oil. (see "maintenance" for details)
	排气有异味 The exhaust has peculiar smell	按工艺和环保要求处理排出的气体，加强通风 Dispose the discharged gas according to the process and environmental protection requirements and strengthen ventilation
吸气管道里有油或者 真空过滤器壳体里有油 There is oil in the suction pipe or in the vacuum filter housing	油的添加剂发出的气味 The smell of oil additives	选用符合要求的油 Select the oil that meets the requirements
	工艺气体在管道中的冷凝物 Condensation of process gas in pipeline	吸气管道上加装排液支管，定期排放 A liquid discharge branch pipe shall be installed on the suction pipe for regular discharge
	吸气阀密封失效引起的停机返流 Shutdown backflow caused by sealing failure of material suction valve	打开吸气法兰，清理吸气阀O型圈的密封面，拉长吸气弹簧，复位安装好吸气法兰。 Open the suction flange, clean the sealing surface of the O-ring of the suction valve, lengthen the suction spring, reset and install the suction flange.