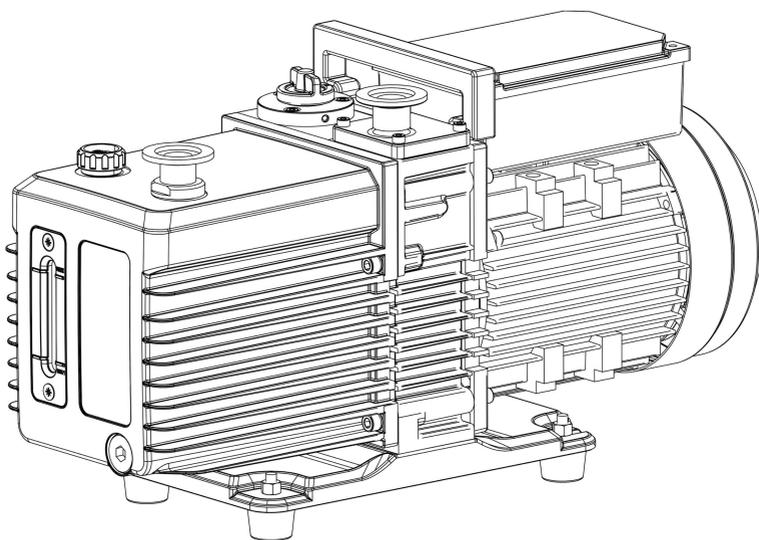


400-888-2236



LDV系列双级旋片式真空泵 使用说明书

郑州利德真空设备有限公司

致用户

尊敬的用户，感谢您对本公司的信任与支持。我们将竭诚为您提供优质的服务。欢迎您使用本公司的LDV系列真空泵产品。

多年来，本公司一直以创造卓越品质高可靠性的LDV系列真空泵作为自己的目标，把用户的需求作为我们研发的基点。我公司具有雄厚的技术力量，先进的加工设备；一流的装配流水线；精确的检测设备。能最大程度满足产品的质量和用户的需求。

本系列产品是引进德国技术，并严格按照德国行业标准生产。同时我司根据国内外市场的需求进一步完善设计，使之更加完美，产品美观大方。本产品采用国内外高质量的原材料加工而成，具有极限真空度高、低噪音、不喷油、不返油、气镇方便可靠、性能稳定、使用寿命长、故障低，维护方便等特点。

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1.使用之前

当您收到产品时请检查：

- (1)与您订购的产品是否一致；
- (2)备件、附件、使用说明书等是否齐全；
- (3)运输过程是否有损坏；
- (4)如您发现有任何破损、缺陷或丢失部件等情形请及时与本公司或当地经销商联系。
- (5)在使用本产品前，请您务必仔细阅读此说明书。按产品操作规程进行操作。

2.搬运注意事项

- (1)搬运过程中任何一个小的疏忽都可能造成泵的损伤，请小心搬运；
- (2)泵只有停止运转，且断开电源后才可移动；
- (3)请检查泵是否漏油，由于流出的油有使人滑到的危险；
- (4)当起吊泵时，请确认吊装装置是否安全?避免掉下来造成人员受伤、损坏泵等现象。

3.主要特点与适用范围

LDV 系列真空泵是真空应用领域中最基本的真空获得设备之一，广泛应用于需要获得高、低真空环境的科研、教学、真空应用设备的配套、电子工业、半导体工业、显示器生产线、真空包装、真空冷冻干燥、冰箱空调生产线、电光源、分析仪器等需要真空环境的应用领域。

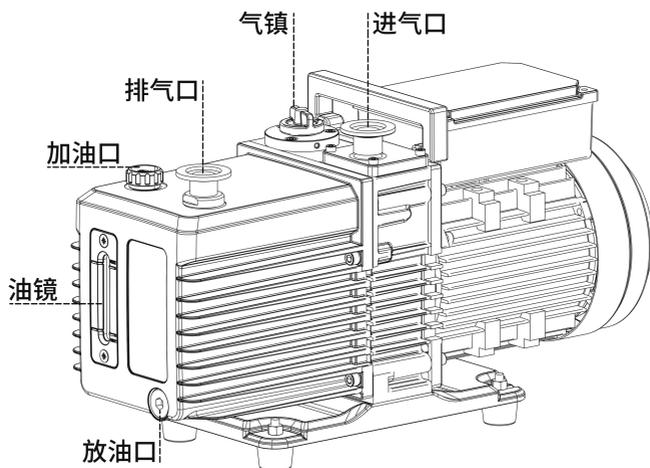
本泵可单独使用，也可作为各种分子泵、扩散泵、罗茨泵等高真空、超高真空系统的前级泵和预抽泵。

本泵不能用来抽除含粉尘、腐蚀性、易爆性以及与黑色金属、真空泵油发生化学反应的气体；亦不能作为压缩泵或传输泵使用。

本泵进气口敞开连续通大气运转，不得超过三分钟。进气口压强小于1333Pa的条件下允许连续运转。

本系列高速直联双级油封旋片真空泵，极限真空度高、低噪音、不喷油、不漏油等特点。防返油止逆阀系统、油泵压力控制系统，气镇阀方便可靠等结构保证了产品的性能稳定，使用寿命长，故障低，维护方便。

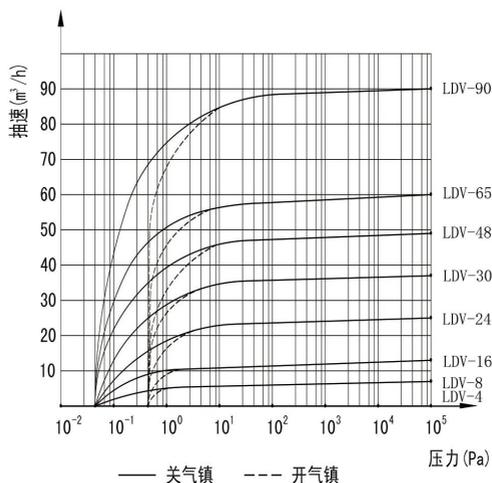
4. 结构简图



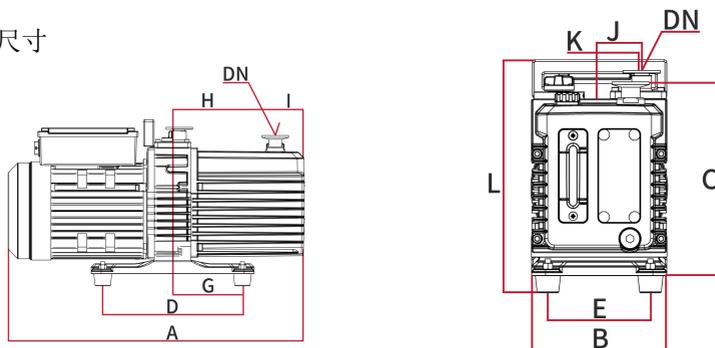
5. 主要技术参数

项目	单位	LDV-4	LDV-8	LDV-16	LDV-24	LDV-30	LDV-48	LDV-65	LDV-90
抽速	50Hz	4	8	16	24	30	48	65	90
	60Hz	4.8	9.6	19.2	28.8	36	57.6	78	108
关气镇极--限分压力	pa	4×10^{-2}							
关气镇极--限全压力	pa	4×10^{-1}							
开气镇极--限全压力	pa	10	10	8	8	3	3	3	3
电机转速	50Hz	1440							
	60Hz	1720							
电机功率单相/三相	kW	0.4/0.37	0.4/0.37	0.75/0.55	1.1	1.1	1.5	2.2	3
防护等级		IP44							
进气排气接口		KF16/25	KF16/25	KF25	KF25/40	KF25/40	KF40	KF40	KF40
油量	L	0.6-1.0	0.6-1.0	0.9-1.5	1.3-2.0	1.3-2.0	3.3-4.5	3.3-4.5	3.3-4.5
工作环境温度	°C	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40
噪音	dB	≤53	≤53	≤58	≤58	≤58	≤62	≤62	≤65
重量	kg	19	21	30	35	43	62	65	68
尺寸 (L*W*H)	mm	440×144×217	440×144×217	530×188×272	567×188×272	567×188×272	730×234×358	730×234×358	730×234×358

6. 抽气速率曲线图



7. 安装尺寸



LDV安装尺寸 (单位: mm)

Type	A	B	C	D	E	G	H	I	J	K	L	DN
LDV-4	440	144	217	210	110	95	143.5	45	45	34	/	KF16/25
LDV-8	440	144	217	210	110	95	143.5	45	45	34	/	KF16/25
LDV-16	530	188	272	320	148	160	165	69	59	38	295	KF25
LDV-24	567	188	272	320	148	160	185	82	59	47	295	KF25/40
LDV-30	567	188	272	320	148	160	185	82	59	47	295	KF25/40
LDV-48	730	234	358	396	190	200	223	157	69	55	390	KF40
LDV-65	730	234	358	396	190	200	223	157	69	55	390	KF40
LDV-90	730	234	358	396	190	200	223	157	69	55	390	KF40

8. 安装

- (1)一定要将泵安装在水平位置。因为不稳定或倾斜安装可能造成泵振动，噪音加大，甚至损坏
- (2)泵连接到真空系统时，尽可能使用泵的机脚螺孔连接。
- (3)泵安装场地的选择应考虑：
 - 方便安装、维护、拆卸等作业。
 - 良好的通风环境。
 - 方便接线。
- (4)泵的工作环境温度：**8-40°C**,湿度不大于**85%**

9. 真空系统连接

- (1)泵与真空系统连接采用国际标准的“快卸法兰”,方便快捷。
- (2)连接泵与真空系统的管道尽可能短、粗，尽量减少弯道
- (3)连接管道的通径尺寸至少应与进气口通径一致。如果管道的口径小于泵的进气口径，泵的抽速会下降。
- (4)泵的排气管道口径至少与排气口口径尺寸一致。如果管道口径小于泵的排气口口径，泵油箱中的压力会升高，并使泵的真空度出现不稳定。
- (5)排气管道安装应防止凝聚物回流泵中。
- (6)对管道和法兰的连接处进行检漏。良好的密闭性对于泵达到极限压力非常重要

10. 接线

- (1)接线前检查并确认是否切断了动力电源。
- (2)接线由专业电工按电机标识来完成
- (3)接线应按照电机商标上的额定值进行。
- (4)接通电源后请务必确认电机的正确转向，此点要特别注意。
- (5)通过进气口检查电机的旋转方向：首先打开进气口和排气口，然后把进气口盖放在进气口上，接着瞬间通电逗车，同时观察进气口盖，它被吸住为电机的正确转向。

11. 操作前的准备

- (1)泵起动前，一定要使排气口畅通，严禁在封堵排气口情况下启动泵。
- (2)观察油箱内注油量是否合适。
- (3)电机所接电源是否与电机铭牌上的额定值相符。
- (4)电机转向是否正确。
- (5)换油或长时间停泵后重新启动泵时，应盖住泵的吸气口启动泵，以便把泵油中的气体排出。

12.操作时注意事项

(1)无可凝性气体：抽除永久性气体时，气镇阀旋钮应处于关闭状态。

(2)有可凝性气体：

·当真空系统中含少量可凝性气体时，打开气镇阀可抽除系统中少量可凝性气体，待被抽系统降低到一定数值时，再关闭气镇阀进行抽气。

·如果泵工作在较低的温度下，气体可能溶解在泵油中，泵油可能变质，从而影响泵的性能，还可能腐蚀泵体。因此在抽气过程结束后，不要立即停泵，应在气镇阀打开和进气口关闭的情况下继续工作，直到把泵油中的可凝性气体分离出去。

(3)泵在工作中或停泵后短时间内，泵的表面温度可能会很高，严禁赤手触摸电机和泵表面高温部位，避免烫伤。

(4)停泵和存放：

·在正常情况下工作完成时，可直接关闭泵。

·长时间不用泵时，应封盖泵的进气口和排气口，防止粉尘、污物污染泵体。

·长时间没有使用泵时，气体会吸附在泵及部件上，再次使用泵时，适当延长抽气时间，将被吸附的气体排除后，即可恢复泵的正常使用的。

·泵的最高工作温度不大于80℃。

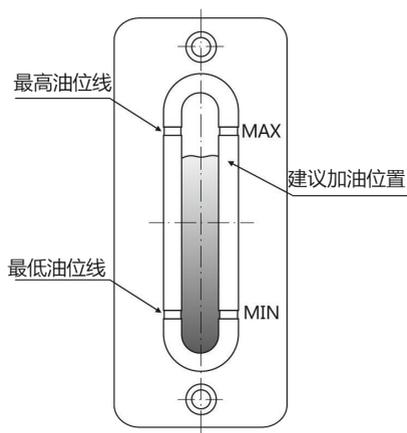
13.维护

(1)将泵从真空系统中拆卸前，必须要切断电源

(2)泵刚停止时，泵温可能很高，注意触碰，避免烫伤。

(3)检查油的容量：

泵在工作中，泵油液面应在油标的相应区间内。如果油位过低，应停泵加油；油位过高应放出多余的泵油。



(4)检查油的质量:

观察泵油颜色，正常的泵油应该是清洁和透明的。如果油的颜色变暗或浑浊请换油。

(5)换油:

- 为确保泵性能稳定和使用寿命，一定要保证泵油清洁及油量适当。
- 油的更换时间，视使用情况的不同来确定。如果油被污染，需及时更换。
- 新泵初次使用，换油时间应适当缩短，建议泵运转100小时左右更换一次。
- 泵的真空度随着工作时间延长不断下降时，需要换油。

(6)换油方法:

- 换油时，应关闭泵，再打开放油塞把油箱中被污染的油放到适当的容器中。
- 为使泵腔中剩油都排出，打开进气口让泵短暂运转(约10秒)。放空剩余的油，同时检查放油塞密封垫是否完好，再将放油塞拧上。
- 打开注油塞，注入新油，并拧紧注油塞。
- 为保证泵性能，建议使用专用高速真空泵油。

(7)清洁进气口过滤网:

过滤网在使用过程中，由于粉尘、油垢等污物会吸附和堆积在过滤网上，造成抽速下降，甚至阻塞。污物进入泵腔易加剧磨损或损坏。视使用工况不同需定期检查过滤网，需清洗时，将过滤网取出清洗干净，吹干后重新安装使用。如有损坏请更换。

14. 常见故障及处理方法

现象	原因	处理方法
泵启动困难	1.电源不通	1.检查电源、开关、线路连接情况
	2.输入电机电压异常	2.确保电源电压与电机额定值相符
	3.电机发生故障	3.维修电机
	4.环境温度太低	4.提高环境温度
	5.泵内部件损坏	5.维修泵
	6.泵内有异物卡机	6.维修泵
泵达不到极限压力	1.气镇阀处于打开状态	1.关闭气镇阀
	2.真空系统泄漏	2.排除真空系统漏点
	3.真空计不准或不合适	3.修复真空计或更换合适的
	4.泵油污染或油量不足	4.换油或加油
	5.油路阻塞	5.拆卸修理, 清洁油路
	6.排气阀片损坏	6.更换排气阀片
	7.防返油装置有问题	7.修理防返油装置
抽气速度慢	1.进气管、排气管口径太小	1.更换合适进、排气管道
	2.进气口滤网或管道阻塞	2.清洗滤网, 疏通管道
	3.油被污染	3.换泵油
	4.真空系统泄漏	4.排除漏点
	5.泵选型不当	5.选择抽速适当的泵
	6.防返油阀损坏	6.修理防返油阀
停泵后真空系统压力升高过快	1.真空系统泄漏	1.对真空系统进行检查排除漏点
	2.防返油阀损坏	2.修理防返油阀

现象	原因	处理方法
泵温过高	1.缺油	1.注足油量
	2.进气口在高压下连续运转	2.尽可能缩短排大气时间
	3.供油系统不畅	3.拆泵修理清洗，保证油路通畅
	4.泵风扇损坏	4.修理风扇
	5.被抽气体温度太高	5.在进气口加装降温装置
	6.工作环境温度太高	6.降低环境温度
排气口喷油	1.注油太多	1.放出多余泵油
	2.气镇阀处于开启状态	2.关闭气镇阀
	3.进气口高压下连续运行	3.减少排大气时间
	4.泵排气阀片损坏	4.更换排气阀片
	5.真空系统漏气	5.检查并排除真空系统漏点
油耗过高	1.油箱与泵支座间漏油	1.更换垫片
	2.衬套损坏或受腐蚀	2.换装新衬套
	3.油封损坏或安装不当	3.更换油封及正确安装油封
	4.放油塞密封垫损坏	4.更换密封垫
泵运转声音异常	1.输入电源电压异常	1.检查电源、开关、线路连接情况
	2.电机轴承损坏	2.维修电机
	3.泵油不足	3.注足油量
	4.联轴器损坏	4.更换联轴器
	5.泵内进入异物	5.拆卸修理，清除异物
	6.旋片损坏	6.拆卸修理换旋片

15.保修条款：

(1)保修期为自购入起一年。

(2)在保修期内，按使用说明书要求正常使用条件下发生的故障，本公司将无偿提供维修服务。

(3)属以下情况引起的故障，本公司需有偿修理：

·受自然灾害或人为因素造成的故障；

·易损件的损坏；

·特殊环境使用造成的故障；

·经本公司技术人员鉴定，为违规操作引发的故障。

A letter to the user

Dear users, thanks for trusting and supporting our company. We will serve our clients wholeheartedly. Welcome to use LDV series vacuum pump products.

Over the years, our company has been taking create excellent quality and high reliability LDV series vacuum pump as our goal and the needs of users as our research and development starting point. We have strong technical strengths, advanced processing equipment, top-ranking assembly lines, and accurate checking equipment to ensure the quality of the products and satisfy users' needs to maximum extent.

This series of products adopt advanced Germany technology and are produced in strict accordance with Germany industry standard. Meanwhile, we further perfects the design with respect to market demands both at domestic and abroad, for the purpose of making it more perfect and enjoying elegant appearance. This product is made from high-quality raw materials at domestic and abroad, and has characteristics including extreme high vacuum degree, low noise, no oil injection, no oil return, convenient and reliable gas ballasting, stable performance, long service life, low malfunction, convenient maintenance, etc.

Directory

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- 2.Attention in transportation
- 3.Main features and application
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- 10.Wiring connection
- 11.Preparation before operation
- 12.Attention in operation
- 13.Maintenance
- 14.Common faults and disposal measures
- 15.Warranty

1. Instruction before use

In order to make the best use of the product, please make the following checking before use:

- (1) Make sure the product is in accordance with the one you ordered;
- (2) Make sure spare parts, accessories and operation instructions are all in readiness;
- (3) Check if there are any damages that might occur during transportation;
- (4) In the event of any damages, flaws or lost any assembly units, please contact our us or local dealer for details;
- (5) Before using this product, please read this manual carefully. Operation should be carried out according to the operation specification.

2. Attention in transportation

- (1) Any small negligence might cause damage to pump, thus please handle with care;
- (2) The pump can be removed only when the pump is shut down and power is disconnected;
- (3) Check to ensure no oil leakage in pump, due to the oil drained out of the pump might put people at the risk of slip;
- (4) When hoisting the pump, make sure the hoisting assembly device is safe, in order to avoid staff in injuries or pump damage caused by falling down the pump.

3. Main features and application

LDV series vacuum pump is one of the most basic vacuum equipment in the field of vacuum application, and it has been widely used in application fields that need high or low vacuum environment scientific research, teaching, vacuum application complete sets of equipment, electronic industry, semiconductor industry, monitor production line, vacuum package, vacuum freeze drying, refrigerator and air-conditioner production line, lamp manufacture and analytical instrument, etc. This pump can be used alone, also can be used as fore pump and backing pump of high vacuum and ultrahigh vacuum system including molecular pump, diffusion pump, roots pump, etc.

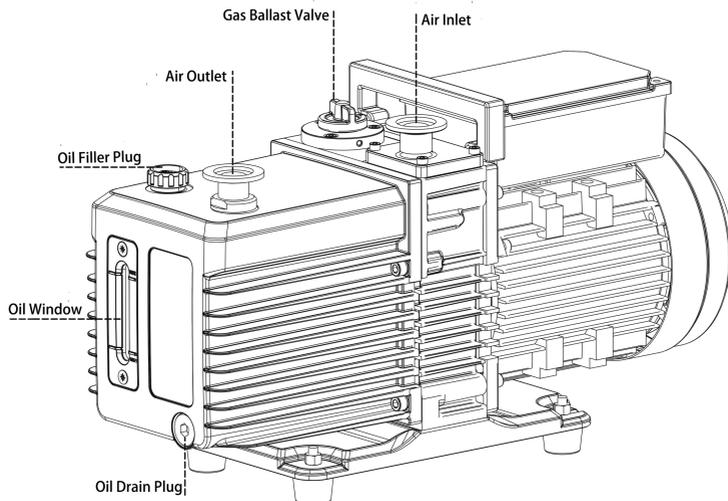
The pump cannot be used for pumping neither gas containing dust, corrosive and explosive, or gas that can chemically react with black metal and vacuum pump oil; nor can it used as a compression pump or transmission pump.

It must not exceed 3 minutes for pump air inlet open continuously to atmosphere.

Under the condition that air inlet pressure is less than 1333 pa, continuous operation is allowed.

This series of high-speed straight oil seal sliding-vane rotary vacuum pump is characterized by excellent ultimate vacuum, low noise, no oil injection, no oil leakage, etc. The structure of non-return check valve system, pump pressure control system and convenient and reliable gas ballast valve ensure the product of stable performance, long service life, low malfunction, convenient maintenance.

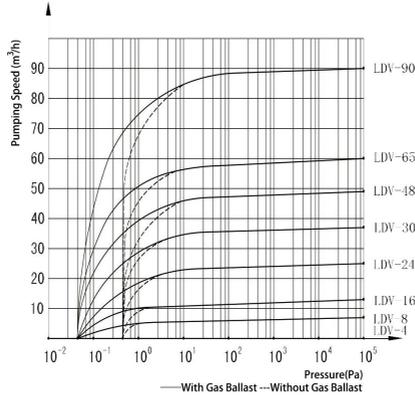
4. Structure Diagram



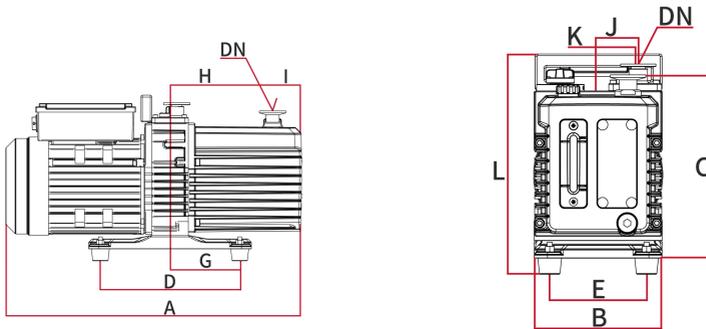
5. Main Technical Parameters

Pumping Speed	50Hz	m ³ /h	LDV-4	LDV-8	LDV-16	LDV-24	LDV-30	LDV-48	LDV-65	LDV-90
	60Hz		4.8	9.6	19.2	28.8	36	57.6	78	108
Gas cut-off pole - limited partial pressure	pa	4×10 ⁻²								
Closed gas ballast - limited total pressure	pa	4×10 ⁻¹								
Open gas ballast - limited total pressure	pa	10	10	8	8	3	3	3	3	3
Motor speed	50Hz	r/min	1440							
	60Hz		1720							
Motor power single phase/three phase	kW	0.4/0.37	0.4/0.37	0.75/0.55	1.1	1.1	1.5	2.2	3	
Class of protection		IP44								
Intake and exhaust port		KF16/25	KF16/25	KF25	KF25/40	KF25/40	KF40	KF40	KF40	
Oil capacity	L	0.6-1.0	0.6-1.0	0.9-1.5	1.3-2.0	1.3-2.0	3.3-4.5	3.3-4.5	3.3-4.5	
Ambient temperature	°C	10-40	10-40	10-40	10-40	10-40	10-40	10-40	10-40	
Noise	dB	≤53	≤53	≤58	≤58	≤58	≤62	≤62	≤65	
Weight	kg	19	21	30	35	43	62	65	68	
Dimension (L*W*H)	mm	440×144×217	440×144×217	530×188×272	567×188×272	567×188×272	730×234×358	730×234×358	730×234×358	

6. Pumping rate curve chart



7. Overall dimension



LDV Installation Size (Unit: mm)												
Type	A	B	C	D	E	G	H	I	J	K	L	DN
LDV-4	440	144	217	210	110	95	143.5	45	45	34	/	KF16/25
LDV-8	440	144	217	210	110	95	143.5	45	45	34	/	KF16/25
LDV-16	530	188	272	320	148	160	165	69	59	38	295	KF25
LDV-24	567	188	272	320	148	160	185	82	59	47	295	KF25/40
LDV-30	567	188	272	320	148	160	185	82	59	47	295	KF25/40
LDV-48	730	234	358	396	190	200	223	157	69	55	390	KF40
LDV-65	730	234	358	396	190	200	223	157	69	55	390	KF40
LDV-90	730	234	358	396	190	200	223	157	69	55	390	KF40

8. Installation

- (1) The pump must be set at the horizontal position. Because unsteadiness and slanting installation might cause pump vibration; the noise might be heightened and even damage the pump.
- (2) When connecting pump with vacuum system, it is suggested to connect with under-chassis screw.
- (3) When choosing pump installation site, the following factors should be taken into consideration:
 - Easy to assemble, maintain and unassemble;
 - Favorable ventilation condition;
 - Easy connection.
- (4) Pump operating ambient temperature: 8-40°C, humidity should be not more than 85%.

9. Vacuum system connection

- (1) The connection between pump and vacuum system adopts the international standard LDV of "quick-release flange", which is convenient and efficient.
- (2) The pipeline for connecting the pump with vacuum system should be short and thick, and curve should be minimized as far as possible.
- (3) The size connecting to the pipe should be at least consistent with the air inlet size. If the pipe diameter is less than the pump inlet diameter, the pumping speed will decline.
- (4) The size of pump exhaust pipe should be at least consistent with the size air outlet. If the pipe diameter is less than the pump air outlet diameter, the pressure of pump fuel tank will increase, and pump vacuum degree will be instable.
- (5) When install the exhaust air duct, agglomeration should be prevented from refluxing to pump.
- (6) The leakage detecting should be carried out in the joint of pipeline and flange. Good leakproofness is very important for pump to reach ultimate pressure.

10. Wiring connection

- (1) Before connection, check and confirm whether the power supply has been cut off.
- (2) The connection should be carried out in accordance with motor sign by trained electricians.
- (3) The connection should be carried out in accordance with the rating value on the motor trademark.
- (4) Please make sure the right rotation direction of the motor after connecting power supply; this should be paid special attention.
- (5) Check the rotation direction of motor through the air inlet: first, open the inlet and outlet, and then put the inlet cover on the air inlet; then instantaneously power on while observe inlet cover, if it sucked, the right rotation direction of the motor is shown.

11.Preparation before operation

- (1)Before starting pump, make sure air outlet is unblocked; starting pump under unblocked air outlet is strictly prohibited.
- (2)Check oil level and oil capacity in oil tank is proper.
- (3)Make sure the power supply conform to nameplate rating of motor.
- (4)Ensure the motor rotation is in right direction.
- (5)When changing oil and restarting pump when the pump is stopped for a long time, pump intake port should be covered to start the pump, so as to discharge the gas contained in oil pump.

12.Attention in operation

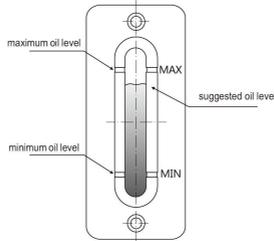
- (1)Without condensable gas: pumping perpetual gas, rotary knob of gas ballast valve should be in inactive state.
- (2)With condensable gas:
 - When vacuum system contains a small amount of condensable gas, turn on gas ballast valve to extract the condensable gas contained in system; when the pumped system declines to a certain value, turn off gas ballast valve to extract air.
 - If the pump work at relatively low temperature, gas may be dissolved in the oil pump, oil might be spoiled, thus affecting the performance of the pump and corrode the pump body. So at the end of the air exhaust, don't stop the pump immediately. Operation should be continued when the gas ballast valve is open and the air inlet is closed, until the condensable gas in oil pump is separated out.
- (3)When the pump is at work or during s short period after termination of pumping, the surface temperature of pump might increase, touching the high temperature part of pump and motor with bare hands is strictly prohibited to avoid scalding.
- (4)Turn off and store the pump:
 - When the work is finished under normal circumstances, you can turn off the pump directly.
 - When the pump was not in use for a long time, block the air inlet and outlet of the pump to prevent the pump body from being polluted by dust and dirt.
 - When the pump was not in use for a long time, gas will be absorbed on pump and assembly unit, when using the pump again, appropriately extend the time of extraction,after the absorbed gas is out the pump can come back to normal use.
 - The maximum operating temperature of the pump should not be more than 80°C.

13.Maintenance

- (1)Before discharge the pump from the vacuum system,power supply must be cut off.
- (2)When the pump just stop,the temperature of pump might be high thus care should betaken to contact the pump to avoid scalding.

(3)Check the oil capacity:

When the pump is at work,the oil level of pump should be within the corresponding interval of oil mark.If the oil level is too low.you should stop pump and add gas;when the oil level is too high, you should be let out surplus pump oil.



(4)Check the oil quality:

Observe the color of pump oil; normal oil pump should be clean and transparent. If oil color turns to dark or turbid, please change the oil.

(5)Oil change:

·In order to ensure the pump performance of stability and service life, make sure the pump oil is clean and the amount is appropriate. Oil change time depends on different usage. If the oil is contaminated, please change oil timely.

·When the pump used for the first time, the time for changing oil should be appropriately shorten.

·It is suggested that oil be changed whenever the pump running for about 100 hours. The vacuum degree of pump will constantly decline as working time extends, oil change is needed.

(6)Methods for changing oil:

·When changing oil, the pump should be closed; open oil drain plug to put the contaminated oil contained in tank to proper container.

·To discharge the remaining oil in the pump cavity, open air inlet to run the pump for about 10 seconds temporarily. Empty remaining oil, at the same time, check whether the sealing gasket of oil drain plug is in good condition, and screw down the oil drain plug.

·Open the oil fill plug, inject new oil and screw down the oil fill plug.

·In order to ensure the pump of good performance, the use of dedicated high-speed vacuum pump oil is recommended.

(7)Clean air inlet filter screen:

During the use of filter screen, since powder and oil dirties might be adsorbed and stacked on the filter screen, the pumping speed may decline or even be blocked. If dirt gets into the cavity, pump may easily be worn or damaged. Regular checking on screen should be carried out depending on different working condition, when cleaning is needed, remove and clean the filter screen, dry it and reinstall it for use. Please replace the pump in the event of any damages.

13.Common fault and disposal measures

Symptom	Possible Cause(s)	Disposal measure(s)
Pump won't start.	1.The power can't be connected.	1.Check the power supply, switch,wire connection.
	2.Abnormal input motor voltage.	2.Ensure that the supply voltage matches the motor rating.
	3.Malfunction occurs in motor.	3.Repair the motor.
	4.Too low environment temperature.	4.Increase the environment temperature.
	5.Inner pieces damage.	5.Repair the pump.
	6.Foreign object in the pump blocks the motor.	6.Repair the pump.
	7.Anti-suckback device has some problems.	7.Repair anti-suckback device.
The pump fails to reach the maximum pressure.	1.The gas ballast valve is open.	1.Turn off gas ballast valve.
	2.Vacuum system leakage.	2.Exclude vacuum system leaking point.
	3.Vacuum gauge is imprecise or improper.	3.Repair or change vacuum gauge.
	4.Oil pollution or insufficient oil quantity.	4.Change or add oil.
	5.Oil blockage.	5.Discharge and repair,clean oil channel.
	6.Vent valve plate damage.	6.Change discharge valve plate.
	7.Anti-suckback device has some problems.	7.Repair anti-suckback device.
Air exhaust speed is slow	1.The diameter in inlet air pipe and exhaust pipe is too small or the pipeline is too long.	1.Change suitable air inlet pipe and exhaust pipe.
	2.Air inlet filter screen and pipeline is blocked.	2.Clean filter screen and dredge pipeline.
	3.Oil has been contaminated.	3.Change oil.
	4.Vacuum system leakage.	4.Exclude leakage point.
	5.Improper pump selection.	5.Select pump with proper pumping speed.
	6.Anti-suckback valve damage.	6.Repair anti-suckback valve.
When the pump stops,the vacuum system pressure increase excessively fast.	1.Vacuum system leakage.	1.Check the vacuum system to exclude the leaking point.
	2.Anti-suckback valve damage.	2.Repair the motor.

Symptom	Possible Cause(s)	Disposal measure(s)
Abnormal voice occurs when pump is running.	1. The input power voltage is abnormal.	1. Check the power supply, switch, wire connection.
	2. Motor bearing damages.	2. Repair the motor.
	3. Insufficient oil.	3. Inject enough oil quantity.
	4. Coupling damage.	4. Change coupling.
	5. Foreign object exists in pump.	5. Discharge and repair, dean the foreign object.
	6. Rotary vane damage.	6. Discharge and repair the rotary pane.
Pump temperature is too high.	1. Insufficient oil.	1. Inject enough oil.
	2. Continuous work of air inlet under high pressure.	2. Reduce the time of exhaust air as far as possible.
	3. Oil supply system is blocked.	3. Discharge the dump to repair and clean, so as to ensure clear oil channel.
	4. Pump fan damage.	4. Repair fan.
	5. The gas temperature of abstracted gas is too high.	5. Add cooling equipment in air inlet.
	6. Working environment temperature is too high.	6. Lower ambient temperatures.
Oil injection in air outlet.	1. Too much oil injection.	1. Let out surplus oil.
	2. Gas ballast valve is open.	2. Close gas ballast valve.
	3. Continuous operation of air inlet under high pressure.	3. Reduce the time of exhaust air.
	4. Pump discharge valve plate damage.	4. Change discharge valve plate.
	5. Vacuum system leakage.	5. Check and exclude vacuum system leakage.
Fuel consumption is too high.	1. Leakage occurs between tank.	1. Change sealing gasket.
	2. Oil seal damage or corrosion.	2. Change new oil seal.
	3. Oil seal set damage or improper installation.	3. Change new oil seal and install oil seal correctly.
	4. Drain plug sealing gasket damage.	4. Change sealing gasket.

15.Warranty

- (1)This vacuum pump is warranted against defects in materials and workmanship for one year from date of purchase.
- (2)Within warranty, products are guaranteed free of charge when used in accordance with our direction and recommendations.
- (3)The warranty shall not apply to any vacuum pump, which has been subject to the following situation: misuse, negligence or accident, including the following situation:
 - Malfunction caused by natural disaster and human factor;
 - Damages in quick-wear parts;
 - Malfunction caused by using under special environment;
 - Malfunction caused by operation in violation of rules, which is appraised by company technical personnel.



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