



Empowering you to work smarter

UniDrive LC-MS Vacuum Pump Operating Manual



Failure to follow warnings could
result in death or serious injury.

**SAVE THIS MANUAL
FOR FUTURE REFERENCE**

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Use Information

Dear distinguished customer,
Thanks for choosing NAVAC vacuum pump of high reliability (Hereinafter referred to as "the pump").
Please check carefully whether the product received is the same as you ordered and the accessories, spare parts & operating manual are attached as well. Please also check if there's any damage occurred during transportation. If needed, contact the local distributor or our sales team.
In order to maintain a stable performance level of the pump, read this operating manual carefully to fully understand the safety instructions, technical data as well as operating procedures before installation, operation, repair and maintenance of the pump.

 Warning

Failure to observe the terms could result in personal injury or even death.

 Notice

Failure to observe the terms could result in damage to the pump.



This warning label indicates risk of electrical shock. Disconnect the pump from the power supply before beginning with connections, repair and maintenance. Make sure the cover of junction box is properly installed before running.



This warning label indicates high temperature hazard. Do not touch the pump when the pump is in operation.

 Notice

Read the operating manual carefully and follow the operating procedures. We reserve the right to modify the design and technical data of the pump without notice which may have discrepancies in the manual. Add vacuum oil as requested before starting the new pump.

Attention

In order to ensure the personal safety, read the operating manual carefully before installation, operation, repair and maintenance.

 Warning

- 1). According to the technical guidelines and wiring regulations for electrical equipment, the power supply must match with the information shown on the pump nameplate and the electrical connections must be performed by a skilled electrician.
- 2). To prevent electrical hazards and sudden start-up hazard which may result in personal injury, disconnect the power supply before checking or repairing the pump.
- 3). The selected cable and motor protection switch rated current have to matches the rated current value of the motor nameplate.
- 4). The pump is strictly prohibited to pump dusty, active toxic, corrosive, flammable and explosive gases.

- 5). Do not place obstacles which may affect the ventilation of the motor and cause burn hazard and fire by abnormal temperature rise.
- 6). Please keep the exhaust port open before running the pump. There are not allowed to clog or restrict the exhaust airflow. The size of exhaust pipe absolute pressure is required not less than 1.15bar (Relative pressure not less than 0.15bar).

! Notice

- 1). When the external input power supply is abnormally powered off, please wait for around 20s after normal power input. Then restart the switch of the pump.
- 2). The pump must be operated at ambient temperature between 18-40°C. It may cause the pump fail to operate if not do as the required.
- 3). Please select a circuit breaker or fuse with a rated 16A for the pump connection power socket.
- 4). The pump needs to be strictly filled according to the requirements of the scale line, as excessive oil can cause pump failure.
- 5). When the pump connect the vacuum system, The pump foot can be horizontally directly put on the ground or connect the pump foot with bolt.
- 6). During pump operation and within 1 hour of pump shutdown, the surface temperature of the pump may be very high. Don't touch the case and surface of the pump to avoid burns.
- 7). Please install the pump horizontally within 10° in a stable and secure place.
- 8). Please comply with relevant environmental protection regulations when disposing the waste oil and other parts.
- 9). Please install the corresponding accessory when medium pumped contains a small amount if dust. Otherwise, it will cause pump failure or deduction of performance.
- 10). Please contact us if there have special specification requirements, like pumping flammable and explosive gas, corrosive medium, special material.
- 11). Please do not disassemble the pump if you are non professionals. Otherwise it will cause pump failure or running normally. Please contact us if there need.

Description

This product is an oil-sealed single stage vacuum pump which is a basic vacuum equipment. This pump is developed and used as a mass spectrometer industry equipment which have stable running, low noise, high pumping speed during extreme vacuum and stability vacuum advantage.

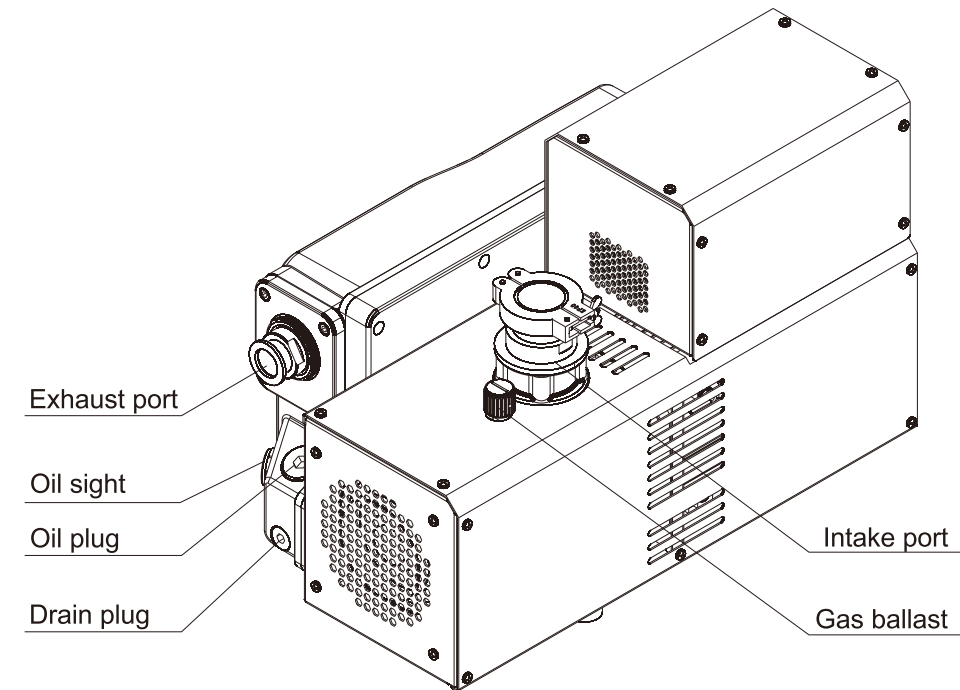


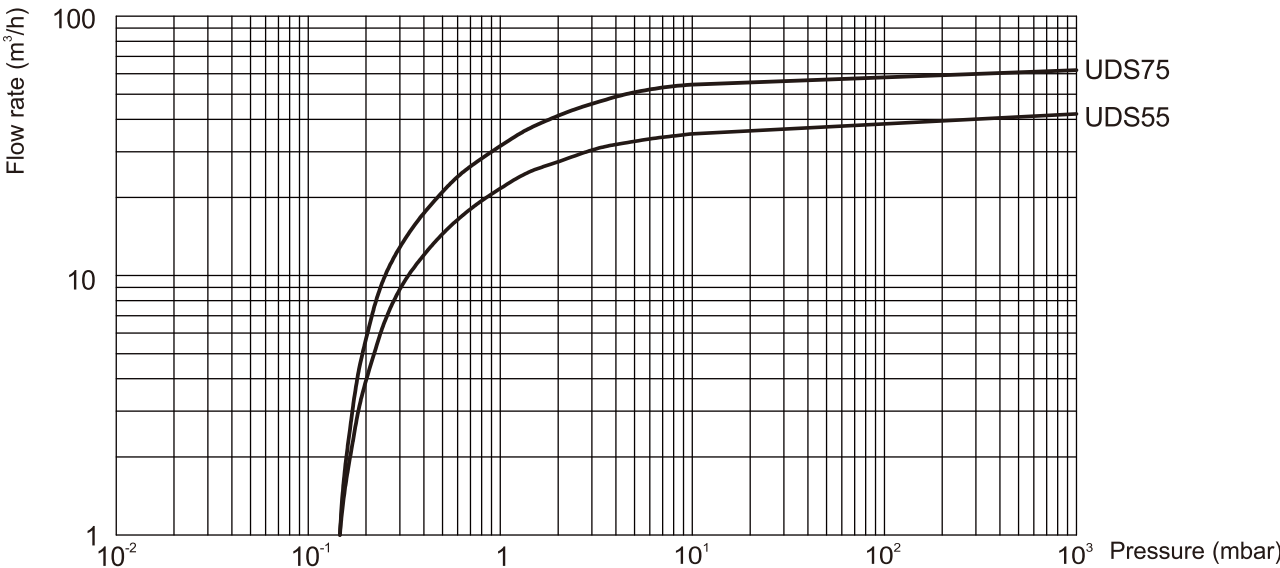
Fig.1

Technical Parameters

Model			UDS55	UDS75
Displacement	60Hz	m ³ /h	47	62
Ultimate Pressure		Pa	15	15
Power Supply			220V/50-60Hz	220V/50-60Hz
Power Rating		kW	1.5	1.5
Inlet and Exhaust Port			KF40/25	KF40/25
Oil Capacity		L	2.5	2.5
Motor Speed	60Hz	rpm	1400	1800
Ambient Temperature		°C	10 - 40	10 - 40
Noise		dB	≤63	≤65
Weight		lbs	121	121
Dimension(L*W*H)		in	21.5x12.7x14.6	21.5x12.7x14.6

Table 1

Pumping speed characteristics



Dimension

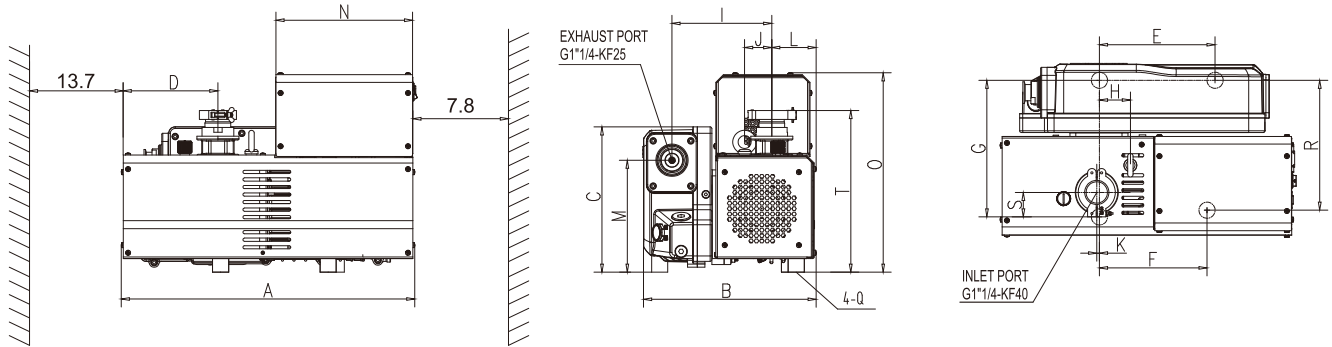


Fig.2

Unit: inch

Model	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	Q	R	S	T
UDS55	21.5	12.7	10.6	6.9	8.5	7.9	9.3	2.3	7.3	2	0.2	3.3	8.2	10	14.6	M8	9.5	1.8	11.8
UDS75	21.5	12.7	10.6	6.9	8.5	7.9	9.3	2.3	7.3	2	0.2	3.3	8.2	10	14.6	M8	9.5	1.8	11.8

Table 2

Transport and Packaging

Warning

Only the pump stops operating and the power is cut off, could the pump removes.

Notice

- 1). Any negligence will cause pump's damage. Take care during transportation. Please move the pump horizontally for filled oil pump to avoid oil overflow.
- 2). Please deal the packaging materials in accordance with environmental protection rules.

Inspect and Maintenance

Warning

- 1). All inspect and maintenance must be accordance with kinds of safety rules to operate. All work must be finished by the staff who is trained professional.
- 2). In the case of hazardous substances determine the kind of hazard first and observe the applicable safety regulations. If the potential hazard still persists, the pump must be decontaminated before starting with any maintenance work.

Notice

When VM70F starting, wait 15 seconds to feel the pump start.

6.1 Routine checking

Inspection	Period
Oil level	Every day
Pump noise	Every day
Oil mist filter	Running in one year in Corrosion-free environment or appear oil oil mist
Floating ball	Operating for 1500~3000 hours or emerging oil fog
Gas ballast cartridge	One year
Anti-suckback plate	One year or the vacuum failed
Intake air filter	One year
Oil filter	Running in one year in cleaning environment or after the oil change
Clean fan cover	One year
Change the oil	Running in one year in cleaning environment
Wiring checking	One year

Table 3

6.2 Maintenance

6.2.1 Inspect the oil level

- 1) The pump oil must be maintained between the lowest and highest when the pump working. Please fill the oil in time if the oil is less than the lowest level.
- 2) Observe the oil color. Normal oil is clean and transparent. Please change the pump oil when the oil become dark and cloudy.

6.2.2 Inspect the pump noise

The sound of the pump is continuous and stable without any other abnormal sounds. If there is an abnormal sound, please see handling method is shown in Table 3 Fault analysis.

6.2.3 Change the oil

- 1) After stopping the pump, Please change the oil after the pump cools to avoid burns.
- 2) Open the oil plug when changing the oil, and discharge the used oil into the appropriate container. When the oil flow stops, screw on the oil drain plug, the oil drain and oil plug must be tightened to ensure the air tightness of the gearbox and avoid the entry of external air, resulting in a decrease in the vacuum degree.
- 3) After oil change, please put the treated oil into the specified container, and comply with the relevant environmental regulations for disposal.

6.2.4 Clean the fan cover

Before pump working, check whether a large amount of dust accumulates on the fan cover of the fan inlet, and ensure that the surface of the fan cover is properly ventilated. Avoid poor heat dissipation, affecting the pump performance.

Troubleshooting

Fault	Possible Reason	Remedy
Pump cannot start	1. Wiring is malfunctioning.	1. Check and repair wiring.
	2. Operation voltage is abnormal.	2. Make sure the voltage is within rated voltage's tolerance of $\pm 10\%$.
	3. Motor is malfunctioning.	3. Replace the motor.
	4. Overload protector is active.	4. Check the ambient temperature or pumped gases temperature.
	5. Oil temperature is below 10°C	5. Increase the ambient temperature.
	6. Pump is jammed.	6. Repair the pump.
	7. Out of operating for long.	7. Repair the pump.
	8. Oil is too viscous.	8. Change the oil.
	9. Exhaust filter or exhaust line is clogged.	9. Replace the filter or clean the exhaust line.
	10. Pump inner parts are damaged.	10. Repair the pump.
Pump cannot reach ultimate pressure.	1. Vacuum system configuration is unreasonable.	1. Choose a suitable pump.
	2. Vacuum system leak.	2. Check the system.
	3. Measuring technique or gauge is unsuitable.	3. Use correct measuring technique and gauge. Measure the pressure directly at pump's intake port.
	4. Poor lubrication.	
	4.1 Oil filter is obstructed.	4.1 Change the oil filter.
	4.2 Oil is unsuitable.	4.2 Change the oil.
	4.3 Oil channel is obstructed.	4.3 Clean the channel.
	4.4 Oil is insufficient.	4.4 Add the oil to the level as requested.
Pumping speed is too low.	5. Anti-suckback oil valve is malfunctioning.	5. Repair anti-suckback oil valve.
	6. Intake line is dirty.	6. Clean vacuum lines.
	7. Floating ball components return oil valve is malfunctioning.	7. Repair floating ball components return oil valve.
	1. Intake port line is clogged.	1. Clean the intake port line.
	2. Connecting lines are too narrow or too long.	2. Use adequately wide and short connecting lines.
	3. Exhaust line is clogged.	3. Keep exhaust port line unobstructed.
	4. Oil mist filter is clogged.	4. Change the oil mist filter.
Noise is abnormal.	5. Anti-suckback oil valve is malfunctioning.	5. Repair anti-suckback oil valve.
	1. Operation voltage is abnormal.	1.1 Check the power supply, switches and wiring connection. 1.2 Make sure the voltage is within rated voltage's tolerance of $\pm 10\%$.
	2. Foreign matters entering into the pump.	2. Repair the pump.
	3. The oil level of the pump is too low.	3. Add the oil to the level as requested.
	4. The pump inner parts are damaged.	4. Disassembly and replace the parts.

Fault	Possible Reason	Remedy
Pump get shotter than usually observed.	1. Poor ventilation.	1. Improve ventilation environment.
	2. The fan is damaged.	2. Change the fan.
	3. Pumped gas temperature is too high.	3. Add cold trap at intake port.
	4. Poor lubrication.	
	4.1 The oil filter or exhaust line is clogged.	4.1 Replace oil filter or clean the exhaust line.
	4.2 Oil is unsuitable.	4.2 Change the oil.
	4.3 Oil channel is obstructed.	4.3 Clean the channel.
	4.4 Oil is insufficient.	4.4 Add the oil to the level as requested.
	5. The condensator is dirty.	5. Clean the condensator.
Oil in the intake line or in vacuum vessel.	6. Ambient temperature is too high.	10. Repair the pump.
	1. Oil comes from the vacuum system.	1. Check the vacuum system.
	2. Anti-suckback valve spring is obstructed.	2. Replace anti-suckback valve spring.
	3. Anti-suckback valve plate is obstructed.	3. Replace anti-suckback valve plate.
Vacuum pressure in system rises too fast when pump stops.	4. Oil level is high.	4. Drain the excess oil.
	1. Vacuum system leak.	1. Check the system.
Too much oil in the exhaust port.	2. Anti-suckback valve is malfunctioning.	2. Repair anti-suckback valve.
	1. Too much oil in the pump.	1. Drain some oil.
	2. Continuous operation under high pressure in the intake port	2. Shorten exhaust time.
Sealing surface leak	3. Oil mist filter is obstructed.	3. Replace oil mist filter.
	1. The seal is damaged.	1. Replace the seal.
	2. Seal ring is damaged.	2. Replace the seal ring.

Table 4

8. Warranty

UDS Series vacuum pumps have one year guarantee from the date of purchase. Spare parts will be provided free of charge within the period of guarantee in condition that the pump is operated according to the operating manual. The following failures will be charged for repair:

- 1) Malfunction caused by nature disasters or artificial factors.
- 2) Malfunction caused by special operating environment.
- 3) Damage of wear parts.
- 4) Malfunction caused by abnormal operation or incorrect use indentified by our engineers Before the pump is delivered to our company for maintenance, it is required to acquire the information if the pump is contaminated (and which kind of pollutants) or hazardous substances exist inside the pump. Without receiving this statement in advance, the pump will be returned to the address of the sender.

9. Accessories

To ensure the stability of the pump, it is recommended to use genuine spare parts and accessories provide by the manufacture if you need further assistance, please contact us. The accessories below are for your selection:

- 1) Wear parts. Check the exploded view and spare parts list to select the required spare parts with corresponding item numbers.
- 2) Intake port/exhaust port other than default one.
- 3) Dust filter.

9.1 UDS55/75 Exploded view

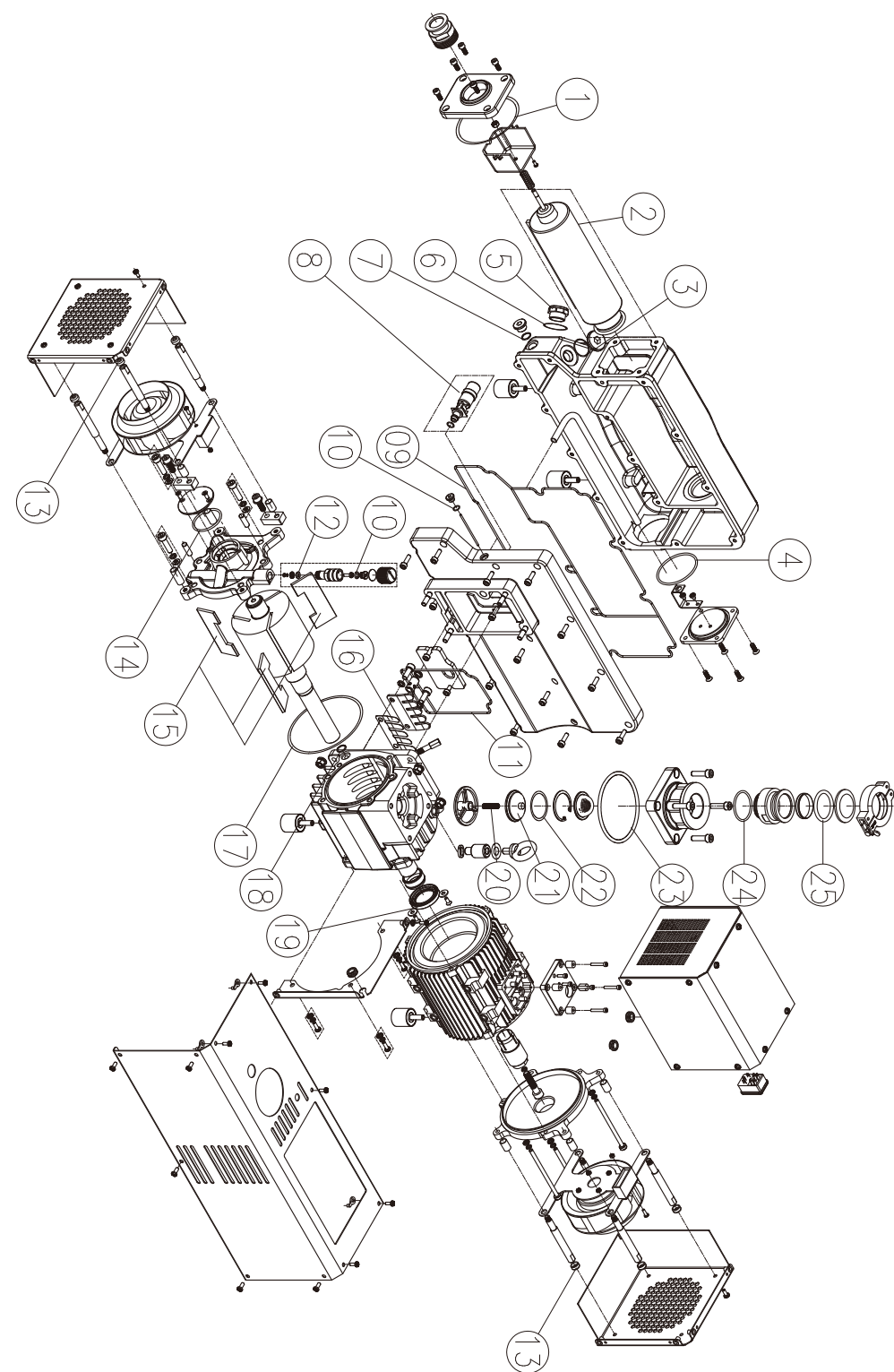


Fig.4

9.2 UDS55/75 Spare parts list

Item No.	Description	Material	Code	Quantity (PCS)
1	O-ring	FKM	300310225	1
2	Oil mist filter		320750601	1
3	O-ring	FKM	300310197	1
4	O-ring	FKM	300310212	1
5	Oil sight		320170311	1
6	Washer		320190211	1
7	O-ring	FKM	300310081	1
8	Floating ball		120003001	1
9	O-ring	FKM	300310224	1
10	O-ring	FKM	300310204	2
11	O-ring	FKM	300310222	1
12	O-ring	FKM	320230301	1
13	Rubber pad	Rubber	320832002	8
14	O-ring	FKM	300310131	1
15	Vane		320101424	3
16	Exhaust valve	FKM	320240431	1
17	O-ring	FKM	300310223	1
18	O-ring	FKM	300310210	1
19	Seal		300280504	1
20	Spring		320111003	1
21	Anti-suckback plate		320510324	1
22	O-ring	FKM	300310328	1
23	O-ring	FKM	300310215	1
24	O-ring	FKM	300310211	1
25	O-ring	FKM	300310127	1

Table 5

Remark: 1) Please refer to the exploding drawing for the relationships of each spare parts
We reserve the right to modify the design and specified data in this operating manual without notice.

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