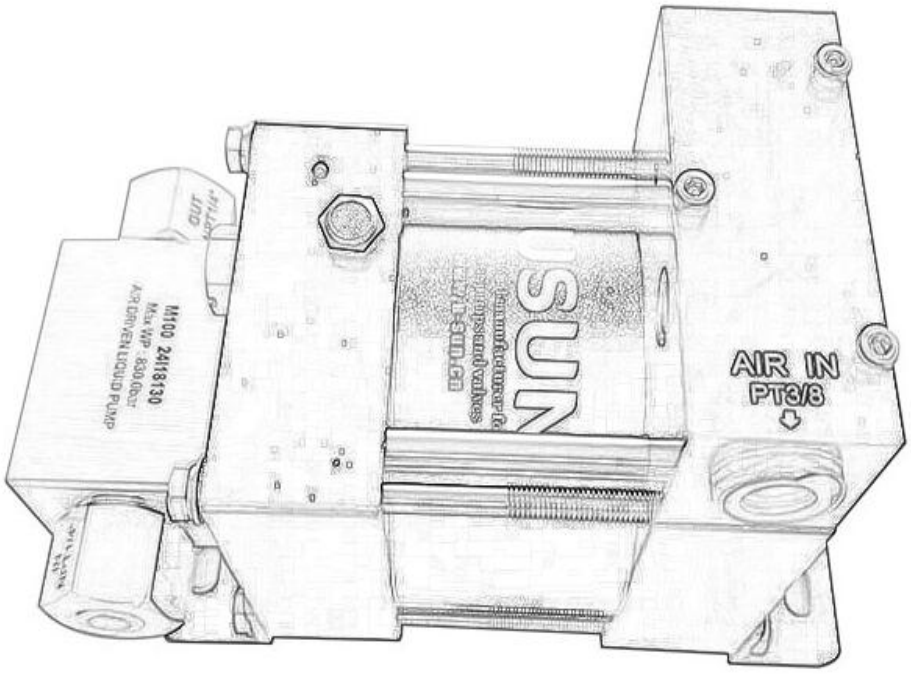
M10 AIR LIQUID PUMP OPERATION MANUAL



★The M series gas-liquid booster pump is a compressed air single drive single action liquid booster pump, which can be applied to most liquids. If special liquids are used, please confirm with the manufacturer's technical personnel!

★If the product malfunctions during use, please read this manual carefully before troubleshooting. If there are damaged parts, they can be purchased according to the material model in this manual. We will not be held responsible for any problems arising from the use of non original accessories!

★The vast majority of faults are caused by filtration and lubrication not meeting the usage standards. Please read this manual carefully and prioritize troubleshooting such faults.

Product Contents

01 Safety rules

Caution

Pay attention to non professional and abnormal operations, which may cause equipment damage!In addition to this manual, the relevant safety and accident prevention regulations stipulated by law are still valid. In order to avoid personnel injury and equipment damage during installation, commissioning, operation, and maintenance, it is necessary to read and understand this manual before use and strictly implement it;

This equipment is a high-pressure fluid device, and improper operation may cause serious personal injury. Therefore, the operator of this equipment must have relevant work experience or work under the guidance of an engineer with relevant work experience.Do not modify the system without authorization, and all losses incurred shall be borne by the user.

Operational safety regulations

Protective goggles must be worn during use.
Before starting the booster pump, it is necessary to check the valves, pipelines, and other related equipment components for accuracy, and observe the surrounding environment for potential hazards before starting.
Check if the driving air pressure is within the rated pressure range of the equipment.
Ensure that the drive air source is cut off and the pressure of the drive and high-pressure cylinder is completely drained before installing/disassembling the booster pump.
This device can only be operated with necessary protective measures in a safe working environment.

Safety regulations for pressure pipelines and pressure vessels

According to relevant safety regulations for pressure pipelines, pressure pipelines should be inspected at least once every six months by professionals.
Before use, it is necessary to check whether the hose is damaged, such as bulges, tears, cuts, wear, detachment, aging, etc. In addition, it is also necessary to check whether it is deformed under no-load and load conditions. Once discovered, the system pressure should be unloaded first, and then repaired by professional personnel.
Before checking the pipeline, first confirm that the pipeline connection is normal and there are no safety hazards.
In addition, current regulations related to pneumatic, hydraulic, hydraulic pipelines, and pressure vessels should also be followed.
It is necessary to comply with current regulations on safety, noise, environmental protection, and accident prevention.

Maintenance and safety standards

Maintenance and inspection personnel must master the necessary safety guidelines before carrying out maintenance and repair work on the pump.
In order to ensure the normal production and operation of the booster pump, please regularly (no more than six months) inspect, maintain and upkeep the booster pump.
Maintenance or repair work is only allowed to be carried out by trained professionals.
Maintenance and repair work can only be carried out after confirming safety: Any movement that poses
A danger must be returned to a stationary state.
B Avoid incorrect or non compliant startup.
C Avoid the potential dangers caused by excessive energy accumulation

02 Requirements for the use of air liquid pump

Installation requirements for booster pump

Drive pressure range	1 bar ≤ driving air pressure ≤ 8.3 bar
Work environment requirements	Require dust-free (maximum allowable particle size of 40 μ m, non corrosive, ambient temperature 0-60 ℃)
Drive gas access	When the drive air interface is marked (with a note on the installation size of the port thread) and the drive air is connected, a filter device with a filtration accuracy of ≤ 40um needs to be configured. The drive air is equipped with an oil mist device, and it is recommended to add VG32 turbine oil to the oil mist device. For low-temperature environments, please add low-temperature resistant lubricating oil. (Note: This product is oil free lubrication, but if lubricating oil is added, it needs to be added regularly to ensure that the volume of lubricating oil is 1/4 of the volume of the oil cup.)

Requirements for driving gas source Classification standard: ISO8573-1

solid particle		Pressure dew point		maximum oil content	
classification	μ m	classification	℃	classification	kg/m³
6	≤5	4	+3	2	≤0.1

Media type	The boosting medium can be hydraulic oil, pure water, liquid CO2, etc. Conventional boosting pump media should not be corrosive, oxidizing, flammable and explosive liquids, such as nitrate.
Low pressure medium access	When marked with IN interface (note the form of threaded interface), connect the pressurized medium, and the minimum cleanliness requirement for the medium is NAS1638-10 level. A filter must be configured with filtering accuracy that meets relevant requirements.The recycled medium requires regular inspection or replacement of the filter element.

Minimum requirements for cleanliness of low-pressure media (NAS1638 standard)

Classification	Maximum number of solid particles in each size range per 100ml of liquid				
	15	25	35	70	100μm or above
10	256000	456000	8100	1440	256

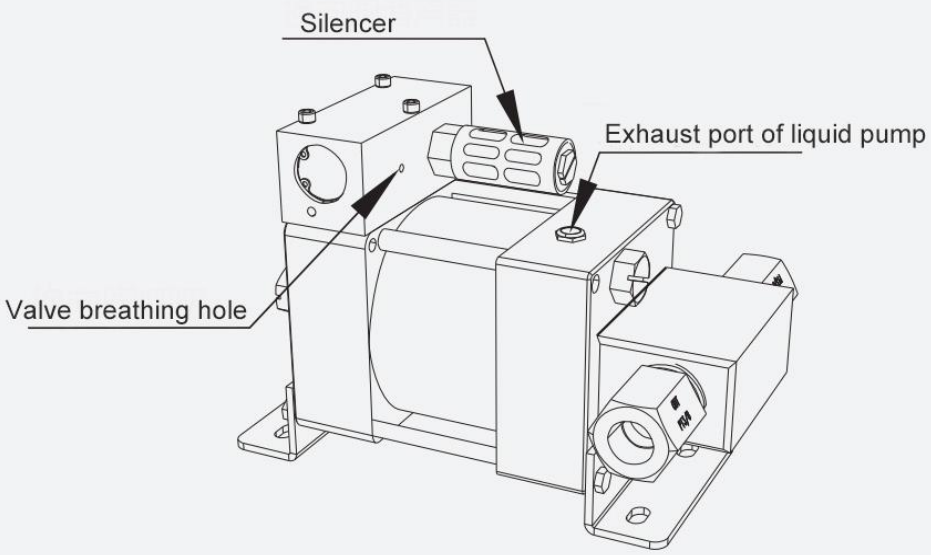
Recommended filtration accuracy for low-pressure media

Liquid pressurization system (Pressure/Mpa	Recommended filtering accuracy/μm)				
0-2.5Mpa	2.5-7	7-14	14-35	35-100	100 or above
100-150μm	25-50	15-25	10-15	5-10	<5

Temperature requirements	The temperature of the driving gas and cylinder during operation of a conventional booster pump is -20~80 ℃. If it exceeds this range, it must be shut down. High temperature resistant products shall be executed according to the specified temperature.
Pipeline requirements	According to the output pressure of the pump, a pipeline that can withstand the maximum output pressure of the pump must be selected.
Fixed method	Each air liquid pump is equipped with two L-shaped bracket, which are installed according to the size of the openings on the bracket.
Start	1. Ensure that the air liquid pump is securely fixed. 2. Ensure that all interfaces are sealed and connected. 3. Adjust the pressure reducing valve to adjust the air pressure to 0 psi. 4. Turn on the intake switch and slowly increase the pressure until the pump starts (the normal starting pressure is 15-20psi). Continue adjusting and observing the high-pressure gauge until the desired pressure is reached.

03 Faulty description

The air liquid pump may have some malfunctions:



To reduce noise, the exhaust holes of the directional valve of the gas-liquid booster pump are all connected to mufflers. When the booster pump is working normally, it is a normal phenomenon for the directional valve exhaust holes to exhaust;

Fault Type	Fault cause analysis	Fault handling methods
Fault 1. The booster pump is not working	A. First, check if the driving air source is normal;	A. Simply turn on the drive air source switch;
	B. The muffler or exhaust hole of the directional valve leaks, check whether the sealing of the directional valve is ineffective or stuck;	B. It is necessary to remove the reversing valve core, replace the O-ring, or re lubricate the valve core;
	C. The muffler or exhaust hole of the directional valve leaks air, and the connection between the driving piston/high-pressure piston fails;	C1. Need to disassemble the drive cylinder and reinstall the drive piston; C2.Need to disassemble the high-pressure cylinder and reinstall the high-pressure piston;
Fault 2. Slow action of booster pump piston	A. Check if the flow rate of the driving air source is too low or the pressure is too low;	A.Check the diameter of the driving gas source and adjust the pressure of the driving gas source to the required flow rate;
	B.Check if the internal lubrication of the booster pump has failed;	B. Need to check the product parts and re lubricate them effectively;
	C. Check for damage to the high-pressure pressure bearing components of the booster pump;	C. It is necessary to inspect the high-voltage components and replace the damaged parts before reassembling them;

03 Faulty description

Fault Type	Fault cause analysis	Fault handling methods
Fault 3: The operating frequency of the air liquid pump is too fast	A. Leakage of the firing pin causes continuous exhaust from the exhaust hole of the valve block;	A. Disassemble the firing pin assembly and check if the sealing ring, spring, and firing pin are normal. If they are defective, please replace them;
	B. The breathing hole of the directional valve continues to leak, which may indicate wear on the sealing ring of the directional valve;	B. Disassemble the reversing valve core, check the sealing components of the valve core, and replace them if they are worn;
Fault 4. The liquid booster pump operates normally, but the outlet pressure is abnormal	A. Check if the pressure of the driving air source is too low,(Drive gas source pressure * Boost ratio=High pressure output pressure);	A. Adjust the pressure of the driving air source to the rated pressure of the product;
	B. The booster pump operates normally, but the medium cannot be pressurized (due to impurities entering the check valve or seal failure);	B. Open the check valve and check if there are impurities in the valve body, if the valve core is deformed, and if the seal is worn. If so, replace the relevant accessories;
	C. Check whether there is air leakage in the detection hole of the booster pump, wear of the high-pressure seal, or damage to the high-pressure pressure bearing components;	C. Inspect high-pressure components, replace seals and damaged parts;
Fault 5. The liquid booster pump operates normally, but unable to maintain pressure normally or pressure gauge drops	A. When the pressure drops during holding, check if the outlet check valve is malfunctioning;	A. Check the check valve components, clean out any debris, and reassemble the check valve;
	B. Check if there is any leakage in the high-pressure outlet pipeline or valve;	B. Just eliminate the leakage point;

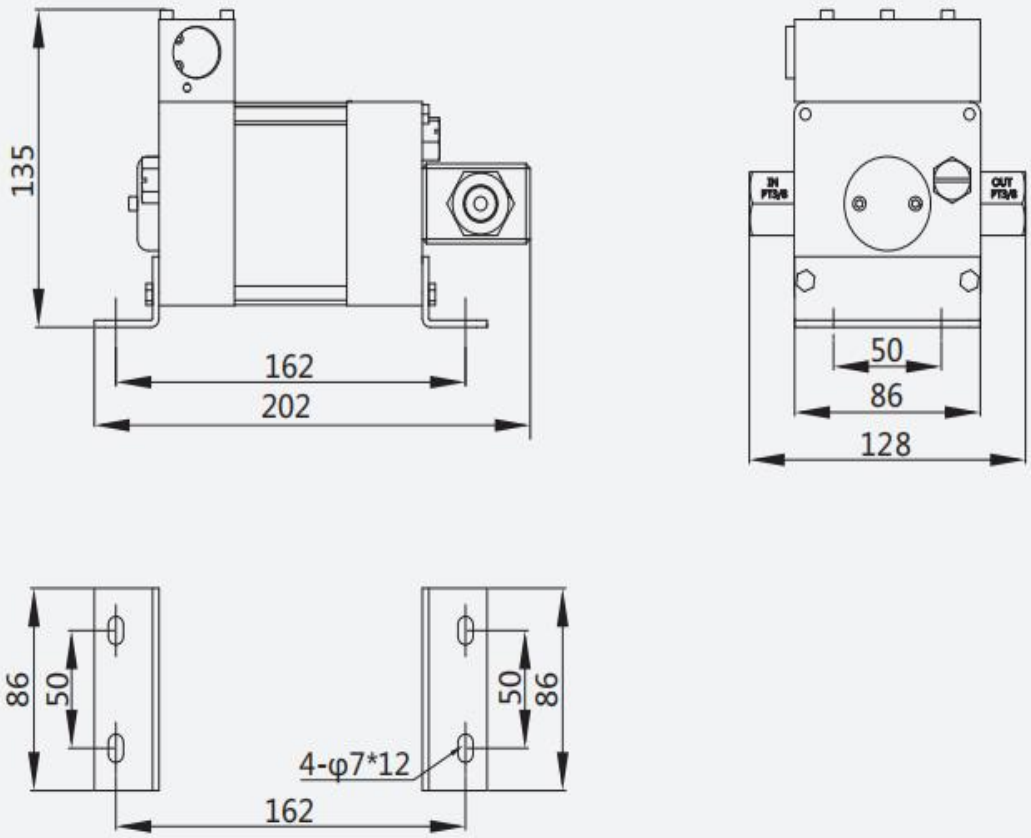
Based on the above faults, find the corresponding parts on the following repair page for repair, but:

Caution

1. It must be in a clean and tidy environment to ensure that no foreign objects enter the pump body.
2. Use tools correctly during disassembly and assembly to avoid secondary damage.
3. Unable to identify the fault point, blind disassembly is not allowed.
4. When disassembling sealed interfaces, please pay attention to the sealing form, which may include gasket sealing, and be careful to store it.
5. The driving air source must be cut off and the output pressure must be completely unloaded before any spare parts can be repaired, disassembled, or assembled, otherwise serious consequences may occur!
6. In the assembly testing process, the following steps should be followed: drive gas - after normal operation - connect the pre pressurized gas - slowly increase the pressure - after increasing the pressure to the rated pressure, maintain and supplement the pressure.
7. It is not allowed to modify the product system without authorization, otherwise all losses caused shall be borne by the user.

04 Dimensions and main parameters of air liquid pump

Dimensional drawing of air liquid pump (unit: mm)



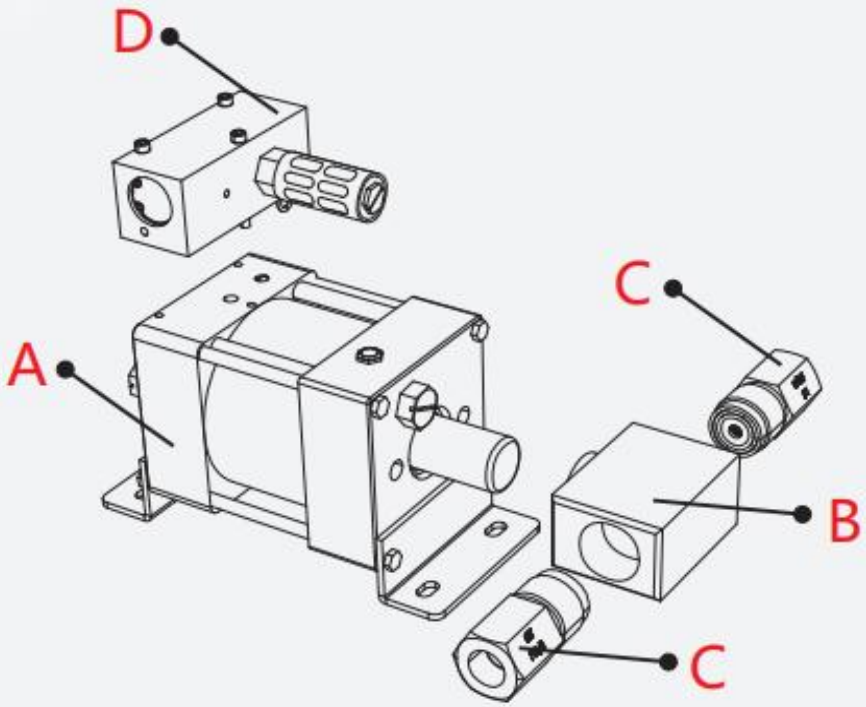
Main technical parameters of the product

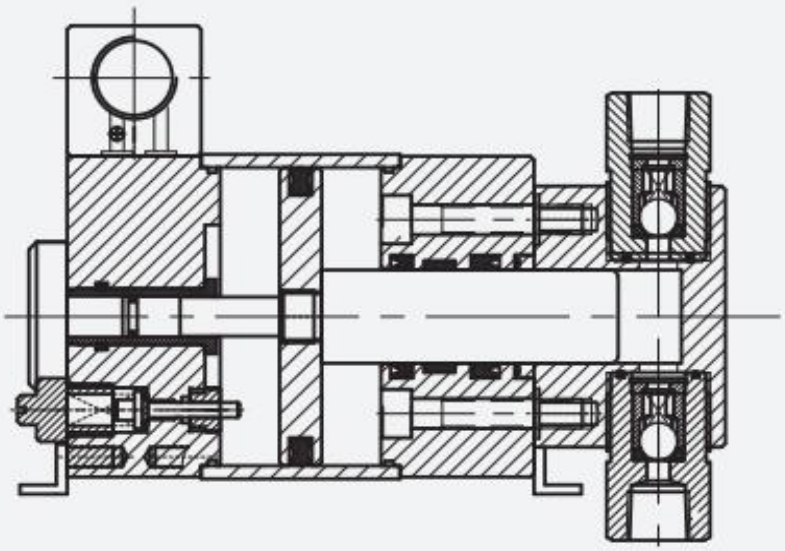
1. Maximum output pressure: 8.3MPa, working pressure: 7MPa
2. Boost ratio: 10:1
3. Working medium: Liquid or Oil or CO2
4. Drive medium: Compressed air
5. The pressure range for driving the intake port is 0.1-0.83MPa (for the sake of product lifespan, it is recommended to drive the intake port pressure to ≤ 0.7MPa)
6. Maximum air consumption based on 0.7MPa driving air pressure: 0.6m³/min

7 Low pressure inlet size: NPT3/8" female

8. High pressure outlet size: NPT3/8" female
9. Drive air connector size: PT3/8 "female

05 Disassemble the air liquid pump

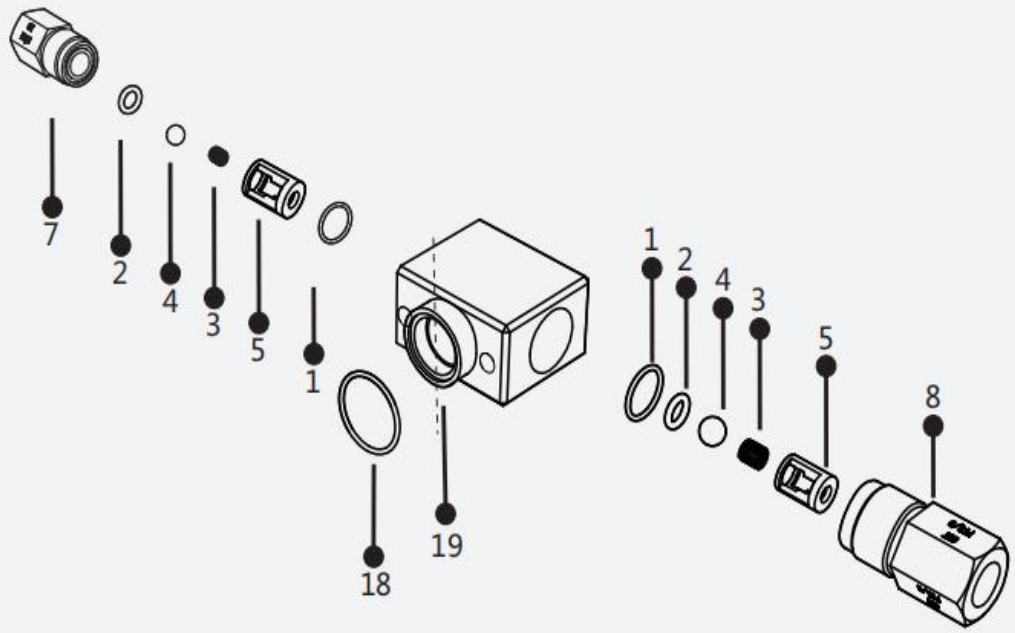




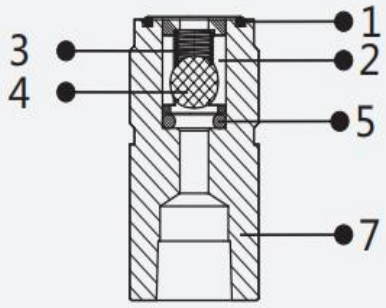
M10-CO2 Main assembly components			
Part Code	Part name	Unit	Quantity
A	Low pressure air driven assembly components	set	1
B	High pressure components	Set	1
C	Inlet and outlet check valve assembly parts	Set	1
D	Air cycling valve assembly parts	Set	1

Disassemble steps should be follow by A-B-C-D

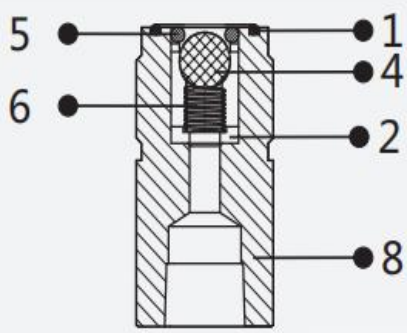
06 Check valve component



Inlet check valve



outlet check valve

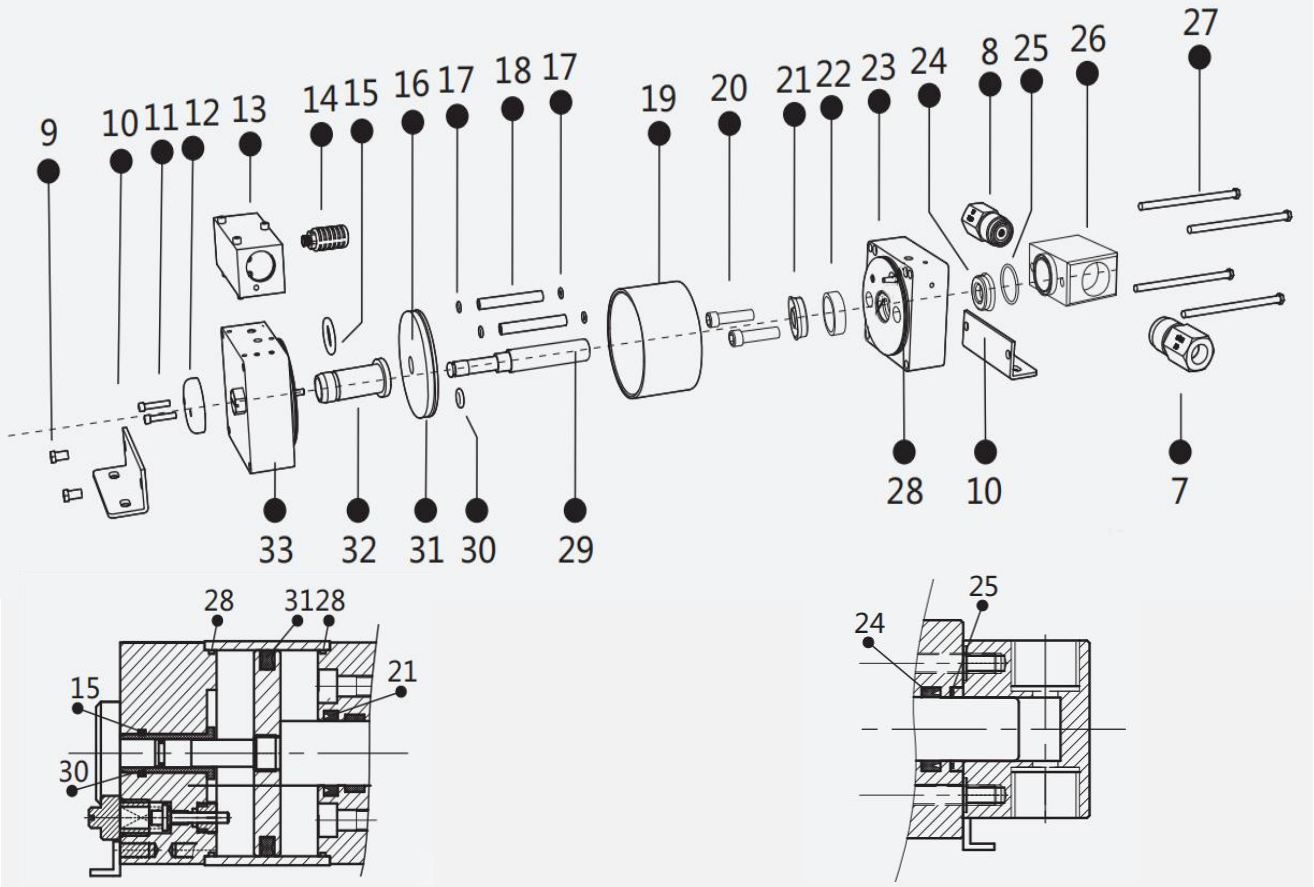


1. If it is preliminarily judged that the check valve of the booster pump is faulty, the check valve needs to be repaired. For specific fault manifestations, please refer to pages 3 and 4 for fault analysis;
2. In a clean and tidy environment, disassemble the inlet and outlet check valves;
3. Check whether there are burrs or other impurities blocking the one-way valve channel and components, causing the check valve to malfunction. Check whether there is any damage to the components inside the check valve assembly. If there is any damage, replace the parts in a timely manner. Carefully check whether the check valve seals (1) and (5) are damaged, aged, or other factors that may cause the check valve to malfunction. If so, replace the parts and assemble the check valve assembly according to the diagram.

Spare parts list

Item NO	Serial code	Item name	Unit	QTY	Remark
1	OXQ18*1.8-90°	O ring seals	PC	2	*Wearing parts
2	VS2703-001	3/8"Check valve core	PC	2	
3	YSTHD7.6	Compression spring	PC	1	*Wearing parts
4	304GQ10	Steel ball	PC	2	
5	OXQ8*2.65-90°-H	O ring seals	PC	2	*Wearing parts
6	YSTHD8	Compression spring	PC	1	*Wearing parts
7	VB2703-PT	3/8" Inlet check Valve body	PC	1	
8	VB2703-PT	3/8" Outlet check Valve body	PC	1	

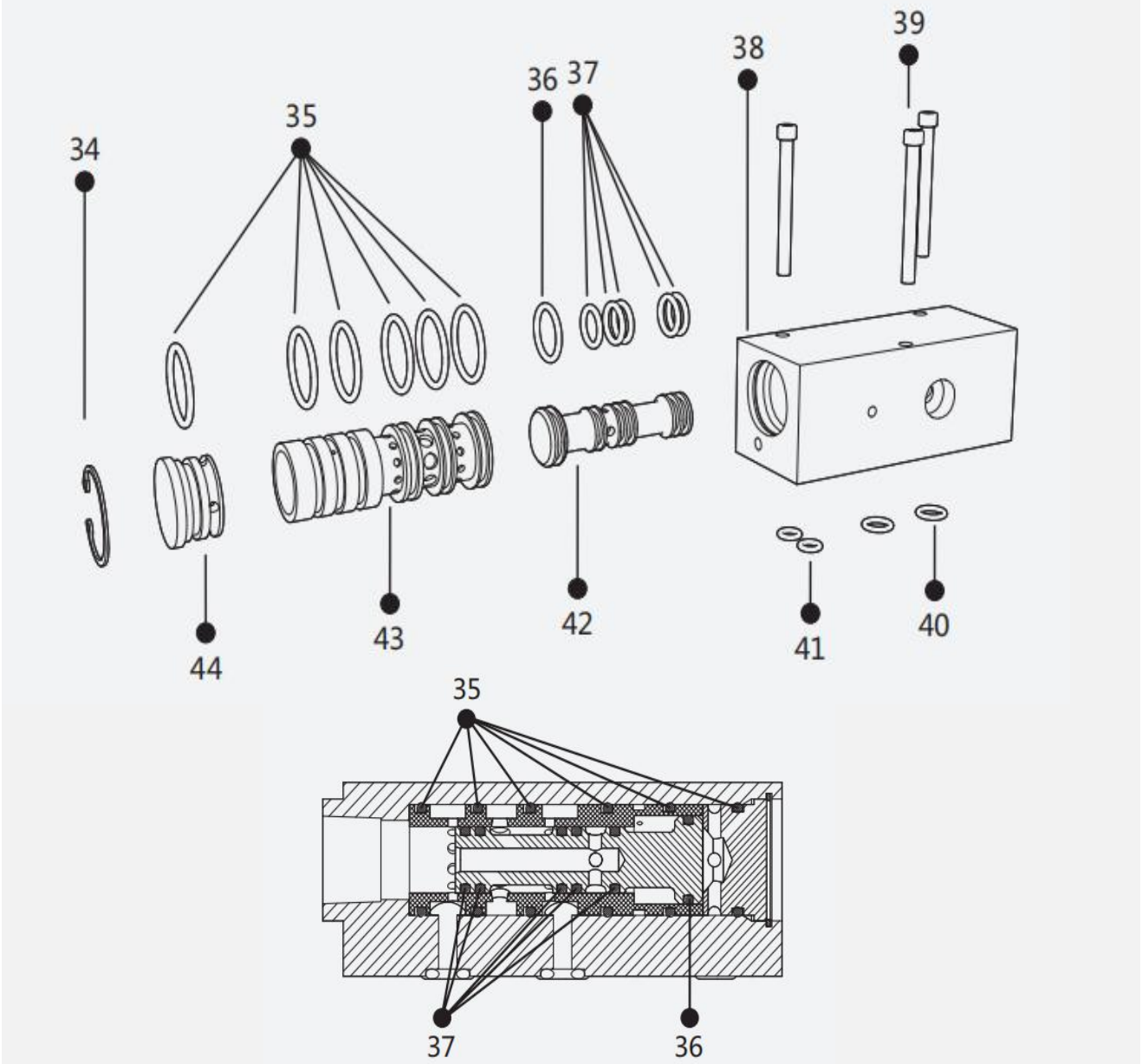
07 Air Drive assembly



Air drive Spare parts list

Item NO	Serial code	Item name	Unit	QTY	Remark
9	WLJ6*10(304)	Outer hexagon bolt	PC	2	
10	HL080-001	L-shaped bracket	PC	2	
11	NLJ4*15	Inter hexagonal bolt	PC	2	
12	VF040030-002	M series windproof cover	PC	1	
13	VA020090-M	Directional valve component-	PC	1	
14	XYQ1/4-V-HB	Silencer	PC	1	
15	OXQ13.2*2.65	O ring seals	PC	1	*Wearing parts
16	PT080012-001	M-series drive piston	PC	1	
17	OXQ4.5*1.8	O ring seals	PC	4	*Wearing parts
18	G0009	M series metal air tube	PC	2	
19	AL080052-001	M series drive cylinder	PC	1	
20	NLJ8*45	Hex socket head bolt	PC	2	
21	ZF25*33*6	Shaft seal	PC	1	
22	NT033005-001	Screw nuts	PC	1	
23	CI080100-001	Middle cover	PC	1	
24	GYFH605-25*33*6.8/75	High pressure seal	PC	1	
25	OXQ26.5*1.8	O ring seals	PC	1	*Wearing parts
26	AH070055-001	High pressure cylinder body	PC	1	
27	WLJ6*100(304)	Outer hexagon bolt	PC	4	
28	OXQ76.5*1.8	O ring seals	PC	2	*Wearing parts
29	PR025129-001	Piston rod	PC	1	
30	OXQ8*1.8	O ring seals	PC	1	*Wearing parts
31	HSFAPA80	Piston seal	PC	1	
32	VF020011-001	Guide Sleeve	PC	1	
33	CB080100-001	Directional valve plate	PC	1	

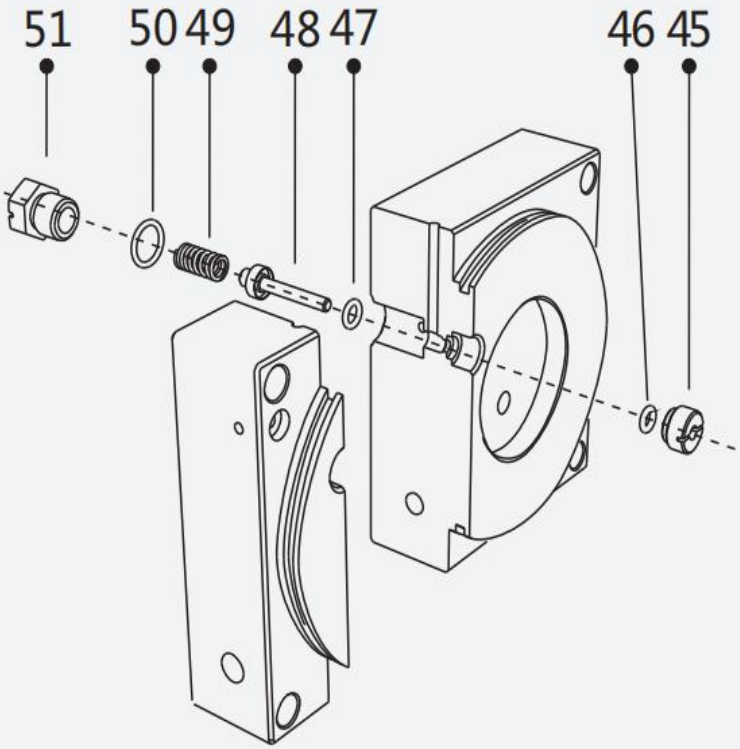
08 Directional valve with HK components

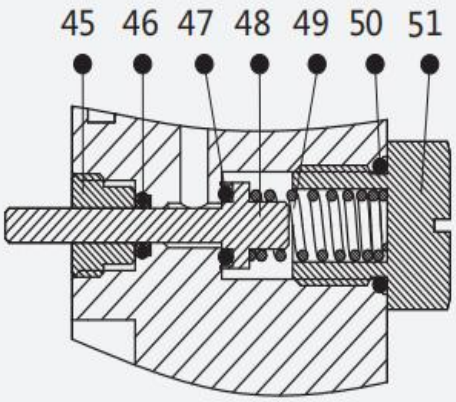


Directional valve Spare parts list

Item NO	Serial code	Item name	Unit	QTY	Remark
34	KY22-MG	Circlip for holes	PC	1	
35	OXQ17*1.8	O ring seals	PC	6	*Wearing parts
36	OXQ12.7*1.7	O ring seals	PC	1	*Wearing parts
37	OXQ8.7*1.8	O ring seals	PC	5	*Wearing parts
38	VB020090-M	MV valve body	PC	1	
39	WLJ4*45(304)	Outer hexagon bolt	PC	3	
40	OXQ6.9*1.8	O ring seals	PC	2	*Wearing parts
41	OXQ4.5*1.8	O ring seals	PC	2	*Wearing parts
42	VS020090-001	3/8"Directional valve core	PC	1	
43	VE020090-001	3/8"Directional valve sleeve with HK	PC	1	
44	VC020090-M	MV valve cover	PC	1	

09 Pilot pins assembly





Pilot pins sectional view

Pilot pins Spare parts list

Item NO	Serial code	Item name	Unit	QTY	Remark
45	FP1000-003	Pilot pins sleeve	PC	2	
46	OXQ4.0*1.8	O rings	PC	2	*Wearing parts
47	OXQ5.6*1.8-90°	O rings	PC	2	*Wearing parts
48	FP1000-002	Pilot pins	PC	2	*Wearing parts
49	YSTHD7	spring	PC	2	*Wearing parts
50	OXQ11*1.8	O rings	PC	2	
51	FP1000-004	Pilot pins nut	PC	2	

1. If it is preliminarily judged that there is a fault in the charging pump needle component, please refer to pages 3 and 4 for specific fault manifestations;
2. First, use an open-end wrench/screwdriver to unscrew part (51), and then use pointed nose pliers to clip out part (48);Check if there are any impurities affecting the sealing of part (47). If so, replace the firing pin and seal or clean the impurities. If normal, apply a small amount of lubricating grease to the firing pin and install the firing pin assembly as shown in the diagram;

10 Regarding Warranty

Warranty

1. The accessories included in the booster pump are covered by a one-year warranty from the date of shipment, and vulnerable parts, seals, and guide components are exempt from warranty.The warranty period does not apply to product damage, malfunctions, and defects caused by external factors.(External factors include accidents, misuse, mistranslation, improper use and installation of products, failure to perform necessary preventive maintenance, normal wear and tear, natural disasters, fires, floods, wars, violent acts, or any similar events.)

2.Damage beyond the rated working pressure is not covered by the warranty.

If you are unable to repair it, please feel free to mail the faulty machine to our company. After receiving the faulty machine, we will send you a quotation. After your confirmation, we will repair it as soon as possible and mail it to you.

Friendly reminder

Spare parts list

Item NO	Accessory code	Accessory name/specification	Unit	QTY	Remark
39	0XQ92.5*5.3	O Ring seals /ID 92.5*5.3	PCS	2	NBR material

If you need to mail parts, please provide the accessory code and accessory name;

Transportation and Storage

1. The USUN booster pump is a precision mechanical equipment that must be properly fixed during transportation. It is strictly prohibited to tilt and should be handled with care. It is also strictly prohibited to collide with it.
2. During storage, attention must be paid to moisture prevention, rust prevention, dust prevention, etc. It is not allowed to tilt or stack other products.
3. During transportation and storage, the inlet and outlet of each pipeline must be sealed, and fixed particles such as dust are strictly prohibited from entering the pipeline.