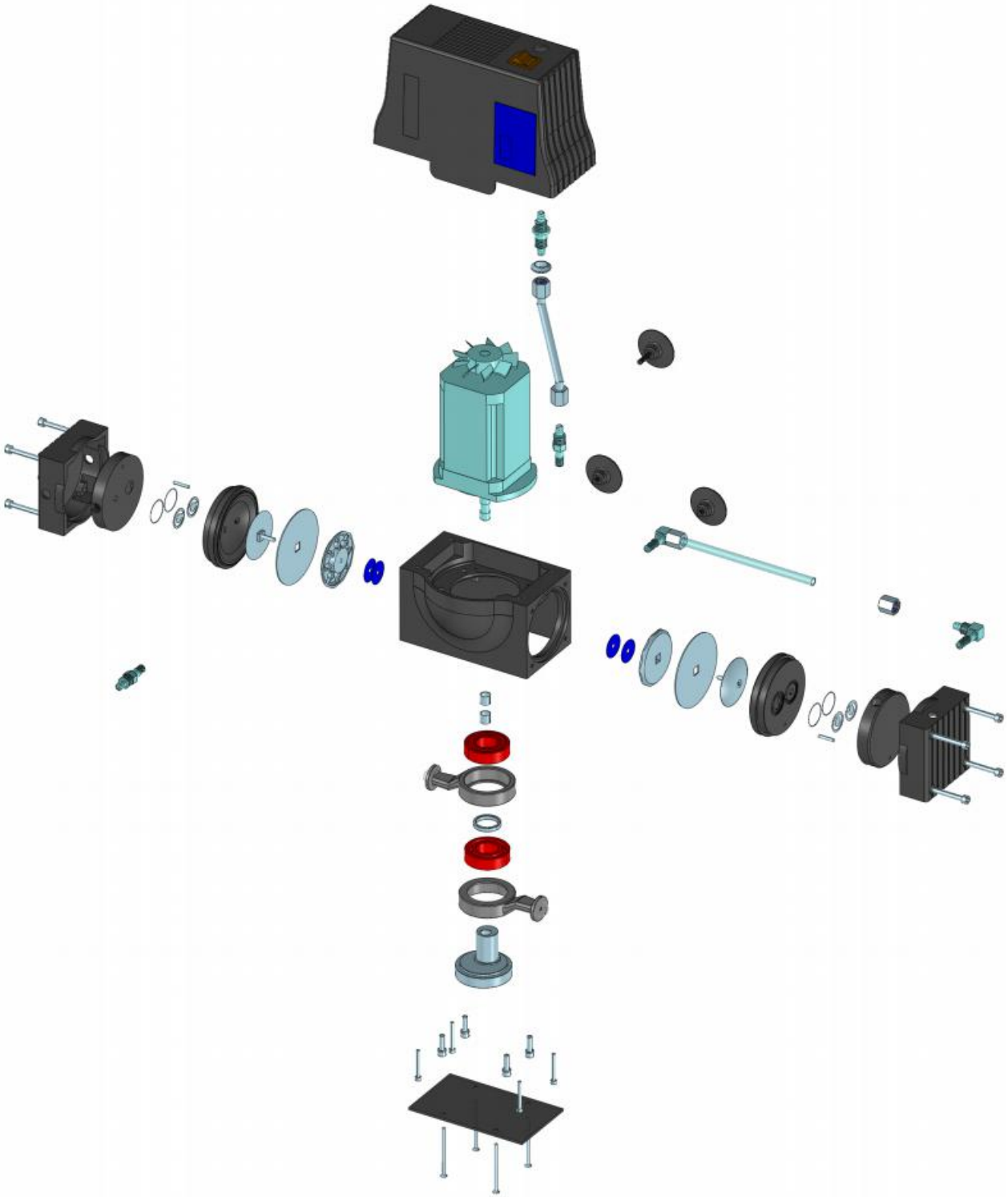
TSVP®

TSVP® Diaphragm Pump

Operating Instructions

www.vacuumpumpts.com

LINHAI TAN'S VACUUM EQUIPMENT CO., LTD



EN  Safety instructions for vacuum equipment

Attention: This manual is not available in all languages . The user must not operate the device if he does not understand this manual. In this case a technically correct translation of the complete manual has to be available. The manual must be completely read and understood before operation of the device and all required measures must be applied.

CN  真空设备的安全信息

注意：该操作手册不提供所有的语言版本。操作者在没有理解手册之前，不能操作该设备。在这种情况下，需要有一个整个操作手册技术上正确的翻译。在操作该设备前，必须完全阅读并理解该操作手册，必须实施所有需要的测量。

DE  Sicherheitshinweise für Vakuumgeräte

Achtung: Die vorliegende Betriebsanleitung ist nicht in alien EU-Sprachen verfügbar.Der Anwender darf die beschriebenen Geräte nur dann in Betrieb nehmen, wenn er die vorliegende Anleitung versteht oder eine fachlich korrekte Übersetzung der voll-ständigen Anleitung vorliegen hat. Die Betriebsanleitung muss vor Inbetriebnahme der Geräte vollständig gelesen und verstanden werden, und alle geforderten Mali-nahmen müssen eingehalten werden.

IT  Istruzioni di sicurezza per apparecchi à vuoto

Attenzione: Questo manuale non è disponibile in tutte le lingue della Comunità Eu-ropea (CE).L’utilizzatore non deve operare con lo strumento se non comprende questo manuale. In questo caso deve essere resa disponibile una traduzione tec-nicamente corretta del manuale completo. II manuale deve essere completamente letto e compreso prima di operare con lo strumento e devono essere applicati tutti gli accorgimenti richiesti.

FR  Avis de sécurité pour des dispositifs à vide

Attention: Le mode d'emploi présent n'est pas disponible dans toutes les langues d'Union Européenne. L’utilisateur ne doit mettre le dispositif en marche que s'il comprend le mode d'emploi présent ou si une traduction complète et correcte du mode d'emploi est sous ses yeux. Le dispositif ne doit pas être mis en marche avant que le mode d'emploi ait été lu et compris complètement et seulement si le mode d'emploi est observé et tous les mesures demandées sont prises.

Source language: Chinese

EN

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REMARK

Thanks for reading!

In order to get the optimum condition and safe operation,please read this manual carefully before installation.

Only operate **TSVP® VACUUM PUMP** in a proper way according to operating manual can ensure the safety and efficient operation of the pump.**TSVP® VACUUM PUMP** can only be operated under the proper condition or the described environment as this manual shows. The product can only be operated by the skilled technician.
About some special requirement and rules, please check with your local related department.
About the operation and maintenance, please check with our sales department or our local distributors if have.

TSVP® VACUUM PUMP is not suit for:

- Contains dust, active,flammable explosive gas
- Oxygen concentrations higher than 21%
- Under the flammable explosive condition

We reserve the right to modify the design and specified data including operating manual without notice.

Correct use

■ **Use**

Together with the accessories recommended by **TSVP®**, the device is suitable for:

- Evacuation of gas from a lab device,

e.g. a rotary evaporator.

Mode of operation: Tabletop device.

■ **Range of use (indoor use only)**

- Laboratories - Schools
- Pharmacies - Universities

This equipment is suitable for use in all areas except:

- Residential areas
- Areas that are connected directly to a low-voltage supply network that also supplies residential areas.

The safety of the user cannot be guaranteed:

- If the instrument is operated with accessories that are not supplied or recommended by the manufacturer
- If the instrument is operated improperly contrary to the manufacturer's specifications
- If the instrument or the printed circuit board are modified by third parties.

Unpacking

■ **Unpacking**

- Please unpack the device carefully
- In the case of any damage a detailed report must be sent immediately (post, rail or forwarder)

■ **Delivery scope**

- **TSVP®**
- Operating instructions.

Useful information

Diaphragm vacuum pumps (also called membrane pumps) are oscillating positive displacement pumps. The diaphragms generate vacuum by expanding the volume in the vacuum chamber which in turn reduces the pressure in the vacuum chamber thus causing atmospheric pressure air to be pushed into the chamber. The air in this chamber is then pushed out from the vacuum chamber through a different route (gas outlet) with the use of valves. These periodic movements of the diaphragm generates vacuum at the in¬let of the pump. Attention have to be paid when working with gas mixtures containing condensable gases, e.g. water vapour or solvents.

Use of TSVP® with these gases will result in their condensing somewhere in the air flow of the pump. This causes pressure build up in the vacuum chamber which in turn reduces the service life of the diaphragms and valves.

To prevent condensation or to discharge condensates produced by the pump, the gas ballast valve should be opened. By opening the gas ballast valve, a small amount of air is allowed into the vacuum chamber, reducing the concentration of the condensable gas. Purging of condensation can also be done by allowing full gas flow at atmospheric pres¬sure through the pump for several minutes.

To protect the internal valves and diaphragms, fit an up¬stream condensation trap (such as a Woulff bottle). The release of solvent vapors into the atmosphere can be avoided by fitting a downstream discharge condensation trap.

The exhaust air hose should generally deliver to a laboratory extraction system.
Fitting an exhaust air hose will also reduce the noise level.

Technical data

Model	DVP2	DVP4	DVP2D	DVP4D	DVP8	DVP16
Pumping Speed (m^3/h)	2	4	2 or 4	4 or 8	8	16
Ultimate Pressure (mbar)	≤8	≤2	≤2 or ≤8	≤1.5 or ≤2	≤30	≤150
Frequency Conversion	Adjustable between 1400~1800		Rated at 1400			
Safety Function	Motor Anomaly Detection					
Pumping Head	1	1	1 or 2	1 or 2	1	1
Power Supply (w)	180	360	360	400	400	400
Inlet Connector	10mm/KF16	10mm/KF16	10mm/KF16	10mm/KF16	KF16	KF16
Dimensions (cm)	268*242*150	385*242*170	280*270*170	502*252*252	375*200*310	375*200*310
Weight (kg)	10	17	16	25	20	20

Materials In Contact With Medium

Components	**Wetted parts**
Displacing Valve	FFKM
Diaphragm	"Sandwich Configuration" PTFE
Inlet/outlet	PTFE
Fittings	PTFE、PVDF
Inlet plate	Carbon Fiber Reinforced ECTFE
Cavity/Diaphragm Clamping Disc	HAIII and Teflon

Remarks:the D means double cavity with single side

Subject to technical changes!

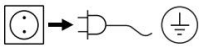
Setting Up

- Connect vacuum hose from inlet nozzle to recipient. Plug in power socket to mains and flip rocker switch.
- Observe the ambient conditions (temperature, humidity etc) listed under technical data.

Maintenance and cleaning

The equipment is maintenance-free. It is only subject to the natural wear and tear of components and their statistical failure rate.

Cleaning



Disconnect main plug prior to cleaning!

Use only cleaning agents which have been approved by **TSVP®** to clean the instrument.

Dirt	**Cleaning agent**
Dye	sopropyl alcohol
Construction material	water containing tenside /isopropyl alcohol
Cosmetics	water containing tenside /isopropyl alcohol
Foodstuffs	water containing tenside
Fuel	water containing tenside

For materials which are not listed, please request information from **TSVP®**.

- Wear protective gloves during cleaning the instrument.
- Electrical devices may not be placed in the cleansing agent for the purpose of cleaning.
- Do not allow moisture to get into the equipment when cleaning.

Before performing a non-recommended method of cleaning or decontamination, the user must ascertain with **TSVP®** that this method will not destroy the instrument.

Maintenance

- Remove the top cover
- Examine hoses visually for cracks. If cracks have developed or the hose becomes brittle, replace with suitable new one

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Using the gas ballast valve

- Ensure that when the gas ballast valve is open, the air/gas that enters through the gas ballast valve doesn't come in contact with any hazardous, explosive or otherwise dangerous mixtures that the vacuum pump is pumping at its inlet.
- Venting the receptacles or the vacuum pump using ambient air may under some circumstances create a risk of serious damage to the equipment and/or surrounding installations and a risk to personnel of serious injury or even death, due to the formation of hazardous and/or explosive mixtures if a reaction between the air and the medium that is being pumped occurs either within the pump or at its outlet

For pumping condensable vapours (water vapour, solvents, etc.):

- Let pump run with gas ballast valve closed until pump reaches its operating temperature.
- Open gas ballast valve.
- Gas ballast valve is open when the notch on the cap is aligned with the notch on the nozzle (Gas ballast valve can be closed by rotating cap at least 90°).
- When gas ballast valve is opened, ultimate vacuum will be reduced and pumping speed will decrease.
- Use inert gas at air inlet to avoid formation of explosive mixtures.

Spare parts order

When ordering spare parts, please give:

- Machine type
- Serial number, see type plate
- Item and designation of the spare part

Repair

Please send equipment for repair only after it has been cleaned and is free from any materials which may constitute a health hazard.

For this you should request the "Decontamination Clearance Certificate" from **TSVP®**.

Return the equipment in its original packaging.
If the original packaging is not available, please use suitable shipping package materials.

Warranty

✧ In accordance with **TSVP®** warranty conditions, the warranty period is 24 months.

✧ For claims under the warranty please contact your local dealer. You may also send the machine direct to our factory, enclosing the delivery invoice and giving reasons for the claim. You will be liable for freight costs.

✧ The warranty does not cover worn out parts, nor does it apply to faults resulting from improper use, insufficient care or maintenance not carried out in accordance with the instructions in this operating manual.

Troubleshooting

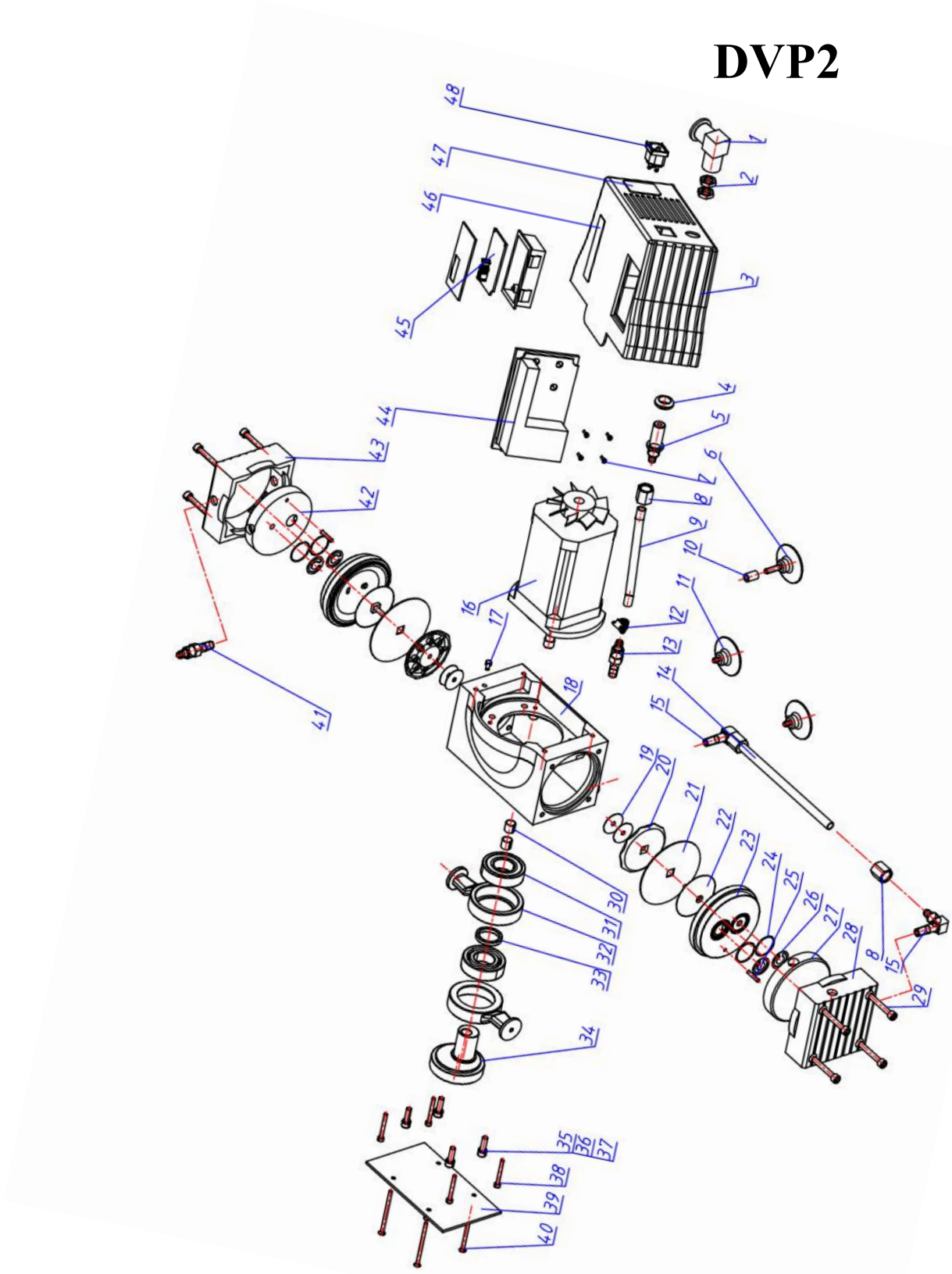
Problem	Cause	Correction
Pump stopped and cannot be switched on again.	Thermal cutout activated due to motor over-temperature.	➢ Manual reset is necessary. Switch off device or isolate the equipment from mains. Wait approx. five minutes before restarting the device. ➢ Ensure pump fan is working and pump is placed in an area with an ambient temp of less than or equal to 40°C
Ultimate vacuum cannot be reached.	Fittings or hose connection have leakage.	➢ PTFE thread seal tape at thread if necessary. Check hose connection for any cracks. Follow instructions for "disassembling top cover" under "Maintenance and Cleaning" section to check inner hoses for leaks.
	Valves are not seated properly, incorrect orientation or damaged.	➢ Contact **TSVP®** service department.
	Diaphragm not seated in bore properly or damaged.	➢ Contact **TSVP®** service department
	Incorrect washer configuration assembled during replacement of diaphragm	➢ Contact **TSVP®** service department
	Liquid or solid parts inside the pump chamber	➢ Use gas ballast valve to purge system of condensates. Remove the vacuum hose to the gas inlet and open the gas ballast valve. Turn the pump on and run it at idle. ➢ If problem persists, contact **TSVP®** service department.
Knocking noise during pump operation.	Incorrect washer configuration assembled during replacement of diaphragm	➢ Contact **TSVP®** service department

If the actions described fails to resolve the fault or another error code is displayed then take one of the following steps:

- Contact **TSVP®** service department
- Send the instrument for repair, including ***a short description of the fault***.

Assembly Drawing

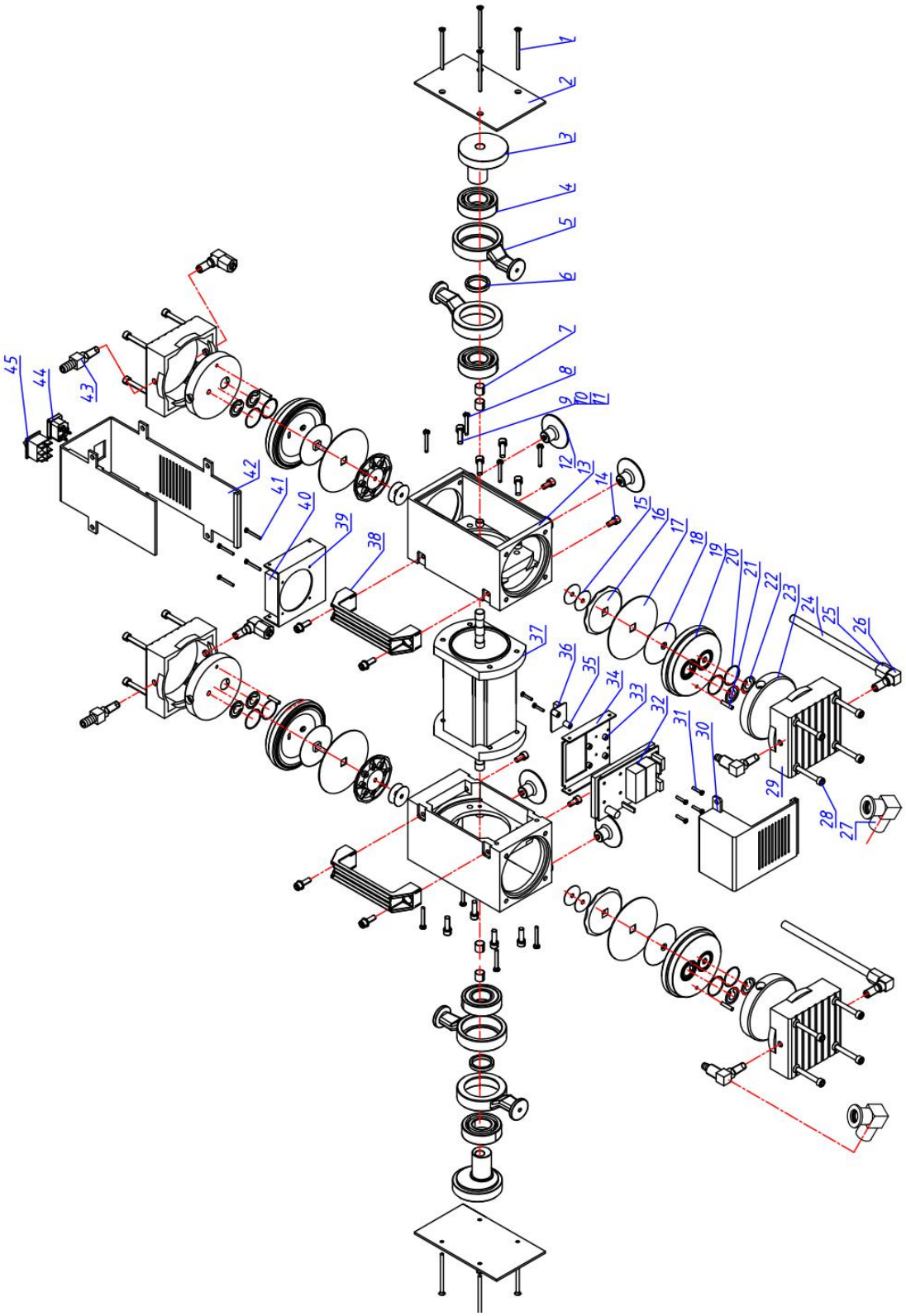
DVP2



NO.	ITEM	QTY
1	silencer	1
3	back cover	1
5	outlet Connector	1
7	screw M2.6 x 12	4
9	connectorΦ10 x 1，L=145	1
11	sucker M6 x 23	2
13	inlet connector	1
15	connector	2
17	screwM4 x 5	1
19	adjusting Washer	2
21	diaphragm	2
23	chamber	2
25	round pinΦ4 x 25	2
27	outlet disc	1
29	screw M6 x 40	8
31	bearing	2
33	spacer	1
35	washer	4
37	screw M6 x 25	4
39	cover	1
41	iInter joint	1
43	cover	1
45	governor plate	1
47	nameplate	1

NO.	ITEM	QTY
2	nut M14 x 1.5	2
4	protective ring	1
6	sucker M6 x38	1
8	nut M14 x 1.5	3
10	cushion cover	1
12	clamp Φ11.3	1
14	inlet Φ10 x1，L=185	1
16	motor	1
18	cover	1
20	support disc	2
22	clamping disc	2
24	sealing ring	2
26	valve	4
28	tank cap	1
30	tightening set	2
32	swing arm	2
34	eccentric bushing	1
36	washer	4
38	screw	4
40	screw M6 x 65	4
42	inlet plate	1
44	controller	1
46	label	1
48	power	1

DVP2D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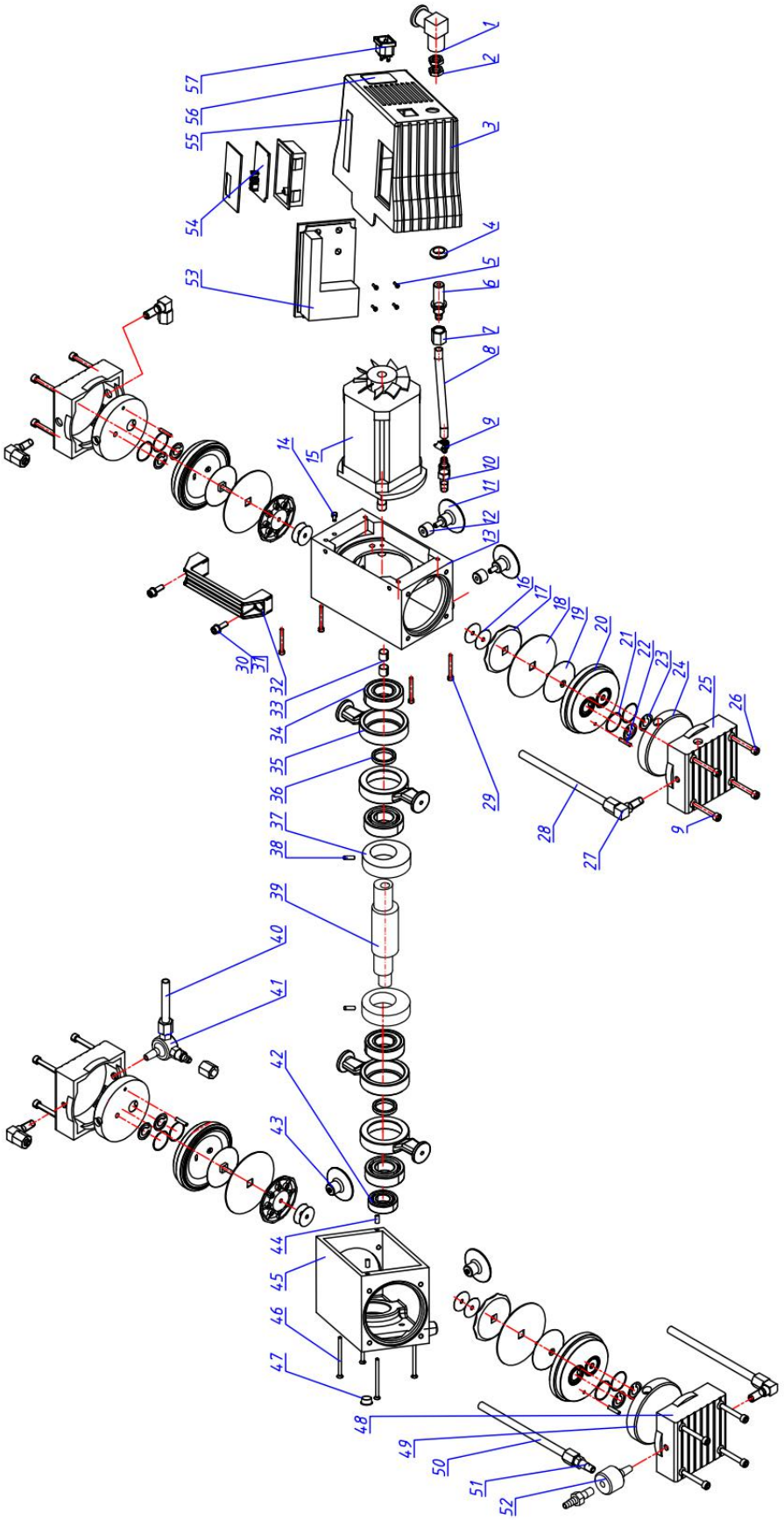
NO.	ITEM	QTY
1	screwM4 x 65	8
3	eccentric bushing	2
5	swing arm	4
7	tightening set	4
9	washer	12
11	screwM6 x 25	12
13	cover	2
15	adjusting Washer	4
17	diaphragm	4
19	chamber	4
21	round pinΦ4 x 25	4
23	inlet disc	4
25	nut M14 x 1.5	4
27	silencer	2
29	tank cover	4
31	screwM3 x 18	6
33	spacer legΦ7 x Φ3.2 x 5	4
35	spacer legΦ7 x Φ3.2 x 10	2
37	motor	1
39	support plate	1
41	screwM3 x 30	4
43	inlet joint	2
45	water-proof switch	1
47	Nameplate	1

NO.	ITEM	QTY
2	plate	2
4	bearing	4
6	spacer	2
8	screwM4 x 28	8
10	washer	8
12	suckerM6 x 23	4
14	screw M5 x 6	4
16	support disc	4
18	clamping disc	4
20	sealing ring	4
22	valve	8
24	pipe Φ10 x 1，L=185	2
26	connector	6
28	nut M6 x 40	16
30	control board cover	1
32	control board	1
34	control board supporting plate	1
36	speed board	1
38	handle	2
40	fan60 x 60	1
42	switch board	1
44	power	1
46	label	1

DVP4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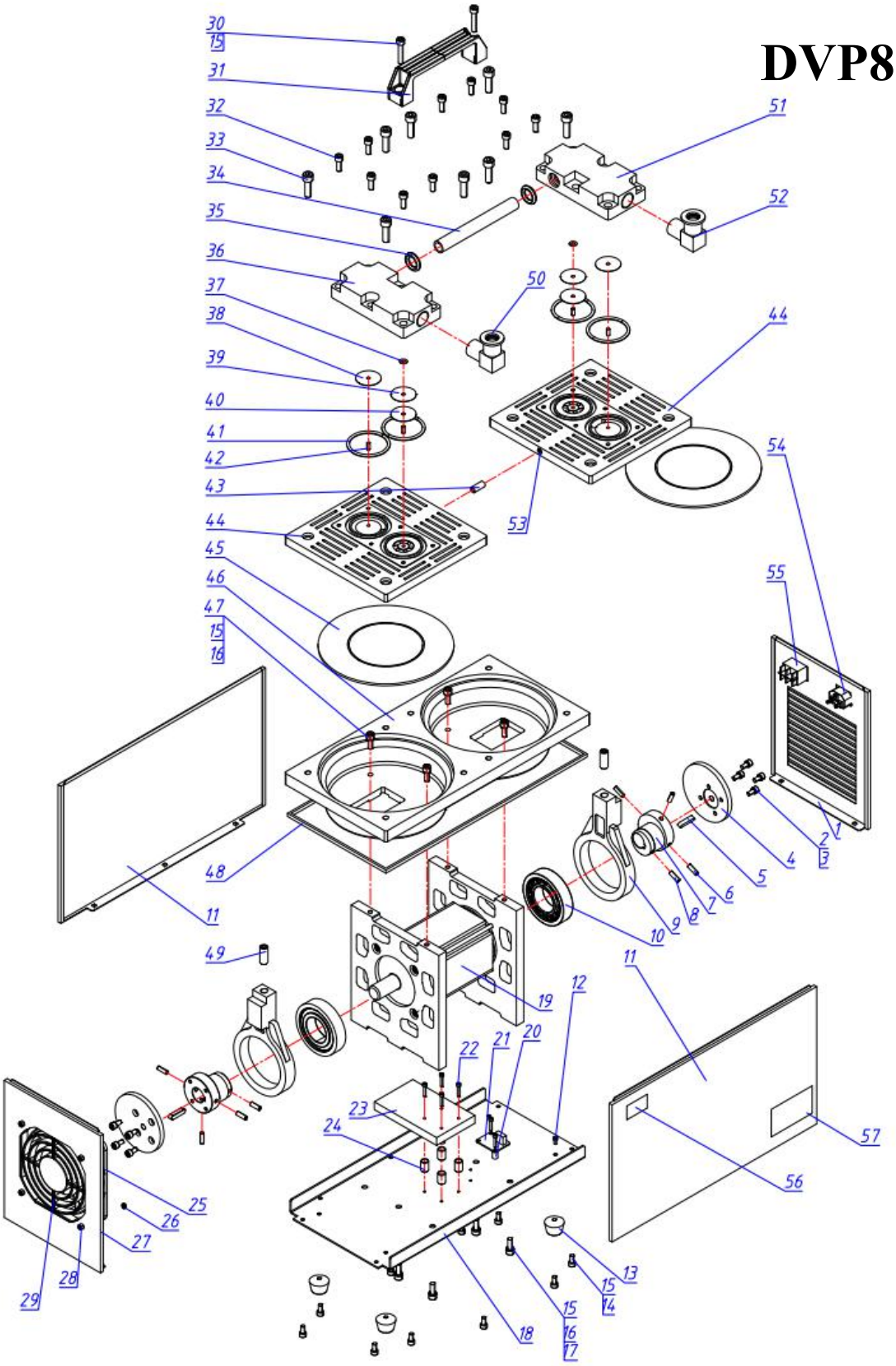
NO.	ITEM	QTY
1	silence	1
3	cover	1
5	screw M2.6 x 12	4
7	nut M14 x 1.5	9
9	clamp Φ11.3	1
11	sucker M6 x 38	2
13	back cover	1
15	motor	1
17	support disc	4
19	clamping disc	4
21	sealing ring	4
23	valve	8
25	outlet tank cover	1
27	connector	5
29	screw M4 x 40	1
31	screw M6 x 25	2
33	tightening set	2
35	swing arm	4
37	counterbalance	2
39	Eccentric bushing	1
41	t-cock joint	1
43	sucker M6 x 23	2
45	front cover	1
47	choke plug	1
49	inlet plate	3
51	connector	3
53	control board	1
55	label	1
57	power	1

NO.	ITEM	QTY
2	Nut M14 x 1.5	2
4	protective ring	1
6	outlet connector	1
8	connectorΦ10 x 1，L=145	1
10	outlet connector	1
12	washer	2
14	nut M4 x 5	1
16	washer	4
18	diaphragm	4
20	chamer	3
22	round pinΦ4 x 25	4
24	outlet disc	1
26	nut M6 x 40	4
28	inletΦ1,0 x1，L=185	4
30	washer	2
32	handle	1
34	coupling	4
36	Spacer	2
38	screw M5 x 10	2
40	pipeΦ10 x 1，L=52	1
42	coupling	1
44	round pin Φ4 x 10	2
46	screw M6 x 180	4
48	inlet cover	3
50	pipeΦ10 x 1，L=165	1
52	inlet connector	1
54	speed board）	1
56	nameplate	1

DVP8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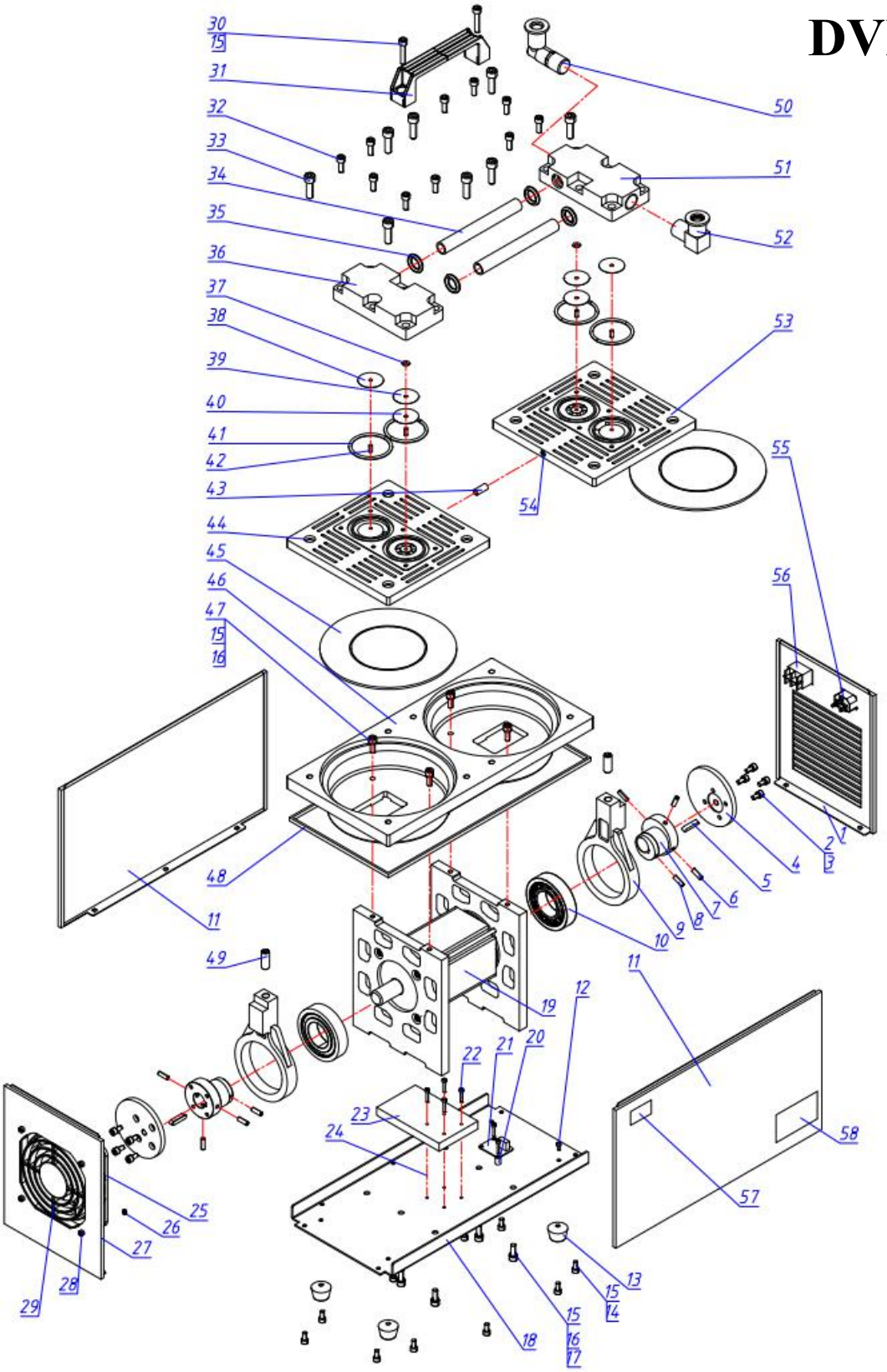
NO.	ITEM	QTY
1	switch plate	1
3	washer	8
5	key C6 x 6 x 25	2
7	Eccentric bushing	2
9	swing arm	2
11	sideboard	2
13	rubber feet	4
15	washer	2
17	screwM6 x 20	6
19	motor	1
21	speed board	1
23	control board	1
25	fan 120 x 25	1
27	fan board	1
29	protective guard105 x 105	1
31	handle	1
33	screwM8 x 25	8
35	O-ring	2
37	washer	2
39	displacing valve	2
41	o-ring 47.5 x 3.55	4
43	air tube Φ8 x 20	1
45	diaphragm	2
47	screw M6 x 25	4
49	screw M10 x 25	2
51	inlet bonnet	1
53	screen vent	2
55	water-proof switch	1
57	nameplate	1

NO.	ITEM	QTY
2	screw M5 x 10	2
4	counterbalance	2
6	screw M8 x 16	1
8	screw M5 x 10	3
10	coupling	2
12	screw M3 x 5	1
14	screw M5 x 8	1
16	washer	10
18	baseboard	1
20	spacer legΦ7 x Φ3.2 x 10	2
22	screw M3 x 18	6
24	spacer legΦ7 x Φ3.2 x 5	4
26	nut M4	4
28	screw M4 x 12	4
30	screw M6 x 30	2
32	screw M5 x 16	10
34	air tube Φ16 x 2 x 136	1
36	exhaust valve cap	1
38	inlet valve	2
40	adjusting wahser	4
42	round pin Φ4 x 10	4
44	inlet plate	2
46	fixed plate	1
48	rubber strip 300/130	2
50	mute joint	1
52	inlet joint	1
54	power	1
56	label	1

DVP16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序号	名称	数量	序号	名称	数量
1	switch plate	1	**2**	screw M5 x 10	8
3	washer	8	**4**	counterbalance	2
5	key C6 x 6 x 25	2	**6**	screw M8 x 16	4
7	Eccentric bushing	2	**8**	screw M5 x 10	4
9	swing arm	2	**10**	coupling	2
11	sideboard	2	**12**	screw M3 x 5	1
13	rubber feet	4	**14**	screw M5 x 8	1
15	washer	2	**16**	washer	10
17	screwM6 x 20	6	**18**	baseboard	1
19	motor	1	**20**	spacer legΦ7 x Φ3.2 x 10	2
21	speed board	1	**22**	screw M3 x 18	6
23	control board	1	**24**	spacer legΦ7 x Φ3.2 x 5	4
25	fan 120 x 25	1	**26**	nut M4	4
27	fan board	1	**28**	screw M4 x 12	4
29	protective guard105 x 105	1	**30**	screw M6 x 30	2
31	handle	1	**32**	screw M5 x 16	10
33	screwM8 x 25	8	**34**	air tube Φ16 x 2 x 136	1
35	O-ring	2	**36**	exhaust valve cap	1
37	washer	2	**38**	inlet valve	2
39	displacing valve	2	**40**	adjusting wahser	4
41	o-ring 47.5 x 3.55	4	**42**	round pin Φ4 x 10	4
43	air tube Φ8 x 20	1	**44**	inlet plate	1
45	diaphragm	2	**46**	fixed plate	1
47	screw M6 x 25	4	**48**	rubber strip 300/130	2
49	screw M10 x 25	2	**50**	mute joint	1
51	inlet bonnet	1	**52**	inlet joint	1
53	inlte board	1	**54**	screen vent	2
55	power	1	**56**	water-proof switch	1
57	label	1	**58**	nameplate	1

TSVP®

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