DS50 SERIES MEDICAL SUCTION UNIT

OPERATION MANUAL

(Please read the operation manual before maintaining or repairing equipment, the manual is only for guidance, our company have the right to improve the design.)

Thank you for choosing to use our company's DS series of medical suction machine! If the first time install and use medical suction unit, please make sure to read all the information supplied firstly, in particular the installation information in this manual and other terms mentioned in the note. This will help you to make better use of our products.

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1. Brief introduction

Thank you for purchasing our dental suction unit. It is our company well-developed multi-purpose mechanical and electrical integration of energy-saving product with small, mobile, good appearance, less power consumption, free maintenance, safe and durable etc. In order to be convenient for you to operate the unit, please read the manual carefully.

1.1 Contents of the manual

The operation manual includes brief introduction, technical data, installation and test, maintenance, split-up drawing of ring blower and so on. You can get help in according to the contents.

1.2 Performance and structure

Medical suction unit consists of air and water separator, filter, ring blower, draining pump and electrical board.

1.3 Usage

The suction unit is applied in the process of oral cavity treatment as it can pump foreign objects attached with germina, such as oral secretion and dirty blood, as well as protecting environment since the objects can be dealt with before being pumped. It is mainly used for clinics and hospitals in the treatment of oral health.

1.4 Safety Information

1.4.1 Electric safety

- To make sure that the plug of this unit is three-phase with good grounding.
- Before connecting the power plug, please ensure the rated voltage consistent with the named voltage which this unit required.
- To avoid unsteady voltage, please do not use the power plug together with other electric equipment.
- Before maintaining or repairing the unit, please unplug that electric wire firstly.
- Please check the electric wire and plug regularly to avoid the damage or extrusions.

1.4.2 Cleaning

Please keep the environment around the product clean, and note to unplug that electric wire before cleaning the unit. The process of cleaning as follows: firstly wipe the outer surface with a soft cloth stained with neutral detergent, and then use a soft cloth to clean the machine again.



Notice: Do not use liquid or detergent containing flammable substances.

1.4.3 Other safety information

When using this unit, please strictly operate it in according to the following rules:

1) Please note that the power plug is designed as the safety device, not power switch. It is necessary to ensure the power plug can be unplugged from the plug without extrusions.

Warning: The good grounding is necessary to avoid the risk of electric shock.

2) Equipment cannot be used in flammable mixture environment.

3) Equipment cannot be used in anesthetic and air, oxygen, nitrogen mixture environment.

4) Don't put the equipment together with oxygen cylinder.

5) Please do not operate the equipment or replace the accessories when the following situations occur:

- Damage of the power plug
- Equipment cannot work normally
- Breakdown of the equipment
- Water inlet of the equipment
- Loud or shrill noise, overheated outlet air or foul smells during operation.

When above situations occur, please contact the manufacturer or local agent. In order to be convenient for us to offer after sale service, please offer drawing of electrical circuit, air and water connection diagram, packing list and other useful information when necessary.

6) Please use original or qualified disinfector.
7) Turn off the power when the operator left.
8) Dispose of waste liquid and waste solid according to the local health regulations.
9) Do not use and store the equipment outside the specified environment.
10) Keep accessories from dropping to avoid damages.
11) Keep the electric wire from loosing in the process of treatment.
12) Please use accessories from original manufacturer.
13) Keep the equipment in a solid and horizontal level.

1.5 Product information

Name: Medical Suction Unit
Model: DS506
Configuration: refer to enclosed Packing List
Models of dental suction units: DS502、DS504、DS506

2、Technical data

2.1 Specifications:

Sheet 1

No.	Product Model	Volt/Freq	Power (VA)	Suction Air Flow (L/min)	Max. Negative Pressure (Kpa)	Noise Level (dB)	Number of Chair
1	DS502	a.c.220 V 50HZ	1100	2500	-17	60	1/2
2	DS504	a.c.220 V 50HZ	1500	3600	-20	60	2/3
3	DS506	a.c.220 V 50HZ	2200	4500	-24	60	3/4

2.2Configurations:

Sheet 2

No.	Product Model	Ring Blower	Filter	Air and Water Separator	Control Board	Amalgam Separator	No.
1	DS502	•	•	•	•	•	○
2	DS504	•	•	•	•	•	○
3	DS506	•	•	•	•	•	○

Note: • means Standard, ○ means Optional

Warning:

Please operate the unit strictly under the rated supply voltage, because the unsteady current can cause injuries to the unit.
Please install power voltage regulator when supply voltage is unsteady, and the rated power is no less than 4000VA.

2.2 Product Classification

2.2.1 Classification of air flow: High volume suction system
2.2.2 Classification of suction method: semi-dry system

2.2.3 Classification of dental equipments management: Oral equipments and instruments (code6855), Type 2 management
2.2.4 Classification of electric shock protection: Type I equipment.
2.2.5 Degree of Protection against electric shock: Type B equipment.
2.2.6 Classification of waterproof: Normal equipment (IP20).
2.2.7 Classification of working frequency: intermittent duty.

2.3 Transportation, storage and condition of usage
2.3.1 Condition of transportation
The machine should be transported according to specific requirements of signed contract.
2.3.2 Condition of storage
The machine should be stored in the place with relative humidity not greater than 80%.Surrounding area of the machine should be clean, dry, and free of corrective gas, well ventilated and indirect sunlight.
2.3.2 Condition of usage
Ambient temperature: 5℃~40℃
Relative humidity: ≤80%
Atmosphere pressure: 86Kpa ~106Kpa
Warning: The unit can not be used in an area where the air is contaminated with the flammable anaesthetic, which the explosion may occur.

2.5 Condition of installation
Installing the machine in a solid and horizontal level with, and does not have an incline greater than 2°.

2.6 Condition of power
Voltage range: AC110-220V 50/60Hz

2.7.1 **Electromagnetic Compatibility**

Electromagnetic Emission Standards and Our Announcement		
DS series dental suction unit should be used in following electromagnetic environment, and the use of this product should ensure to use under suitable environment.		
Electromagnetic Emission Test	Standards	Electromagnetic Environment Standards
Radiation Electromagnetic Disturbance	CISPR 11 I FORM A CLASS	Electromagnetic emission of DS series dental suction unit can only satisfy its inherent functions, so its wireless radiation level is so low, that could not effect the contiguous electronic equipment.
Power Disturbance Voltage	CISPR 11 I FORM A CLASS	
Harmonic Emission	IEC 61000-3-2	DS series dental suction unit can used by all companies and

Voltage Fluctuation/Flash	IEC 61000-3-3	institutes, and could not connect with household or public low voltage power system.

2.7.2 **Electromagnetic Emission Standards and Our Announcement**

Electromagnetic Emission Test	Electromagnetic Environment Standards
Electrostatic Discharge	The materials of floor should be wood, concrete and ceramic tile. If the floor is synthetic material, relative humidity no less than 30%.
EFT IEC 61000-4-4	The quality of power supply is used in special commerce or hospital.
Surge (Impact) IEC 61000-4-5	The quality of power supply is used in special commerce or hospital.
Voltage Sag And Short Supply Interruption Voltage Change IEC 61000-4-11	The quality of power supply is used in special commerce or hospital. When DS series dental suction unit need to continuous operation when grid interrupts, please use uninterruptable power output.
Power Frequency Magnetic Fields IEC 61000-4-8	/

Electromagnetic Emission Standards and Our Announcement

DS series dental suction unit should be used in following electromagnetic environment, and the use of this product should ensure to use under suitable environment.

Protection Test	IEC 60601 TEST VALUE	Standards	Electromagnetic Environment Standards
Radio transmission IEC 61000-4-6 Radio radiation IEC 61000-4-3	3 Vrms 150 kHz to 80 MHz 3 V/m 80 MHz to 2.5 GHz	3 Vrms 3 V/m	Portable or mobile radio communication equipment should stay away from DU series portable dental unit, including cables, also should leave more than the recommended separation distance calculated. Recommended separation distance $d = \left[\frac{3.5}{V_1}\right]\sqrt{P}$ $d = \left[\frac{3.5}{E_1}\right]\sqrt{P}$ 80 MHz 800 MHz $d = \left[\frac{7}{E_1}\right]\sqrt{P}$ 800 MHz 2.5 GHz P: is the fixed output power by radio equipment manufacturer, the unit is W. D: Recommend separation distance. Fixed radio transmitter, determined by electromagnetic measurements, A: Each frequency band must be less than the standard requirements. B: The equipment maybe interfered nearby the device with following symbols: 

Note: 1 Between 80 MHz and 800 MHz, higher frequency range applies.

2 This specification maybe do not suitable for all situations, because the propagation of electromagnetic waves can be effected by the absorption and reflection of buildings, objects and people.

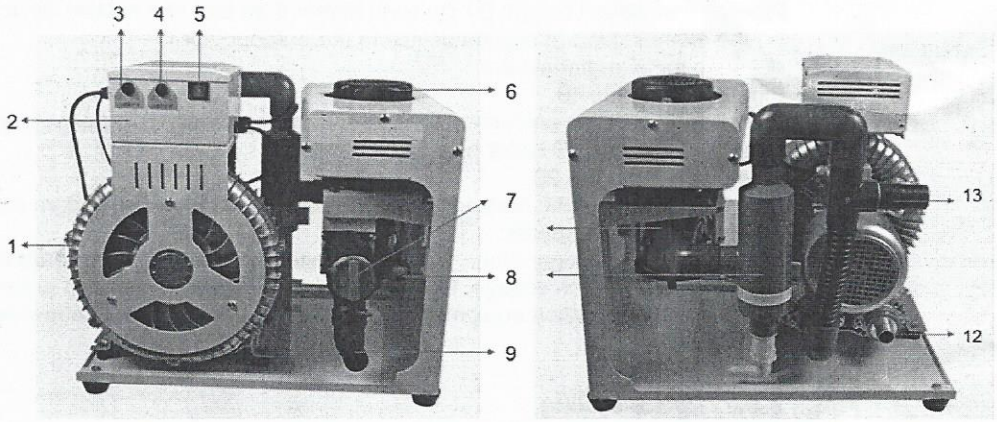
A: The electromagnetic strength of fixed radio transmitter, such as radar station, cordless telephone and mobile radios, amateur radio, FM and AM radio and television, this can not be predicted in theory. The estimated of electromagnetic environment depends on the fixed radio transmitters, and electromagnetic measurement points should be considered. If the magnetic strength nearby the DU series is more than the above allowed value, then DU series portable dental unit should be observed to verify by the normal operation. In addition, when to re-install the DU series portable dental unit, the above information should you measured again.

B: Frequencies above 150kHz to 80 MHz, the electromagnetic intensity should be less than 3V/m.

Recommended separation distance between DS series dental suction unit and Portable or mobile radio communication equipment			
DS series dental suction unit for radio interference to be controlled electromagnetic environment, the users of DS series dental suction unit should ensure the minimum distance between the DS series dental suction unit and portable or mobile radio communication equipment according to the following recommended value, and take the maximum output power into account.			
Communications equipment, the rated maximum output power(W)	Separate communication channels established in accordance with the distance (m)		
	150 kHz to 80MHz $d = \frac{3.5}{V_1}\sqrt{P}$	80 MHz to 800 MHz $d = \frac{3.5}{E_1}\sqrt{P}$	800 MHz to 2.5GHz $d = \frac{7}{E}\sqrt{P}$
0.01	0.117	0.117	0.233
0.1	0.369	0.369	0.738
1	1.167	1.167	2.333
10	3.689	3.689	7.379
100	11.667	11.667	23.333
Because the rated maximum output power of communications equipment do not mentioned above, the recommended separation distance d (meters) can be estimated according to same communication device. P is the maximum output power (in watts) according to the communications equipment manufacturers.			
Note: 1. From 80 MHz to 800 MHz, separation distance is more accordance with the higher frequency. 2. This specification do not apply to all situations. Because the propagation of electromagnetic waves by buildings, objects, people effects of absorption and reflection.			

3. The Equipment Structure

3.1. DS5 structure (DS502.504.506)



1. Air Pump	2. Control box	3.Spectator protector
4.Overload protector	5. Power switch	6. Separator motor
7. Filter	8. Drain outlet	9. Suction Port
10. separator	11.second separator	12.air outlet
13.Decompression Valve		

3.4 Procedures of installation

3.4.1 Installation:

（（1）Check after unpacking

Ensure that every component of the unit is intact after opening the box and check that spare parts are intact according to packing list. In case of doubt, please contact our company or local agent.

（2）Precautions of installation

The electric units should be installed by competent person only.

（3）Condition of installation

(a) Ambient temperature: 5℃~40℃

(b) The unit should be well positioned to ensure there is an adequate airflow around the machine.

（4）Method of installation

Users can choose the following methods for installation:

(a) the equipment installed the dental chair the .In order to ensure the safety of electricity, please don't open the door of this equipment.Suction equipment installation surface must be installed lower than dental chair.

(b) installed in the ventilation of the room.Please keep the both sides of the suction device (intake and exhaust side) and the wall of the room at least 25 cm above the distance, to maintain good ventilation.

(5) on the installation site and piping requirements:

(a) a suction device and the pipeline between dental unit:

Material: PPR or PVC water pipe.

Pressure suction pipe diameter: phi 40.

Pipe length: it is recommended that no more than 20 m.

Pipeline installation height: 50 ㎜ level higher than that of a suction device to underside.

(b) the exhaust pipe (a suction device to the outdoor pipe) :

Material: metal material tube.

Pipe diameter: phi 40.

(c) the drain (suction equipment to the sewage treatment equipment of pipe) :

Material: PPR or PVC water pipe.

Pipe diameter: phi is 20.

Pipe installation height: horizontal pipeline should be below the bottom of a suction device.

(d) electrical requirements:

Power supply configuration: installation site should be in accordance with the suction equipment calibration voltage, frequency, provide power socket with ground wire.

Signal lines: the suction equipment signal lines should connect to corresponding control switch on dental chair.

3.5.2、DS5- testing

Check all connections of tubes, voltage and current, and connect drain outlet port into drain pipe. After connected choose valve and signal lines, open power switch, and indicator light of power switch is on. Lift up saliva ejector from rack, and operation of suction unit starts. Water will be sucked by suction port, and pump out from drain port, then put saliva ejector to original place of rack. Suction unit will stop after delay of 10 seconds.

Warning: To avoid unsteady voltage, please do not use the power plug together with other electric equipment.

4. Functions of main parts

Filter: mainly used to collect and separate solid particles (such as tooth chippings, amalgam particles), bloods and secretions, then be more convenient for centralized processing and protect environment.

Note: please clean filter weekly.

Ring Blower: mainly offer negative pressure for dental treatment.

Air and water separator: ring blower offers negative pressure to pump drainage water into air and water separator, then drainage water and air will be separated individually, and achieve function of pumping in and out at same time.

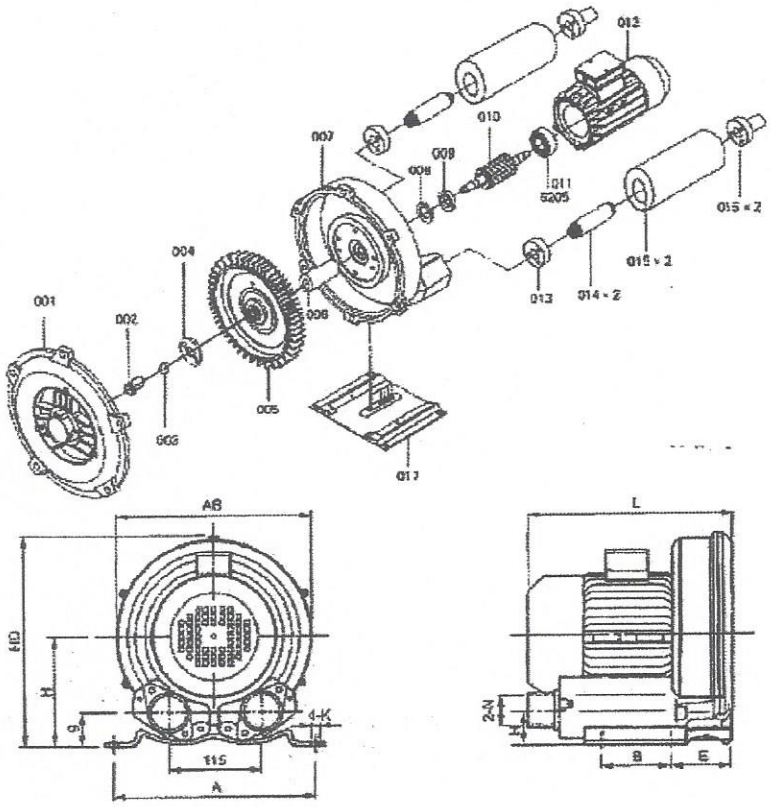
Amalgam separator: optional function, separation rate must be not less than 95%, and metal collection bottle assembled with amalgam separator will collect these heavy metals to avoid pollutions to environment.

5. Maintenance

1. Clean the suction tubes and instruments everyday by sucking clean water twice (2 liters each time) after using.
2. Requirements of cleanser: Foamless, tasteless cleanser, PH value is in between of 6-10. The cleanser beyond the ph value scope which are out of warranty.
3.Tubes cleaning: Clean the tubes with cleanser weekly.

6. Split-up drawing of ring blower

001 Wind cover	006 Bushing block	011 Bearing	015 Flue pipe
002 Screw	007 Wind barrel	012 Electric motor	016 Connector
003 Spring-pad	008 Bearing	013 Rubber gasket	017 Foot
004 Impeller plate	009 Bearing block	014 Sponge	
005 Impeller	010 Rotor		



7. Troubleshooting

	Problem	Reason	Check
1	weak suction,slow speed suction	The air inlet is blocked	Clean air inlet
		The filter is blocked	Clean air filter
2	compressor shaking and noisy, can not start up the machine	The voltage is too low.	Examine the voltage by professional technicians
3	The pump cannot work.	The power is not switched on	Check if the power supply is connected correctly
		A fuse is blown	Check whether the fuse is blown
		The overload protector is bounced	Check whether the overload protector is bounced

		The wire to the power supply has fallen off or any electronic component is loose	Open the panel, check the electric connection and components inside.

8. Working principle overview

Ring blower working principle: Ring blower's impeller contains numerous blades in its edge and it is special designed for a high air pressure. When the impeller is rotating, air between the impeller would be accelerated along the direction of the fan blades and due to rotating movement, after air enters outside air layer, it comes back to the base of the fan blades due to the effect of the differential pressure, the cycle will repeat several times, air will expel quickly because of the pressure there bigger than the pressure in the system when the air runs through the outlet, to make the air run spirally so as to increase the pressure.

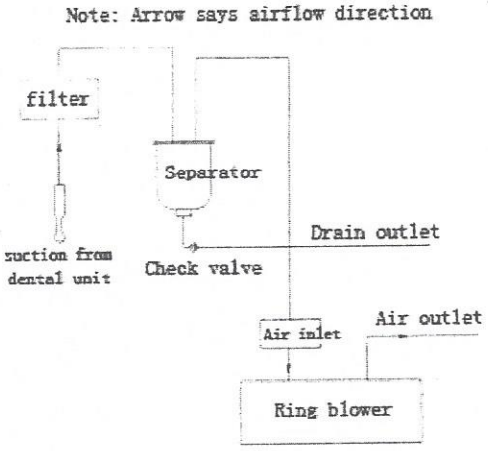
Operating principle: Connect the suction unit with dental treatment unit, take up saliva ejector from clip-on instrument holder of dental treatment unit, and the suction unit will start automatically to suck foreign objects attached with germina (such as oral secretion and dirty blood) into filter, the filter will separate solid particles(such as teeth fragments, silver amalgam particles) from dirty blood and oral secretion(please clean solid particles inside the filter regularly).The filtered dirty blood and oral secretion will be sucked into drain bottle, the air and water separator will separate the air from dirty blood and oral secretion to ensure the air offered for ring blower is clean and prevent the impellers from corrosive damage.

9. Safety precautions

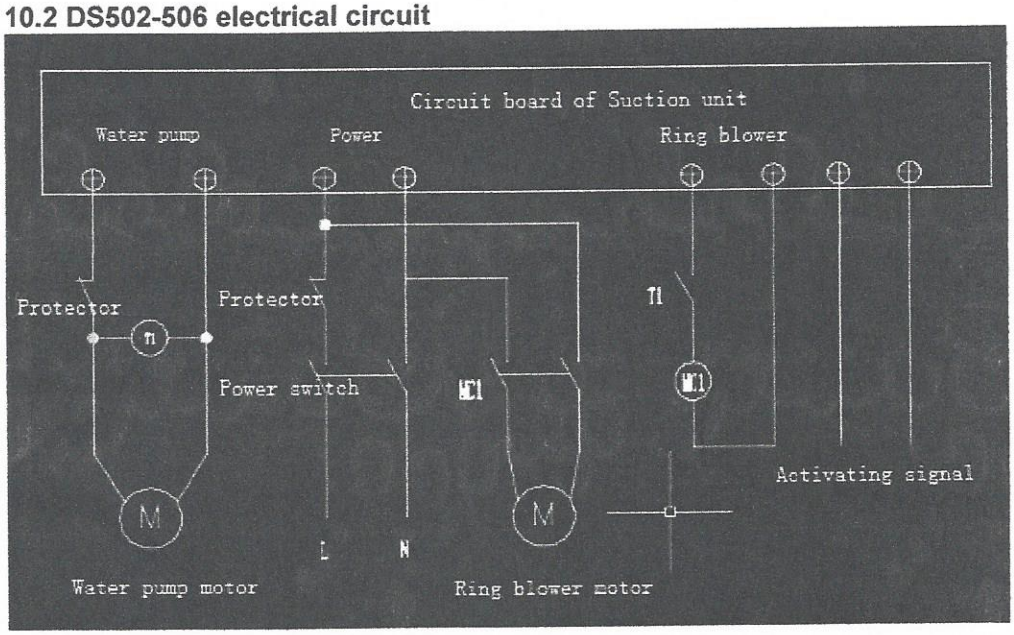
1. When dental suction units are working, please make sure that there will be no goods can be touched the suction unit.
2. Clean the filter regularly.
3. Turn off the power before changing the electrical parts.
4. When to clean and maintenance the suction units, please to turn off the power.
5. After setting up the suction units, do not move the machine too often, avoid to affecting its working conditions.
6. To forbid the unprofessional person to use the air compressor, avoiding to operating wrong.
7. When to maintenance the suction units, it must be some person who is very qualified.
8. Do not let the olds, children to contact the suction unit, to avoid resulting harm.
9. When under knowing using the suction units will harm someone, please don't use the suction units.
10. When the dental suction units are retired, the capacitor and electrical components should be available to the local law and regulation.
11. Any waste products of the suction unit should be handled according to relevant provisions of the state.

10. Drawing of air connection and electrical circuit

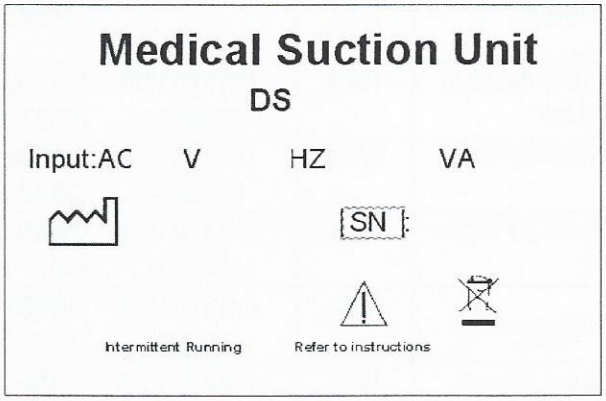
10.1 DS502-506 air connection



10.2 DS502-506 electrical circuit



11：Nameplate



12：Outside Label

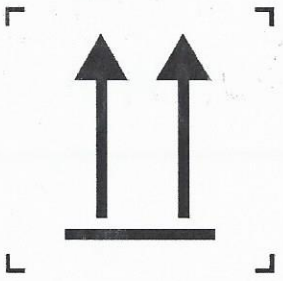
1)、Contents：

- Product Name：Medical Suction Unit
- Model：DS -×××××××
- Series No.×××××
- Production Date: XX/2016

2)、Size

- Dimension：L×W×H
- G.W.：×× kg。 NET.：×× kg。

3)、Grand Label：



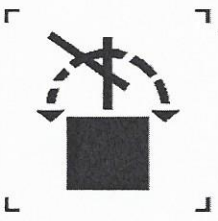
Upward



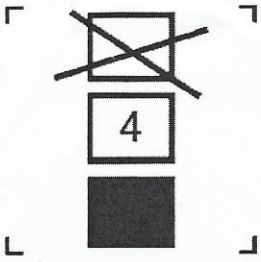
Fragile



Dry



Avoid roll



Stacking tier

13: Packing List

Code	Name	Qty.	Note
1.	DS3701CS Suction Unit	1unit	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
2.	DiameterΦ40 Pipe	2pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
3.	DiameterΦ20 Pipe	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
4.	Hose Clamp Φ40	6pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
5.	Diameter 20mm Pipe(3m)	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
6.	Hose Clamp Φ20	2pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
7.	Power Cord	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
8.	Operation manual	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
9.	Warranty Card	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）
10.	Product Qualification Certificate	1pcs	DS3701CS（DS502）、DS3701CS（DS504）、DS3701CS（DS506）