SPA-2800-V4

大气等离子清洗机

Atmospheric Plasma System

(The appearance of the equipment is constantly upgraded and adjusted, subject to the actual shipment)

接触角测量仪国家标准制定者

华南理工大学等离子技术联合实验室

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一、Introduction to Plasma

1.1 Product Principles

Ionization into plasma is achieved by applying an electric field to the process gas. The "active" components of plasma include ions, electrons, atoms, free active groups, excited nuclides (metastable), photons, etc. Plasma treatment is the process of utilizing the properties of these active components to undergo physical and chemical reactions such as oxidation, reduction, cracking, cross-linking, and polymerization to change the surface properties of the sample, thereby optimizing the surface properties of the material and achieving cleaning, modification, etching, and other purposes.

1.2 Industry Applications

Mobile industry

Mobile phone assembly bonding, camera module, earphone bonding, middle frame bonding, improving surface adhesion and

Display industry

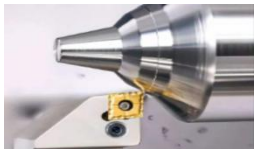
TP bonding can effectively remove oily dirt and organic pollutant particles on the surface and improve the bonding stability.

Lithium battery industry

Battery sticky, welding, packaging, blue film paste, effectively remove surface organic matter and impurities, and improve surface adhesion.

Automobile industry

Headlights, steering wheels, EPDM sealing strips, windshields, automotive electronics, enhance the surface hydrophilicity and improve the quality of the paste.



Metal industry

Gold plating, silver plating, welding, organic matter and oxide layer such as grease and oil on the surface.

Connector industry

Cable character printing improves material surface adhesion and enhances printing quality.

Plastics and plastics industry

Surface activation, bonding, screen printing

Improve hydrophilicity and enhance the service life of adhesive printing.

Glass industry

Coating, ink printing, coating paste, remove static electricity, dust and oil, improve hydrophilicity, and prolong the service life of coating printing.

二、Product Introduction

2.1 Product Overview

The Plasma Cleaner is the first domestically developed "independently developed" atmospheric plasma cleaning machine. It adopts a highly stable phase-shifting full bridge soft switching circuit and has a stable analog communication data transmission method, which can achieve unified monitoring by the central control system, making the cleaning effect more stable and durable, enhancing anti-interference performance, reducing fault rates, controlling maintenance costs, improving production capacity, and effectively reducing production costs.

2.2 Product Advantages

- Military grade hardware design, with an ambient temperature range of -25 °C -50 °C, suitable for different harsh scenarios, and an MTBF (Mean Time Between Failures) time of ≥ 190Khrs MIL-HDBK-217F (25 °C);
- Digital power meter displays real-time operating parameters, real-time monitoring, and strong anti-interference;
- Adopting constant pulse width mode for operation, with strong stability;
- Supports analog communication interfaces and powerful remote control;
- It has four detection functions: real-time detection of air pressure, detection of transformer primary peak current, detection of power grid current, and real-time monitoring of spray gun speed (optional);
- The plasma generator supports both jet and rotary spray guns;
- It has protection functions such as over temperature protection, overload protection, short circuit, open circuit, leakage protection, and various misoperation protection.

2.3 Product Structure

SPA-2800-V4 atmospheric plasma cleaning machine structure: composed of a high-voltage power generator and a plasma generator spray gun.

(A) High voltage power generator:

The generation of plasma requires high-voltage excitation. The SPA-2000-V4 atmospheric plasma cleaning machine uses an intermediate frequency power supply for excitation and operates in a constant pulse width mode. The parameters need to be adjusted according to the actual situation of the sample to achieve the optimal

processing effect.

(B) Plasma generator nozzle:

X800-V4 atmospheric plasma cleaning machine paired with rotary nozzle: mainly handles large and complex shaped materials, with a processing area range of 20-90mm. It can be paired with existing production lines to achieve fully automatic online production and save labor costs.

2.4 Product specifications

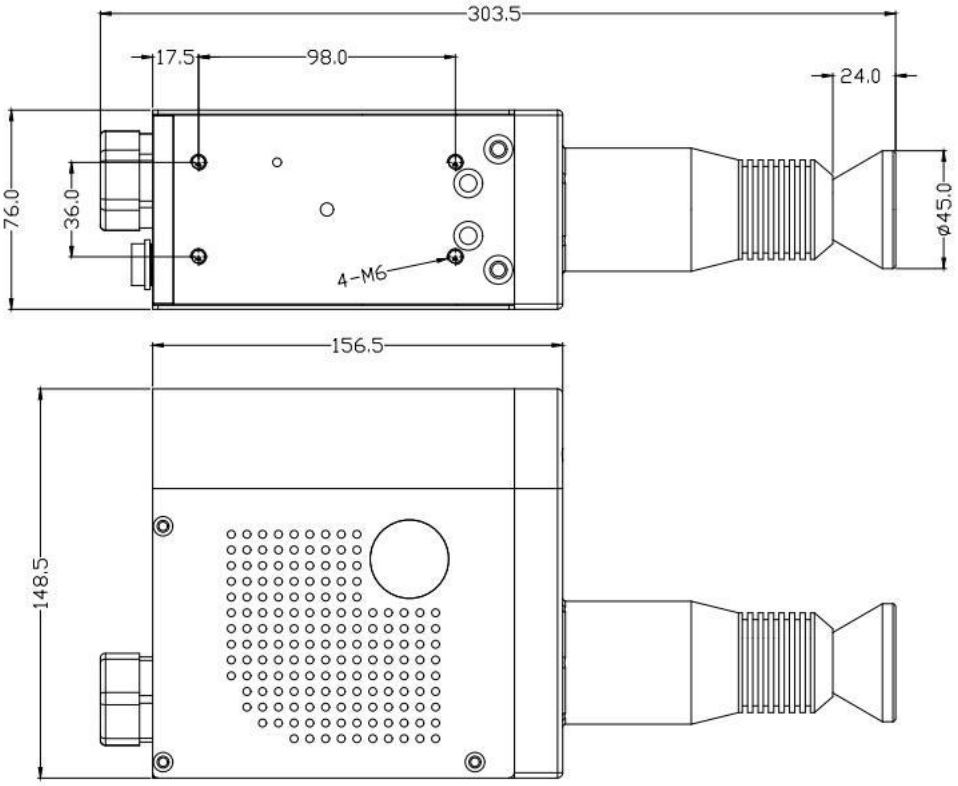
2.4.1 Power supply parameter list

SPA-2800-V4			
No.	Items	Parameters	Notes
1	Power supply power	Single-phase 220V/IC、50/50Hz 10A	Ground connection<40
2	Input air source	CDA/N2(0.3-0.6Mpa) air inlet pipe diameter： 8	oil-free and water-free
3	Output power	600-1300W	Depends on the jet nozzle
4	Output accuracy	± 5%	Determined by power value
5	Effective cleaning range	20-100mm	measured at a cleaning height of 8mm for different jet nozzle models
6	Effective cleaning range	100(50-500)mm/s	cleaning speed affects cleaning performance
7	Recommended cleaning speed	8-20mm	cleaning height affects cleaning performance
8	Power factor:	≥50%	A higher power factor, higher power efficiency
9	Axial outlet air pressure	0.18-0.30Mpa	Depends on the nozzle settings
10	Working frequency	20KHz-35KH	Depends on the nozzle settings
11	External interface	PLC-IO	Check the user manual
12	Minimum bend diameter of the Corrugated pipe	R120mm	Less than 120mm can damage the corrugated pipes.
13	Start/Stop Interval	Start： 35, Stop： 35	If the interval is too short, the stability of false readiness will be reduced.
14	Operating Temperature	-20~35℃	N/A
15	Nozzle size	L303W76H148mm	Total nozzle length depends on nozzle

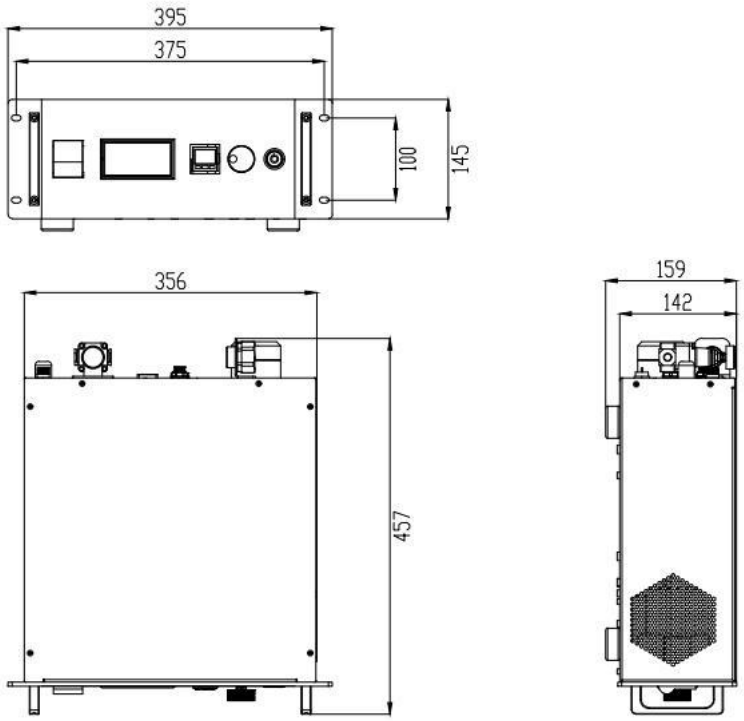
			model.
16	Nozzle weight	5.5kg	N/A
17	Nozzle speed	2600-3000RPM	Speed affects product processing uniformity.
18	Dimensions (mm)	L457xW395xH159mm	See the power supply dimensional drawing in 2.52 for details.
19	Power supply weight	15KG	N/A
20	Precautions	※Separate the plasma power supply from the PC power supply. ※Keep the plasma equipment (power supply, gun head, and high-voltage cable) at least 20cm away from the PC and monitor. ※Be sure to connect an independent ground (cable with a diameter of 4 mm² or more	

2.5 Equipment Dimensional Drawings

2.5.1 Dimensional Drawing of Rotating Nozzle X800-V4



2.5.2 Power Supply Dimensional Drawing SPA-2000-V4



三、Specification requirements

3.1 Factory specification requirements

Factory specification requirements	
Demand power supply	Power supply: single-phase AC220V, 50/60Hz, 10A
Grounding requirements	The power box needs to be connected to the machine ground wire (the ground wire thickness should be 4mm or above, the ground resistance should be less than 0.6Ω, and a separate ground wire interface should be reserved for the machine)
Gas source requirements	Air Tubing Requirements: PU tubing 8mm Gas Requirements: CDA/N2, pressure 0.3-0.6 MPa, solid particle size <= 0.1 μm, oil content <= 0.01 mg/m³, Pressure dew point below -40°C
Factory exhaust	Flow rate: 5m ³/ Min The material of the gas exhaust pipe: corrosion-resistant material
Layout Space	Good ventilation, with more than 200mm of heat dissipation space on the left and right, and 200mm of wiring space at the rear.

3.2 Configuration List

Configuration List				
No.	Name	Model and specifications	Number	Notes
1	Host generator	SPA-2800-V4	1	PCS
2	Rotary Nozzle	Equipped according to customer requirements	1	PCS
3	Jet head	Equipped according to customer requirements	1	PCS
4	Metal corrugated pipe length	Line length 3.5M/5M	1	PCS
5	delivery note	Paper documents	1	PCS
6	DB15 connector	Line length 20cm	1	PCS
7	User manual	Paper documents	1	PCS
8	Maintenance Manual	Paper documents	1	PCS
9	Product Certificate of Conformity	Paper documents	1	PCS
10	Product warranty card	Paper documents	1	PCS
11	Product quality inspection report	Paper documents	1	PCS

3.3 Acceptance criteria

Acceptance criteria		
Project	NO.	Content
Hardware acceptance	1	Equipment list acceptance
	2	Factory report
	3	Instructions
Performance acceptance	1	Try using a white glass substrate for treatment, with a linear speed of less than 4M/min and an averagecontact angle of less than 10 ° after treatment. When measuring the water droplet angle using a water droplet angle measuring instrument, the liquid is pure water.

		The test results indicate that the water droplet angle before white glass treatment is less than 30 °, and it is required to test the water droplet angle within 5 minutes after plasma treatment, with a requirement of less than 10 °.
Stability test	1	Continuous 1 hour plasma jet test
	2	Water droplet angle test of test piece
Acceptance date	1	Acceptance must be completed within 2 months after equipment delivery

3.4 Loss List

Loss List				
NO	Model and specifications	Power	Air pressure	Life time
1	Nozzle &Electrode	1300W	0.22-0.30MPa	1000H
2		1000W	0.22MPa	1500H
3		800W	0.20MPa	2000H
4		600W	0.18MPa	2000H

Note: The service life of consumables is related to the on-site usage conditions, and the above service life is for reference only.

3.5 Nozzle power range reference

Nozzle Definition

Nozzle	Plasma width	Type	Stanard power range	High power range

Single head Rotary	20mm	**Stanard**	600-800W	800-1100W
		Silenced	600-800W	800-1100W
	30mm	**Stanard**	600-800W	800-1100W
		Silenced	600-800W	800-1100W
	50mm	**Stanard**	600-1000W	900-1300W
		Silenced	600-800W	800-1100W
		Electrostatic	600-900W	900-1100W
		Lithium battery industry	600-1000W	900-1300W
	55mm	**Stanard**(Special)	600-1000W	900-1300W
		Silenced(Special)	600-900W	900-1100W
		Lithium battery industry(Special)	600-1000W	900-1300W
	60mm	Silenced	600-900W	900-1100W
	65mm	Lithium battery industry	600-1000W	900-1300W
	70mm	**Stanard**	600-1000W	900-1300W
		Silenced	600-900W	900-1100W
		Lithium battery industry	600-1000W	900-1300W
	80mm	**Stanard**	600-1000W	900-1300W
		Silenced	600-900W	900-1100W
		Lithium battery industry	600-1000W	900-1300W
		Silenced(Special)	600-900W	900-1100W
		Silenced(Special)	600-900W	900-1100W
	90mm	Silenced	600-900W	900-1100W
	100mm	**Stanard**	600-1000W	900-1300W
		Electrostatic	600-1000W	900-1100W