AIR-COOLED PULSE LASER CLEANING MACHINE

AGC-300A/300/500

OPERATION MANUAL

LUOYANG XINCHENG PRECISION MACHINERY CO.,LTD.

Notice

Before using this product, please ensure that the following items are in compliance with the product safety operation requirements. Otherwise, it is forbidden to turn on the system and perform cleaning operations.

	It is prohibited to use this product in places with flammable and explosive materials.
	When cleaning highly reflective materials (copper, aluminum, etc.), it is forbidden to have people stand around to avoid damage caused by reflected light.
	It is forbidden to aim the cleaning head at the human body to avoid injury.
	It is forbidden to make the tip of the cleaning head upward. Pay attention to the dustproof of the lens.
	Make sure that the equipment is reliably grounded.
	Clean combustible items carefully and equip with fire-fighting equipment.
	This product is a Class IV radiation laser. Goggles must be worn.
	The minimum bending radius of the integrated cable should be more than 200mm.

Content

I Scope of application

This product can be used to remove attachments or coatings on the surface of objects, including rust, paint, oil stains, coatings, etc. (High-reflective materials need to be tested and verified). It has the advantages of non-contact, no chemical damage, mobility and high efficiency, etc.

II Product description

1.Main technical parameters

Model	AGC-300A	AGC-300	AGC-500
Laser Power	300W		500W
Laser Wavelength	1070±10nm		
Output Method	Pulsed		
Pulse Duration	10-500ns	20-500ns	
Modulation Frequency	1-3000KHz		1-4000KHz
Integrated Cable Length	5m（Customizable）		
Adjustable Width	0-100mm		0-190mm
Voltage	AC110-220V±10%		
Input Power	2KW		3KW
Cooling Method	Air Cooling		
Ambient Temperature Range	0℃～35℃		
Ambient Humidity Range	40%-80%		
Dimensions of machine	580*430*630㎜		
Packing Dimensions	700*500*770㎜		
Net Weight	≤52kg	≤54kg	≤67kg
Gross Weight	≤70kg	≤72kg	≤85kg

2.Equipment structure diagram

Ⅲ Use instruction

1.Installation and use requirements

1.1 This machine uses a 110V-220V AC power supply. If this requirement is not met, please use the machine with a transformer.

1.2 The minimum bending radius of the integrated cable is 200mm.

1.3 Please keep at least 60cm of space around the machine to ensure good ventilation and to avoid affecting performance due to poor heat dissipation.

1.4 Ensure the air inlet of the machine is clean, and prevent foreign objects or large particles of dust from being sucked into the chassis.

1.5 The operating environment temperature range of the laser cleaning machine is 0 to 35°C. If it exceeds this range, it may cause the system to alarm.

2. Operation precautions

2.1 Please check and ensure that the equipment is powered off before installing/removing laser cleaning components and other operations.

2.2 It is recommended to dedust the lens and the cleaning head with clean air or wipe it with a lens cloth after each use to prevent dust or other pollution. Please cover the lens with a protective cover when the cleaning head is not working.

2.3 When transporting or handling, avoid knocking and overturning.

2.4 If the equipment is abnormal, check and troubleshoot in time or contact the after-sales service. Do not operate the machine to avoid unnecessary losses.

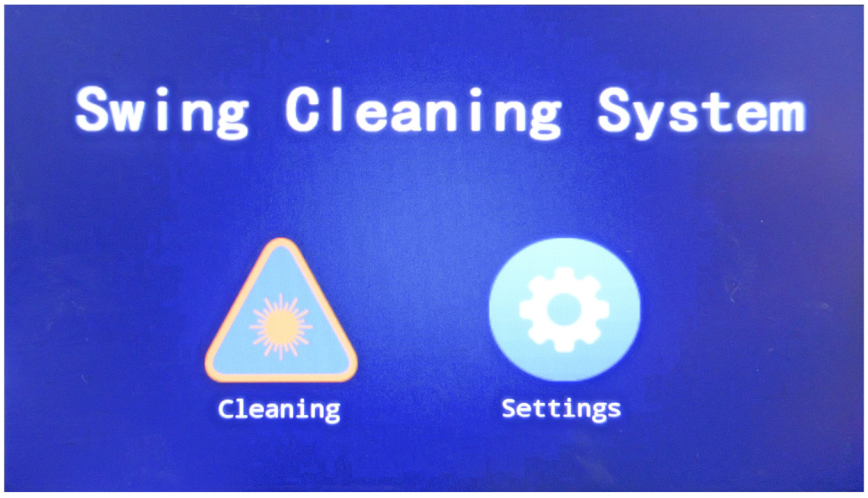
Ⅳ Operation process

1. Connect one end of the power cord to the power port of the machine, and the other end to the AC power supply.
2. Turn on the emergency stop and key switch to start the machine.
3. Set the swing and laser parameters according to the target.
4. Click "Sway" and "Laser" to enter the cleaning preparation state.
5. Double-click the cleaning head button and keep pressing to start cleaning.

Ⅴ Laser controller interface description

After powering it on, the control screen enters the main operation interface of the handheld laser cleaning system.

1. Main operation interface



Main operation interface

Cleaning: Initial account: admin, password: 1, click to enter the cleaning management interface.
Setting: Default password: 6, click to enter the system settings interface.

1.1 Cleaning Management

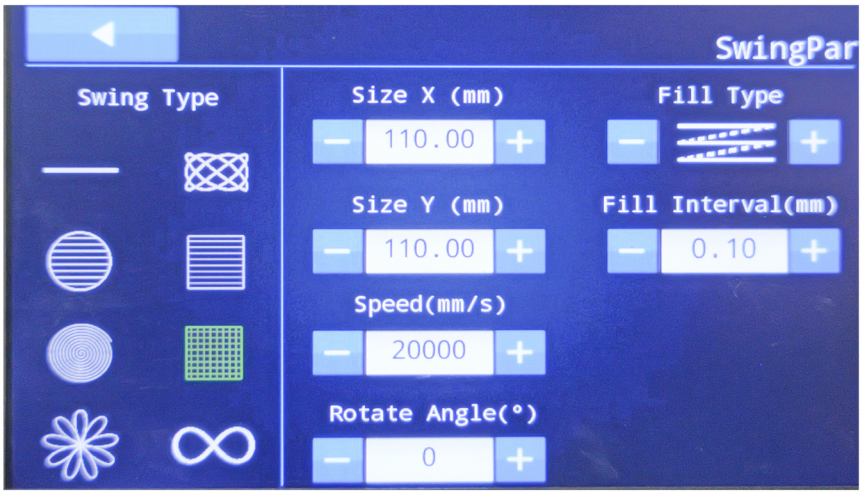
Cleaning Management

Click “Cleaning”, enter the password to enter the interface. Click “Swing” and “Power” to set the parameters. Please refer to 1.2 and 2.5 for parameter setting.

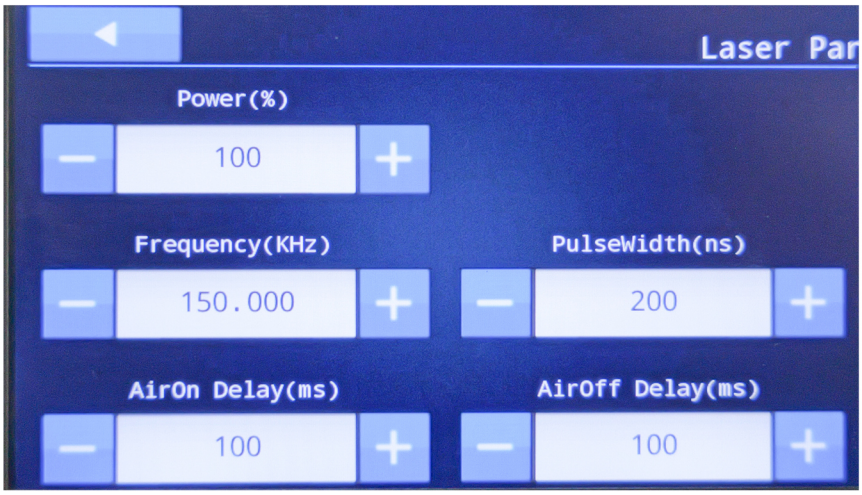
Click "Sway" and "Laser" to enter the cleaning preparation state. Aim the the cleaning head at the target with an interval of about 280mm (F254 field lens), and double-click the button of the cleaning head to start.

Note: In the process of cleaning, please pay attention to vacuuming. Otherwise the raised smoke and dust will cause damage to the lens!

1.2 Function description for swing parameter and laser parameter



Swing Par.



Laser Par.

Please refer to the following table for details:

Item	Parameter	Function	Note
swing parameter	Size X(mm)	Set the X-direction scan width	0-190mm (Depends on the lens)
	Size Y(mm)	Set the Y-direction scan width	
	Speed(mm/s)	Set the scanning speed of the cleaning head. Different tracks have different speed limits. The faster the speed, the more cleaning times per unit time.	
	Fill type	There are 3 different beam trajectories	
	Fill interval	The interval between filling lines. The denser the filling, the better the cleaning effect, but the lower the efficiency.	
	Fill angle	The inclination angle of the fill line. It can be set in conjunction with the "rotate angle" parameter.	
	Rotate angle	The overall rotation angle of the scanned graphics (does not include fill line angle)	
	Phase move	The phase shift speed of the sine line.	
	Sine Num.	Density series of sinusoidal wavy lines	
Laser Parameter	Power（%）	Control the power output of the laser source. The greater the power, the greater the energy.	0-100%
	Frequency（KHz）	The number of laser pulse output per unit time. It is used to adjust the energy density and needs to be adjusted with the pulse width. For details, please refer to 2.4.	1-4000
	Pulse Width	The duration of a single pulse. It controls the energy of a single laser spot. It needs to be adjusted with the frequency. For details, please refer to 2.4.	10-500
	AirOn Delay（ms）	Set the air blowing time in advance before cleaning starts	
	AirOff Delay（ms）	Set the time to keep blowing after cleaning	

1.3 Swing parameter table

Scanning Width（mm）	Scanning Speed（mm/s）
20	2500
30	3500
40	5000
50	6000
60	7500
70	8500
80	10000
90	11000
100	12500
110	13500
120	15000
130	16000
160	18000
190	20000

Note: The scan width is directly proportional to the scan speed. The narrower the scan width, the corresponding scan speed needs to be reduced.At this time, the cleaning intensity will increase. It is recommended to adjust the scanning width and scanning speed referring to the above table. Otherwise it may cause the galvanometer motor to whistle or even cause damage.

2. Laser parameter setting instructions

2.1. Control the output energy by adjusting the power. The higher the power is, the higher the output energy is, and vice versa.

2.2. The frequency can adjust the speed of the pulsed laser. The higher the frequency, the faster the speed, and vice versa.

2.3. The pulse width can adjust the the single output energy. Thelarger the pulse width, the stronger the energy, and vice versa.

2.4. The pulse width and frequency need to be adjusted accordingly. See the laser parameter table for details.

2.5. Laser parameter table

AGC-300A			
Pulse Width (ns)	Minimum Frequency (KHz)	Maximum Frequency (KHz)	Single Pulse Energy (mj)
10	1500	3000	0. 2
20	750	3000	0. 4
30	525	3000	0. 57
40	480	2000	0. 63
50	420	2000	0. 71
60	375	2000	0. 8
80	270	2000	1. 11
100	210	1000	1. 43
150	135	1000	2. 22
200	105	1000	2. 88
250	90	900	3. 33
350	75	600	4. 0
500	60	400	5. 0

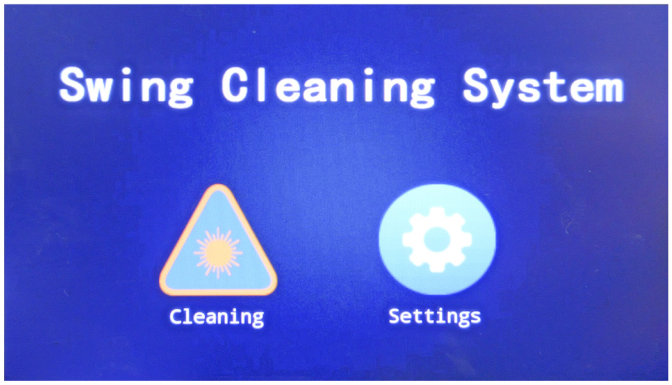
AGC-300			
Pulse Width (ns)	Minimum Frequency (KHz)	Maximum Frequency (KHz)	Single Pulse Energy (mj)
20	1875	3000	0.16
30	1350	3000	0.22
40	1050	2000	0.29
50	900	2000	0.33
60	825	2000	0.36
70	735	2000	0.41
80	675	2000	0.44
90	645	1000	0.47

AGC-300			
Pulse Width (ns)	Minimum Frequency (KHz)	Maximum Frequency (KHz)	Single Pulse Energy (mj)
100	525	1000	0.57
150	300	1000	1.00
200	255	1000	1.18
250	225	600	1.33
350	195	600	1.54
450	165	600	1.80
500	165	500	1.80

AGC-500			
Pulse Width (ns)	Minimum Frequency (KHz)	Maximum Frequency (KHz)	Single Pulse Energy (mj)
20	3300	4000	0.15
30	2000	4000	0.25
40	1600	3000	0.31
50	1000	3000	0.5
60	825	3000	0.61
80	725	2000	0.69
90	600	2000	0.83
100	500	2000	1.00
120	450	2000	1.11
150	400	1000	1.25
200	350	1000	1.43
250	330	600	1.52
350	330	500	1.52
450	330	400	1.52
500	330	400	1.52

Note: When the pulse width is high and the frequency is low, the laser's single-point energy is high, which can quickly produce a strong cleaning effect. This mode is more suitable for situations where the surface quality requirements are not particularly strict, especially for rough cleaning on metal surfaces. When the pulse width is low and the frequency is high, the laser's single-point energy is relatively low, which means that the intensity of each cleaning is small, but it provides better control and reduces the risk of damaging the substrate. This mode is suitable for occasions with strict requirements on surface finish, such as cleaning of precision parts or in the protection of artworks and cultural relics, it is necessary to avoid any damage to the delicate surface. It is recommended to set according to Table 2.5 during cleaning, and the parameters can be fine-tuned according to the actual situation.

3.System Settings



Main operation interface

Setting: Default password: 6, click to enter the system settings interface.

System Setting

Icon	Item	Function	Note
	Correct	Calibrate the scanning width when the focal lens is changed.	Need to be adjusted by a professional
	IO	Adjust the input and output signal types of the control board IO port	

Icon	Item	Function	Note
	Temp.	Detect and display the real-time temperature of the cleaning head	Need to be adjusted by a professional
	Users	Set up a user account and password	Customers can add accounts by themselves
	Others	Adjust the language displayed on the screen	Just adjust the language
	Versions	Check the program version of the screen and control box and the effective usage time of the system	When the expiration date is approaching, please contact the manufacturer
	PwrRamp.	The strong light spots on both sides of the laser are optimized to eliminate the strong light spots	If adjustments are required, please contact the manufacturer
	Dynpar.	Setting the laser power using the laser output button	It is not recommended to use without professional training

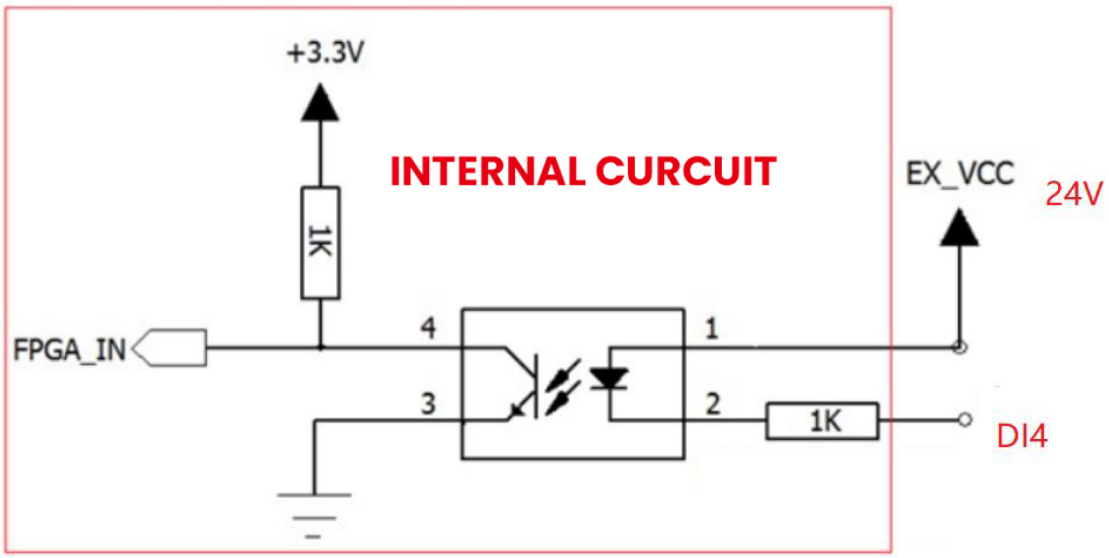
4. External IO triggers control start and stop

4.1. Connect the external control signal to DI4 (valid when low level)

4.2. Go to System Settings -> IO Settings, assign terminal DI4 function as "remote laser on" as shown in the figure below.

4.3. Return to the cleaning management page. After activating the sway and laser buttons, the cleaning head will be controlled to switch on and off through external signals.

4.4. Note: Before emitting laser, make sure that the cleaning head is firmly fixed to prevent it from falling off. The button of the cleaninghead and the external control signal cannot be used at the same time.



Ⅵ Fault analysis and troubleshooting

Fault phenomenon	Cause Analysis	Troubleshooting method
The spot does not swing	1. The control cable connector of the cleaning head is loose. 2. The motor or control card is damaged.	1. Tighten loose joints 2. Please contact us
Sudden loss of energy during cleaning	1. There are foreign objects or damage to the optical lens. 2. Laser failure or abnormality	1. If it is due to the protective lens, clean or replace it, and for other lenses please contact us. 2. Please contact us.
The cleaning head is hot	1. The optical lens is dirty or damaged 2. Optical path deflection	1. Clean or replace protective lenses. For other lenses, please contact us. 2. Check whether the connection between the optical fiber and the cleaning head is loose.
The cleaning effect before and after is inconsistent in the same condition	1. Power attenuation 2. The integrated cable is seriously bent	1. It is normal that the power attenuation is in the normal range. 2.The minimum bending radius of the integrated cable should be more than 200mm.

Ⅶ Maintenance

Note: In order to avoid personal injury and man-made damage, the maintenance of the handheld laser cleaning machine must be carried out by professionals.

1.Handheld cleaning head

1.1 Daily inspection: Check the protective lens. If there is foreign matter, use a special dust-free cotton swab dipped in industrial alcohol to clean it. If there is coating damage or lens damage, please replace

the protective lens in time to avoid other optical lenses being burned.

1.2 Regular inspection: When the machine is used or not used for some time(One week is recommended), first check the laser module, and make sure that each optical component is free from dust pollution, mildew, and other abnormal phenomena before turning it on.

1.3 Observing the light spot: The operator can check the laser output light spot with black image paper. Once the spot is found to be uneven or skewed, it should be repaired in time.

Ⅷ Warranty terms

1.The warranty period of this product is one year for the whole machine, and the warranty period for the laser source is two years:

1.1 From the date of purchasing this product, our company provides free warranty within one year. If the machine need to be returned to the factory for repair, the user only needs to bear the cost of two-way transportation.

1.2 This product is repaired free of charge for life, and the user only needs to bear the cost of spare parts and two-way transportation.

2.The following scopes are not covered by warranty:

2.1 Damage caused by improper use such as violent bumping, bending, etc.

2.2 Human-caused damage.

2.3 Laser accessories and consumables are not guaranteed (galvanometers, field mirrors and other optical parts, Integrated cables, etc. are not covered by the warranty).

※ The relevant technical parameters listed in this manual are for reference only. The relevant product information is subject to change without prior notice. All technical parameters and agreements are subject to the terms of the sales contract.

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