Aerosol Generator
Model 3990-01

Operation Manual

Please carefully read and understand the warnings and precautions marked in this manual before using the product For the convenience of long-term use, please keep this manual properly.

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Users Must Know

1. **Please read this manual carefully and be familiar with relevant terms before using the instrument.**
2. **Failure to operate in accordance with the requirements of this manual may cause instrument damage, fire, electric shock or other serious personal.**

We define the types of warnings used in the manual as follows.

[Marking Instruction]

Warnings Prevent personal accident
There may be a risk of personal accident for ignoring the contents of such warnings.

Attentions Precautions Prevent damage to the instrument
The instrument may be damaged or its performance may be degraded for ignoring the contents of such warning.

[Icon description]

△ Symbol indicates precautions (including danger). There are specific precautions drawn in the triangle frame.

⊘ Symbols indicate prohibited matters. Specific prohibited content is drawn within the circular frame

● Symbols indicate mandatory actions. Draw specific content near the picture

⚠ Warning	
 **Placement prohibited**	○ It is prohibited to place the instrument in flammable, explosive and corrosive gases ... Otherwise, it may cause fire or even explosion
 **Disassembly is prohibited**	○ Do not disassemble or modify the instrument ... Otherwise, the instrument may not work properly.
 **Correct use**	○ Please use the instrument correctly according to the requirements of the instruction manual.

Content

I. Product Overview

Model 3990-01 is a portable aerosol generator that does not require a power supply. After the aerosol solution is injected, clean compressed air is introduced at the inlet end, and the output concentration is adjusted according to actual needs, so that polydisperse aerosol particles that meet industry standards can be produced.

Aerosol generator as an aerosol dust source generation device, usually used in the filter upstream of the dust, can be used in conjunction with the aerosol concentration detection instruments (photometer or particle counter), through the comparison of filter upstream and downstream aerosol concentration to calculate the efficiency of HEPA air filtration, or to determine whether the system is installed with leakage, the purpose of checking for leakage is to find out the defects of the filter itself and the installation process in a timely manner. to take appropriate remedial measures to ensure the cleanliness of the area.

1.1 Product Features

★ No need for power supply, only compressed air supply is required work

★ The aerosol concentration is controlled by 3 regulating valves to meet different test requirements

★ Stainless steel portable housing, pressure resistant design

★ 3-inch standard sanitary flange outlet

1.2 Applications

★ Test for high efficiency particulate air filter

★ Nuclear energy and fuel

★ Pharmaceutical industry and electronic industry

★ Medical operating room, clean room

★ Biosafety cabinet, clean bench

★ Food processing, scientific experiments

1.3 Main Specifications

Flow range	50~8100 cfm
Aerosol concentration	100μg / L @ dilution flow 810 cfm 10μg / L @ dilution flow 8100 cfm
Air source	Clean, dry compressed air, pressure range 72~116psi (0.5~0.8MPa)
Generate particles	PAO、DOP、Much dispersed
Occurrence method	1~6 Laskin Nozzle
Overall dimensions（L x W x H）	28cm(L)×27cm (W)×25cm (H)
Weight	8.4 kgs

Power supply	unnecessary

Attached: Commonly used conversion units

1 Psi = 6.89×10^{-3}MPa

1 MPa = 145 Psi

1 CFM = 1.7 m^3/h

1 m^3/h = 0.59 CFM

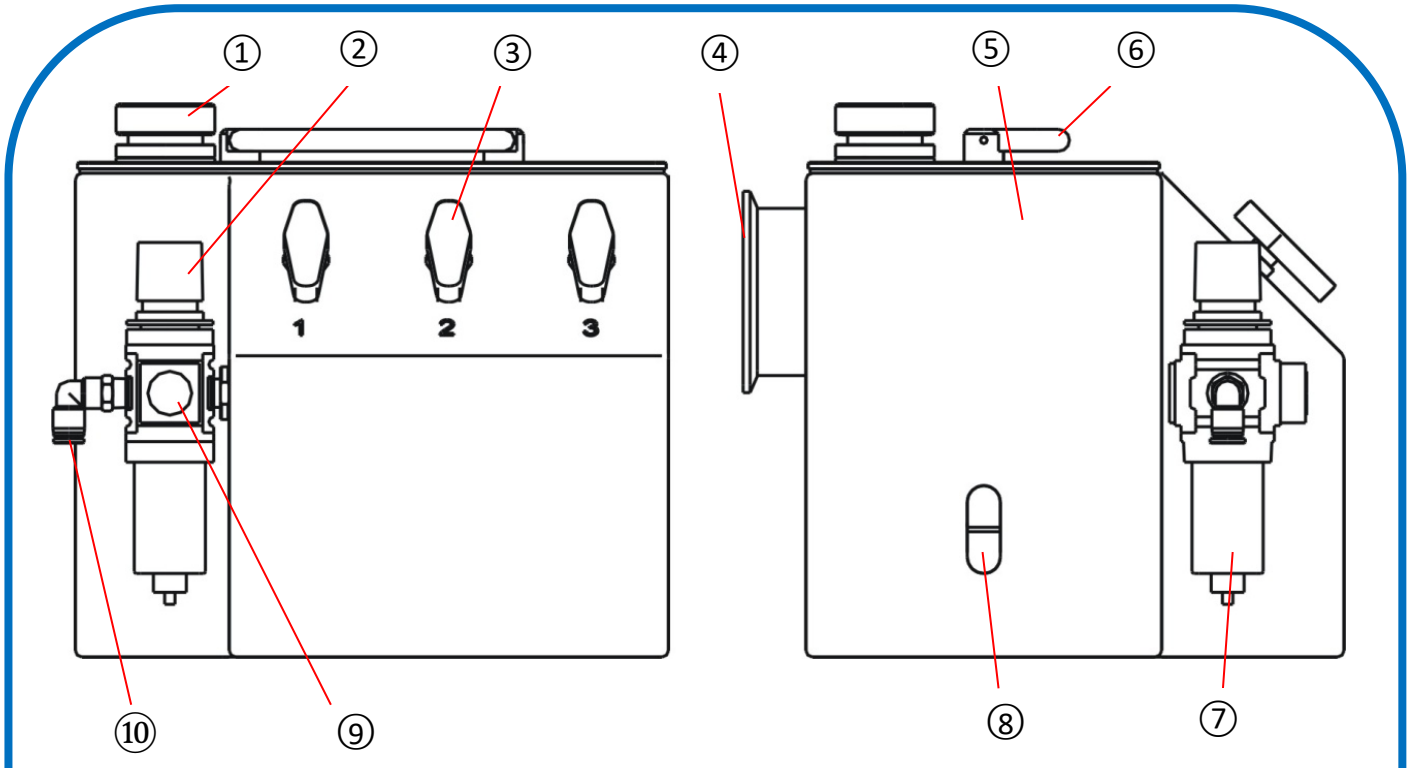
1 μg / L = 1 mg / m^3

1.4 Packing List

Name	Quantity
Main unit (with portable handle)	1
Clamp	1
Silicone gasket	1
Chuck (with water pipe connector)	1
Hose clamp	1
Manual	1

II. Instrument Introduction

2.1 Main Engine Introduction

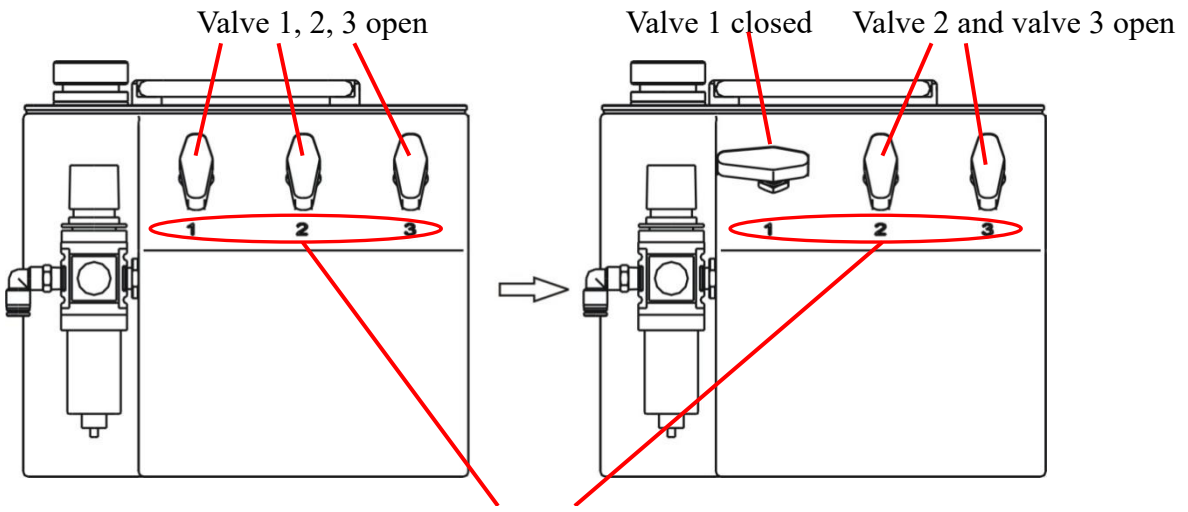


①—Liquid injection port ②—Pressure adjustment knob ③—Concentration adjustment valve

④—Aerosol outlet ⑤—Case ⑥—Carrying hands ⑦—Filter ⑧—Liquid indicator window

⑨—Pressure gauge ⑩—Air outlet

2.2 How to use the concentration regulating valve



1, 2, and 3 are not only the code names of the valve, but also represent the number of nozzles that the valve can control.

Warning

The direction of the concentration adjustment valve is an indicator of the nozzle closed/open status.

a. Nozzle closed: valve handle is horizontal;

b. The nozzle is open: the valve handle is vertical.

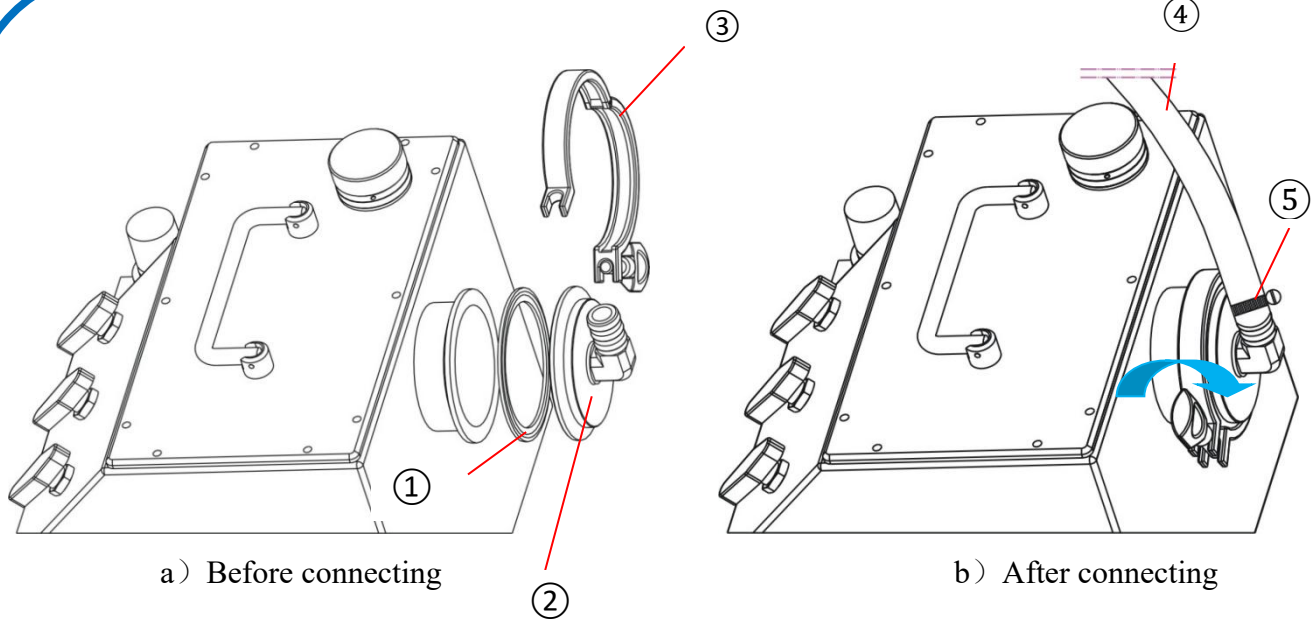
1, 2, and 3 are not only the code names of the valves, but also represent the number of nozzles that the valve can control, that is, valve 1 controls 1 nozzle, valve 2 controls 2 nozzles, and valve 3 controls 3 nozzles.

Under the same pressure, the more open nozzles, the greater the aerosol concentration produced

By changing the valve switch to control the number of nozzles opened, the aerosol output concentration is changed. See the table below for details:

Number of nozzles used	Valve 1 status	Valve 2 status	Valve 3 status
1	√	×	×
2	×	√	×
3	×	×	√
4	√	×	√
5	×	√	√
6	√	√	√
Note: √ represents open and × represents closed			

2.3 Aerosol outlet connection



a）Before connecting　　b）After connecting

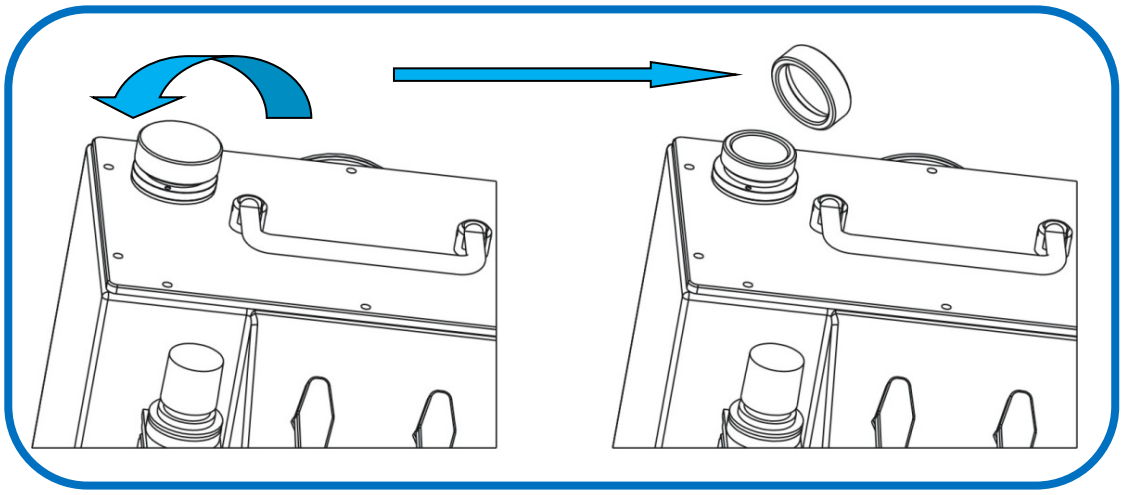
①—Silicone gasket ②—Chuck ③—Clamp ④—Inner diameterφ19water pipe ⑤—Hose clamp

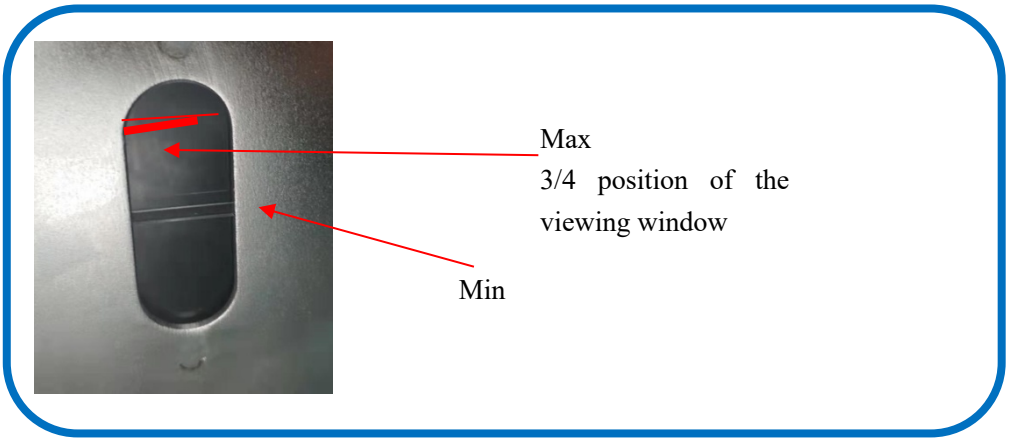
Note：1. The connecting water pipe must be purchased by the user according to the actual length.
2. The hose clamp is locked with a flat-blade screwdriver.

Warning
In any case, keep the outlet and pipeline unblocked, otherwise the instrument will be deformed and leaked, and in severe cases, the housing will explode, threatening personal safety.

2.4 Aerosol injection

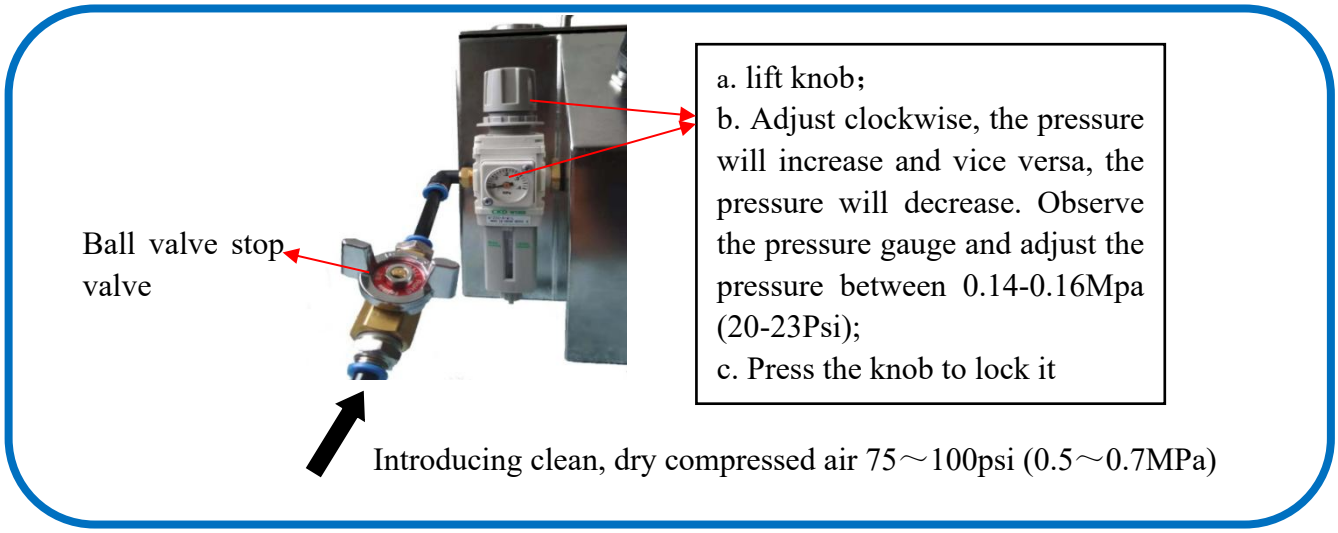
Unscrew the filling cap on the top of the tank and inject the dusty aerosol liquid, PAO-4 is recommended. The liquid level range is between Min and Max indicated in the figure below. Please replenish the aerosol liquid in time when the liquid level is close to Min. And tighten the filling cap after filling the liquid.





2.5 Adjustment of working pressure

Introduce clean and dry compressed air supply at the air inlet of filter regulator. It is recommended to use a cut-off valve (ball valve) to turn on or turn off the air supply of the instrument. Turn on the air supply and adjust the working pressure according to the method indicated in the figure below.



III. Preparation before Transportation

1. Drain all liquids from the machine.
2. Make sure the filling cap is fully tightened.
3. Plug the aerosol outlet flange to prevent residual liquid from damaging the box.

IV. Common Causes of Failures and Solutions

Common fault phenomena	Possible reasons	Countermeasures
No change in input pressure	Test pressure not connected	Turn on test stress source
	Reaching the upper limit of the pressure source	Replace the inlet pressure source
Aerosol oil mist leakage	Part joint sealing problem	Replace sealing ring or locking screw
	Leakage at the welding point of the shell	Contact the manufacturer

V. Warranty and After-Sale Service

5.1 Warranty

- Warranty card is attached in the package of the instrument, when you buy the product, please fill in this warranty card carefully.
- From the date of purchase of the product (except consumables), if there is a quality problem, our company warranty for one year.
- The warranty does not cover the following conditions if they occur during the warranty period.

  1) Use the instrument under inappropriate conditions and environments specified in this manual, or malfunctions caused by improper operation.

  2) Unauthorized modification, disassembly and repair.

  3) The instrument itself does not cause the malfunctions.

  4) Improper use of the instrument.

  5) Instrument damage caused by natural disasters and other factors.

5.2 After-Sale Service

- If an abnormality occurs, please contact our company.
- Due to quality problems, the instruments under warranty will be repaired by us at no cost.
- After exceeding the warranty period, our company will carry out paid repairs according to the user's needs.
- If the product is discontinued, repair parts will be kept for at least 5 years, please contact us for details.

Annex: Aerosol Concentration Calculation Description and Formula

The following formula can be used to calculate the aerosol concentration produced and output by the nozzle when the solution is DOP and the output air supply pressure is 20psi, or the solution is PAO-4 and the output air supply pressure is 23psi:

$$\text{Output aerosol concentration } (\mu g/L) = \frac{13{,}500 \times (\text{Number of nozzles turned on})}{\text{total traffic (cfm)}}$$

Note: For different aerosol liquids to generate aerosol of the same concentration, the required pressure of output air supply is different. Refer to the following table for specific pressure:

Aerosol liquid	Air source pressure occurs (psi)
DOP/DEHP	20
DOS/DEHE	24.4
White mineral oil	22
Polyethylene glycol	26.6
Paraffin oil	24.2
Corn oil	23.4

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