

Attention: Before operating this CLJ-03A01 Laser Particle Counter (LPC), user must read this operating manual carefully, please!

CLJ-03A01 Laser Particle Counter (LPC)

Executing Standard Q/320500GSUB001-2000

OPERATING MANUAL

ISO9001:2000 CERTIFIED
SUZHOU CLEANING TECH. RESEARCH INSTITUTE
BAISHEN TECHNOLOGY (SUZHOU) CO., LTD.

CLJ-03A01 Laser Particle Counter (LPC)

Operating Manual

1. *General Description*

CLJ-03A01 Laser Particle Counter (LPC) is designed according right angle accepting format; LPC operating concept is equal as same nature particle counter according particle optical scattering. According American Federal Standard FS-209E. Our national accepting standard JGJ171-90 for cleaning room construction, Pharmaceuticals specification "Good Manufacturing Practice" (GMP) and real usage requirement of our customers, CLJ-03A01 LPC adopts semiconductor laser as sensor optical source, and it can maintain particle size sensitivity in $0.3\mu\text{m}$, guarantee degree of cleanliness. Class 100 for $0.5\mu\text{m}$ particle size.

LPC is a counter using semiconductor optical source. It features that laser source wavelength is uniform, energy concentration. LPC overcomes disadvantages of incandescent light source they are short usage life, bigger power consumption, easy interruption and etc, so LPC has high measuring sensitivity and high accuracy. small dimensions, light weight, convenience. LPC main functions are measuring particle size, (divided 6 ranges $0.3\mu\text{m} \sim 10\mu\text{m}$) counting dust particles pieces.

CLJ-03A01 Laser Particle Counter Can judge degree of cleanliness according 95% creditability of American Federal Standard "FS-209E", also LPC can count particle pieces in one cubic meter for customer's convenient usage.

Before LPC shipping from the manufacturer, every LPC should be checked/tested according our national accepting specification JJG547-88. LPC features auto-printing, digital display, large sampling rate (2.83liters/min), multi-function, space saving, light weight, data standardization, high accuracy and etc.

LPC has a series of excellent superiority, so it can be used in electronics industry, pharmaceuticals, hygiene, precision mechanical engineering, colour TV tube making, tape making and etc for measurement of clean environment.

2. *Technical specification*

- 2.1. Self-cleaning time: 10min.
- 2.2. Repeatability characteristic: 10% (relative standard error).
- 2.3. Accuracy: 35% (relative error).
- 2.4. Scattered degree: 25%.
- 2.5. Sampling volume rate: 2.83liter/min (0. ICMF)
- 2.6. Minimum measuring particle size: $0.3\mu\text{m}$
- 2.7. Outline dimension of LPC: 240(L) 140(H) 170(D)mm.
- 2.8. Weight: 4kg

3. *Operating ambient condition*

- 3.1. Temperature: $+10 \sim +35$
- 3.2. Relative humidity: 75%RH
- 3.3. Power supply: 220 22V, 50Hz, single phase
- 3.4. Max. permissible measuring dust concentration 3 million particles pieces in 2.83 liter volume. (0.1 cubic feet volume)

4. LPC Functions

- 4.1. Particle size can be divided into 6 ranges: 0.3, 0.5, 1, 3, 5, 10 μm .
- 4.2. Sampling time: 1~10min.
- 4.3. Sampling points: sampling points can be set from 2 to 7 points.
- 4.4. Sampling times at each point: sampling times at each point can be set from 2 to 9 times.
- 4.5. Six ranges of particle size can be measured simultaneously, also order number and digital display of particle size in a certain range are indicated.
- 4.6. LPC can convert particle PCS in 2.83 liters volume to particle PCS in one cubic meter volume.

5. Operating Procedure

5.1. LPC burn-in

- 5.1.1. Put electric plug on connector located on rear panel, press power switch, digital display on the front panel is indicated as **P 0000**, it means that LPC is in stand-by state, and start to burn-in.
- 5.1.2. Burn-in time is 15 minutes.

5.2. Self-checking for LPC

- 5.2.1. Press "SELF-CHECKING" key located on the front panel, the corresponding indication bulb is bright, digital display is changed from **P 0000** to **PP 0000**, one minute later it is converted to **Y 0000**, it means that LPC operates normally.
- 5.2.2. At this time press "SELECT" key, the select indication bulb is bright, then press " \uparrow " or " \downarrow " key repeatedly until count value 99208 for particle size 0.3, 0.5, 1 μm is displayed, or count value 9618 for particle size 3, 5, 10 μm is displayed. At this case LPC normal operation is further more certificated.
- 5.2.3. Press "SELF-CHECKING" key again, the indication bulb is turned off, self-checking function is cancelled, **P 0000** is recovered to indicate again on the digital display.
- 5.2.4. Upon 5.2.3 is confirmed normally, the following procedure can be going on.

5.3. Measuring period Set

- 5.3.1. PLC has automatic setting period time function for one minute, so it is not necessary for setting period time of one minute.
- 5.3.2. Other period time setting is performed as follows:
 - 5.3.2.1. PLC should be in stand-by state, and **P 0000** is indicated on digital display.
 - 5.3.2.2. Press "PERIOD" key, period indication bulb is bright, digital display is changed from **P 0000** to **F n**, in this case, "F" represents that LPC is in period time adjustable state, "n" represents that LPC measuring period time is from 2 min to 10min optimally.
 - 5.3.2.3. "PERIOD" and " \uparrow " or " \downarrow " keys are pressed for corresponding period time setting. For example, display is indicated as **F 2**, "2" means period time is 2 minutes, after period time setting is completed, then press "PLAY" key again, in this case "PERIOD" indication bulb is still bright.

5.4. Real clock time correction

- 5.4.1. LPC can indicate year, month, date, o'clock and minute on the "TIME" digital display. When LPC operates, these data can be printed for customers' archives.

- 5.4.2. LPC real clock time correction is only performed when digital display is in **P 0** state.
- 5.4.3. Press "TIME" key, corresponding indication bulb is bright, digital display is from **P 0** to **1 XX**, then press "↑" or "↓" key repeatedly digital display "1" is indicated as required year.
- 5.4.4. Press "TIME" key again, "TIME" indication bulb is bright, press "TIME" key until digital display is indicated as **2 XX**, "2" represents required month.
- 5.4.5. Press "TIME" key again, "TIME" indication bulb is bright, press "TIME" key until digital display is indicated as **3 XX**, "3" represents required date.
- 5.4.6. Press "TIME" key again, "TIME" indication bulb is bright press "TIME" key until digital display is indicated as **4 XX**, "4" represents required o'clock.
- 5.4.7. Press "TIME" key again, "TIME" indication bulb is bright press "TIME" key until digital display is indicated as **5 XX**, "5" represents required minute.
- 5.4.8. When real clock time correction is completed, press "TIME" key, "TIME" indication bulb is turned off, digital display is recovered as **P 0** state.
- 5.4.9. If require to print real clock time data, when print test data is performed simultaneously, in this case "TIME" indication bulb must be in bright state.
- 5.4.10. If there's no requirement to print real clock time data. Press "TIME" key until "TIME" indication bulb is turned off.
- 5.4.11. At normal use condition, real clock time should not be corrected often. This correction is recommended once after several days' use.

5.5. *How to set sampling points and sampling times for each point.*

- 5.5.1. At first, digital display must be at **P 0** state, if it is not, press "PLAY" key once or twice until it is recovered at **P 0** state.
- 5.5.2. Press "209E" key, digital display is changed from **P 0** to **A X**, then press "↑" or "↓" key repeatedly until digital display is indicated as **A X**, A means required points.
- 5.5.3. Press "209E" key again, digital display is changed from **A X** to **L X**, then press "↑" or "↓" key repeatedly until digital display is **L X**, L means required sampling times.
- 5.5.4. After setting sampling points and sampling times for each point, press "209E" key once again, digital display is recovered at **P 0** state.

5.6. *Measuring procedure of LPC*

After setting measuring period time real clock time correction setting sampling points and sampling times for each point, measuring procedure of LPC according GB/T16292-16294 is as follows:

(National Standard GB/T16292-16294 "Test method for airborne particles in clean room (area) of the pharmaceutical industry")

- 5.6.1. Press "PERIOD" key, period indication bulb is bright, at this time period time is as set period time. If sampling time is one minute, it is not necessary to press "PERIOD" key.
- 5.6.2. Press "PLAY" key, LPC enters to measuring state, press "209E" key and "TIME" key, "209E" indication bulb and "TIME" indication bulb are bright.
- 5.6.3. Pull off sampling plastic tube from connection mouth located on the rear panel of

LPC, then a dynamic sampling head is connected with the connection mouth .
(The dynamic sampling head is a necessary accessory when purchase LPC)

- 5.6.4. Tune "FLOW RATE ADJUST" switch located on the rear panel of LPC until upper surface level line, i, e, flow rate is 2.83 liter/min (0.1CFM).
- 5.6.5. Put the dynamic sampling head on the first sampling position, the LPC starts to measure. The test results are printed after measuring is completed for each measuring. Because it is only necessary to print real clock time data at the beginning sheet, so after printing real clock time data at the first sheet, press "TIME" key once, "TIME" indication bulb is turned off, it means real clock time correction is cancelled.
- 5.6.6. When the first sampling times are reached for setting times, press "209E" key, "209E" indication bulb is turned off, it means measuring the first sampling point is completed.
- 5.6.7. Move the first sampling point to the second sampling point then press "209E" key again, measuring the second sampling point begins.
- 5.6.8. Follow this operating procedure repeatedly until measuring all sampling points is completed finally.
- 5.6.9. At last, LPC can print VCL data of particle size 0.5 μm ; 5 μm ; 95% creditability. UCL data is in PCS/ m^3 , and it can judge air cleanliness level.

5.7. Explanation for "PLAY", "SFLECT" and "pcs/ m^3 " keys.

5.7.1. "PLAY" key

- 5.7.1.1. Press "PLAY" key, LPC begins to measure, digital display located on the front panel is indicated as follows: On the left particle size is displayed, and on the right particle PCS in 2.83 liter volume (0.1 cubic feet volume) is displayed.
- 5.7.1.2. At this case digital display is skipped continuously, Skipping fast means there's high particle concatenation in air, conversely skipping slowly means there's low particle concentration in air.
- 5.7.1.3. When a LPC measuring is completed, LPC can clear zero automatically, and restart to perform the second measuring.
- 5.7.1.4. Each measuring data only can be printed/recorded.

5.7.2. "SELECTION" key.

- 5.7.2.1. Press "SELECTION" key once, the selection indication bulb is bright.
- 5.7.2.2. Press/release "⬆" or "⬇" key repeatedly until digital display indicated as required particle size.

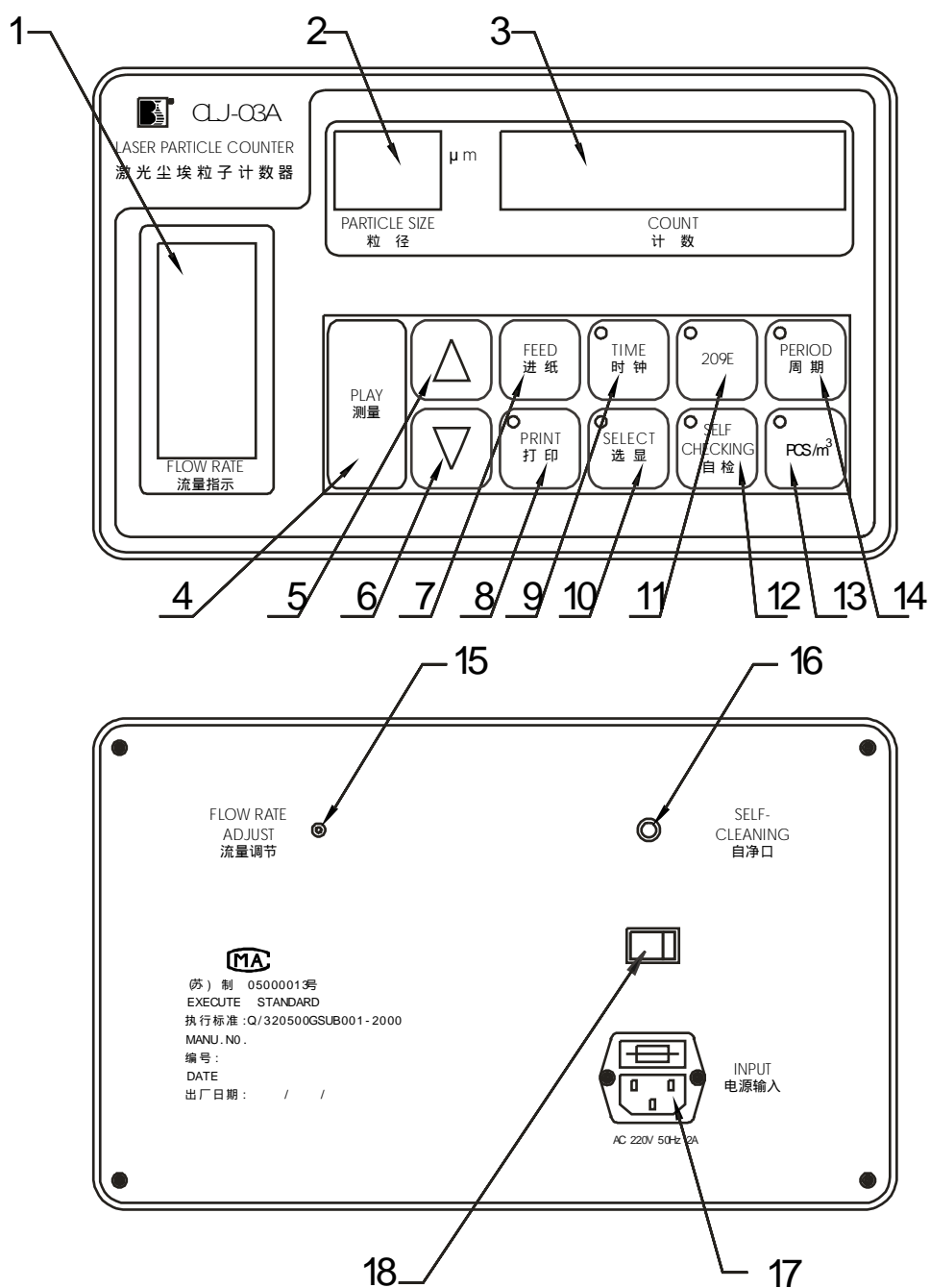
5.7.3. "pcs/ m^3 " key.

- 5.7.3.1. Press "pcs/ m^3 " key, the "pcs/ m^3 " indication bulb is bright.
- 5.7.3.2. PLC can convert particle pieces in 2.83 liter volume to particle pieces in one cubic meter volume.

5.8. How to finish LPC operation

- 5.8.1. Upon LPC operation is finished, don't turn off LPC at once.
- 5.8.2. Put off away sampling head, and insert plastic tube onto a self-cleaning mouth located on the rear panel of LPC.
- 5.8.3. In order to clean dust in the tube system, go on operating for 3~5 minutes.
- 5.8.4. When digital display is indicated as zero for 0.5 μm particle size, turn off power supply, then packing by a clean plastic bag.

6. Function Explanation of the Front Panel and the Rear Panel



- | | | |
|------------------------------------|----------------------------|------------------|
| 1. Flow rate | 2. Particle size | 3. Count |
| 4. Play | 5. Δ | 6. ∇ |
| 7. Feed | 8. Print | 9. Time |
| 10. Select | 11. 209E | 12. Self Checkig |
| 13. pcs/m ³ | 14. Period | |
| 15. Flow rate adjust rotary switch | 16. Filter connector-mouth | |
| 17. Main power supplies connector | 18. Power supply switch | |



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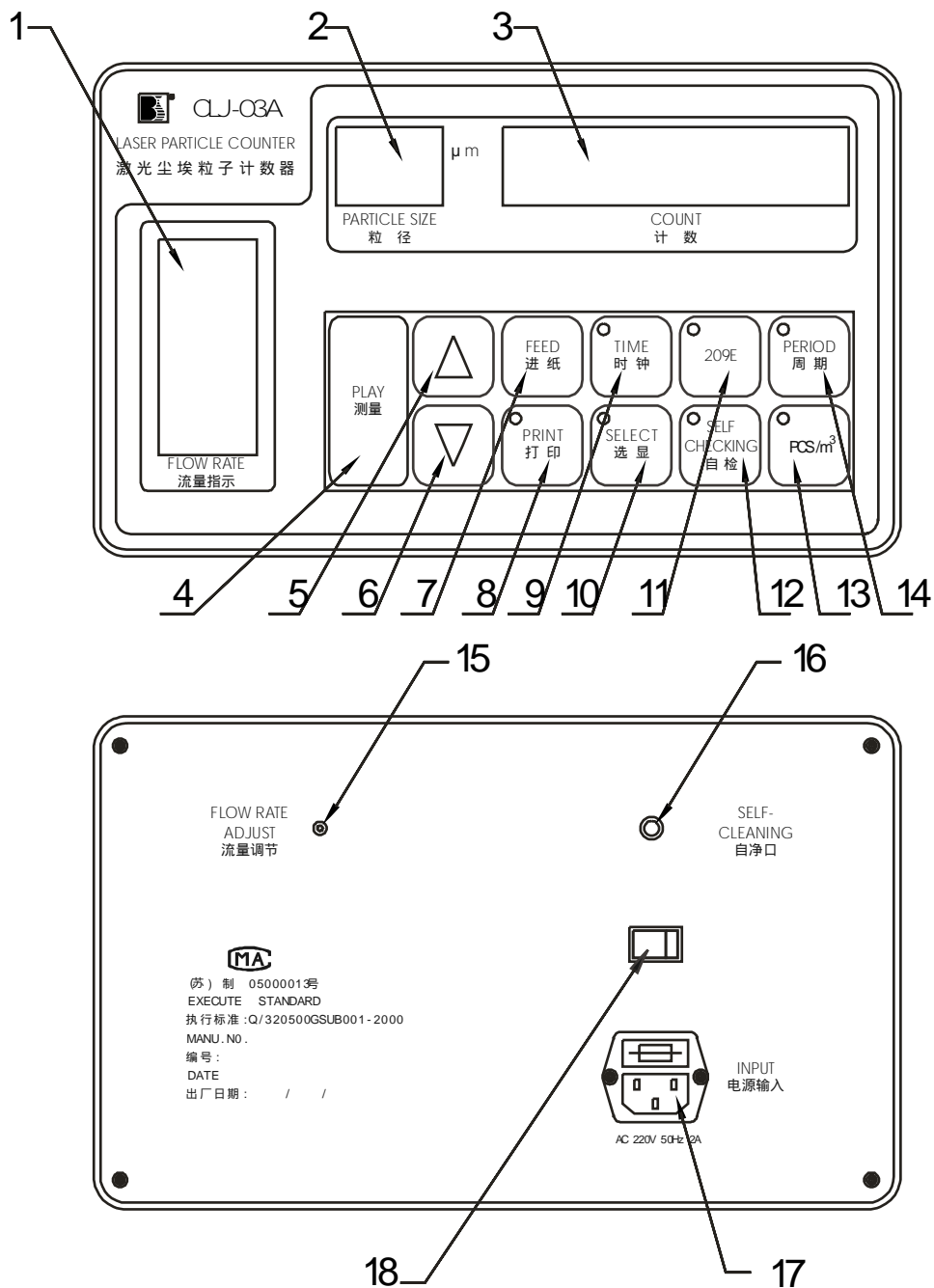
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6. 面板及后板功能说明



- | | | |
|-------------|---------------|------------|
| 1. 流量计 | 2. 粒径显示 | 3. 颗粒数显示 |
| 4. 测量开始键 | 5. 增量调节键 | 6. 减量调节键 |
| 7. 进纸键 | 8. 打印键 | 9. 时钟调节键 |
| 10. 粒径选择显示键 | 11. 209E设置键 | 12. 仪器自检键 |
| 13. 单位换算键 | 14. 检测周期键 | 15. 流量调节旋钮 |
| 16. 过滤器接嘴 | 17. 电源插座及保险丝座 | 18. 电源开关 |



CLJ-03A激光尘埃粒子计数器说明书

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