1. Application

SISCO-PC-3016H handheld dust particle counter (hereinafter referred to as the instrument) is used to measure the size and number of dust particles per unit volume of air in a clean environment. It can directly detect clean environments with cleanliness levels ranging from one million to one hundred.

This instrument uses semiconductor laser light source and LCD display. It is small in size, light in weight, high in detection accuracy, simple and clear in function operation, computer controlled, capable of storing and printing sampling results, and very convenient for testing clean environment. It is widely used in electronics, optics, chemistry, food, cosmetics, medicine and health, biological products, aerospace and other departments.

2. Main technical parameters

- 1. Overall dimensions: $130 \times 220 \times 45$ mm³ (width×depth×height)
- 2. Mass 0.6kg
- 3. Maximum power consumption 8W
- 4. Power supply DC power supply 8.4V
- 5. Particle size channels: 0.3, 0.5, 1, 3, 5, 10 ($\mu\text{m})$
- 6. Sampling flow rate: 2.83L /min
- 7. Operating environment Temperature: 10℃ —30℃

Humidity: 20% ----75%

Atmospheric pressure: 86kPa — 106kPa

8. The maximum sampling concentration allowed: 35000 particles L (dust particle

size is not less than 0.5m), the sampled air must

not contain corrosive gases such as acid and alkali

9. Self-cleaning time \leqslant 10min

3. Working Principle

This instrument uses the principle of light scattering. When suspended particles in the air pass through the photosensitive area, they scatter a light flux that is proportional to their particle size. After photoelectric conversion, amplification and processing, the equivalent diameter and number of the collected particles are obtained.

4. Function

Front panel

It contains an LCD screen and eight function keys: "Reset", "Sample", "Print", "Exit", "▲", "▼", "Confirm", and "Mode". The LCD screen display content is controlled by a computer, and the procedure is as follows:

1: Startup screen

Y09-3016 Handheld laser dust particle counter Welcome to use

See Figure 1 for the boot screen.

2: Setting screen

Press the "Confirm" button to enter the settings screen See Figure 2 for the setting screen.

● Data Measurement	
Date: September 6th, 2005	
Time: 8:05	
Measure Position: 101	
Operating Parameters	
Clear the data: O	
Data Query	

Figure 2

Each time you press the " $\mathbf{\nabla}$ " key, the cursor moves down, and each time you press the " \blacktriangle " key, the cursor moves up with a "beep" sound. When the cursor moves to the date, press the "Confirm" key to enter the date adjustment interface. 05-09-06 , Indicates adjustment position, press the " \blacktriangle " key to increase in sequence (0-9), each time the " $\mathbf{\nabla}$ " key is pressed. The cursor moves

backwards in sequence and cycles. Press the "Confirm" key to save the current settings and exit. Other function settings are the same as above. Measuring position: 000-999 can be adjusted arbitrarily, 000 means don't care about the position, the rest can be set by yourself.

Clear data: To clear memory data, 0 does not clear the memory. If you want to clear the memory, adjust 0 to 5 and press the "**Confirm**" key. The number changes to 9, indicating that all memory is cleared (do not set it to 5 easily).

3: Setting screen - (operating parameters)

Press the "Confirm" button to enter the settings screen

See Figure 3 for the setting screen.

Operating Parameter Settings
Cycle T:00 Hour 01 Minute 00 Second Number of continuous measurements: 00 Measurement Interval: 0000 Second time-Lapse: 00 Second Alarm: 0 confidence coefficient: 2 Count: 2 Exit setup

Figure 3

Note: Period T: represents the sampling period, which can be selected between 1 second and 12 hours.

Continuous measurement times: represents the number of times each point is sampled (used when calculating UCL).

Measurement interval: represents the time of each measurement interval. Delay time: represents the delay of each measurement.

The alarm level is 0-5, 0 represents no alarm function, 5 represents 100-level alarm, 6 represents 1,000-level alarm, 7 represents 10,000-level alarm, 8 represents 100,000-level alarm, and 9 represents 300,000-level alarm. If the environment exceeds the set level, a "beep" alarm sound will be emitted at the end of the sampling cycle.

Confidence status: "0" means the confidence status is off, and confidence status: "1 2 3 4" means the confidence status is on. Confidence:

1 represents: ISO
2 represents: old GMP
3 represents: static
4 represents: dynamic

The number of measuring points is the number of locations to be measured, which can be set between 2 and 9 (used when calculating UCL).

After the parameters are set, move the " \bullet " cursor to exit the setting and press the confirm key to enter the measurement interface.

4: Query screen

" \bullet " Move the cursor to data query, press the confirm key to enter the query interface Figure (IV)

Measurement data query Date: September 6th, 2005 Start the query Exit the query

Figure 4

Each time you press the " $\mathbf{\nabla}$ " key, the cursor moves down, and each time you press the " $\mathbf{\Delta}$ " key, the cursor moves up, accompanied by a "beep" sound. When the cursor moves to the date, press the confirm key to enter the date adjustment interface. September 6, 2005 <u>,</u> Indicates adjustment position, press the " $\mathbf{\Delta}$ " key to increase in sequence (0-9), each time the " $\mathbf{\nabla}$ " key is pressed. The cursor moves backwards in sequence and cycles. Press the confirm key to exit the current setting and save the current setting. **•** Move the cursor to the start query, press the "**confirm**" key to start the query, and after 2-3 seconds, the screen will display the data to be queried. If there is no data, it will be displayed as no data. Press the "exit" key to return to the setting screen. **•** Move the cursor to the data measurement, press the "**confirm**" key to enter the measurement interface.

5: Measurement interface

Inquire			F:0.0	OL/
			T:00	060
0.3um				0
0.5um				0
1.0um				0
3.0um				0
5.0um				0
10um				0
L:000		200)5/09/05	10:34:00
W:OFF	P:ON	S:OFF	Recs:	0086/1000

The measurement screen is shown in Figure (5)

Figure 5

Query in the upper left corner of the screen. F: 0.00L/min in the upper right corner of the screen means the sampling pump is off, T: 00060 means the sampling cycle is 60 seconds. 0.3, 0.5, 1, 3, 5, 10 (μ m) means the particle size of the sampled particles, and the following value means the number of particles. L: 000 means the address number is 0, 2005/09/05 means the date of the last sample save, and 10:34 means the time of the last sample save. W: OFF means the observation function is off. P: OFF means the print function is off, press the "Print" key to turn it on (ON). S: OFF means the storage function is off, press the "Confirm" key to turn it on (ON). R: 0086/1000 means 86 data are stored out of a maximum of 1000 data. In the case of no sampling, press the "Mode" key, and the number of particles displayed on the screen switches between the number of particles in each cycle (particles/sampling volume of the sampling cycle) and the concentration (particles/cubic meter) as shown in Figure (V). Press the " \blacktriangle " or " \checkmark " key to view the stored measurement data.

After pressing the "Sampling" key, F: 0.00L/min on the screen changes to F: 2.83L/min (sampling flow rate). T: 060 changes to T: 00001/060 (001-060 increments). At this time, pressing the "Mode" key can turn on W: ON, indicating that the observation function is turned on. The screen displays the changes in the number of sampled particles in the current cycle in real time, see Figure 6. The function of the "Mode" key switches between three display modes.

Sampling			F:2.8	3L/m
			T:00	001/00060
0.3um				0
0.5um				0
1.0um				0
3.0um				0
5.0um				0
10um				0
L:000		2005/	/09/05	10:34:00
W:OFF	P:ON	S:OFF	Recs:	0086/1000
		Figure 6	5	
Sampling			F:2.83	3L/m
			T:000	005/00060
0.3um				10
0.5um				3
1.0um				0
3.0um				0
5.0um				0
10um				0
L:000		2005/	09/05	10:34:00
W:OFF	P:ON	S:OFF	Recs:	0086/1000

Figure (VII) shows the particle concentration displayed by the instrument.

Note: The first state after entering data measurement is the data last saved when the machine was last shut down.

6: Use of confidence level (number of measurement points 2-9)

In Figure (2), set the confidence level to 2 (0-4 options), set the number of measurement points between 2 and 9 (depending on the room area and cleanliness level), and number the measurement positions yourself. For example, Room 1 measures 3 points, each point 3 times.

First: adjust the parameters to the following state,

Operating parameter Settings
Period T: 00:01:00
Continuous measurement times: 03
Measurement interval: 0000 seconds
Delay: 00 seconds Alarm: 0
Confidence Level: 2 Points: 3
Exit Settings

Second: Press "Confirm" to enter

Sampling	A:01	/03	F:	2.83L/m
N:	01/03		T:0006	50
0.5um				0
5um				0
L:000		200	5/09/05	10:34:00
W:OFF	P:ON	S:OFF	Recs:	0086/1000

Third: Press the **"Sampling"** button to turn on the sampling pump and measure the first point. The screen is now

Sampling A:01/03	F:2.83L/m
N:01/03	T:00005/00060
0.5um	0
5um	0
L:000 C:001/003	2005/09/05 10:34:00
W:OFF P:ON S:	OFF Recs: 0086/1000

- A represents the number of points: A=1/3 represents the first point to be measured.
- N represents the number of times: C=001/003 represents the first time of this point.
- C represents the number of times: C=001/003 represents the first time of this

point.

Fourth: After the first point is tested, the second point is tested immediately; it takes time to move.

Therefore, before measuring, you must select the operating parameters in the measurement interface; select the measurement interval

Adjust the timing of the required movement;

000 means stop once for measurement, change the point, and press the sampling key again

Run it bit by bit; finally the following screen will appear

The res	ults are shown as
Measurement Result	
Date:05/09/06	10:34
Recs:001/300	LOC:002
Mmax:PCM	
0.5um:	0
5um:	0
UCL:PCM	
0.5um:	0
5um:	0
CLASS :	100

Note: Before the last sampling point is closed, press the "Print" key to turn P:ON, and the confidence value will be printed at the end. If the "Print" key is turned on during the sampling process, the particle number or concentration value in the current cycle will be printed (depending on the display mode).

If you are not concerned about the measurement position, you do not need to return to the parameter setting screen. You can directly turn "Sampling" on and off in the measurement interface to complete the measurement of an address point.

During the confidence sampling process, if you want to interrupt the sampling and restart, return to the setting screen in Figure 2, set the confidence setting state to "O" and press the "Confirm" key, then set the confidence state to

"1" again and press the "Confirm" key, and then enter the measurement interface.

7: Introduction of each function key

- "Confirm" : The instrument enters the state shown in Figure (2). When in data measurement, press this key to enter the state shown in Figure (3). When in Figure (2) In other cases, this key is the parameter setting start and end key. In the state shown in Figure (3), this key is the sampling data storage switch key, which can be set to ON or OFF.
- "Exit" : The instrument returns from the measurement interface to the parameter setting interface. Returns from the query state to the parameter setting interface.

"Reset" : restart the sampling cycle.

"Sampling" : the sampling pump is turned on or off, and the screen displays F: 2.83L/min or 0.00L/min.

- "Print" : Print status on or off, the screen displays P: OFF or ON. When the measured data display mode is concentration, the concentration is printed. In other cases, the number of particles in the corresponding cycle is printed.
- "Mode" : In the initial startup state, press this button to switch between Chinese and English

In the measurement interface, if the sampling pump is turned on, this key can be used to switch between three display states: \bigstar Observation state, W: ON, the number of particles is continuously accumulated until the sampling cycle ends and a new cycle starts again. \bigstar W: OFF, the total number of sampled particles in the previous cycle is displayed. \bigstar W: OFF, the concentration of sampled particles in the previous cycle (particles/m3^{) is displayed}. If the sampling pump is not turned on, this key can only be used to switch between two display states, that is, the observation state is closed.

- "▲": In the parameter setting screen, press "▲" to move up. Another function is to change the parameter value that needs to be modified. In the measurement interface, press "▲" to scroll up to view the stored historical data.
- "▼" In the parameter setting screen, move the downwards. Another function is to move the underline to the parameter that needs to be modified. In the measurement interface, press the "▼" key to scroll down to view the stored historical data.

5. Operation Instructions

1. Preparation

- (1). Turn on the power switch, press the "Confirm" key to adjust the screen to the measurement interface of Figure (IV), and look at the battery symbol. If the battery is low, plug the power adapter into the "power socket" to charge the battery. At the same time, the instrument can also be operated normally.
- (2). Turn on the machine and preheat for about 1 minute.
- (3). Connect the filter self-cleaning port to the sampling port, press"Confirm" twice to enter the measurement interface, turn on "Sampling" to make the instrument self-clean and clear to zero.
- 2. Operation steps

Connect the sampling head to the "sampling port".

In the parameter setting interface, press " \blacktriangle ", " \blacktriangledown " and "Confirm" to set the required working parameters. If the database is cleared, move the cursor to the data clearing position, press " \blacktriangle " to change the number from "0" to "5" and then press the "Confirm" key, and the number becomes "9". If you do not want to modify the working parameters, directly press the "Confirm" key to enter the measurement interface.

After pressing the "Confirm" key to enter the measurement interface, press the "Sampling" key to turn on the pump source for sampling test and data collection. If the sampling result is ideal, press the "Confirm" key to turn "Rec" on the bottom of the LCD screen to ON and store the sampling data. Otherwise, press the "Confirm" key to turn "Rec" off. Press the "Mode" key to switch the display mode. Press the " \blacktriangle " and " \blacktriangledown " keys to flip and observe the sampling records of a previous period in the first and third states. Press the "Sampling" key again to turn it off.

In the test interface, if you need to change the working parameters, press the "Exit" key to return to the parameter setting state.

6. Software Installation and Use

1. First, please use your "trusted" anti-virus software to scan your system to ensure that your system is virus-free.

2. Make sure that there is more than 50 MB of hard disk space left in your system disk. If there is insufficient space, it may easily cause incomplete data



installation and data loss.

Install the "Handheld Dust Particle Counter Data Acquisition System
 1" software.



Welcome to the installation interface, and the license agreement window will appear. Click "I Agree" and click "Next" to enter the next window.



For the user's rights and interests, enter the user's detailed information and click "Next"



In this window, you can select the installation path and press "Next"



Click acquisition the "Finish" button and the data software is installed successfully. Double-click the icon on the desktop



拉子计数器

and the following window will appear



First, you need to set up the system: as shown below

─采集通信设置	确认
COMM口: 5 _ 波特率: 9600 _	- 退出
 无校验 奇校验 偶校: 	验
产品信息	
□ 带温湿度 □ 带远程控制	
⑤ 周期以分为单位	ž
产品类型: CL09-6	-

I. "COMM Settings" (communication settings), select the "COMM" port corresponding to the computer

II. The baud rate is 9600 by default

III. No verification required

IV. Product information: Generally, instruments can be remotely controlled, and the sampling period is usually measured in minutes.

V. Product Type

Check version 5.0 (because it is the latest version)

After setting, press "OK"

Then close the software and restart it, the following interface will appear



2 了计数器数据	8米集软件										
N量数据 (Period (L	量信度数据 ← m3			采泉	重调	MIR	合田(E)	系统设置	łltb	远控	jit ti
量数据显	示									Recs:0	
日期	9 社部環境	0.3un	0.5un	1 van	3un 5un	10 van					

5. Dust particle counter connected to PC

To connect the particle counter to a PC:

(1) Connect the RS232 cable to the serial communication port of the dust particle counter and the PC respectively. When connecting, make sure the dust particle counter is turned off.

(2) Turn on the power switch of the dust particle counter and the software on the computer.

- (3) Software function introduction:
- Collection: All data and related information on the instrument will be displayed in this window, and the relevant data can also be printed using a computer.
- Query: can accurately find the data of a certain location in a certain year, month, day, and time period.
- Delete: Delete the data stored in the dust particle counter
- Remote control: remote start and stop of the dust particle counter, as well as real-time remote observation and export functions.
- Export: The software will automatically export the measurement data list to Excel file.

And automatically calculate the average, maximum and minimum values Generally, data is collected first and then exported

7. Maintenance and troubleshooting

1. Notes on use and storage of the instrument

The working position and sampling port of this instrument should be under the same air pressure and temperature and humidity environment to avoid affecting the normal operation of the instrument and causing condensation and even damage to the instrument. If it must work under pressure, the maximum pressure difference

cannot exceed 200Pa. Working under pressure difference and temperature and humidity difference will increase measurement error and even damage the instrument.

It is prohibited to extract gases containing water vapor, oil, corrosive substances and high-temperature gases; it is prohibited to use it in an environment with high dust concentration; avoid using this instrument in a non-purified environment.

When not in use, the instrument should be placed in a dry, dust-proof indoor environment and powered on for more than 30 minutes every month.

When moving the instrument, it should be handled with care and free from vibration and impact. It is best to place it in a special packaging box before moving.

When the instrument is packed at the factory, it is allowed to be transported and stored for a short period of time in the following environment: Temperature: -40° °50°C Humidity: 90%RH (40°C).

This instrument should be sent back to the manufacturer for calibration once a year to ensure its accuracy.

Appendix: Cleanliness level specified by GMP

	Maximum allowa dust particle particle	ble number of s (number of es/m ³)	Maximum n microorganis	Equivalent to	
Cleanliness	leanliness level ≥0.5□m ≥5□m		Planktonic bacteria/m ³	Sedimentati on bacteria/di sh	ISO Classification
Level 100	3, 500	0	5	1	ISO Class 5
10,000 Level	350,000	2,000	100	3	ISO Class 7
100,000 Level	3, 500, 000	20,000	500	10	ISO Class 8
300,000 Level	10, 000, 000	60, 000		15	

Appendix: Cleanliness levels specified by ISO and traditional classification

IS014644	Max	imum concen	tration 1	imit (number c	of particles	/m ³)	Approximate
	0.1 u m	0.2 u m	0.3 u m	0.5 u m	1.0 u m	5.0 u m	correspondence
Grading							
							Traditional
							specifications
ISO Class	10	2					
1							
ISO Class	100	twenty	10	4			
2		four					
ISO Class	1,000	237	102	35	8		Level 1
3							
ISO Class	10,000	2,370	1,020	352	83		Level 10
4							
ISO Class	100, 000	23, 700	10, 200	3, 520	832	29	Level 100
5							
ISO Class	1,000,0	237, 000	102,000	35, 200	8, 320	293	1,000 Level
6	00						
ISO Class				352,000	83, 200	2,930	10,000 Level
7							
ISO Class				3, 520, 000	832,000	29, 300	100,000 Level
8							
ISO Class				35, 200, 000	8, 320, 000	293, 000	
9							