

# **Particle Counter**

## **User Manual**

### **V0.1**

# [ Revision History ]

Version	Date	Revision history	작성자	책임자
V0.1	2017.07.21	Revised	조성민	하민성
V0.2	2017.11.22	Revised	조성민	박병곤

## 1. 개요

Particle Counter is a device for acquiring data of particles with the size of 100nm and 200nm, and for transferring the Particle Data to an agent PC through wired/wireless communication. Users are advised to read carefully all manuals provided with the package, to ensure safe and efficient use of Particle Counter. This manual explains necessary skills and information for setting up and using both Particle Counter and Signal Recorder

## 2. Basic specifications of Particle Counter

Particle Counter is comprised of three boards and each board contains following components

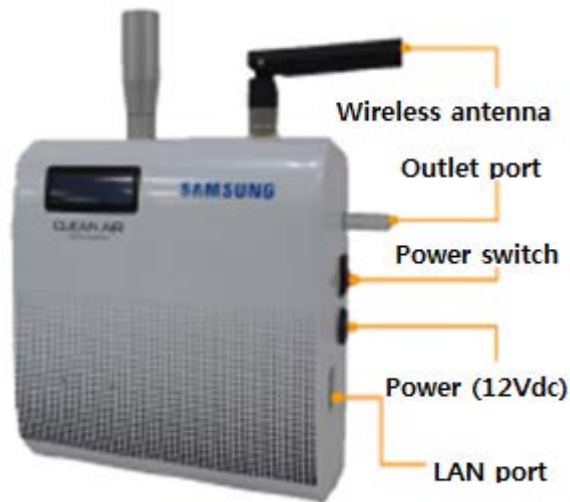
- 1) Board components
  - i. Main Board : CPU / Power Module
  - ii. Interface Board : WIFI / LAN / Flash
  - iii. Sensor: Laser sensor I/F Module

### 2) Exterior

This picture shows an exterior of Particle Counter. The front panel of Particle Counter has LCD, Port for external antenna, and inlet port for Particle. The side panel of Particle Counter has Power (12Vdc), Power switch, LAN port, and Serial port (Debug).



**Figure 1 Particle Counter Exterior-Front panel**



**Figure 2 Particle Counter Exterior-Side panel**

- A. Power : 12Vdc supply (VCC / GND / FG).
- B. Antenna: Port for connecting Wi-Fi module (One wireless antenna is given in the package).
- C. LAN : LAN port for Ethernet communication with other devices using TCP/IP.
- D. Debug : RS232 Debugging Port
- E. Inlet/Outlet port: Port for inlet/outlet of particle.

### 3) H/W Specifications

- A. Particle Counter internal H/W has following characteristics.
  - i. Artmega 128 micro controller
  - ii. Dual Band WIFI, 802.11 a/b , Ethernet communication support

## B. Particle Counter HW details

품목	사양
CPU	Atmega 128, CYW43907(Cypress)
ETHERNET	GIGABIT-LAN
SERIAL	USB to SERIAL Debug port
WIFI	802.11a/b
Power SWITCH	ROCKER SWITCH x 1
SUPPLY POWER	12V DC, 1A
Size	120 x 130 x 60 (mm)

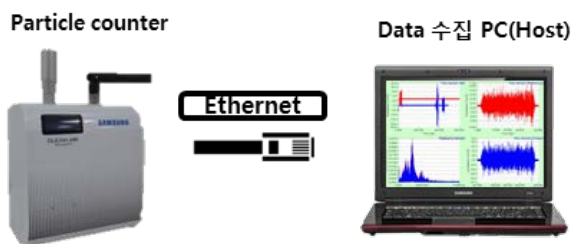
## 3. How to install and use

### 1) Particle Counter installations

#### A. Wireless connection



#### B. Wired connection



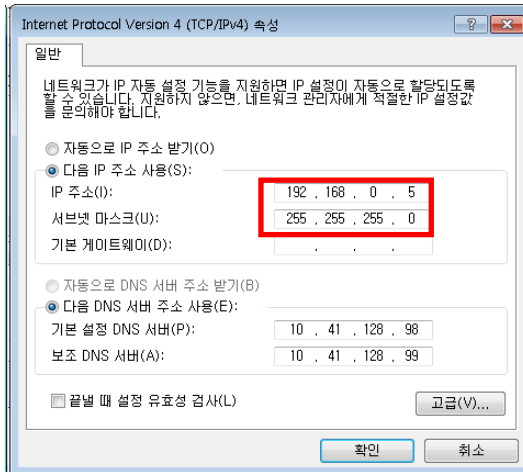
2) Particle Counter connection check

A. Change IP address for Data PC to 192.168.0.5

-Default Host IP : 192.168.0.5

-Default Client IP : 192.168.0.9

(It can be modified through Signal Recorder later)

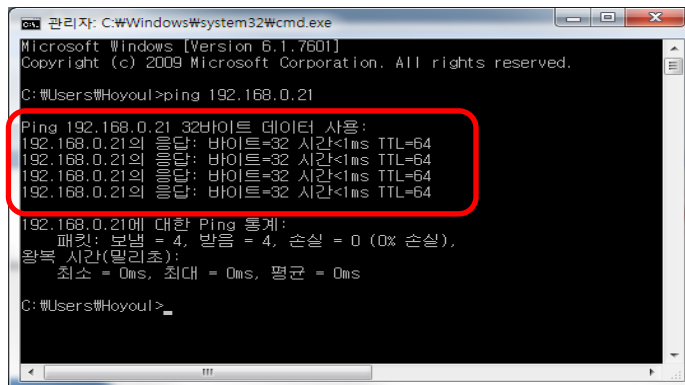


B. Check a blue light on LCD when the power is on.



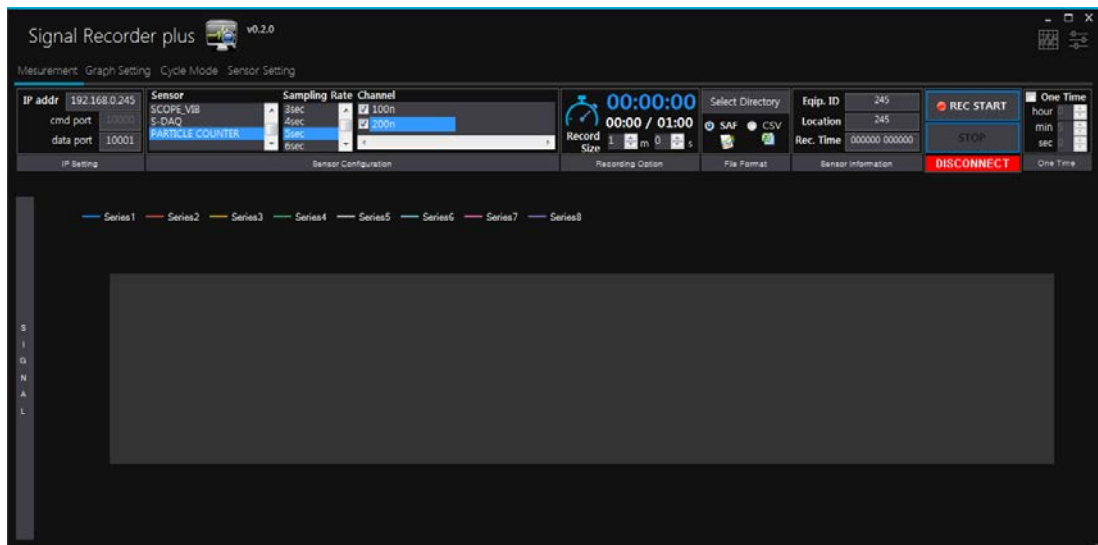
C. Try to ping the Particle Counter from Host PC to confirm connection.

windows > cmd > type "ping 192.168.0.9 -t"

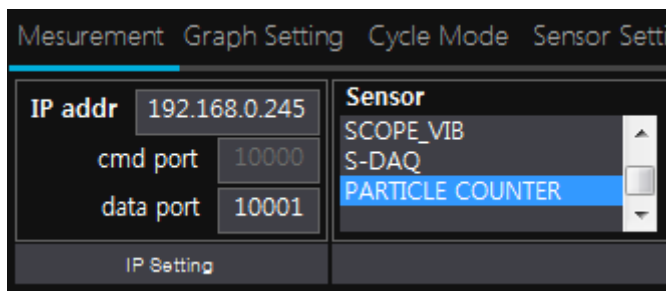


1) How to use SW (Signal Recorder plus)

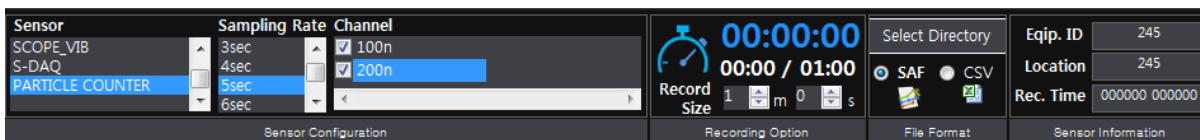
A. Run Signal Recorder plus.exe



- B. Enter IP address of the Particle Counter, and choose Particle Counter in the list of Sensor.



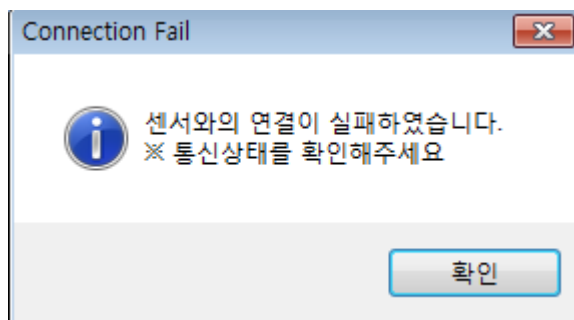
- C. Considering the service environment, choose sampling rate, channel, recording time, save path, file type (SAF/CSV), and file name.



- D. Press start button and confirm that the green 'CONNECTED' sign is on.



- E. Check LAN cable or wireless AP or IP address of PC and Particle Counter if you see a popup window as follows.



F. Wired/Wireless IP setting

A. IP Setting

- Press 'Sensor Network Setting' in 'Sensor Setting' of Signal Recorder Plus, then you can see a popup window as follows.

**SENSOR CONFIGURATION**

**SENSOR INFO.**

Equip.ID  Position

Sensor  Sampling Rate

**LAN/WLAN IP**  유선  무선(Wi-Fi)

Sensor IP  HOST(AP/PC) IP

Cmd Port  AP SSID

Data Port  AP P/W

Subnet  Wi-Fi Band  2,4GHz

Gateway   5GHz

DHCP모드(IP동적할당) Certification

Enable DHCP  WPA2\_PSK

DHCP Server IP   WPA2\_ENT(PEAP)

PEAP ID

**UPLOAD TO SENSOR**

LAN/WLAN

Target IP   GEN3

Cmd Port  Data Port

USB

USB drive

**LOAD FROM SENSOR**

B. Wired connection setting

- Press 'UPLOAD' button after connect Particle Counter with LAN and setting up as follows. (Default Host 192.168.0.5, Sensor 192.168.0.9)
- Check a wired checkbox. (유선)
- Sensor IP (IP address of the sensor)
- Host IP (IP address of Host PC)
- Subnet and Gateway can be ignored
- Check GEN3 checkbox (necessary)

- X

### SENSOR CONFIGURATION

#### SENSOR INFO.

Equip.ID	<input type="text"/>	Position	<input type="text"/>
Sensor	고정밀 진동 센서	Sampling Rate	<input type="text"/>

**LAN/WLAN IP**  유선  무선(Wi-Fi)

Sensor IP	192.168.0.11	HOST(AP/PC) IP	192.168.0.10
Cmd Port	10000	AP SSID	<input type="text"/>
Data Port	10001	AP P/W	<input type="text"/>
Subnet	255.255.255.0	Wi-Fi Band	<input checked="" type="checkbox"/> 2.4GHz <input type="checkbox"/> 5GHz
Gateway	192.168.0.1		

DHCP모드(IP동적할당)	Certification
<input type="checkbox"/> Enable DHCP	<input checked="" type="radio"/> WPA2_PSK
DHCP Server IP	<input type="radio"/> WPA2_ENT(PEAP)
<input type="text"/>	PEAP ID <input type="text"/>

#### UPLOAD TO SENSOR

LAN/WLAN

Target IP	192.168.0.9	<input checked="" type="checkbox"/> GEN3	<input type="button" value="UPLOAD (LAN, Wi-Fi)"/>
Cmd Port	10000	Data Port	10001

USB

USB drive	C:\	<input type="button" value="SAVE (SafeBoot.cfg)"/>
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#### LOAD FROM SENSOR

<input type="button" value="LOAD INFORMATION"/>
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### C. Wireless connection Setting

- Press 'UPLOAD' button after connect Particle Counter with LAN and setting up as follows. (Default Host 192.168.0.5, Sensor 192.168.0.9)
- Check a wireless checkbox. (무선, Wi-Fi)
- Enter both SSID and P/W (ex. ureadythings // qwe124@@)
- Set Wi-Fi Band
- DHCP Enable
- Set PEAP ID (ex. MAC@u.things)

- X

## SENSOR CONFIGURATION

### SENSOR INFO.

Equip.ID  Position

Sensor  Sampling Rate

### LAN/WLAN IP

유선  무선(Wi-Fi)

Sensor IP	<input type="text"/>	HOST(AP/PC) IP	<input type="text"/>
Cmd Port	10000	AP SSID	ureadythings
Data Port	10001	AP P/W	qwe124@@
Subnet	255.255.255.0	Wi-Fi Band	<input checked="" type="checkbox"/> 2,4GHz
Gateway	192.168.0.1		<input checked="" type="checkbox"/> 5GHz

DHCP모드(IP동적할당)

Enable DHCP

DHCP Server IP

Certification

WPA2\_PSK

WPA2\_ENT(PEAP)

PEAP ID

### UPLOAD TO SENSOR

LAN/WLAN

Target IP   GEN3

Cmd Port  Data Port

UPLOAD (LAN, Wi-Fi)

USB

USB drive

SAVE (SafeBoot.cfg)

### LOAD FROM SENSOR

LOAD INFORMATION

#### 4. HW Specifications

	광학식 Particle Counter	기구	
측정방식	광학식	SIZE	120x130x60mm
주요 기능	Clean 환경에 미세 파티클 측정		
측정 사이즈	100nm 이상, 200nm 이상	외형	
Flow Rate	0.1 CFM (2.83LPM)		
Display	2ch(100nm, 200nm)		
측정효율	50±20%@100nm (ISO 21501-4)		
Zero count 기준	< 7 count @5분간		
사용온도	( 10~ 30°C )		
무선 통신 규격	IEEE 802.11 a/b		
유선 통신 규격	LAN 100Mbps		
전원사양	12Vdc(±1.2V)		
데이터 갱신	매 10초 (60초 누적값 표시)		
비고	- 실시간 Particle Counting Display ※ Cleanroom 환경 전용		

### **FCC Compliance Statement**

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

### **FCC Interference Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

### **FCC Caution**

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

### **FCC Radiation Exposure Statement**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

IEEE 802.11b operation of this product in the USA is firmware-limited to channels 1 through 11.