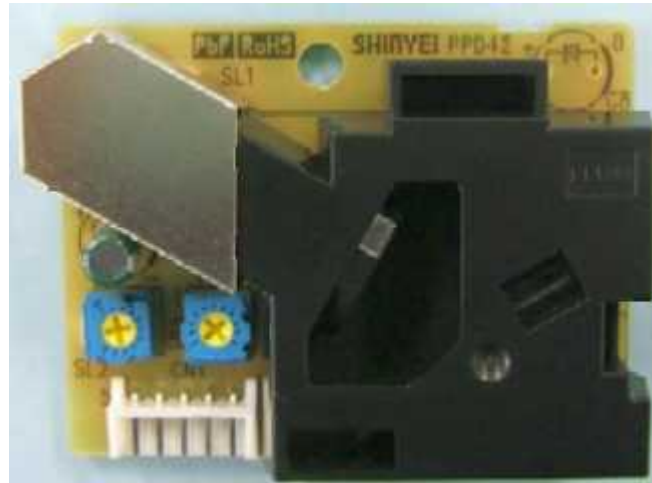


Particle Sensor in combination with Air Purifier



Panasonic, Japan



Mitsubishi, Japan



Panasonic, Japan

IAQ_(Indoor Air Quality) at a glance

It can help allergy sufferers

- Our sensor can detect not only cigarette smoke but house dust which triggers many types of allergy.
- Air Quality Monitor which shows IAQ condition at real time should be useful for allergy sufferers and also health-conscious consumers.

Tip.

20% of the U.S. population has allergies. This is approx. 54 millions people. 20% of this has moderate to severe allergy (10.8 million). Similar rates should be found world-wide.



What Is Secondhand Smoke?

Asthma can be triggered by the smoke from the burning end of a cigarette, pipe, or cigar and the smoke breathed out by a smoker.

Indoor Asthma Triggers

✓ Secondhand Smoke

✓ Dust Mites

✓ Pets

✓ Molds

Cockroaches

Shinyei PPD sensor is designed to detect (✓) marked objects.

About Pets

Your pet's skin flakes, urine, and saliva can be asthma triggers.

What Is Dust Mites?

Dust mites are too small to be seen but are found in every home. Dust mites live in mattress, pillows, carpets, fabric-covered furniture, bedcovers, clothes, and stuffed toys.

Related Topics

✓ Ozone
House Dust

✓ Combustion Appliances

✓ Pollen

About Cockroaches

Droppings or body parts of cockroaches can be asthma triggers.

About House Dust

House dust may contain asthma triggers.

About Pollen

Many people are allergic to pollen, and pollen can be an asthma trigger. On high pollen days, stay indoors with the windows closed. Using your air conditioner may help to filter outside air coming into the home.

About Ozone

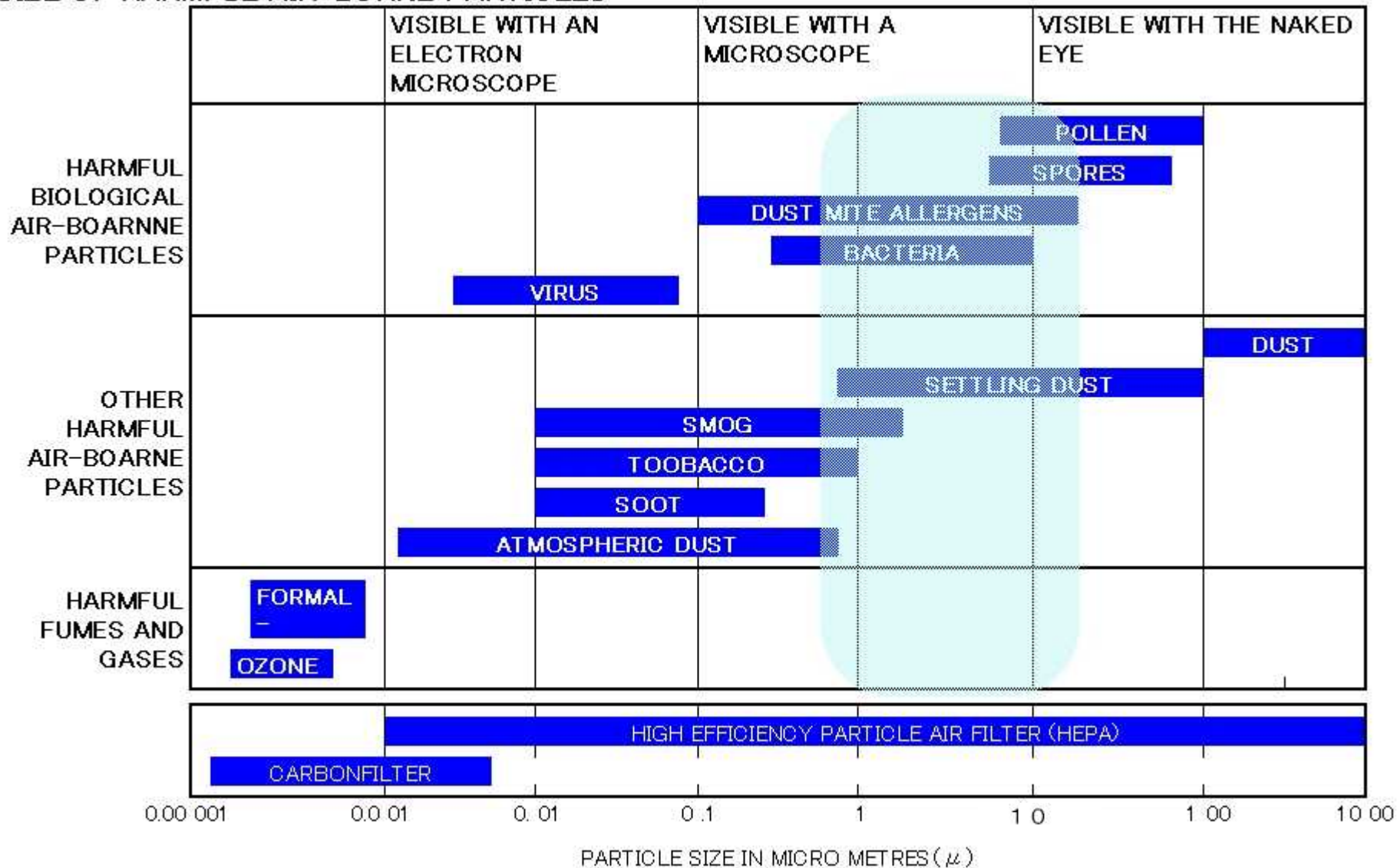
When inhaled, ozone can aggravate the lungs and can lead to chest pain, coughing, shortness of breath, and, throat irritation. Ozone may also worsen chronic respiratory diseases such as asthma and compromise the ability of the body to fight respiratory infections.

What are Combustion Pollutants?

Combustion pollutants are gases or particles that come from burning materials. The combustion pollutants discussed in this booklet come from burning fuels in appliances. The common fuels burned in these appliances are natural or LP gas, fuel oil, kerosene, wood, or coal. The types and amounts of pollutants produced depend upon the type of appliance, how well the appliance is installed, maintained, and vented, and the kind of fuel it uses. Some of the common pollutants produced from burning these fuels are carbon monoxide, nitrogen dioxide, particles, and sulfur dioxide. Particles can have hazardous chemicals attached to them. Other pollutants that can be produced by some appliances are unburned hydrocarbons and aldehydes. Combustion always produces water vapor. Water vapor is not usually considered a pollutant, but it can act as one. It can result in high humidity and wet surfaces. These conditions encourage the growth of biological pollutants such as house dust mites, molds, and bacteria.

PPD Detection Range

SIZE OF HARMFUL AIR-BORNE PARTICLES



IAQ at a glance (Air Quality Monitor)



air quality indicator



Air Quality Monitor

Left : Odor level Indicator by "Gas Sensor"

Center : Cigarette Smoke level Indicator by "PPD20V"

Right : House Dust level Indicator by "PPD20V"

It can be used to show your filter's great performance.

- You must have great technologies on the filter you use for your Air Purifier.
- It is important to show the consumer how quick your filter can improve the Indoor Air Quality (IAQ).
- Our sensor can keep us with the variation of the particle concentration in the IAQ. Air Quality Monitor function would be able to show them how IAQ can be improved with your filter.



Automatically adjust the fan settings to the optimum fan speed.



Air quality monitor can show how quick your filter collect particles in IAQ

It can help in saving energy



Panasonic, Japan

- With using our sensor , Air Purifier can have automatic operation to have power “on” or “off”, and “optimum fan speed selection” depending on the sensor signal in accordance with actual IAQ condition.
- In other words, Air Purifier works just the period while it is needed.

Particle Sensor Unit PPD42NS

APPLICATION

Air Purifier · Air Conditioner · Ventilator · Air Quality Monitor etc.

SPECIFICATION

Supply Voltage
DC5V±10%

Power Consumption
MAX.90mA

Operating Range
0°C ~ 45°C,95%RH

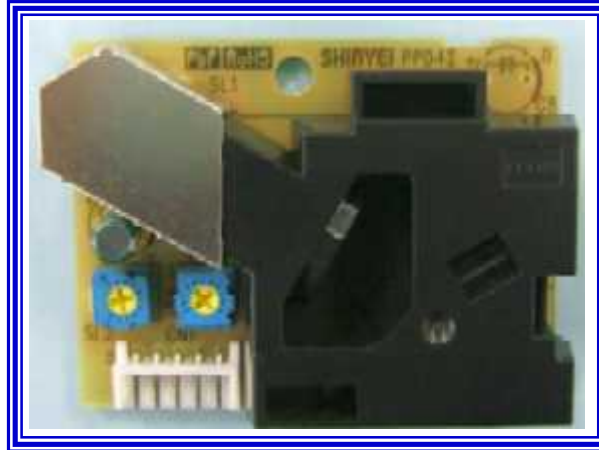
Recommended Storage Temperature
- 30°C ~ 60°C

Detectable Particle Size
1micro meter and over

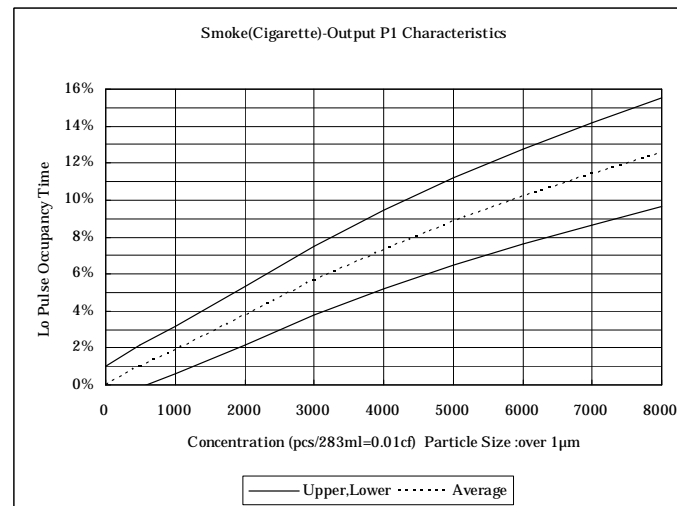
Detectable Range of Concentration
From clean air to 1.5
cigarette/room(about 30cu. meter).

Output
Lo pulse (Negative Pulse)

Time for stabilization
After power on, warm up time is 1
minute.



Cigarette Smoke-Output Characteristics



☆Based on the mechanism of Particle Counter, it always detect the amount of particle per unit volume.

☆Highly sensitive sensor detects particles such as smoke, pollen and dust which is larger than 1 micro meter.

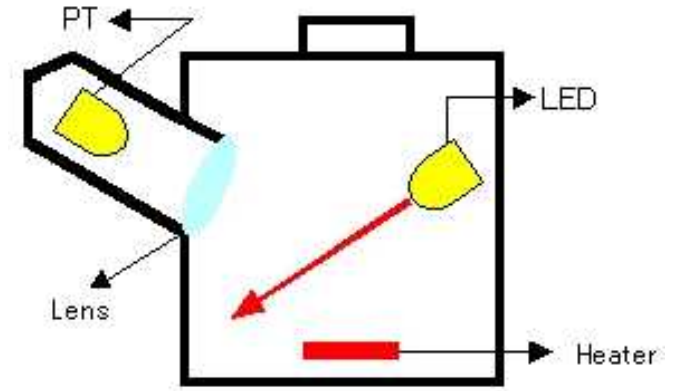
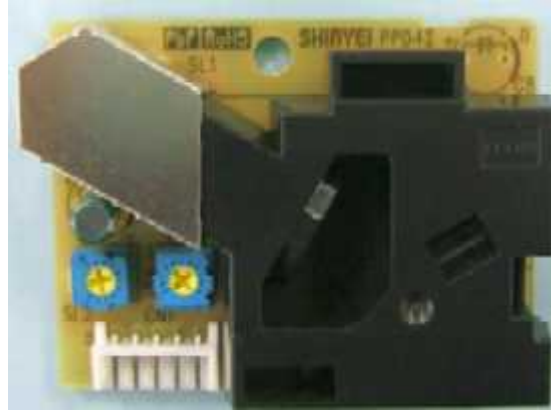
☆Compact and light, and easy installation.

W59 X H45 X D22 (mm)
Weight. 24g (approx.)

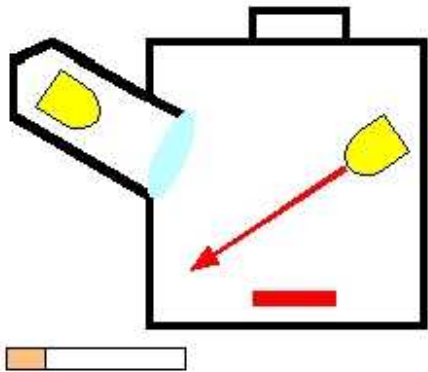
☆Self aspirated.

☆Easy maintenance and high sensitivity in the long term.

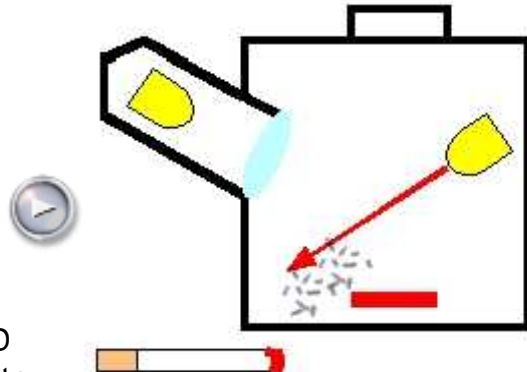
How It Works



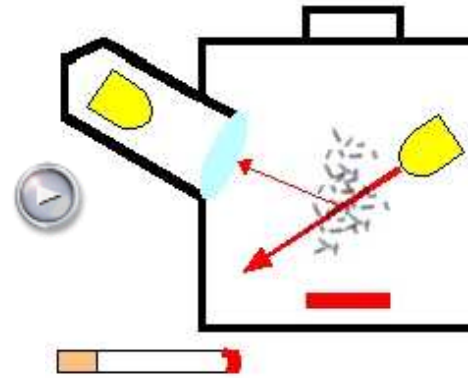
Light emitter : LED
 Light receptor : Photo Transistor
 Lens : both for emitter and receptor
 Heater : Resistor to generate "Updraft"



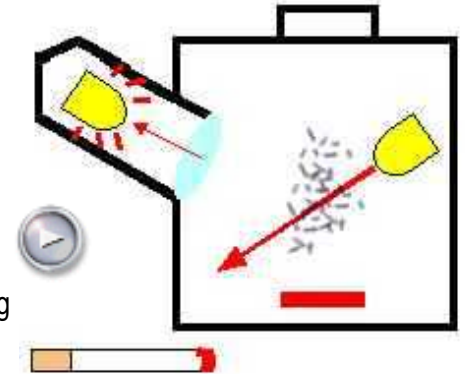
Resistor generating updraft. Infrared light beam from LED has been focused with Lens to sensing point at the center.



Airborne particles have been taken into the sensor box with the updraft created by resistor's heat.



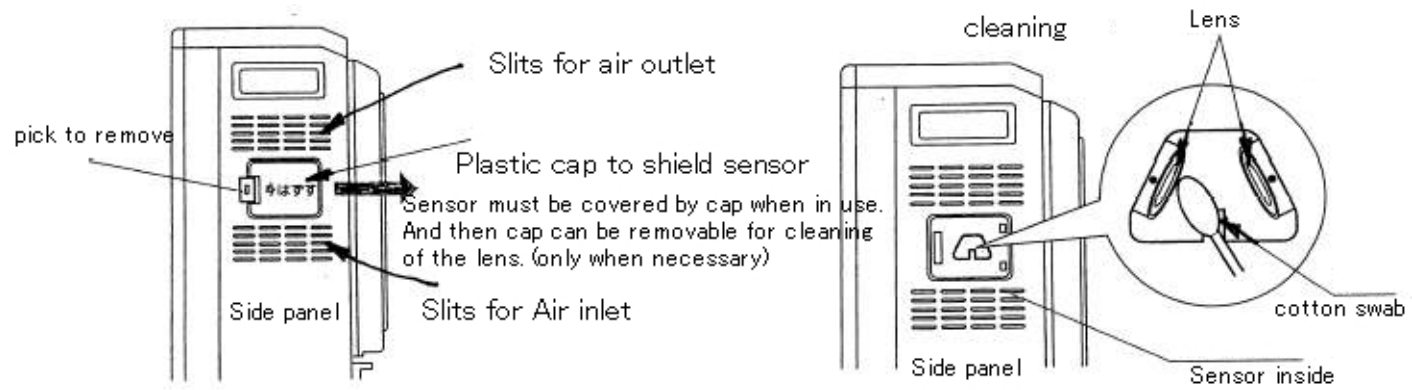
Particle passing through sensing point scatters light.



Receptor (Photo transistor) receive scattered light through the lens and transformed into pulse signal. Pulse signal are to be converted into voltage output.

Application Note (for installation)

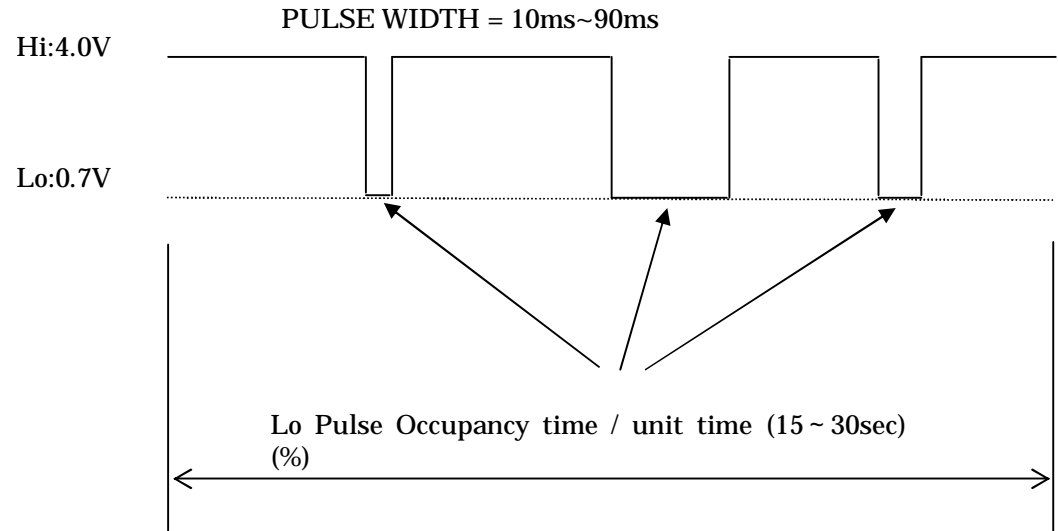
1. Due to its principle, dust sensor must stay vertical position.
2. As for Location of the sensor, higher position would be better. (because particle would rise up along with convection of the air)
3. Please install the sensor so that plastic case (black color) to be facing outside, so that user can access inside of the sensor when the cleaning of the lens is necessary. (see next page)
4. Please have the sensor located at isolated position from any winds or air stream effected by air purifier.
Such current of air against the sensor will affect the sensor output.
5. Please refer next page which shows typical condition of the sensor installed in air purifier.
 - 1. It needs slits for inlet and outlet of the air. So have the sensor located just inside the housing with slits.
 - 2. Inside of the sensor must be kept complete dark condition, so please prepare the cap as shown on the sketch.
Also soft cushioning material to seal the gap between sensor and housing is necessary.
 - 3. The cap should be better if it has detachable structure, for easy maintenance.
** If you prepare the cap making it face to the same level of the housing panel, it looks better. If it can be detachable, sensor can be cleaned with simple action as shown in next page..
6. If the sensor located closed to noise generating components, sensor output may be affected by such noise.
Also ripple voltage from power supply line may affect the sensor.
So when design the system, please consider the effect from noise and ripple voltage from power supply.



Example (using PPD20V)



**Example of fan mode notch
in accordance with sensor output –
Lo pulse Occupancy Ratio (%)**



P1 out Lo (%)

Fan Mode 3steps	Example A (Standard)			Example B			Example C (Sensitive)		
	=<	<	Gap	=<	<	Gap	=<	<	Gap
HI	6.9			6.3			5.9		
MID	4.8	6.9	2.1	4.4	6.3	1.9	4.0	5.9	1.9
LOW	2.7	4.8	2.1	2.3	4.4	2.1	1.9	4.0	2.1
STOP	0.0	2.7	2.7	0.0	2.3	2.3	0.0	1.9	1.9

P1 out Lo (%)

Fan Mode 4steps	Example A (Standard)			Example B			Example C (Sensitive)		
	=<	<	Gap	=<	<	Gap	=<	<	Gap
SUPER	6.9			6.3			5.9		
HI	5.7	6.9	1.3	5.1	6.3	1.3	4.6	5.9	1.3
MID	4.2	5.7	1.5	3.6	5.1	1.5	3.2	4.6	1.5
LOW	2.7	4.2	1.5	2.3	3.6	1.3	1.9	3.2	1.3
STOP	0.0	2.7	2.7	0.0	2.3	2.3	0.0	1.9	1.9