

Particle Size Discrimination by PPD42NJ

Discrimination of particle size can be done using a special method with our Particle Sensor, Model PPD42NJ.

PPD42NJ has dual pulse output which works as follows;

- 1) Receptor receives scattered light from the particle, as a pulse.
- 2) Each raw pulse is amplified by an op-amp so that pulse can be acknowledged clearly.
- 3) PPD42NJ has 2 fixed threshold; voltage = 1V for P1 and voltage = 2.5V for P2.
The threshold represents detecting size of particles, (approx) 1 micron or larger, and (approx.)2.5 micron or larger sized particles respectively.

With PPD42NJ you can read each selected pulse, selected with 2 threshold detection voltage 1V and 2.5V which was converted to Lo Pulse directly at the same time.

PPD42NJ also has a port enabling the user to set the alternative threshold detection voltage directly. (In other words, a threshold detection voltage 2.5V will be replaced with your designated alternative voltage.)

As you may understand from above 3), you can have 2 different minimum size particles which will generate a pulse.

For example :

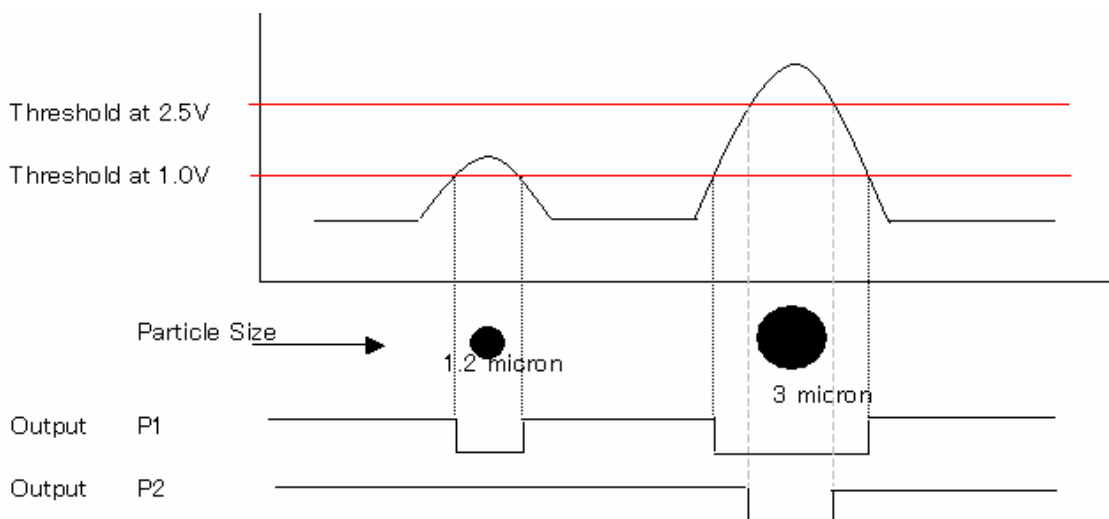
Particle sizes of cigarette smoke range from 0.01 micron to around 1micron.

Particle sizes of house dust range from 1 micron to around 10 micron.

When you use 1V threshold (when you read Lo Pulse output at P1,) PPD42NJ detects particles larger than (approx.) 1 micron.

When you use 2.5V threshold (when you read Lo Pulse output at P2,) PPD42NJ detects particles larger than (approx.) 2.5 micron.

Fig. 1



Over 1 micron sized particles represents cigarette smoke and house dust.

Over 2.5 micron sized particles represents house dust only, because this is over the size range of cigarette smoke particles.

When you use our PPD42NJ to check unidentified particles in the room, you check the Lo Pulse occupancy time (ratio) over a certain unit time at both P1 and P2.

By simple math you can then determine how much of which range of particle sizes there are.

Following are simplified explanation how to determine what kind of particles exists at measurement environment.

Pattern A

1V threshold Lo pulse output occupancy ratio : high
2.5V threshold Lo pulse output occupancy ratio : low or none
means you have cigarette smoke at that period.

Pattern B

1V threshold Lo pulse output occupancy ratio : high -- (a)
2.5V threshold Lo pulse output occupancy ratio : high --(b)

(a) - $k \cdot (b)$ nearly equal 0(zero)
means you have house dust at that period

Pattern C

1V threshold Lo pulse output occupancy ratio : high -- (a)
2.5V threshold Lo pulse output occupancy ratio : high --(b)

(a) - $k \cdot (b)$ still rather high
means you have cigarette smoke and house dust at the same time at that period

PPD42NJ has two pins (No.4 and 2) for Lo Pulse output.

You can input alternative threshold voltage (example; 2.0V) to pin (No.5), and then check the output pulse occupancy through P2 (pin No. 2)



CONNECTOR

CN : S5B-EH(JST)
1 : COMMON(GND)
2 : OUTPUT(P2)
3 : INPUT(5VDC 90mA)
4 : OUTPUT(P1)
5 : INPUT(T1) --- FOR THRESHOLD FOR [P2]