“Active Type” and “Passive Type” theory of air purifier

We can classify all the air purifier on market with 2 main different kinds of purification process theory “Active Type” and “Passive Type”. Purification process means the process of the machine to remove, filter out or total solve the pollutant problem, most common process are mechanical trap out the particles, oxidize the chemical, absorb the odor or kill the bacteria by destroy their DNA or direct by high voltage etc….

If the purification process is designed inside the machine, then the machine is classify as “Passive Type” e.g. machine with Electrostatic Precipitator or HEPA filter, or the process is designed direct inside the room ambient air, then the machine is “Active Type” e.g. Plasma Ion Generator (+/−) Ion. Depends on our needs and purpose, we are no need to compare or never have answer of which one is the best on market.

For reference: Most hospital has been installed both the active and passive machine in their centralize HVAC system e.g. Electrostatic Precipitator and HEPA filter (Passive) to filter out fine dust particles and remove the bacteria & virus, Plasma Ion Generator (+/−) ion (Active) direct blow out the (+/−) Ion into the ambient air inside whole the hospital building to kill bacteria and virus etc… Most public smoking room e.g. airport has been installed some electrostatic Precipitator (EP) machine (Passive) to filter out fine dust particles form cigarette smoke etc… Most utilities public toilet e.g. train station installed (EP) machine (Passive) for odor remove purpose etc… Most urban public market installed Plasma Ion Generator (+/−) Ion (Active) direct blow out the (+/−) Ion into the market place for odor remove purpose etc…

Hints:

For points of consumable cost: Most common Active type machine are design with low consumable cost e.g. replace the ionization tube or ion generator etc… which is always low on cost and also with long service lifetime. Most common Passive type need to replace filter regularly, depend son the original machine value, such filter can be cost from USD20/30 to USD300/400 yearly.

For point of use: Most active type e.g. ion generator or ozone machine are difficult to measure or monitor their effectiveness because their ion and ozone generate out will react with air pollutant immediately, user may difficult to set the best volume of ion or ozone for their area needed, sometime over dose may happen and make user feel uncomfortable. Active type is more stable and reliable when use, when the machine is under operation, the filter will help us to purify the polluted air which is draw into the machine, we just need to select the machine with sufficient service capacity for the area. (Note: we must clean up or replace the filter regularly).

Conclusion: Depends on our needs and purpose, “Active Type” or “Passive Type” may also be the best air purifier for us.