Training Note

Sensing Modes

Beam Break

Opposed Mode

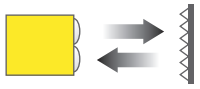
Best for general use and for use in contaminated environments.

Pros
- Most reliable mode for opaque objects
- Provides high excess gain
- Not affected by surface reflectivity
- Reliable for counting parts
- High excess gain allows for dirt/dust accumulation and misalignment tolerance

Cons
- Sees through clear materials
- Need to power two sides
- Need to shape effective beam for small parts

Retroreflective Mode

Best for use in applications where space is limited on one side.



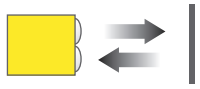
Pros
- Very convenient when space is limited
- Economical, compared to opposed mode

Cons
- Cannot easily shape effective beam for small parts or precise positioning
- Excess gain attenuates in dirty environments
- Sees through clear materials
- Proxing can occur with shiny materials
- Blind spot can occur at short range
- Retroreflector size and type can affect performance

Beam Make

Diffuse Mode

Best for easy applications, or for when opposed or retroreflective sensors aren't practical.

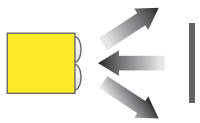


Pros
- Very convenient when space is limited
- Can be used when opposed or retroreflective sensors aren't practical
- One piece sensing solution
- Economical

Cons
- Background objects may be detected if too close
- Small parts don't offer enough reflective area
- Loses gain rapidly as dirt accumulates on lens
- Unreliable for accurate counting of parts
- Less tolerant to surface reflectivity variation
- Shiny objects must be perfectly perpendicular to light path in order to be sensed

Divergent

Good for sensing small objects and objects that aren't in a repeatable position.

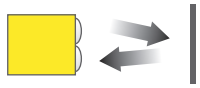


Pros
- Reliable for clear material detection at close range
- Good for small objects
- Can sense surfaces that vibrate or flutter
- Economical
- More tolerant of surface reflectivity

Cons
- Low levels of excess gain
- Wide field-of-view causes sensitivity to objects to the side of the sensor
- Limited range

Convergent

Best for small color marks or for small object detection.

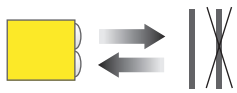


Pros
- Accurate counting of radiused objects
- Accurate positioning
- Defined depth-of-field
- Provides relatively high excess gain

Cons
- Specific focal point will not detect objects that pass at unpredictable distance
- Surface reflectivity of object may affect sensing

Background Suppression (Fixed-Field, Adjustable-Field)

Best for detecting targets of varying reflectivity and ignoring backgrounds.



Pros
- Definite range limit
- Provides high excess gain
- More tolerant of surface reflectivity

Cons
- Shiny surfaces beyond the sensing range may falsely trigger sensor
- Moving background objects may falsely trigger sensor, but can be addressed through sensor positioning or field adjustment