

SEnS+SMART ENVIRONMENT SENSOR PLUS®

KEY FEATURES

TOYOTA SEnS+



Field of View	130°
Detection Time	0.14 seconds
Maximum Distance	32 ft
Operating Condition	-40°F to 140°F
Buzzer Volume	85db
Indicator Type	Audio and Visual
Ingress Rating	IP67
Distinguish Pedestrians vs. Objects	Yes
Number of Zones	3
Dynamic Zoning	Yes
Adjustable Speed Control	Yes
Backward Movement Prevention	Yes

STRONG & WEAK POINTS

- ✓+ **Longest sensing distance with wide field of view**
 - + Dynamically changes detection zones based on travel speed, steering angle, and detection target
 - ✓+ **3 New industry-first features**
 - Dynamic Zoning • Adjustable speed control
 - Backward Movement Prevention
 - ✓+ **Affordably priced with most features**
 - Some limitations to environment and pedestrian orientation
- ADDITIONAL NOTES**
- SEnS+, designed and developed by Toyota, offers 3 new industry-first features .The system dynamically adjusts detection zones and slows down your Toyota Forklift. SEnS+ eliminates the need for carrying pedestrian tags, installing beacons, or any other modifications to the infrastructure.

LIDAR BACKUP ASSISTANCE SYSTEM (BAS)
2D LIDAR TECHNOLOGY



Field of View	270°
Detection Time	Instantaneous
Maximum Distance	13.12 ft
Operating Condition	14°F to 122°F
Buzzer Volume	Configurable
Indicator Type	Optional
Ingress Rating	IP67
Distinguish Pedestrians vs. Objects	No
Number of Zones	2
Dynamic Zoning	w/Ultra Wide Band
Adjustable Speed Control	w/Ultra Wide Band
Backward Movement Prevention	No

- Critical on mounting position for detection
- Objects and pedestrians cannot be distinguished
- Limited coverage area (2D detection only)
 - + Can connect up to 3 extra sensors
 - + Moderately priced

ADDITIONAL NOTES

Lidar emits a field which is a 2-dimensional plane. It does not identify objects that are above or below this plane. This system is mounted on the counterweight which can be easily damaged. In order to provide dynamic zoning and adjustable speed control, this system requires Ultra Wide Band (UWB) beacons and infrastructure modifications which significantly increases the overall cost.

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STRONG & WEAK POINTS

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Buzzer Volume	85db
Indicator Type	Audio and Visual
Ingress Rating	IP67
Distinguish Pedestrians vs. Objects	Yes
Number of Zones	3

- ✓+ Longest sensing distance with wide field of view
 - + Configurable detection zones
 - ✓+ Configurable for objects or Pedestrians
 - +Configurable Alerts
 - ✓+ Affordably priced with most features
 - Some limitations to environment and pedestrian orientation
- ADDITIONAL NOTES**
- SEnS is designed and manufactured by Toyota using Toyota design standards and TPS
- Alarm and lights provide notification to the forklift operator

BLAXTAIR



Field of View	90°
Detection Time	0.30 Seconds
Maximum Distance	23 ft
Operating Condition	-40°F to 167°F
Buzzer Volume	Configurable
Indicator Type	Optional
Ingress Rating	IP69K (Camera Only)
Distinguish Pedestrians vs. Objects	Yes
Number of Zones	2

- Optional display is expensive, can be easily damaged
 - Highest price
 - Requires separate large controller box to be mounted on truck
 - + Optional Telematics
 - + Configurable detection zones
- ADDITIONAL NOTES**
- Requires a large controller box which may have to be mounted to the top of the overhead guard. This is not practical and can easily be damaged.
- Optional 7” display provides live video but may cause operator to not look in direction of travel when traveling in the rearward direction
- Additional camera and controller box can be added to double the field of view, but is not standard

SEEN SAFETY IRIS 860



Field of View	60°
Detection Time	Instantaneous
Maximum Distance	26.24 ft
Operating Condition	-4°F to 140°F
Buzzer Volume	Configurable
Indicator Type	Audio
Ingress Rating	IP67
Distinguish Pedestrians vs. Objects	No
Number of Zones	2

- Requires reflective tape to detect (safety vest required)
 - Field of view up to 120° with extra sensors
 - Cannot distinguish between objects and pedestrians
 - + Unaffected by ambient lighting
 - + Lowest price
- ADDITIONAL NOTES**
- Requires safety vests to be worn by pedestrians at all times. This may not be practical in many facilities.
- Due to the narrow Field of View, may require (2) devices which adds more cost

LIDAR BACKUP ASSISTANCE SYSTEM (BAS)
2D LIDAR TECHNOLOGY



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Detection Time	Instantaneous
Maximum Distance	13.12 ft
Operating Condition	14°F to 122°F
Buzzer Volume	Configurable
Indicator Type	Optional
Ingress Rating	IP67
Distinguish Pedestrians vs. Objects	No
Number of Zones	2

- Critical on mounting position for detection
 - Objects and pedestrians cannot be distinguished
 - Limited coverage area (2D detection only)
 - + Can connect up to 3 extra sensors
 - + Moderately priced
- ADDITIONAL NOTES**
- Lidar emits a field which is a 2-dimensional plane. It does not identify objects that are above or below this plane. Multiple Lidars can be added, but soon becomes cost prohibitive