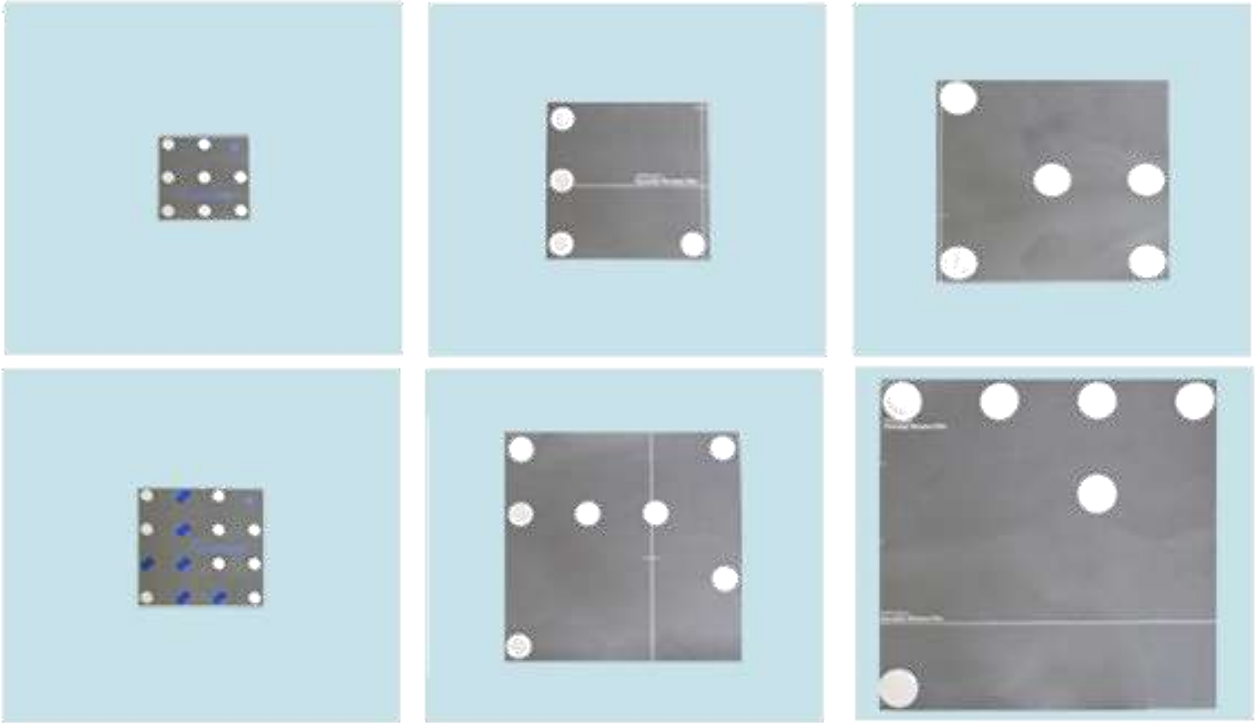


StarGazer Landmark

(HLD□-S, HLD□-L)



Leading Company of Advanced Sensors

HAGISONIC Co., Ltd.

Sensors & Application Systems for Robots, AGVs, Automobiles, Automations
and Energy-Saving Apparatus



StarGazer Landmark

■ Model : HLD□-S, HLD□-L

■ Features

- StarGazer analyzes infrared ray image which is reflected from a passive landmark with an independent ID. The output of position and heading angle of a robot is given with very precise resolution and high speed.
- Landmark is attached to the ceiling in thin paper made from reflective materials.
- IR Projector and image interpretation module shoot out infrared rays to wide area of ceiling.
- No need for separate communication for Sync or Identity exchanges between the robot and its landmark.
- If the robot is driving on a large area, such as a large living room, or several rooms or offices, it can be solved by attaching an additional landmark.
- Rooms are easily distinguished by labeling landmarks with different unique IDs.
- Auto calibration makes it easy for average users such as housewives to measure distance between landmarks regardless of the height of the ceiling.
- Landmark need not be powered up and easily expanded to a larger area with very little additional cost to expand it.

■ How it works

- The IR projector in StarGazer™ shoots off infrared rays at the Landmark on the ceiling.
- And then, the landmark points reflects back the rays to the StarGazer™ on top of a robot.
- At the same time, the reflected infrared rays turns into an image by CMOS Sensor Array of StarGazer™
- Through a digital image processing, StarGazer™ calculates the position and angle of a robot by analyzing the acquired image.



<Ceiling height means the distance between landmarks

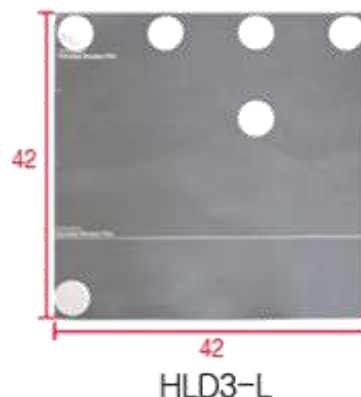
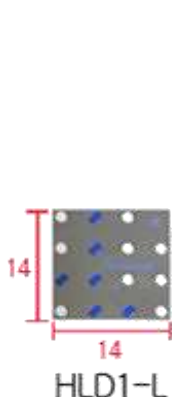
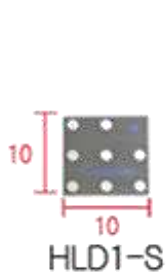
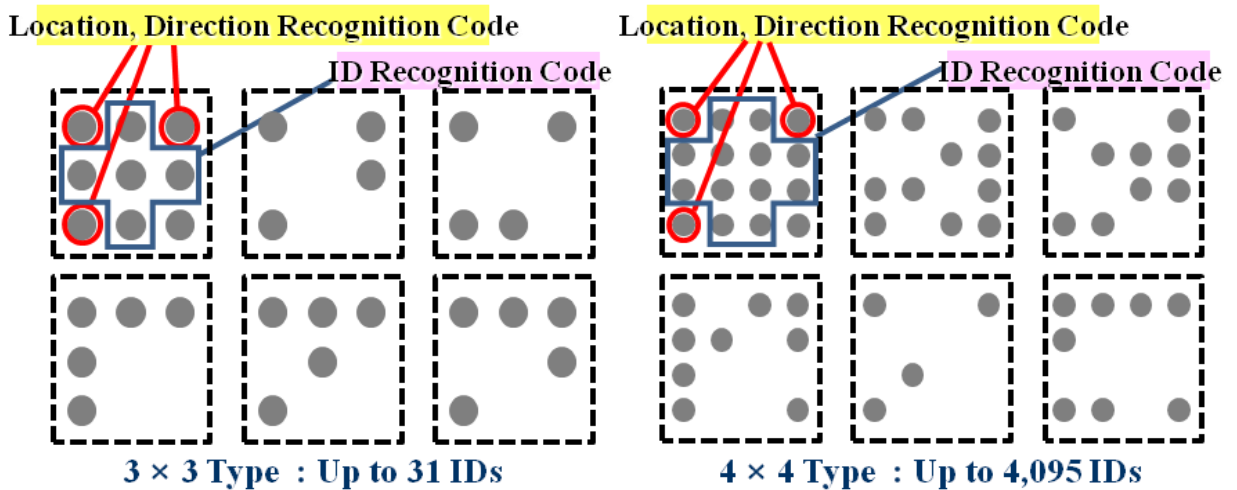
from the position with the StarGazer™>

StarGazer Landmark

■ Model : HLD□-S, HLD□-L

▣ Type and size

- Each landmark has different IDs
 - 3x3 type : 31 ID combinations
 - 4x4 type : 4,095 ID combinations
- Landmark has location, direction, ID recognition code
- Landmark does not consume any electrical power.
- Easy installation, easy expansion to larger area



< The Landmark ID combination is Please refer to the [3 x 3 Landmark Combination & 4x4 Landmark Combination file.](#)>

StarGazer Landmark

■ Model : HLD□-S, HLD□-L

■ Specifications and Use

1. Specifications

Model	ID type	Available height range (cm)	Localization range (per landmark) (cm)	Size of Dots / Size of Landmark (mm)	Application
HLD1-S	3×3	110 ~ 290	160~320	14 / 100	Home / Office
HLD1-L	4×4			14 / 140	
HLD2-S	3×3	290 ~ 450	350~440	30 / 200	Factory/ Warehouse
HLD2-L	4×4			30 / 280	
HLD3-S	3×3	450 ~ 650	440~630	48 / 300	Factory/ Warehouse
HLD3-L	4×4			48 / 420	
HLD4-S	3×3	~ 1500	Active type Development in progress		Convention Hall
HLD4-L	4×4				

2. Use

- ① HLD□-S : 3X3 combinations, consisting of a total of 31, typical uses.
 - HLD1-S : Applied to a ceiling height range of 1.1 m to 2.9 m.
 - HLD2-S : Applied to a ceiling height range of 2.9 m to 4.5 m.
 - HLD3-S : Applied to a ceiling height range of 4.5 m to 6.5 m.

- ② HLD□-L : 4X4 combinations, consisting of a total of 4095, for a large area for which large offices are linked.
 - HLD1-L : Applied to a ceiling height range of 1.1 m to 2.9 m.
 - HLD2-L : Applied to a ceiling height range of 2.9 m to 4.5 m.
 - HLD3-L : Applied to a ceiling height range of 4.5 m to 6.5 m.

■ Notes

- The 3X3 landmark is composed of 31 ID's and has no functional differences except 4x4 Landmark and ID numbers (4,095).
- HLD1-S and HLD1-L are the method of removing and leaving only the seat on the back side, while the seats fitted with HLD2-S, HLD2-L, HLD3-S, HLD3-L are the attached sheet.
- For StarGazer™ and StarGazer™ RS1.0 models, landmarks must be purchased separately.
- The 3X3 Landmark is composed of 31 IDs. To use more than 31 items in one location, purchase them as a 4x4 landmark.