

3D Solid-state LiDAR



Product characteristics

- Full-field frame rate up to 25 fps
- FOV: 68° x 55°; Resolution: 640 x 480
- Supports the setting of 16 groups of user-defined regions-of-interest, with each group supporting multiple user-defined regions-of-interest
- Supports LAN and 1 group of optical coupling isolation GPIO interfaces
- Supports GPIO inputs and simultaneous measurement
- Measuring distance up to 5m
- Centimeter level point cloud distance precision
- Excellent anti-light interference
- Built-in anti-interference algorithm, supports multi-machine work
- All-solid-state construction, industrial grade IP65 waterproof design
- Supports normal mode and high dynamic range (HDR) mode with high adaptability to various scenarios
- Supports 4 measurement modes, including close-range high-precision mode, long-range low-precision mode, long-range high-precision mode, and normal mode

Product application

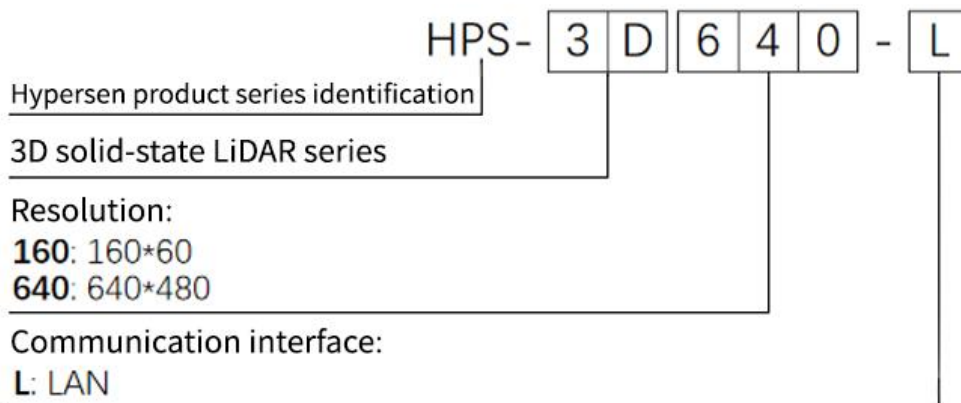
- Robotics & AGV (obstacle detection, SLAM applications)
- Drone obstacle avoidance, height setting
- Protection and proximity protection in industrial safety zone
- Safety monitoring
- 3D motion recognition
- 3D modeling

Product description

HPS-3D640-L is a new generation of high performance solid-state LiDAR sensors based on ToF principle, which features optimally designed illumination system and low-distortion infrared optical lens, with a measuring distance of up to 5m when the target is a white object of 90% reflectivity. With the flexible user-defined region-of-interest setting function, high dynamic range (HDR) mode, and four measurement modes with different ranges and precision, this LiDAR can be used in conditions of different reflectivity.

HPS-3D640-L integrates a high-power 850nm IR VCSEL emitter and high sensitivity photosensitive devices with a built-in high performance processor and advanced data processing, filtering and compensation algorithms, achieving very stable and real-time output of measurement results. The all-solid-state construction, industrial grade IP65 design and rugged aviation aluminum housing allows it to be used in various complex environments.

Ordering Information



Class1 laser product.
Laser classification measurement
according to IEC60825-1: 2014.

CE **FC** **RoHS**

Overview

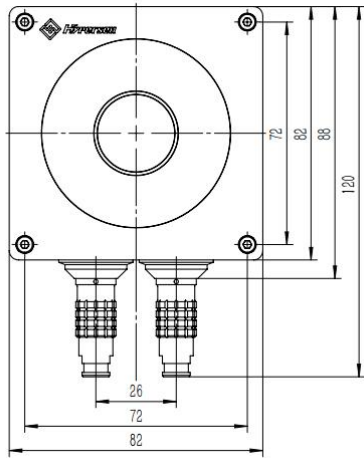
1.1 Technical specifications

Parameter	Value	Unit
Dimensions	88(L) x 82(W)x 49(H)	mm
Weight ^{*1}	440	g
Power supply ^{*2}	12 ~ 24	V
Maximum power consumption	8	W
Static power consumption	3	W
Storage temperature	-40 ~ 85	°C
Operating temperature	-10 ~ 55	°C
Infrared emission wavelength	850	nm
Emission angle	68 (horizontal) x 55 (vertical)	°
Ambient light immunity	80,000	Lux
Maximum measuring distance	2 @10% reflectivity black target 5 @90% reflectivity white target	m
Minimum measuring distance	0.3 @10% reflectivity black target 0.3 @90% reflectivity white target	m
Maximum output frame rate	25 (full FoV)	fps
Output data	Depth data, average distance, signal strength, average amplitude, effective amplitude, maximum distance and minimum distance	-
Measurement modes ^{*3}	Normal mode, close-range high-precision mode, long-range low-precision mode and long-range high-precision mode	
Operating mode	Normal mode and high dynamic range mode	-
Power on and initialization time	10~12	s
Data interface	LAN	-
Optical coupling isolation I/O	One group of input/output	-
Network cable length	1 or 2 (customizable)	m
Power cable length	1	m
Operating systems supported	Linux (x86_64) ARM Linux Windows	
Third-party libraries supported	ROS Point Cloud Library (PCL) Halcon OpenCV	

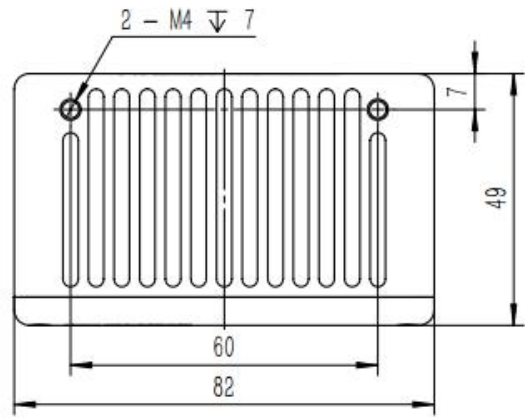
Note: *1 Excluding cables.

*2 The voltage marked on the sensor housing shall prevail.

1.2 Overall dimensions and cable definitions



Front View of HPS-3D640



Left View of HPS-3D640

HPS-3D640-L

Cable color	Signal name	Signal type	Description
Grey/red	VCC	Power	Power, connected to DC +12~ 24V
Grey/black	GND	GND	Power ground
Orange/black	OUT	I/O	Optical coupling isolation I/O output port
Orange/red	IN	I/O	Optical coupling isolation I/O input port
White/black	COM	I/O	Optical coupling isolation I/O common port
Yellow/red	GND	Digital	Signal ground
Yellow/black	TTL	I/O	Expansion IO, non-isolated
White/red	-	-	Reserved
Shield	SHIELD	-	Cable shield, the inside connected with the product housing

2.1 I/O input and output ports

2.1.1 Recommended circuit for optical coupling isolation I/O input port:

There is a 1K resistance in series on the sensor's internal input circuit. If the I/O input port is connected directly with the power supply, it is recommended that the input voltage be between 5V and 12V and the corresponding IF (forward current) current between 4mA and 10mA; and the I/O common port needs to be connected to the power ground.

If the operating voltage is higher than 12V, the customer needs to add a resistance to avoid too high current which may cause equipment failure.

2.1.2 Recommended circuit for optical coupling isolation I/O output port:

It is recommended to connect an R_L resistance in series between VCC and the I/O output port, so that the current I_C (collector current) after conduction is controlled between 5mA and 30mA.

Where the output current is greater than 40mA, it is recommended that the customer adds a power driver stage at the back end to avoid equipment failure due to too high current.

If the series voltage reaches 24V, it is recommended to increase the load to 1K resistance; and the I/O common port needs to be connected to the power ground.

2.1.3 Recommended circuit for non-isolated I/O:

When this port is used as an output port, it is recommended to connect the resistance in series with reference to the requirements in 2.1.2.

When this port is used as an input port, it is recommended to connect the resistance in series with reference to the requirements in 2.1.1.

2.2 Communication interface

The HPS-3D640-L communicates with the host via a LAN interface and has one optical coupling isolation output, one optical coupling isolation input and one non-isolated I/O. Users can use the optical coupling isolation interface for connection with PLC and other devices.

2.3 Sensor indicator status

Red indicator	Green indicator	Status description
On	Blink	The sensor is being initialized
Off	On	The sensor is already connected
On	On	Sensor image capturing error
Off	Blink	The sensor is waiting for connection
On	Off	Unknown error

2.4 Secondary development

To facilitate the secondary development and integration of the HPS3D640 series, this product provides a multi-platform SDK, supporting Windows and Linux platforms.

Package Information

Model	HPS-3D640-L
Sensor size	88(L) x 82(W) x 49(H)
Weight	440g/pc (excluding cables)

Revision history

Date	Revision	Description
1/10/2021	1.0	Initial release.
4/9/2021	1.1	In the technical specifications on Page 2, the contents about "Operating systems supported" and "Third-party libraries supported" were added.

Preliminary

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