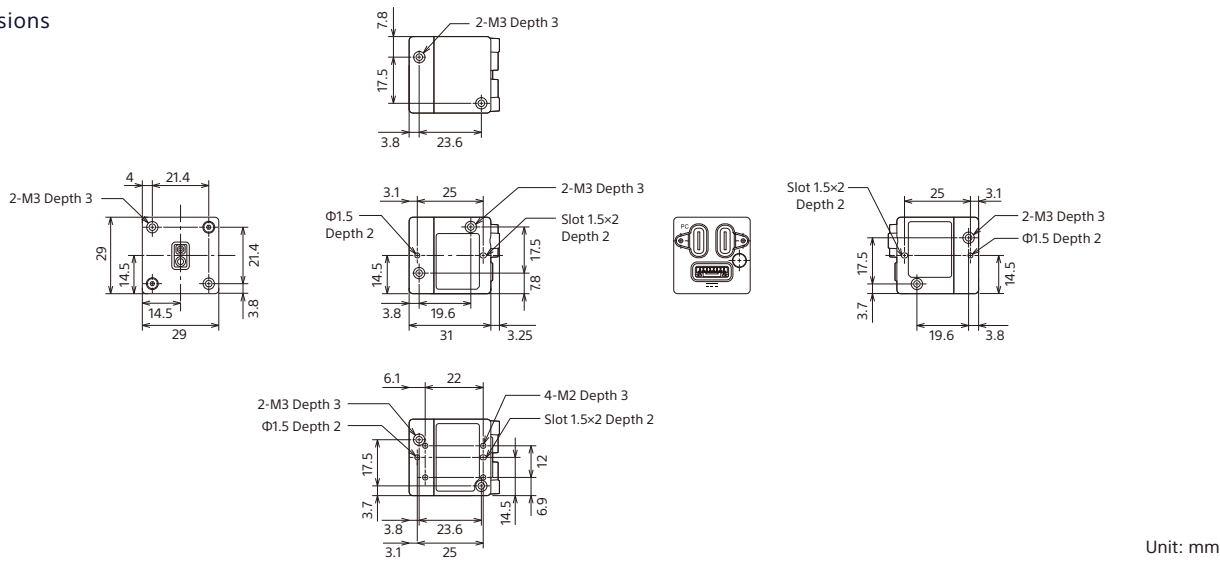


External Dimensions



Main Specifications			
General Specifications			
FOV	HFOV 35.5±2°, VFOV 28.2±2°		
Distance resolution	0.25 mm		
Number of distance measurement points	576		
Light source element	8x24pix VCSEL laser diodes		
Laser wavelength	940±6 nm		
Maximum ranging distance	Indoors: 40 meters (Background light illuminance: 1,000 lx or less) ②		
	Outdoors: 30 meters (Background light illuminance: 40,000 lx or less) ③		
Distance Measurement Range Mode	Distance Measurement Range	Number of Ranging Points [H x V]	Maximum Frame Rate
20M	0.3 to 20 m	24x24	30 fps
30MSTD	0.3 to 30 m	24x24	30 fps
30M15F	0.3 to 30 m	24x24	15 fps
30M30F	0.3 to 30 m	24x12	30 fps
40M	0.3 to 40 m	24x24	15 fps
Interface and Power Information			
Interface	USB3.2 Gen1, USB2.0, UART, Trigger IN/OUT, TS CLK/PRESET		
IO Standard	Non-Isolated 3.3 V (UART, Trigger, TS)		
Power supply	USB TYPE-C 5 V or 8-pin JST GH connector, 12 to 24 V		
Power consumption	Max. 2.5 W		
External connector	USB TYPE-C UFP for HOST		
	USB TYPE-C DFP for Device (internal HUB) 8-pin JST GH connector		
8-Pin JST GH Connector Assignment			
Pin No.	Name	Input/Output	Function
1	GND	-	Ground
2	VCC	Input	External power
3	Trigger In	Input	Ranging start trigger pulse
4	Trigger Out	Output	Ranging pulse
5	UART TX	Output	UART transmission
6	UART RX	Input	UART reception
7	TS Clk	Input	TimeStamp step pulse
8	TS Preset	Input	TimeStamp value setting pulse
Operating Environment			
Guaranteed performance temperature	0 to +40°C ⑦		
Operating temperature	-5 to +45°C		
Storage temperature	-30 to +60°C		
Operating humidity	20 to 80% (no condensation)		
Storage humidity	20 to 80% (no condensation)		
Vibration resistance	10 to 500 Hz, 3 directions (XYZ), 1 hour each		
Shock resistance	200 G, 7 to 8 ms		
Software Support	SDK for AS-DT1 Ver1.01 (Sample program and Python library) Windows11 64 bit Ubuntu 24.04		
Verified operating environment	Jetson Orin AGX JetPack 6.2.2		
	Raspberry Pi OS Release date: Dec 4, 2025 (64/32bit) (Use AS-DT1 Firmware Ver1.01, SDK for AS-DT1 Ver1.01, API Manual Ver1.01) (For the latest information, refer to the API Manual included with SDK for AS-DT1)		
Housing			
External dimensions (W x H x D)	29 × 29 × 31 mm (1 3/16 x 1 3/16 x 1 1/4 in) Excluding protrusions		
Mass	Approx. 46 g (1.6 oz)		
Output Data Format			
Depth data	Point Cloud or Point Cloud Z Axis only		
Intensity Image	UVC YUY2		
Standard and Certifications			
Laser class	Class 1 product, Eye Safety Class 1 IEC/EN 60825-1:2014(Ed.3)		
EMC standard	EN55035 Class A, FCC Class A		

[Notes]
• Because the SPAD sensor features high sensitivity, excessive reflected light from objects with high reflectance at close range can cause overflow, reducing distance measurement accuracy.
• If there is strong ambient light, distance measurement performance may be reduced.

*1 Among 3D LiDAR depth sensors (excluding modules) with a 10 meters or more ranging mode under sunny outdoor conditions. According to Sony research as of April 2025. *2 When using the "40M" distance measurement range mode, for an object with 50% infrared reflectivity, centered in front of the sensor (center point). *3 When using the "30M15F" distance measurement range mode, for an object with 50% infrared reflectivity, centered in front of the sensor (center point). *4 An electronic device (diode) that achieves high sensitivity by utilizing "avalanche multiplication," which amplifies electrons like a snow avalanche from a single incident photon. *5 Excluding protrusions. *6 Expandable up to 3 units per USB port. *7 Provided that the sensor temperature is 70°C or less. *8 Performance at 50% or 80% infrared reflectivity.

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Distance Measurement Performance
Distance measurement performance is expressed in terms of accuracy and precision.
Accuracy: Indicates the error in mm between the average value of multiple distance measurements when the same target is measured multiple times with the target in a fixed position and the true distance.
Precision: Indicates the variation (σ) in mm between the distance measurement values obtained when the same target is measured multiple times with the target in a fixed position.
The object used for performance measurement is a flat plate with an infrared (940 nm) reflectance of 10%/50%/80%. Measurements are taken with the unit facing directly at the flat plate with the distance measurement point in the center of the screen.
For indoor distance measurement, the results are from distance measurements taken in an environment with a background light brightness of 1,000 lx or lower. For outdoor distance measurement, the results are from distance measurements taken in an environment with a background light brightness of 40,000 lx or lower. However, these are under conditions where the background light reflected from the objects does not enter the unit due to total reflection.

Distance [m]	Accuracy (Indoor) [mm]				
	20M	30M STD	30M 15F	30M 30F	40M
0.5	+30/-80	+50/-150	+50/-150	+50/-150	+70/-230
1	+30/-30	+10/-150	+10/-150	+10/-150	+25/-230
2	+10/-60	+10/-150	+20/-100	+20/-100	+40/-140
5	+10/-25	+20/-30	+20/-40	+20/-40	+45/-55
10	+10/-25	+20/-30	+20/-40	+20/-40	+45/-55
15	+10/-25	+20/-40	+20/-40	+20/-40	+60/-55
20	+10/-25	+20/-40	+20/-40	+20/-40	+60/-55
25	-	+20/-40	+20/-40	+20/-40	+60/-55
30	-	+20/-40	+20/-40	+20/-40	+60/-55
35	-	-	-	-	+60/-55
40	-	-	-	-	+60/-55
Distance [m]	Precision (Indoor) [mm]				
	20M	30M STD	30M 15F	30M 30F	40M
0.5	4	4	4	4	4
1	2.5	2.5	2.5	2.5	2.5
2	2.5	2.5	2.5	2.5	2.5
5	2.5	2.5	2.5	2.5	2.5
10	5	5	5	5	5
15	7.5	7.5	7.5	7.5	7.5
20	10	10	10	10	10
25	-	12.5	12.5	12.5	12.5
30	-	15	15	15	15
35	-	-	-	-	17.5
40	-	-	-	-	20
Distance [m]	Accuracy (Outdoor) [mm]				
	20M	30M STD	30M 15F	30M 30F	40M
0.5	+35/-120	+25/-170	+25/-170	+25/-170	+60/-230
1	+35/-120	+25/-170	+25/-170	+25/-170	+60/-230
2	+35/-100	+25/-170	+25/-170	+25/-170	+30/-230
5	+35/-70	+30/-100	+30/-100	+30/-100	+50/-120
10	+35/-70	+30/-100	+30/-100	+30/-100	+50/-120
15	+45/-70 ^a	+30/-110	+100/-110	+100/-110	+120/-120
20	+45/-70 ^a	+30/-110 ^a	+100/-110	+100/-110	+120/-120
25	-	+30/-110 ^a	+100/-110 ^a	+100/-110 ^a	+120/-120 ^a
30	-	-	+100/-110 ^a	+100/-110 ^a	+120/-120 ^a
Distance [m]	Precision (Outdoor) [mm]				
	20M	30M STD	30M 15F	30M 30F	40M
0.5	25	10	10	10	15
1	10	10	10	10	20
2	10	10	10	10	20
5	10	12.5	10	10	20
10	20	25	20	20	40
15	30 ^a	37.5	30	30	60
20	40 ^a	50 ^a	40	40	80
25	-	62.5 ^a	50 ^a	50 ^a	100 ^a
30	-	-	60 ^a	60 ^a	120 ^a

SONY

LiDAR Depth Sensor

Image
Sensing
Products

Envision the Whole Picture
for a Safer World

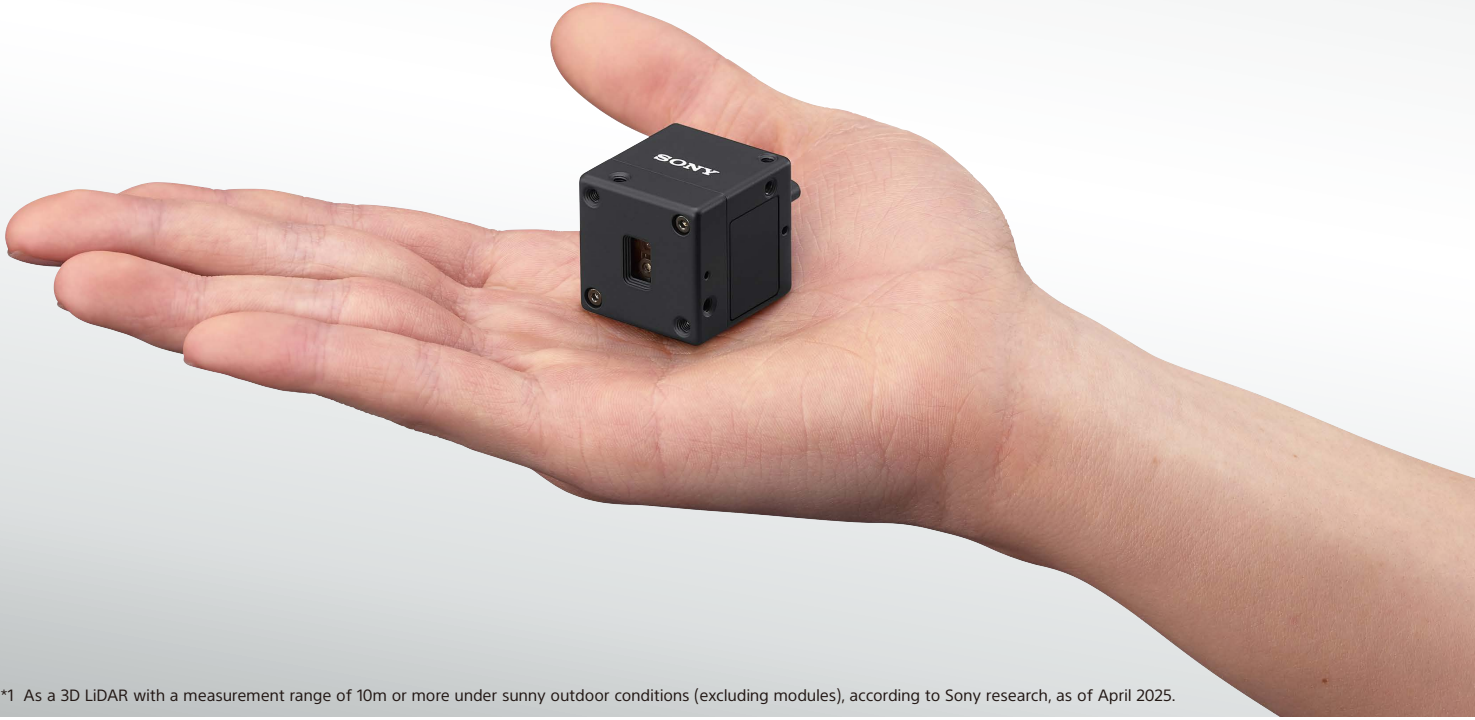
A LiDAR depth sensor that combines high ranging performance with the world's smallest and lightest*1 enclosure, making it suitable for integration into robots and drones.

Adopting the “Direct Time of Flight (dToF) method,” which delivers highly accurate measurement, distance resolution, and measuring range.

Stable Ranging Performance with
High Real-Time Responsiveness

Long-Distance Ranging
Capable Even Outdoors

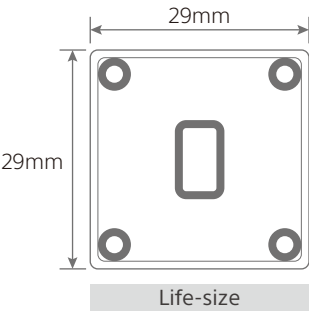
Compact, Lightweight,
and Robust Housing with
Daisy-Chain Expandability



*1 As a 3D LiDAR with a measurement range of 10m or more under sunny outdoor conditions (excluding modules), according to Sony research, as of April 2025.

LiDAR Depth Sensor

AS-DT1

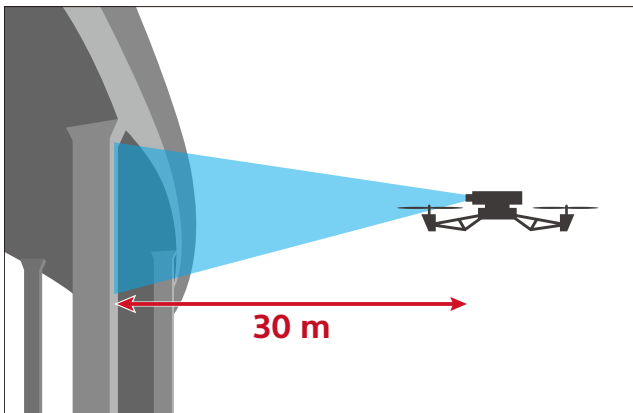


Long-Distance Ranging Capable Even Outdoors

The AS-DT1 enables high-precision ranging even from a long distance of 40 meters² indoors (assuming 1,000 lx) and 30 meters³ outdoors (assuming 40,000 lx). Because high-precision ranging is possible from a long distance even outdoors, it can also be utilized for ranging objects that are difficult for people to approach, such as bridges, expressways, and dams. In addition, ranging is possible even in dark environments (0 lx) such as tunnels.

^{*2} When using the "40M" distance measurement range mode, for an object with 50% infrared reflectivity, centered in front of the sensor (center point).

^{*3} When using the "30M15F" distance measurement range mode, for an object with 50% infrared reflectivity, centered in front of the sensor (center point).

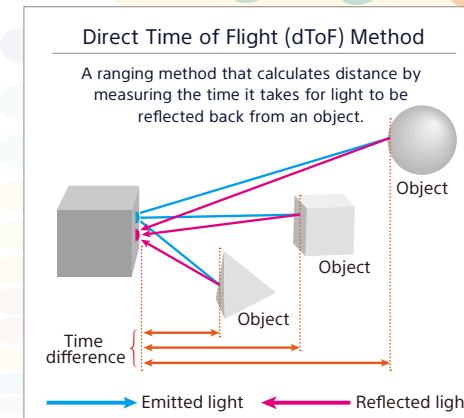


Stable Ranging Performance with High Real-Time Responsiveness

The AS-DT1 enables ranging at up to 30 frames per second. At an indoor distance of 40 meters², the sensor can perform ranging with a repeatability of 0.05% and minimal variation. In addition, the sensor can measure distances to objects with low reflectivity, such as black objects, which is difficult with ranging methods other than dToF. Capable of high-precision ranging with excellent real-time responsiveness for a wide variety of objects, the sensor is suitable for integration into robots used in environments such as stores and warehouses where a diverse range of objects coexist.

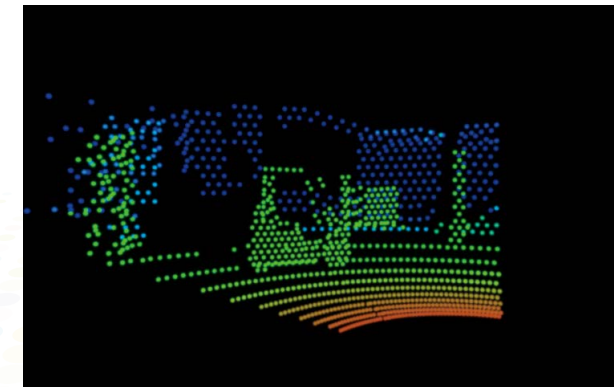
The AS-DT1 is a 3D LiDAR depth sensor that uses a Single Photon Avalanche Diode (SPAD)^{*4} sensor and infrared light with a wavelength of 940 nm to achieve stable ranging without any moving parts. Sony's proprietary dToF ranging module reduces variation in measured distance values, enabling stable measurement of the distance to the object.

^{*4} An electronic device (diode) that achieves high sensitivity by utilizing "avalanche multiplication," which amplifies electrons like a snow avalanche from a single incident photon.



Point Cloud

An example of ranging measurement data displayed as point cloud data (an image for illustration purposes only)



Far ● ● ● ● ● ● ● Near

By using multiple ranging points for distance measurement, the sensor can make precise three-dimensional distance measurements in the vertical, horizontal, and depth directions. Additionally, it can measure distances to objects that are difficult to detect with other ranging methods, such as low-contrast objects and objects with low reflectivity.

Compact, Lightweight, and Robust Housing with Daisy-Chain Expandability

This is the world's smallest and lightest^{*1} sensor; 29 mm in width x 29 mm in height x 31 mm in depth^{*5}, with approximately 46 g in weight.

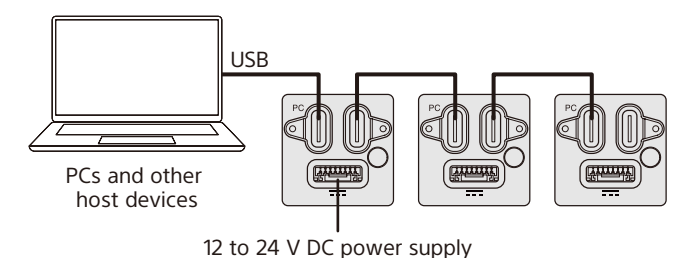
The use of an aluminum alloy for the housing achieves both lightness and robustness. Designed with multiple threaded holes, this compact housing is easy to integrate into various devices, such as autonomous mobile robots with limited space for depth sensors, and drones where weight affects the flight distance.



In addition, the USB Type-C connectors support daisy-chain configurations (multiple sensors connected in series), making it possible to expand the field of view.^{*6}

^{*5} Excluding protrusions.

^{*6} Expandable up to 3 units per USB port.



Application

Achieving higher-precision object detection and autonomous mobility to contribute to industrial automation utilizing robots, drones, and other technologies.

The device delivers high-precision distance measurements in busy environments like stores, where people, objects and fixtures are constantly present.

The range of applications will be expanded by integrating it into various devices, such as food serving robots in restaurants, autonomous mobile robots in warehouses, and drones used for inspections and surveys.

Autonomous Mobile Robots (AMRs)



Inspection Drones

