

# **Product Highlights**

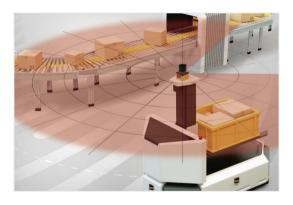




### Industrial obstacle avoidance lidar

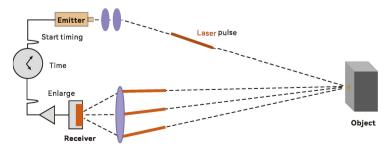
AKUSENSE's new generation TOF single-line LiDAR boasts high reliability, stable performance, and cost-effectiveness. It's an ideal choice for industrial AGVs, mobile robots, and low-speed robots.





### Single-line laser lidar

Accurate 2D scanning of object contours on flat surfaces



# Mainstream performance of TOF single-line lidar

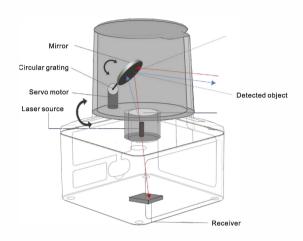
Measurement distance  $\geq$  10 m (70% reflectivity),  $\geq$  4 m (10% reflectivity)

Horizontal viewing angle: 270° scanning angle, can be divided into 64 independent channels Measurement rates up to 54 KHz

### **AS Series**

### Unique structural design, high reliability

The use of lightweight rotary mirror design, with precision brushless silent motor, making the product stable and reliable operation.





# Supports serial port (Type-C connector) communication\*

Online real-time output of measurement data (including distance and light intensity data in each direction)

\* AS-33C

# Vibration and shock resistant, adapting to a variety of inspection scenarios

Precision dust-free assembly process, through the high-intensity vibration test and harsh impact test, product consistency is good.



### Lidar Technology

Pulsed TOF high-speed ranging technology:

AKUSENSE's full range of LIDAR products utilize direct time-of-flight (dTOF) technology for distance measurement.

This means that short, nanosecond pulses with high instantaneous power are emitted and the distance to the target is calculated by measuring the round trip time of the pulse.

Compared to other commonly used ranging mechanisms (e.g. triangulation based on geometric similarity, and phase ranging using the phase difference between the transceiver channels), it is much faster and has a longer detection distance.

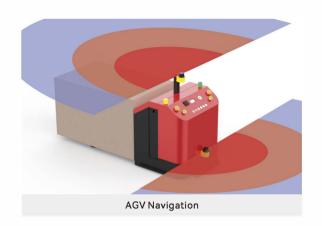
Weak echo signal processing with high signal-to-noise ratio

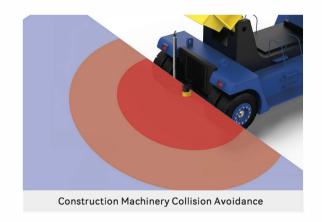
Pulse echo signal at the receiving end of the photoelectric sensor to form a weak photocurrent, converted to voltage signals and through several levels of amplification and conditioning, by the timing circuit for subsequent processing.

In order to ensure the stability and reliability of the measurement results, the entire signal processing path is sufficient to meet the requirements of TOF ranging on the large bandwidth and high signal-to-noise ratio, so as to capture the weaker signals and measure longer distances.

# **Product Highlights**

# Application

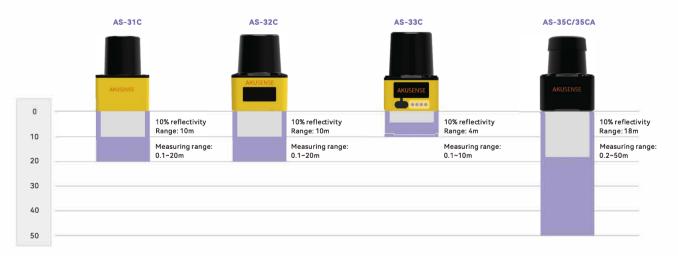




# Selection table



Model.	AS-11C	AS-21C	AS-41C	AS-100C
Scanning angle	360°	300°	300°	360°
Resolution	0.5°	0.5°(default)/0.25°/0.125°	0.5°(default)/0.25°/0.125°	0.05°/0.1°
Scanning frequency	12.5Hz	25Hz(default)/12.5Hz/6.25Hz	25Hz(default)/12.5Hz/6.25Hz	10Hz/20Hz



Model.	AS-31C	AS-32C	AS-33C	AS-35C/35CA
Scanning angle	270°	270°	270°	360°
Resolution	0.12°/0.18°/0.23°/0.35°	0.12°/0.18°/0.23°/0.35°	0.5°	0.06°/ 0.09°/ 0.12°/ 0.18°
Scanning frequency	10Hz/15Hz/20Hz/25Hz/30Hz	10Hz/15Hz/20Hz/25Hz/30Hz	25Hz	10 Hz /15 Hz /20 Hz /30 Hz

Fiber Optic
Slot Sensors

Photoelectric Laser

Proximity

### Displacement

Magnetic

Area Ultrasonic

Contact

Al Image

Code Readers

Vibration

Temperature

RFID

Safety door lock
Pressure Switch

Communication

Accessories

Guidance

Triangulation
TOF Long
Range Type
3D Laser
Profiler
Contact
Displacement

LiDAR Scanner

Color confocal

# AS-21/41C



	Working prin	ciple	TC	DF		
	Optical worki	ng principle	Diffuse Reflection			
	Light source		Infrared laser (905nm)			
	Laser spot exit aperture		8mm			
asic	Scanning range		300°			
Basic Features	Scanning and	gle resolution	0.5°(default)/0.25°/0.125°			
ures	Measuring ran	ige	0.1m ~20m 0.1m ~40m			
	Measurement	System error (typical)	±5cm	±5cm(1m~20m); ±10cm(20m~40m)		
	Error	Statistical error(1o)	±2cm	±2cm(1m~20m); ± 4cm(20m~40m)		
	Indicator		Quantity: 2; Definition: ERR (Equipment Alarm: Failu High/Low Temperature, Dense Fog); HTR (Operation			
Ee	Operating vo	Itage	10V~2	8V DC		
ctrica	Power consumption		5W(Measuring), 3.6W@DC 12V/14.4W@DC 24V(Heating)			
Electrical data	Communication		Ethernet, rate: 10/100 Mbps; Network protocol: TCP/P: Functions: device configuration/ measurement data output/monitoring signal output			
	Operating temperature		-25℃~+50℃			
8 17	Storage temperature		-30°C~	+70℃		
Environmental conditions	Operating humidity		93%,+40°C,2h	(GB/T2423.3)		
ment	Ambient Illumination		<b>≤</b> 70,0	00Lux		
<u>a</u>	Vibration resistance		GB/T2-	423,10		
	Enclosure rating		IP65(GB4208~2008)			
	Connection	nection GB/T2423,10				
Mec	Dimension		83.5×85×104.9(mm)			
Mechanical data	Material		Aluminum Alloy			
al da	Weight		0.6kg			
ថ	Accessories		Side/sit composite bracket AS-21C-AT, power cable AS-21C-EC, standard RJ45 cable, waterproof sheath for cable crystal head, hexagonal M4*8 screws, spacers, recommended installation tools.			
± s	Safety class		Class I(GB 7247.1-207	12, human eye safety)		
Special function	Laser spot er	nission angle	12.5mrad			
3 =	Scanning free	quency	300°(-60°~+240°)			
	Model		AS-21C	AS-41C		

Fiber Optic

Slot Sensors

Photoelectric

Laser

Proximity

Displacement Magnetic

Contact

Area

Ultrasonic

Al Image

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Safetydoorlock

Pressure Switch

Communication

Accessories

Guidance

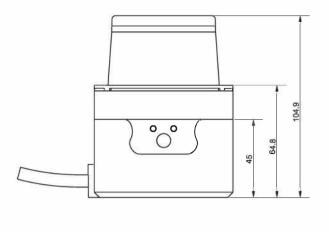
Displacement
Triangulation
TOF Long
Range Type
30 Laser
Profiler
Contact
Displacement

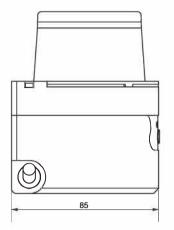
Color confocal

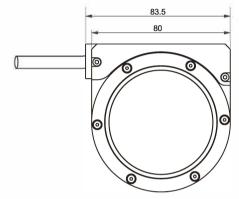
Laser Alignment

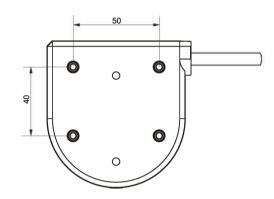
LiDAR Scanner

# Unit:mm Dimensions









### Power Interface

1/0	Socket	Туре	Explanation
Power	DC002	Power	Female 2 pin
Towol	Ethernet	RJ45 socket	4 pin
Network port	I/O	Cable	10 pin

### Accessories

			Mounting screws, gasket and easy installation tool
Composite Bracket:	Power Cable :	Crystal Protective Cover:	Accessories:
AS-21C-AT	AS-21C-EC	AS-21C-WJ	M4x8
1 Piece	1 Strip	1 Piece	1 Set

Fiber Optic

Slot Sensors Photoelectric

Laser

Proximity

### Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature

RFID

Safety door lock

Pressure Switch

Communication

Accessories

Guidance

Guidance

Displacement

Triangulation
TOF Long
Range Type
3D Laser
Profiler
Contact
Displacement

LiDAR Scanner
Color confocal

### Fiber Optic Slot Sensors

Photoelectric

Laser

Proximity

### Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibrati on Temperature

RFID

Safetydoorlock

Pressure Switch

Communication

Accessories

Guidance

### Displacement

Triangulation TOF Long Range Type 3D Laser Profiler Contact Displacement

LiDAR Scanner Color confocal

Laser Alignment

## Indicators and Operation Buttons

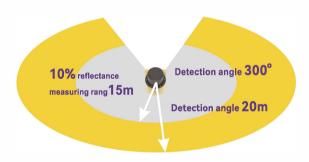
**LiDAR Scanner** 

Name	Instructions
ERR	Work fault indicator  ♦ Startup state: Light on(About 27s)Always off: No fault  ♦ Always on: Internal fault, Abnormal measurement  ♦ Long flicker ( 0.25Hz ); High / low temperature alarm  ♦ Short flicker(1Hz ): Transmissive cover is dirty/occluded¹
HTR	Work status indicator  ◆ Startup state: Off  ◆ Off: The device does not start measuring/ready to restart  ◆ Always on: Equipment normal measurement  ◆ Flash1 (0.5Hz)    ★ Flash2 (1Hz)    ★ Flash3 (2.5Hz)    ★ Ready to start self-learning²
SLR	Operation button  ♦ short press (1s~5s)Start background self-learning  Long press(≥ 6s) Delete background

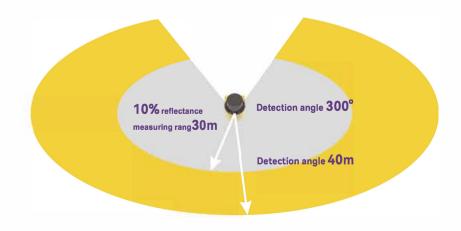
- 1:Including being blocked by dense fog or the detection area being blocked.
- 2:Including "background self-learning" and "normal goal self-learning" (customization function).

### Measuring coordinate system/scan range/range

### AS-21C



### AS-41C





### TOF principle

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	Working prin	ciple	TOF	
	Optical worki	ing principle	Diffuse Reflection	
	Light source		Infrared laser (905nm)	
	Laser spot ex	kit aperture	10mm	
Basic Features	Scanning ran	nge	360°	
Feat	Scanning and	gle resolution	0.5°	
ures	Measuring ran	nge	0.1m ~20m	
	Measurement	System error (typical)	±5cm(1m~15m)	
	Error	Statistical Error(1σ)	±2cm(1m~15m)	
	Indicator		Quantity: 2; Definition: ERR (EquipmentAlarm: Failure/Abnormality, Dirty/Shade of Transparent Cover, High/Low Temperature, Dense Fog); HTR (Operation Status Indication: Detecting Signal/Self-Learning)	
문	Operating vo	Itage	12V~28V DC	
ctrica	Power consu	mption	4.5W@DC 24V	
Electrical data	Communication		Ethernet, rate: 10/100 Mbps; Network protocol: TCP/P: Functions: device configuration/ measurement data output/monitoring signal output	
	Operating temperature		-10℃~+45℃	
ΩШ	Storage temperature		-30℃~+70℃	
Environmental conditions	Operating humidity		93%,+40°C,2h(GB/T2423,3)	
ımen	Ambient Illumination		≤70,000Lux	
a	Vibration resistance		GB/T 2423,10	
	Enclosure rating		IP65(GB4208~2008)	
	Connection		Cable Connection	
Mechanical data	Dimension		86.0×85.0×59.5(mm)	
anica	Material		Aluminum Alloy	
data	Weight		0.5kg	
ш	Accessories		Power Supply,RJ45 socket,Leads	
f <sub>L</sub> S	Safety class		Class I(GB 7247.1-2012, human eye safety)	
Special function	Laser spot er	mission angle	10.0(H) × 2.0(V)mrad	
š –	Scanning fre	quency	360°	
	Model		AS-11C	

Fiber Optic

Slot Sensors
Photoele ctric

Laser

Proximity

Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature

RFID

Safetydoorlock

Pressure Switch

Communication

Accessories

Guidance

Guidance

Displacement

Triangulation

TOF Long
Range Type

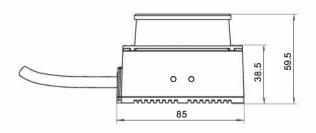
3D Laser
Profiler

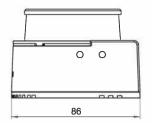
Contact
Displacement

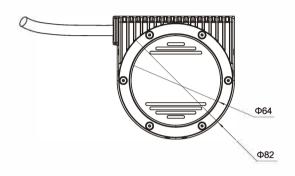
LiDAR Scanner

### Dimensions

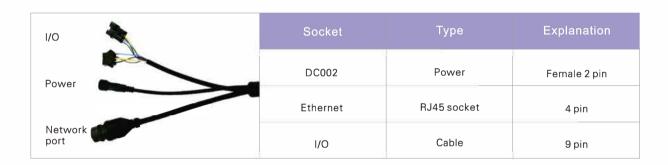
Unit:mm







### Power Interface



### Accessories

# 10%reflectance measuring rang8m Detection angle 360° Detection angle 20m

Fiber Optic

Slot Sensors

Photoelectric

Laser

Proximity

Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Vibration

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RFID

Safetydoorlock

Pressure Switch

Communication

Accessories

Guidance

### Displacement

Triangulation

TOF Long
Range Type
3D Laser
Profiler
Contact
Displacement

LiDAR Scanner Color confocal

# Indicators and Operation Buttons

Name	Instructions
ERR	Work fault indicator  ◆ Startup status: bright (About 27s)  ◆ Off: No fault  ◆ Steady light: Internal fault  ◆ Long flicker (0.5 Hz): High temperature / low temperature alarm  ◆ Short flicker (1Hz): Transmissive cover is dirty/occluded¹
HTR	Work status indicator  ◆ Startup state: off  ◆ Off: The device does not start measurement/ready to reboot  ◆ Bright: Normal measurement of equipment  ◆ Flashing 1 (0.5Hz): Monitor signal output  ◆ Flashing 2 (1Hz): Self–learning²  ◆ Flashing 3 (2.5Hz): Ready for self–learning²

- 1:Including being blocked by dense fog or the detection area being blocked.
- 2:Including "background self-learning" and "normal goal self-learning" (customized function).

### Accessories

			Mounting screws, gasket and easy installation tool
Side bracket: A AS-11C-AT	Cable:A piece of AS-11C-EC	Network cable crystal head waterproof jacket: A AS-11C-WJ	Accessories: A set of M4x8

Fiber Optic
Slot Sensors

Photoele ctric

Laser

Proximity

Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature

RFID

Safety door lock

Pressure Switch

Communication

Accessories

Guidance

### Displacement

Triangulation
TOF Long
Range Type
3D Laser
Profiler
Contact
Displacement

# Li DAR Scanner Color confocal

### Navigation Type

TOF principle

NEW!



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	-	

	Working princ	ciple	TOF	
	Optical worki	ng principle	Diffuse Reflection	
	Light source		Infrared laser (905nm)	
	Laser spot ex	it aperture	10mm	
Basic Features	Scanning angle		360°	
Featu	Scanning angle resolution		0.05°/0.1°	
res	Measuring ran	ge	0.2m ~100m	
	Measurement	System error (typical)	Distance measurement: 25mm(1m~20m) / 40mm(20m~50m); RSSI Measurement: 2%(1m~20m) / 4%(20m~50m)	
	Error	Statistical Error(1σ)	Distance measurement: 10mm(1m~20m)/20mm(20m~50m); RSSI Measurement: 1%(1m~20m)/2%(20m~50m)	
	Indicator		Quantity: 4; Definition: PWR: Power indicator; LNK: Ethernet indicator; ERR: Operating fault indicator; HTR: Normal measurement indicator	
Elec	Operating vol	tage	9V~30V DC	
Electrical data	Power consumption		5W@DC 24V	
data	Communicati	ion	Ethernet: Rate: 10/100Mbps; Functions: device configuration/measurement data output	
	Operating temperature		-10℃~+50℃	
2 п	Storage temperature		-30°C~+70°C	
Environmental conditions	Operating humidity		93%,+40°C,2h(GB/T2423.3)	
ment	Ambient Illumination		≤80,000Lux	
<u>a</u>	Vibration resistance		GB/T 2423.10	
	Enclosure rating		IP65(GB4208~2008)	
	Connection		Connector	
Mec	Dimension		110x96.5x71.5mm	
hanic	Material		Aluminum Alloy	
Mechanical data	Weight		0.7kg	
6	Accessories		Power cables, RJ45 network cables, I/O cables, mounting screws, spacers and easy installation tools, vibration isolating screws, nuts and spacers	
	Safety class		Class I(GB 7247.1-2012, human eye safety)	
Sp	Laser spot en	nission angle	2.0(H)×8.0(V)mrad	
Special function	Scanning free	quency	10Hz/20Hz	
funct	Working cond	dition	Resistant to sunlight, dirt, supports smoke penetration, non-rainfall conditions	
g	Measuremen	t data	Composite data (distance + RSSI)	
	Device self-te	est	Contents: Dirty/obstructed light transmission cover/high/low temperature	
	Model		AS-100C	

Fiber Optic

Slot Sensors

Photoelectric

Laser

Proximity Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibrati on

Temperature RFID

Safetydoorlock

Pressure Switch

Communication

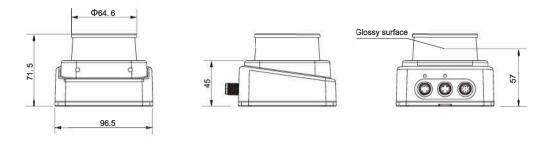
Accessories

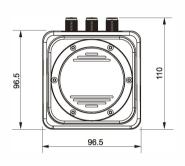
Guidance

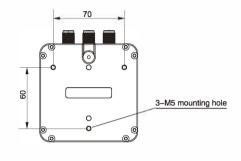
Displacement Triangulation TOF Long Range Type 3D Laser Profiler Contact Displacement

LiDAR Scanner Color confocal

Dimensions Unit:mm



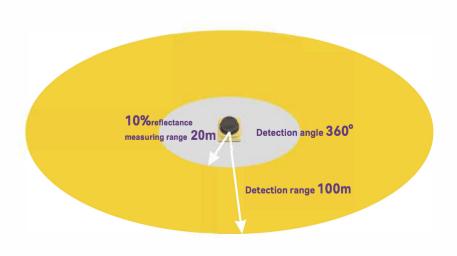




### Power connector

		Socket	Types	Number of terminal
		Power supply	M12(Type A), Male	4
		Etherne	M12(Type B), Male	4
Power supply Network port	I/O	I/O	M12(Type B), Male	8

### Measuring coordinate system/scanning range/range



Fiber Optic Slot Sensors

Photoele ctric Laser

Proximity

Displacemen

Magnetic

Contact Area

Ultrasonic Al Image

Code Readers

Vibration

Temperature

RFID

Safety door lock

Pressure Switch Communication

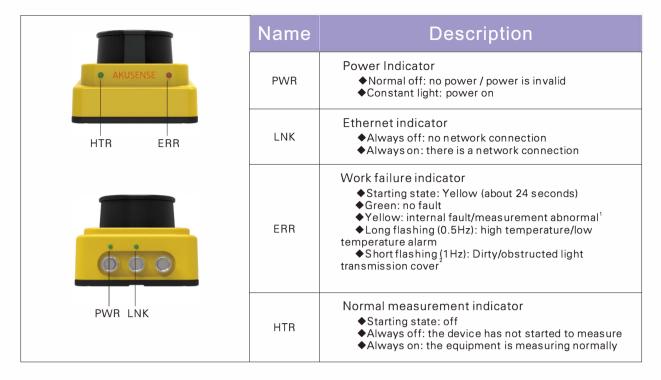
Accessories

Guidance

Displacement Triangulation TOF Long Range Type 3D Laser Profiler Contact Displacement

Li DAR Scanne

### Indicators and Operation Buttons



- 1: Including measurement stop and motor stop;
- 2: Including being blocked by dense fog.

### Accessories

					Mounting screws, washers And easy installation tools
Mounting bracket:	M12 dust plug	Power cable:	RJ45 network cable:	I/O cable:	Parts and accessories:
AS-100C-AT set	Comes with	AS-100C-EC A	AS-100C-IOCB A	AS-100C-IOCB A	M5x8 set

Fiber Optic

Slot Sensors

Photoelectric

Laser

Proximity

Displacement

Contact

Area

Ultrasonic

Al Image

Code Readers
Vibration

Temperature

RFID

Safety door lock

Pressure Switch

Communicatio

Accessories

Guidance

Triangulation
TOF Long
Range Type
3D Laser

Profiler Contact

LiDAR Scanner

### AS-31/32C





7\*3mm

DC 12V

60×60×84.9(mm)

5.2\*9mrad

AS-31C

 $0.1m \sim 20m$  ( 70% reflectivity ); 0.1m

30KHz

Working principle

Light source

Scanning angle

Measuring range

Measurement Error

Operating voltage

Power consumption

Operating temperature

Storage temperature

Operating humidity

Ambient Illumination

Vibration resistance

Enclosure rating

Connection

Dimension

Material

Weight

Accessories

Safety class

Application

Model

Device self-test

Laser spot emission angle

Abnormal alarm function

Sampling frequency

Scanning frequency

Working condition

Communication

Indicator

**Basic Features** 

Electrical data

Environmenta

Mechanical data

Special function

Optical working principle

Laser spot exit aperture

Scanning angle resolution

Resolution

Linearity



C €	AKUSENSE			
_				
	DF .			
	Reflection			
Infrared las	ser (905nm)			
	4.5*2mm			
	(0.000 (0.000)			
	/0.23°/0.35°			
	; 0.1m-10m (10% reflectivity)			
	cm			
20	cm			
-	-			
	DC 9~28V			
5	<b>W</b>			
Ethernet	or RS485			
-20°C	~60°C			
-20°C	~70℃			
93%,+40℃,2h	(GB/T2423.3)			
≤80,0	00Lux			
500m/s (about 50G), 3 tir	mes each in XYZ direction			
IP65(GB42	208~2008)			
Cable Co	nnection			
m)	60×60×81.3(mm)			
Alumini	um Alloy			
0.25kg				
DC5521 female power socket, RJ45 Ethernet male				
Class I(GB 7247.1-2012, human eye safety)				
	4.0*2mrad			
10Hz/15Hz/20Hz/25Hz/30Hz				
Indoor				
Navigation				
Yes				
Υ	es			

AS-32C

Fiber Optic Slot Sensors

Photoele ctric Laser

Proximity

### Displaceme

Magnetic

Contact Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature

RFID

Safetydoorlock

Pressure Switch

Communication

Accessories

Guidance

### Displacement

Triangulation TOF Long Range Type 3D Laser Profiler Contact Displace

### Li DAR Scanner

# AS-33C



TOF principle

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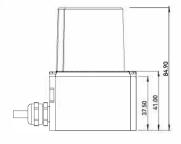
Fiber Optic
Slot Sensors
Photoelectric
Laser
Proximity
Displacement
Magnetic
Contact
Area
Ultrasonic
Al Image
Code Readers
Vibration
Temperature
RFID
Safetydoorlock
Pressure Switch
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Displacement
Triangulation TOF Long
Range Type
3D Laser
Profiler Contact
Displacement
LiDAR Scanner
Color confocal

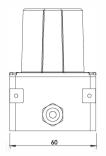
	T	700	
Basic Features	Working principle	TOF	
	Optical working principle	Diffuse Reflection	
	Light source	Infrared laser (905nm)	
	Laser spot exit aperture	4.5(V)*2(H)mm	
	Scanning angle	270°	
	Scanning angle resolution	0.5°	
	Measuring range	10 m (70%reflectivity)/4 m (10%reflectivity)	
	Measurement error	±2 cm(≤10m)	
	Indicator	4 (3 zone signals, 1 fault signal)	
Electrical data	Operating voltage	DC 9V ~28 V	
	Power consumption	Rated power: < 1 W (no load); starting power: < 3 W (no load)	
	Communication	USB-TYPE C(Serial port)	
	Operating temperature	−10°C~50°C	
2 10	Storage temperature	-20℃~70℃	
Environmental	Operating humidity	85% or less, non-condensing	
imeni	Ambient Illumination	≤80000 Lux	
8	Vibration resistance	500m/s (about 50G), 3 times each in XYZ direction	
	Enclosure rating	IP65	
	Connection	Cable Connection	
Mechanical data	Dimension	50x50x72mm	
anica	Material	Aluminum	
al dat	Weight	171g	
Ò	Accessories	Threaded	
± (0	Sampling frequency	18KHz/54KHz	
Special function	Response time	40 ms	
	Start-up time	<10s	
	Model	AS-33C	

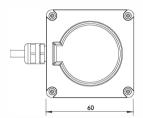
Unit:mm

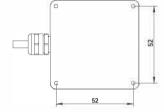
Dimensions

### AS-31C

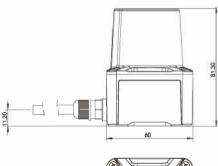


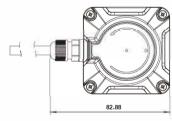


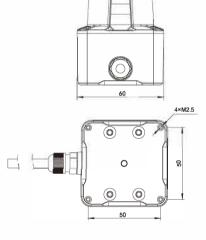




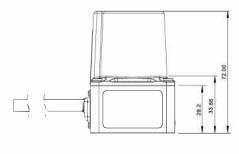
### AS-32C

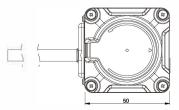


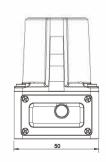


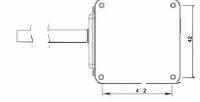


### AS-33C









Fiber Optic

Slot Sensors

Photoele ctric

Proximity

Displacemen

Magnetic

Contact Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature

RFID

Safety door look

Pressure Switch

Accessories

Guidance

### Triangulation

TOF Long Range Type 3D Laser Profiler Contact Displacement

Li DAR Scanne

# AS-35C/AS-35CA



TOF principle

NEW!

CE

Fiber Optic
Slot Sensors
Photoelectric
Laser
Proximity
Displacement

Magnetic Contact

Area

Ultrasonic

Al Image

Vibration

Temperature

RFID

Safetydoorlock

Pressure Switch

Communicatio

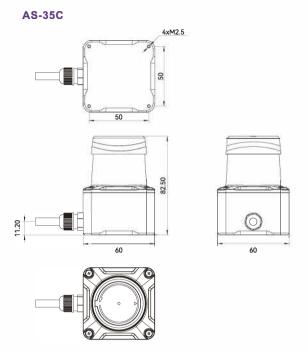
Accessories

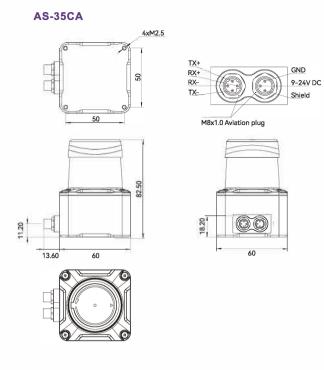
Guidance

Displacement
Triangulation
TOF Long
Range Type
3D Laser
Profiler
Contact
Displacement
LiDAR Scanner

Basic Features	Working principle	TOF			
	Optical working principle	Diffuse Reflection			
	Light source	laser (905nm)			
	Laser spot exit aperture	4.5*2mm			
	Scanning angle	360° (Ranging  performance  in  the  area  of  10°  directly  behind  is  about  half  of  other  positions)			
tures	Scanning angle resolution	0.06°/0.09°/0.12°/0.18°			
	Measuring range	0.2m~50m(90% reflectivity),0.2~18m(10% reflectivity),0.2~6m(2% reflectivity)			
	Measurement error	±2	±2cm		
	Indicator	-			
Elec	Operating voltage	DC9V~24V			
Electrical data	Power consumption	<5W/peak,	<2W/typical		
data	Communication	Ethernet/RJ45	4 holes, M8x1 connector, Ethernet/RJ45 communication		
	Operating temperature	−10°C~50°C(no freezing)			
о <u>п</u>	Storage temperature	-20℃~60℃			
Environmental conditions	Operating humidity	85% or less, non-condensing			
nmen	Ambient Illumination	≤80000 Lux			
8	Vibration resistance	500m/s (about 50G), 3 times each in XYZ direction			
	Enclosure rating	IP65			
	Connection	Cable Connection			
Mech	Dimension	82.5x60x60mm			
anica	Material	Aluminum			
Mechanical data	Weight	about 171 g			
	Accessories	Threaded			
Special function	Sampling frequency	60 kHz 2			
Special function	Power supply	Dc5521 Standard Power Supply 3-hole, M8x1 connector, standard power supply			
	Model	AS-35C	AS-35CA		

Unit:mm Dimensions





Fiber Optic

Photoele ctric Laser

Proximity

Displacement

Magnetic

Contact

Area

Ultrasonic

Al Image

Code Readers

Vibration

Temperature RFID

Safety door look

Pressure Switch

Communication

Accessories

Guidance

**Displacement**Triangulation

TOF Long Range Type 3D Laser Profiler Contact Displacement

LipAR Scanner
Color confocal
Laser Alignment