



YB27-25CR Lidar Product Specification



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Product Introduction

YB series lidar is a single-line lidar based on dTOF ranging principle. It features a compact size, simplicity of use, and high cost-effectiveness, making it suitable for diverse applications such as navigation, obstacle avoidance, and area monitoring.

Technical Parameters

Table 1 Technical parameters table

Detection Parameters		
Scanning radius	25m@70% reflectivity	
Scanning angle	270°	
Angular resolution	Default 0.5°@30Hz Support(0.5°, 1°, 2°) @20/25/28/30/40/50Hz;	
Distance deviation	±2cm (typical value) ①	
Repeatability	±4mm@1sigma②	
Scanning plane Angle	Pitch ±0.5°; roll ±0.5°	
Electrical and mechanical parameters		
Working voltage	DC 9~28V	
Power-on startup time	Typical 10s	
Power consumption	< 2W (No load at output)	
Output	RS232	
Dimensions	52mm×52mm×70mm	
Cable length	Standard 1m	
Ambient temperature	Working: -10℃~50℃ (No frost or condensation on the window) Storage: -40℃~70℃	
Ambient humidity	Working: 35%RH~85%RH; storage: 35%RH~95%RH	
Anti-optical Interference	80000Lux	
Shock resistance	Acceleration 10g; pulse duration: 16ms;	
	Number of impacts: three axes, 1000±10 times per axis	
Vibration Resistance	Frequency 10Hz ~ 55Hz; Amplitude: 0.35±0.05mm;	
	Scanning cycles: 20 times for each XYZ axis	
Protection Rating	IP65	
Electromagnetic compatibility (EMC)	EMI	EN61326-1: 2013
		EN55011; 2009 + A1: 2010
	EMS	EN61326-1: 2013
		EN61000-4-2: 2009
		EN61000-4-3: 2006+A1: 2009+A2:2010
		EN61000-4-4: 2004+A1: 2010
		EN61000-4-6: 2014
		EN61000-4-8: 2010

Notice:

- ① The measurement error of different reflectivity materials is controlled at $\pm 2\text{cm}$ (typical). Factory test method: Three kinds of specimens (black flannels, white paper and reflective stickers) are placed on the automatic tooling of the whole machine at different angles and at the same distance (59cm). The deviation between the center value and the true distance of each material is within $\pm 2\text{cm}$, and the maximum difference between the three materials is within 2cm.
- ② Statistical measurement at 600mm position on 10% black velvet.

Indicator Light



Figure 1 Indicator

POWER: power indicator, steady on indicates normal power supply, off indicates faulty power supply.

MOTOR: motor status indicator, steady on indicates normal motor, off indicates motor failure.

LASER: measurement status indicator, steady on indicates normal measurement, off indicates fault measurement.

OTHER: other status indicators, steady on indicates normal, off indicates other faults.

Note: When the device is just powered on, all indicators will enter the flow light state, indicating that the device is starting and is in the normal state.

Cable and Interface

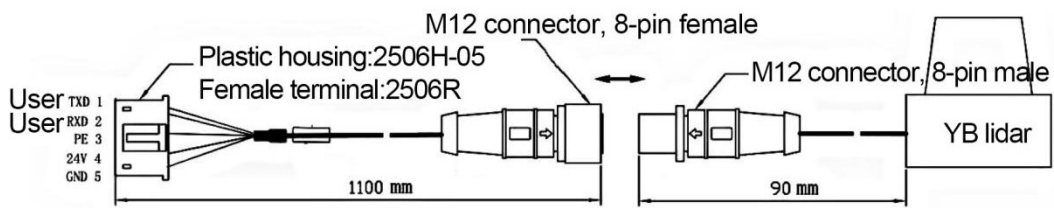
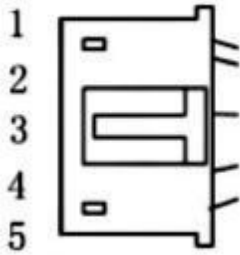
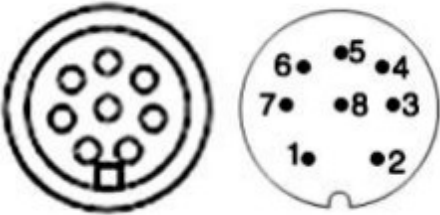


Figure 2 Cable

As shown in the figure, the YB27-25CR transmission line is a four-core shielded cable, with a length of 1100 + 90 mm. The intermediate connection interface is an M12 aviation connector, and the user-end interface is a dedicated plastic casing.

Table 2 Power Cable Color-Signal Table

Power Cable User-End Interface	Pin-Wire Color Mapping	Signal Definition
	1-Yellow	TxD (User)
	2-Black	RxD (User)
	3-Yellow/Green	PE
	4-Red	24V
	5-Green	0V
Power Cable Intermediate Interface	Pin-Wire Color Mapping	Signal Definition
	1-Red	24V
	2-Green	0V
	3-Black	RxD (User)
	4-Yellow	TxD (User)
	Shell-Shielding Layer	PE

Machine Dimension

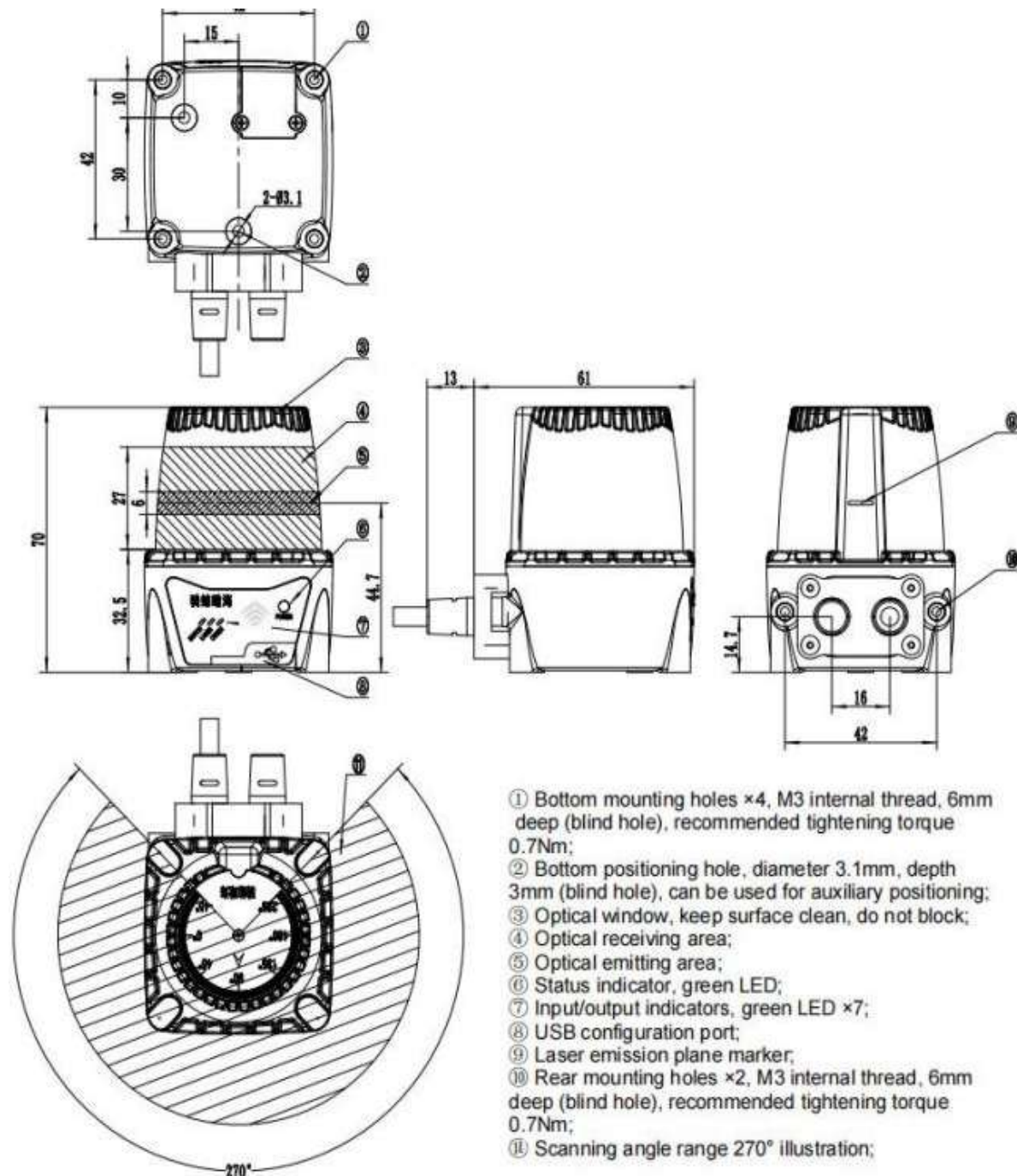


Figure 4 Mechanical dimensions

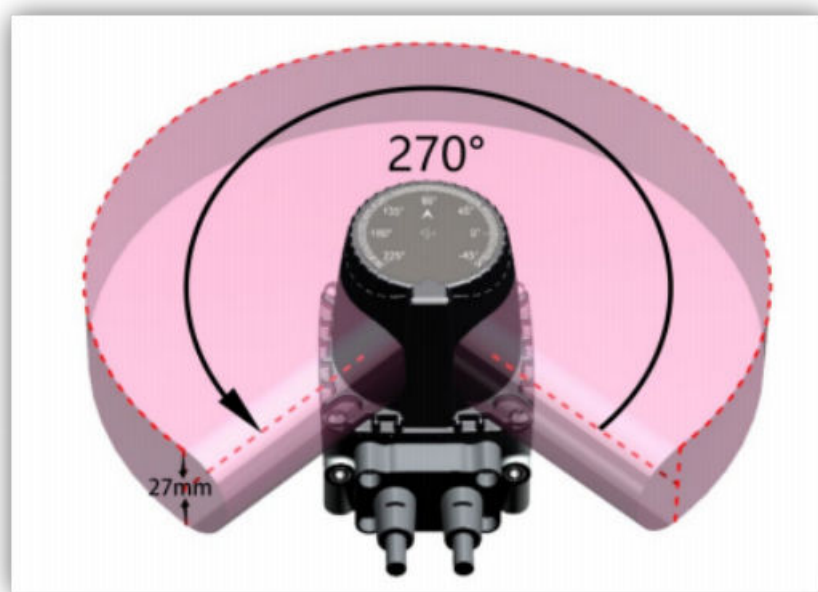


Figure 5 Schematic diagram of scanning range

Communication Protocol

Table 3: Data Format Summary

Data Format Description	Summary	
<pre> struct cmd_frame { uint8_t start_code; uint16_t length; uint8_t check_sum; uint8_t cmd_type; uint8_t data[]; uint8_t end_code; } attribute ((packed)); </pre>	1. Serial communication uses query-response mode. 2. Fixed command format for easy expansion. 3. Default baud rate: 460800 b ps. 4. Data uses big-endian mode, high byte first, low byte last.	
Name	Bytes	Description
start_code	1	Sensor start code 0x02
length	2	Data length following this field, high byte first, low byte last.
check_sum	1	1-byte checksum, calculated as sum of all data from cmd_type to frame end
cmd_type	1	Command type 0x01: Get lidar real-time data 0x02: Single read of distance data + echo intensity 0x03: Configure lidar parameters (baud rate, angular resolution, scan frequency, etc.) 0x04: Read lidar parameters (current baud rate, angular resolution, scan frequency, etc.) 0x05: Get lidar device info (firmware version, serial number) 0x06 : Get complete lidar device info (firmware version, serial number) 0x11: lidar periodic distance data output 0x22: lidar periodic distance + echo data output; 0xaa: Stop lidar periodic data output
data[M]	M	Command data, detailed format per command type, can be empty
end_code	1	Data end code: 0x03

0x01: Single-read lidar distance data. The configuration computer sends one request, and the lidar replies with one data packet.

Table 4 cmd_type(0x01)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x01	info	Single-read lidar distance data	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
start_angle	0~1	2	Start angle of measurement points to read. Angular resolution 0.5° corresponds to value range 0–540 (–45° to 225°). 0°–180° corresponds to values 90–450 (0x005A–0x01C2).
end_angle	2~3	2	End angle of measurement points to read. Angular resolution to value range 0–540 (–45° to 225°). 0°–180° correspond (0x005A–0x012C).
Lidar Response			
cmd_type	data[]	Description	
0x01	info	Single-read lidar distance data (N points)	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
dev_state	0	1	0x01: Power-on initialization—all dis_data are 0 0x02: Startup ready—dis_data contains real values (2-byte format, unit: mm) 0x03: Fault—all dis_data are 0x0001(1 mm)
dis_data[0]	1~2	2	Distance data of the 1st point.
dis_data[1]	3~4	2	Distance data of the 2nd point.
...	...	...	...
...	...	...	...
...	...	...	...
dis_data[N-1]	...	2	Distance data of the Nth point

0x11: Continuous acquisition of lidar distance data command. The configuration computer sends a single request, and the lidar periodically outputs sampled data, with the period equal to one full rotation sampling cycle of the lidar.

Table 5 cmd_type (0x11) Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x11	info	Continuously read lidar distance data	
Info Structure:			
Name	Field Index	Field Length (BYTE)	Description
start_angle	0~1	2	Start angle of measurement points to read. Angular resolution 0.5° corresponds to value range 0~540 (–45°~225°). 0°~ 180° corresponds to values 90~450 (0x005A–0x01C2)
end_angle	2~3	2	End angle of measurement points to read. Angular resolution 0.5° corresponds to value range 0~540 (–45°~225°). 0°~ 180° corresponds to values 90~450 (0x005A–0x012C)
Lidar Response			
cmd_type	data[]	Description	
0x11	info	Continuously read lidar distance data (N points)	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
dev_state	0	1	0x01: Power-on initialization , dis_data are 0 0x02: Startup ready—dis_data contains real values (2-byte format, unit: mm) 0x03: Fault , dis_data are 0x0001 (1 mm)
dis_data[0]	1~2	2	Distance data of the 1st point
dis_data[1]	4~5	2	Distance data of the 2nd point
...	...	...	...
...	...	...	...
...	...	...	...
dis_data[N-1]	...	2	Distance data of the Nth point

0x02: The computer sends a single request, and the lidar returns one data frame containing both distance values and echo intensity values for each measurement point.

Table 6 cmd_type(0x02)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x02	info	Single-Read lidar Distance + Echo Intensity Data	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
start_angle	0~1	2	Start angle of the measurement points to be read. Angular resolution 0.5 ° corresponds to a value range of 0–540 (–45 ° to 225°) , 0°–180° corresponds to values 90–450 (0x005A–0x01C2)
end_angle	2~3	2	End angle of the measurement points to be read. Angular resolution 0.5 ° corresponds to a value range of 0–540 (–45 ° to 225°) , 0°–180° corresponds to values 90–450 (0x005A–0x012C)
Lidar Response			
cmd_type	data[]	Description	
0x02	info	Single-read lidar distance + intensity data (N points)	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
dev_state	0	1	0x01: Power-on initialization, all dis_data are 0 0x02: Startup ready, dis_data contains real values (2-byte format, unit: mm) 0x03: Fault, all dis_data are 0x0001 (1 mm)
dis_data[0]	1~2	2	Distance data of the 1st point
ins_data[0]	3	1	Echo intensity data of the 1st point
dis_data[1]	4~5	2	Distance data of the 2nd point
ins_data[1]	6	1	Echo intensity data of the 2nd point
...	...	...	...
...	...	...	...
...	...	...	...
dis_data[N-1]	...	2	Distance data of the Nth point
ins_data[N-1]	...	1	Echo intensity data of the Nth point

0x22: Continuous acquisition of lidar distance data + echo intensity data. The configuration computer sends one request, and the lidar periodically outputs sampled data, with the period equal to one full rotation sampling cycle of the lidar.

Table 7 cmd_type(0x22)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x22	info	Continuous read lidar distance + intensity	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
start_angle	0~1	2	Start angle of the measurement points to be read: Angular resolution 0.5 ° corresponds to a value range of 0–540 (–45° to 225°). 0 °–180° corresponds to values 90–450 (0x005A–0x01C2)
end_angle	2~3	2	End angle of the measurement points to be read: Angular resolution 0.5 ° corresponds to a value range of 0–540 (–45° to 225°). 0 °–180° corresponds to values 90–450 (0x005A–0x012C)
Lidar Response			
cmd_type	data[]	Description	
0x22	info	Continuous read lidar distance + intensity (N points)	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
dev_state	0	1	0x01: Power-on initialization, all dis_data are 0 0x02: Startup ready, dis_data contains real values (2-byte format, unit: mm) 0x03: Fault, all dis_data are 0x0001 (1 mm)
dis_data[0]	1~2	2	Distance data of the 1st point
ins_data[0]	3	1	Echo intensity data of the 1st point
dis_data[1]	4~5	2	Distance data of the 2nd point
ins_data[1]	6	1	Echo intensity data of the 2nd point
...	...	...	...
...	...	...	...
...	...	...	...
dis_data[N-1]	...	2	Distance data of the Nth point
ins_data[N-1]	...	1	Echo intensity data of the Nth point

0x03: Configure lidar parameters (including communication baud rate, angular resolution, scanning frequency, etc.)

Table 8 cmd_type(0x03)Command Details

Configuration Computer					
cmd_type	data[]	Description			
0x03	info	Configure lidar Parameters			
Info Structure					
Name	Field Index	Field Length (BYTE)	Description		
cfg_bps	0	1	0x01:4800	0x02:9600	0x03:19200
			0x04:38400	0x05:43000	0x06:56000
			0x07:57600	0x08:115200	0x09:128000
			0x0a:230400	0x0b:256000	0x0c:460800
			0x0d:560000	0x0e:600000	0x0f:700000
			Default: 460800		
cfg_res	1	1	0x01: 0.5 °, 0x02: 1 °, 0x03: 2°; Default: 0.5 °		
cfg_hz	2	1	20: 20hz, 25: 25hz, 30: 30hz, 40: 40hz, 50:50hz; Other values are invalid. Default: 30HZ		
Lidar Response					
cmd_type	data[]	Description			
0x03	info	Configure LI parameters			
Info Structure					
Name	Field Index	Field Length (BYTE)	Description		
cfg_bps	0	1	0x01:4800	0x02:9600	0x03:19200
			0x04:38400	0x05:43000	0x06:56000
			0x07:57600	0x08:115200	0x09:128000
			0x0a:230400	0x0b:256000	0x0c:460800
			0x0d:560000	0x0e:600000	0x0f:700000
			Default: 460800		
cfg_res	1		0x01: 0.5 °, 0x02: 1 °, 0x03: 2°; Default: 0.5 °		
cfg_hz	2	1	20: 20hz, 25: 25hz, 30: 30hz, 40: 40hz, 50: 50hz; Other values are invalid. Default: 30HZ		

0x04: Read lidar parameters (including current communication baud rate, angular resolution, scanning frequency, etc.)

Table 9 cmd_type(0x04)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x04	info	Read lidar parameters	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
rev_1	0	1	0x00
rev_2	1	1	0x00
rev_3	2	1	0x00
Lidar Response			
cmd_type	data[]	Description	
0x04	info	Read lidar parameters	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
cfg_bps	0	1	0x01: 4800 0x02: 9600 0x03: 19200
			0x04: 38400 0x05: 43000 0x06: 56000
			0x07: 57600 0x08: 115200 0x09: 128000
			0x0a: 230400 0x0b: 256000 0x0c: 460800
			0x0d: 560000 0x0e: 600000 0x0f: 700000
			Default: 460800
cfg_res	1	1	0x01: 0.5 °, 0x02: 1 °, 0x03: 2°; Default: 0.5 °
cfg_hz	2	1	20: 20hz, 25: 25hz, 30: 30hz, 40: 40hz, 50: 50hz; Other values are invalid. Default: 30HZ

0x05: Get lidar device information (including firmware version number, device serial number)

Table 10 cmd_type(0x05)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x05	NULL	Get lidar device information	
Lidar Response			
cmd_type	data[]	Description	
0x05	info	Get lidar device information	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
firmware_version	0~3	4	Firmware version number
serial_number	4~11	8	Device serial number
dev_type	12	1	0X01(High-precision version)

0x06: Get complete lidar device information (including firmware version number, device serial number)

Table 11 cmd_type(0x06)Command Details

Configuration Computer			
cmd_type	data[]	Description	
0x06	NULL	Get lidar device information	
Lidar Response			
cmd_type	data[]	Description	
0x06	info	Get lidar device information	
Info Structure			
Name	Field Index	Field Length (BYTE)	Description
Model information	0~39	40	Device model
SN	40~71	32	Device serial number
MCU firmware version	72~75	4	MCU firmware version
Hardware version	76~79	4	Hardware version
rev_1	80~83	4	rev_1
rev_2	84~87	4	rev_2
rev_3	88~91	4	rev_3

0xaa: Lidar stops continuous periodic output data.

Table 12 cmd_type(0xaa)Command Details

Configuration Computer		
cmd_type	data[]	Description
0xaa	NULL	stops continuous periodic output data
Lidar Response		
cmd_type	data[]	Description
0xaa	NULL	stops continuous periodic output data