YDLIDAR

YDLIDAR T5
DATASHEET

Contents

OVERVIEW

YDLIDAR T5(hereinafter referred to as T5) is a 300-degree two-dimensional TOF (Time-of-Flight) rangefinder developed by the YDLIDAR team. With a single-line scanning design, T5 supports 20K point cloud data output per second and 15m distance measurement requirement.

The compact appearance (~Ø70mm x 83mm) makes it easily integrate. 905nm infrared laser and self-developed signal processing algorithms can meet the needs of outdoor application scenarios.

Also, YDLIDAR provides a complete integrated development interface, and point cloud data transmission is carried out by network protocol.

T5 is widely used in robot navigation and obstacle avoidance, environmental scanning and mapping, industrial AGV, assisted driving and other fields.

Product Features

- 5m ranging distance
- Ranging frequency up to 20KHz
- High Ranging distance repeatability
- 300 degree omnidirectional scanning ranging distance measurement
- Strong resistance to ambient light interference
- 15-30Hz adaptive motor scanning frequency
- IP Protection Level: IP65
- 100M adaptive network interface for data transmission

Installation and dimensions

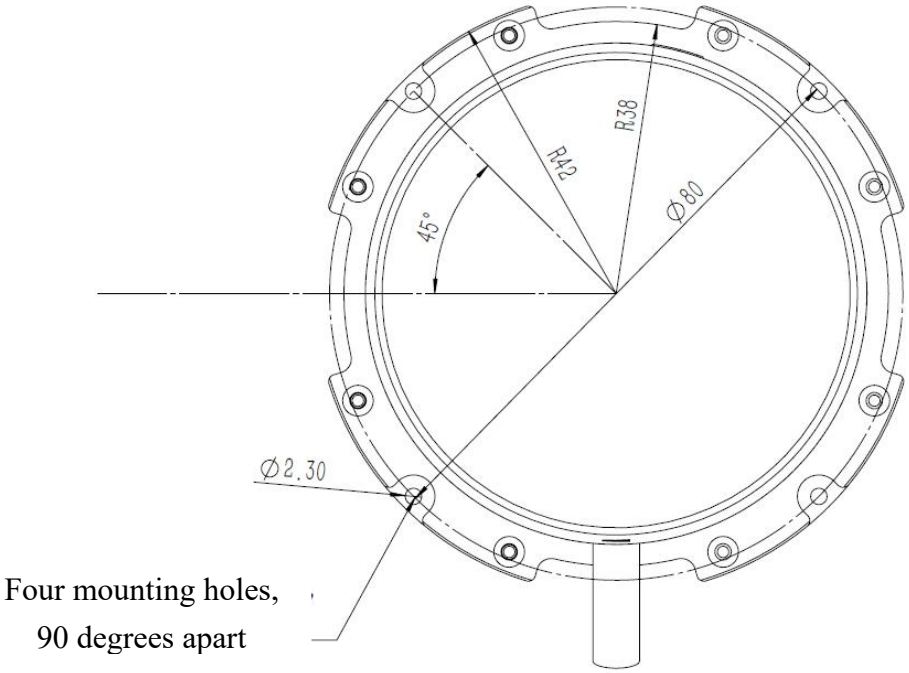


FIG1 YDLIDAR T-SERIES INSTALLATION SIZE

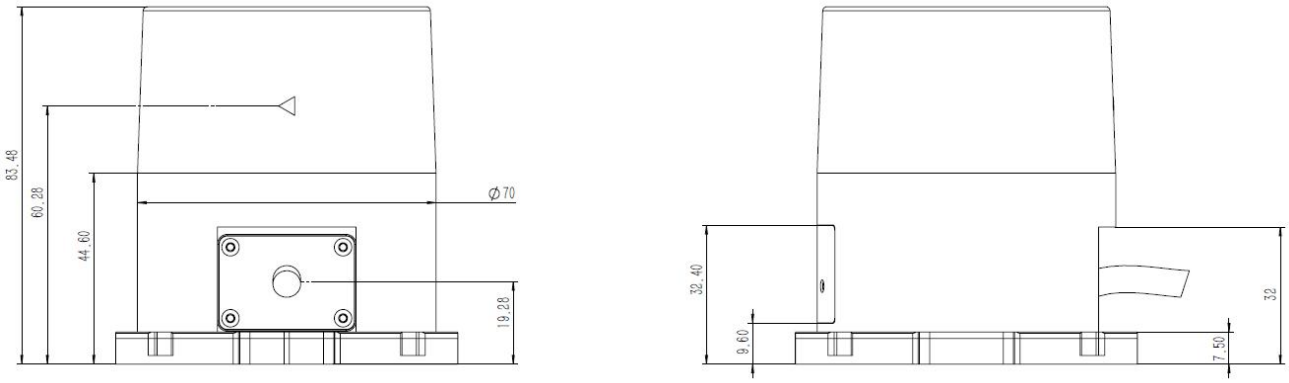


FIG2 YDLIDAR T-SERIES MECHNICAL DIMENSIONS

Product Parameter

CHART1 YDLIDAR T-SERIES PRODUCT PARAMETER

Item	Min	Typical	Max	Unit	Remarks
Ranging frequency	10000	20000	30000	Hz	20,000 times per second
scanning frequency	15	20	30	Hz	Software speed regulation
Ranging range	0.05	-	5	m	T5 model
Scanning angle	-	30~330	-	Deg	-
Angle resolution	-	0.36	-	Deg	Scanning frequency is 20Hz

Electrical Parameter

CHART2 YDLIDAR T-SERIES ELECTRICAL PARAMETER

Item	Min	Typical	Max	Unit	Remarks
Supply voltage	9	12	28	V	Excessive voltage might damage the Lidar while low affect normal performance
Working current	150	200	250	mA	System work, motor rotation
Operating temperature	-10	25	50	℃	Long-term work in high temperature environment will reduce life expectancy
Laser wavelength	895	905	915	nm	Infrared band
weight	-	200	-	g	Bare metal weight
size		Ø70 x 83		mm	Diameter x height
Protection level	-	IP65	-	-	Dustproof and waterproof

Default setting

CHART3 YDLIDAR T-SERIES DEFAULT SETTING

Item	Default Value	Remarks
Network IP	192.168.0.11	Adjustable
USB network IP	202.200.10.100	-
Ranging zero	Equipment center point	-
Direction of rotation	Clockwise (mask triangle arrow indicates direction)	-
Angle zero	Mask triangle arrow vertical line position	Adjustable
Indicator light	Steady red: The device is not ready Steady green: device ready	-
Button	Short press 1s: device restart Long press 5s: restore factory configuration	-

Interface definition

T5 has its own connection cable which is divided into a network port and a power interface.

The RJ45 network interface is used for data transmission and supports 10M/100M adaptive network.

DC5.5*2.5 interface for power supply and wide voltage input with a standard 12V-2A power adapter.

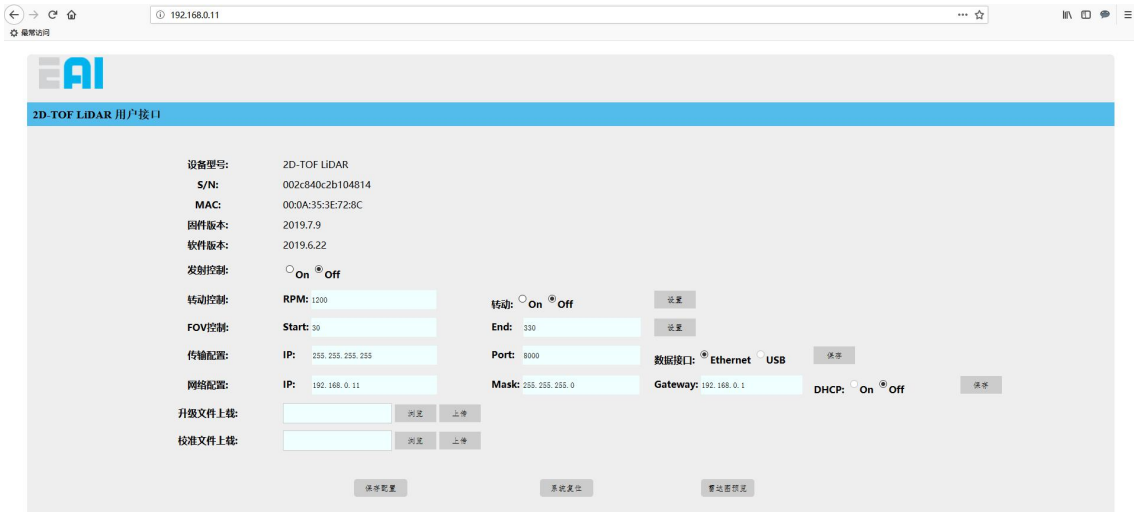
USE INSTRUCTIONS

Connection method

As shown in the figure below, the RJ45 interface is connected to the PC network port,make sure the device and PC are in the same network segment; the DC interface is connected to the power socket through the 12V-2A power adapter. After power-on, the front panel of the device turns red, and the indicator will turn green to steady-state.

Equipment management

T5 can manage the device through the web. After power on, enter the IP address of the device in the browser and log in to the web interface, as shown in the following figure:



The device information can be obtained through the web interface and the device is configured accordingly. Each configuration item is defined as follows:

Device model: Device model information, not editable;

S/N: Device serial number, not editable;

MAC: Device MAC address, not editable;

Firmware version:Firmware version number, which will be updated automatically after firmware upgrade;

Software version: The software version number, which will be updated automatically after the software is upgraded;

Emission control: Control laser emission;

Rotation control: Control motor rotation. Click the "Settings" button to adjust the motor speed between 900 to 1800;

FOV control:Control the scanning angle of view, set the starting scanning angle and the ending scanning angle by the start and end values, the minimum setting value of start is 30, the maximum setting value of end is 330, and the setting is effective after clicking the “Settings” button;

Transmission configuration: Configure data transmission channel and parameters, optional data transmission via Ethernet or USB. IP and port can be used to set the destination host IP address and port number. The default IP address is broadcast IP, and the port number is 8000. After a configuration, you need to click the "Save" button to save the settings. After the device is restarted, the settings take effect.

Network configuration: Configure the device network parameters, set the device IP address, subnet mask, gateway, and set DHCP to automatically obtain the IP address. After changing any of the configurations, you need to click the "Save" button to save the settings. After the device is restarted, The settings take effect;

Upgrade file upload: Set the upgrade. After selecting the upgrade file, click “Upload”, the “Upgrade” window will pop up. During the upgrade, please keep the power connection stable. After the upgrade is complete, the device restarts.

Calibration file upload: Upload calibration file;

Save the configuration: Save all current configuration items of the web and take effect after the device restarts.

System reset: After clicking, the device restarts;

Lidar point cloud preview: Load point cloud data visualization software;

Data Preview

T5 provides a real-time point cloud data visualization software, PointCloudViewer. With this client software, you can visually observe the scan renderings, the real-time point cloud data and scanning frequency.The scanned data can be saved offline to external files for further analysis.

Before you open the client software, make sure that the device and the client software host are on the same network segment, and the network connection is normal. After the operation, the interface is as follows:

FIG8 YDLIDAR T-SERIES RUNNING EVALUATION SOFTWARE

Enter the device IP, select ETLidar and confirm, the it is as follows:

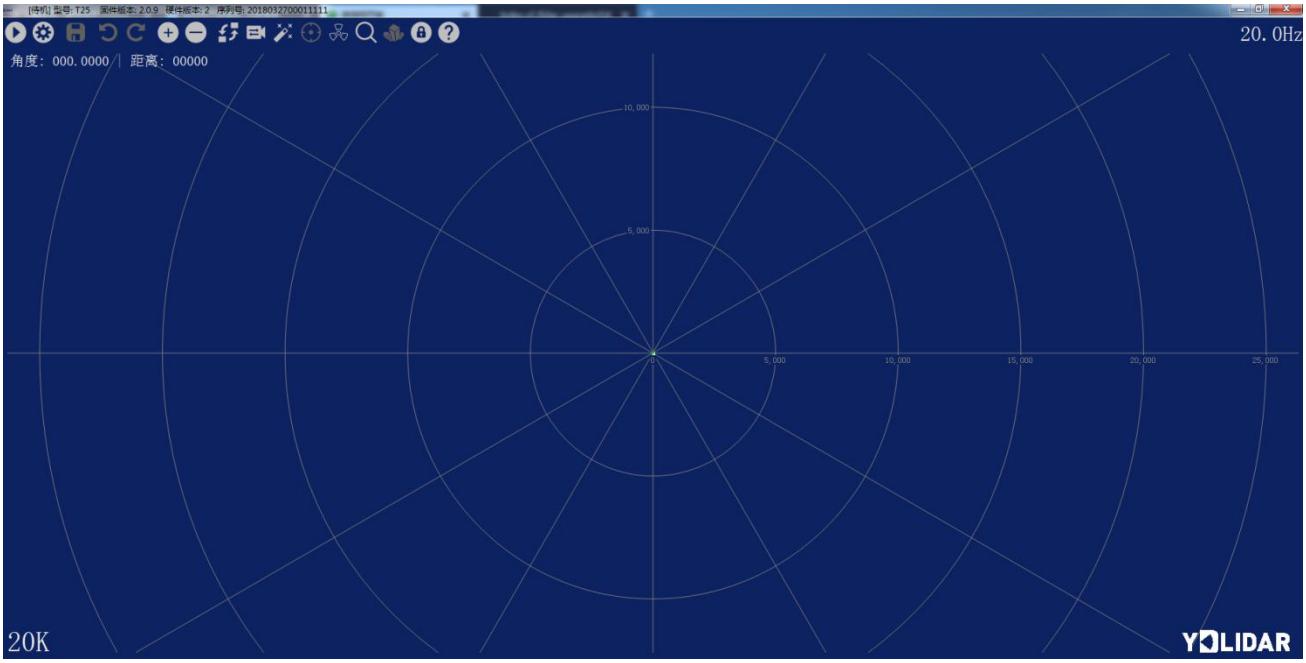
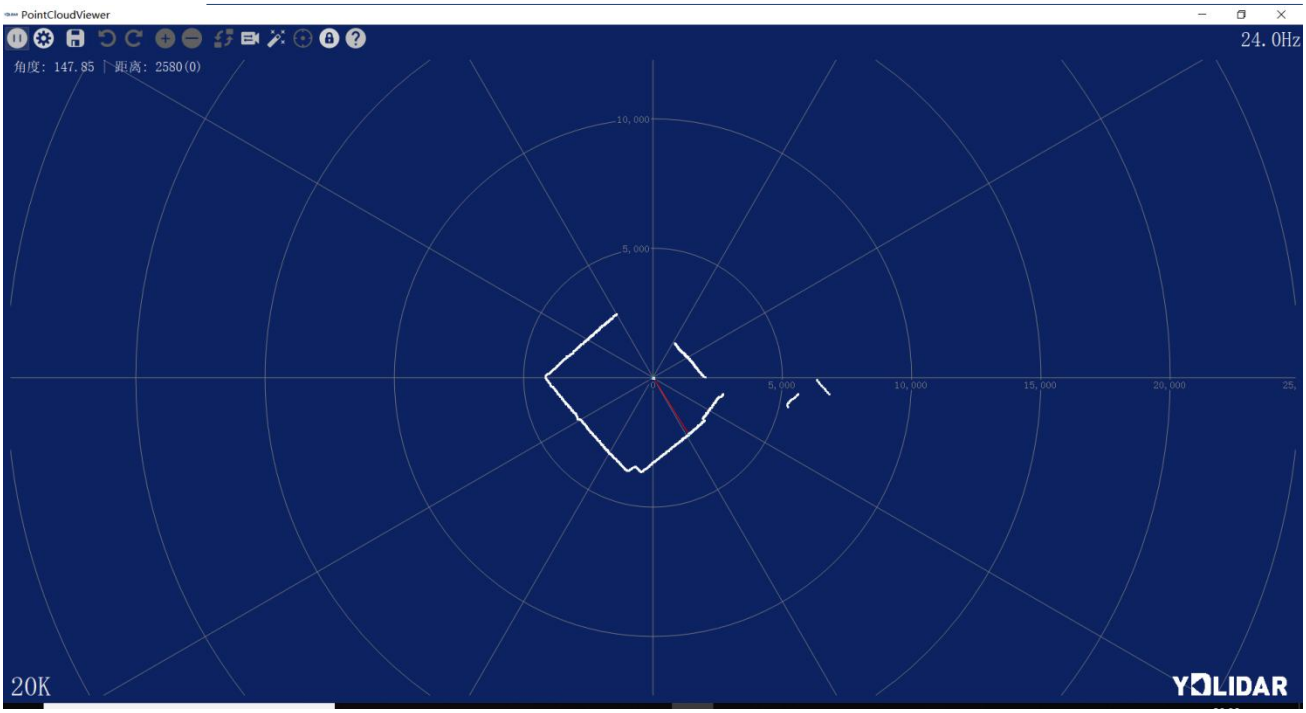


FIG 9 CLIENT SOFTWARE INTERFACE

Click on the stop state, Lidar will automatically start scanning and display the environment of point cloud. Clicking , Lidar will stop. The figure below shows the point cloud image displayed in real time.



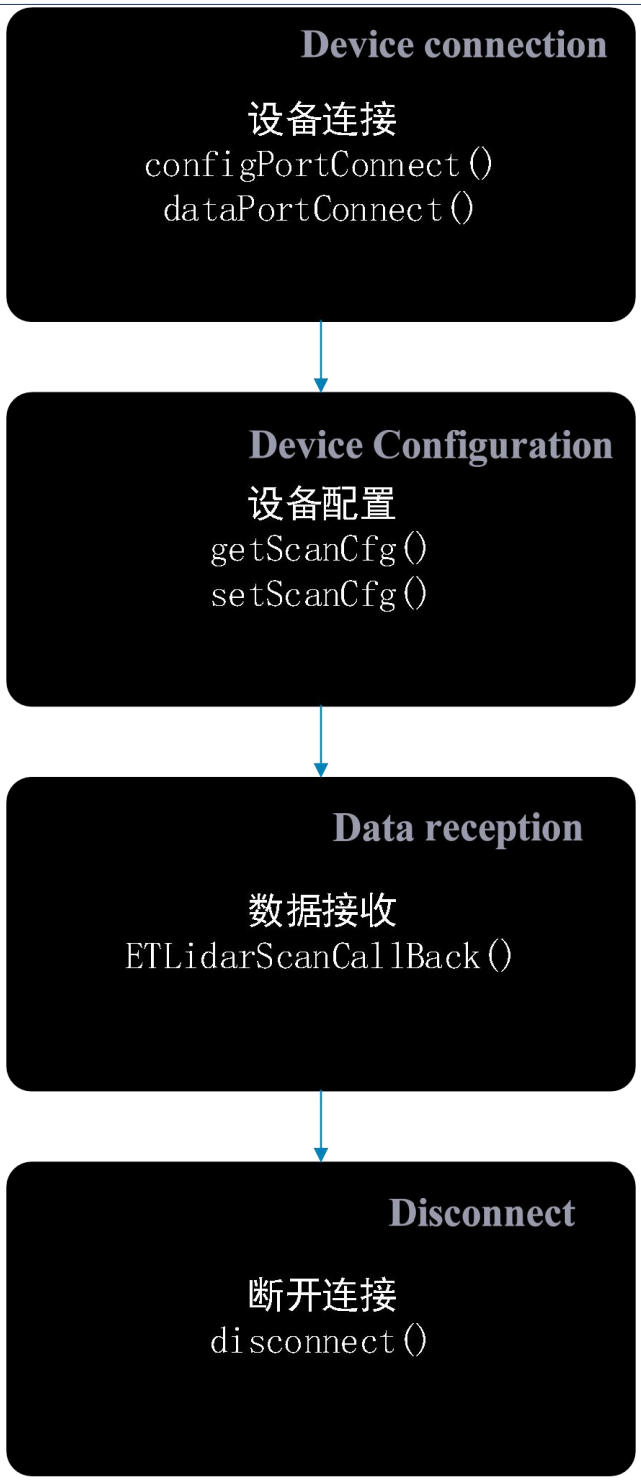
INTEGRATION AND DEVELOPMENT

SDK development kit

T5 provides SDK development kit for user integration and secondary development. The SDK development kit is provided in C++ source code, which can be directly integrated by the user, or compiled into a library file by the provided script, and the device function is called through the API interface; the SDK supports windows system and Linux system development.

Download address: https://github.com/YDLIDAR/etlidar_sdk

Users can learn the SDK usage process through the example.cpp routine in the SDK samples directory. The general process and corresponding API are described as follows:



The device configuration management parameters are defined by the following structure:

```
typedef struct _lidarConfig {
    int laser_en;          //Laser emission enable, 0: Disabled, 1: Enable
    int motor_en;          //Motor rotation enabled, 0: Disabled, 1: Enable
    int motor_rpm;         / / Set the motor speed
    int fov_start;         / / Set the starting scan angle
    int fov_end;           / / Set the end of the scan angle
    int trans_sel;         / / Select USB or Ethernet as a data transmission interface, 0: USB, 1: Ethernet
    char dataRecvIp[16];   / / Set the data receiving IP address
    int dataRecvPort;      / / Set the data receiving port number
    int dhcp_en;           / / Set HDCP enable, 0: disable, 1: enable
    char deviceIp[16];     / / Set the device IP address
    char deviceNetmask[16]; / / Set the device subnet mask
    char deviceGatewayIp[16]; / / Set the device gateway
} lidarConfig;
```

Data is received as data frames, and each frame of data is defined by the following structure:

```
typedef struct _lidarData {
    std::vector<float> ranges;          //distance data, unit: mm
    std::vector<float> angles;          //angle data, unit: deg
    std::vector<int> reflectivity;      / / reflectivity data, 0 ~ 100
    int headFrameFlag;                  // 1: Identifies the first data point of the current data frame as the starting scan point
    uint64_t frame_timestamp;           //The first data point generation time of the current frame, in ns
    uint64_t system_timestamp;          / / System receives the current frame time, unit: ns
} lidarData;
```

ROS Development Kit

Download address：https://github.com/YDLIDAR/etlidar_ros