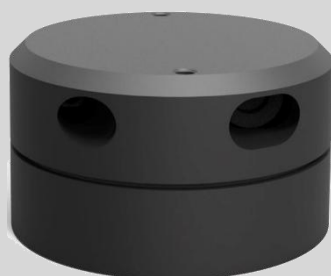


# **YDLIDAR TG30**

## **USER MANUAL**



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## YDLIDAR TG30 DEVELOPMENT KIT

The development kit of YDLIDAR TG30 (hereafter abbreviated as TG30) is an accessory tool provided for performance evaluation and early development of the TG30. Through the TG30 development kit, and with the evaluation software, users can observe point cloud data scanned by TG30 on your environment or development on the SDK.

### Development Kit

The TG30 development kit has the following components:



FIG1 YDLIDAR TG30 DEVELOPMENT KIT

CHART1 YDLIDAR TG30 DEVELOPMENT KIT DESCRIPTION

Item	Qty.	Description
TG30 lidar	1	Standard version of the TG30 Lidar. The TG30 has an integrated motor drive for motor control.
USB Type-C Cable	1	Use with USB adapter board to connect TG30 and PC. USB cable is both a power supply cable and a data cable.
USB Adapter Board	1	USB to UART, PC interconnection. Serial port DTR signal to TG30, motor stop control. USB Type-C Power Interface (PWR) for auxiliary power supply

**Note:** USB Adapter board has two USB TYPE C interface: **USB\_DATA**、**USB\_PWR**.

**USB\_DATA:** Data powered interface. In most cases, this interface can be used to meet power and communication requirements.

**USB\_PWR:** Auxiliary power supply interface. The USB interface of some development platforms has weak current drive capability. At this time, auxiliary power supply can be used.

## USAGE UNDER WINDOWS

### Device Connection

When TG30 is evaluated and developed under windows, TG30 and PC need to be interconnected. The specific process is as follows:

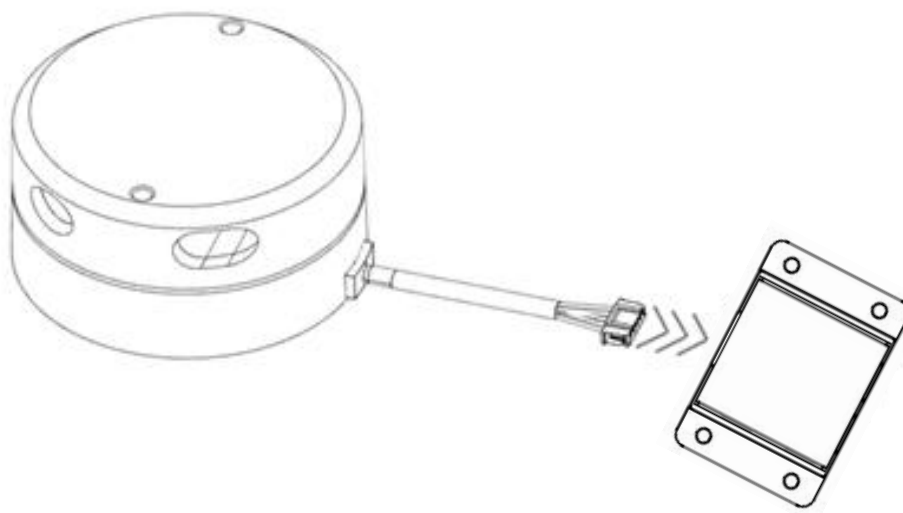


FIG2 YDLIDAR TG30 DEVICE CONNECTION STEP 1

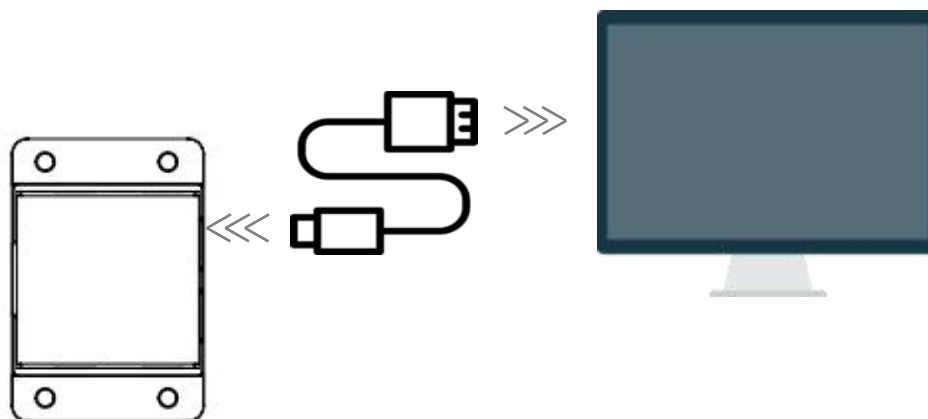


FIG3 YDLIDAR TG30 DEVICE CONNECTION STEP 2

Connect the adapter board with TG30 first, then connect the USB cable to the USB port of the adapter board and the PC. Note that the Type-C interface of the USB cable is connected to the USB\_DATA of the USB interface board, and the idle mode is used after TG30 is powered on. The motor does not rotate.

If supply current is not sufficient, please connect with auxiliary power supply.

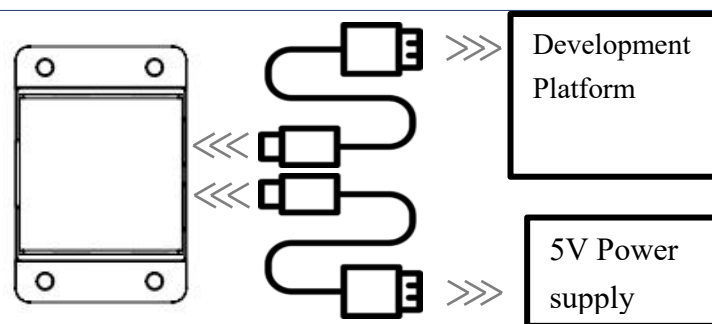


FIG4 YDLIDAR TG30 AUXILIARY POWER SUPPLY

## Driver Installation

To evaluate and develop the TG30 under Windows, you need to install the serial port driver of the USB adapter board. The USB adapter board of this kit adopts CP2102 chip to realize serial port (UART) to USB signal conversion. Its driver can be downloaded from our official website or downloaded from the official website of Silicon Labs.

<http://eaibot.com/>

<http://cn.silabs.com/products/development-tools/software/usb-to-uart-bridge-vcp-drivers>

After decompressing the driver package, run the CP2102's Windows driver installation file (exe file under CP210x\_VCP\_Windows). Please select the 32-bit version (x86) or 64-bit version (x64) installation program according to the version of the windows operating system.

x64	2013/10/25 11:39	文件夹	
x86	2013/10/25 11:39	文件夹	
CP210xVCPInstaller_x64.exe	2013/10/25 11:39	应用程序	1,026 KB
CP210xVCPInstaller_x86.exe	2013/10/25 11:39	应用程序	901 KB
dpinst.xml	2013/10/25 11:39	XML 文档	12 KB
ReleaseNotes.txt	2013/10/25 11:39	文本文档	10 KB
SLAB_License_Agreement_VCP_Windo...	2013/10/25 11:39	文本文档	9 KB
slabvcp.cat	2013/10/25 11:39	安全目录	12 KB
slabvcp.inf	2013/10/25 11:39	安装信息	5 KB

FIG5 YDLIDAR TG30 DRIVER VERSION SELECTION

Double-click the exe file and follow the prompts to install it.



FIG6 YDLIDAR TG30 DRIVER INSTALLING

After the installation is complete, you can right-click on [My Computer] and select [Properties]. On the open [System] screen, select [Device Manager] from the left menu to access the [Device Manager].

Expand [Port] to see the serial port name corresponding to the identified USB adapter, that is, the driver installation is successful. The following figure shows COM3. (Note that the port must be checked in case of TG30 and PC interconnection).

---

*Note: Users can also choose Type-C on TG30 to get started quickly. Connect the PC and TG30 directly with Type-C data cable, and download the vcp serial port driver of TG30 on the official website. After that, start PointCloud Viewer to scan the map to observed the data.*

---

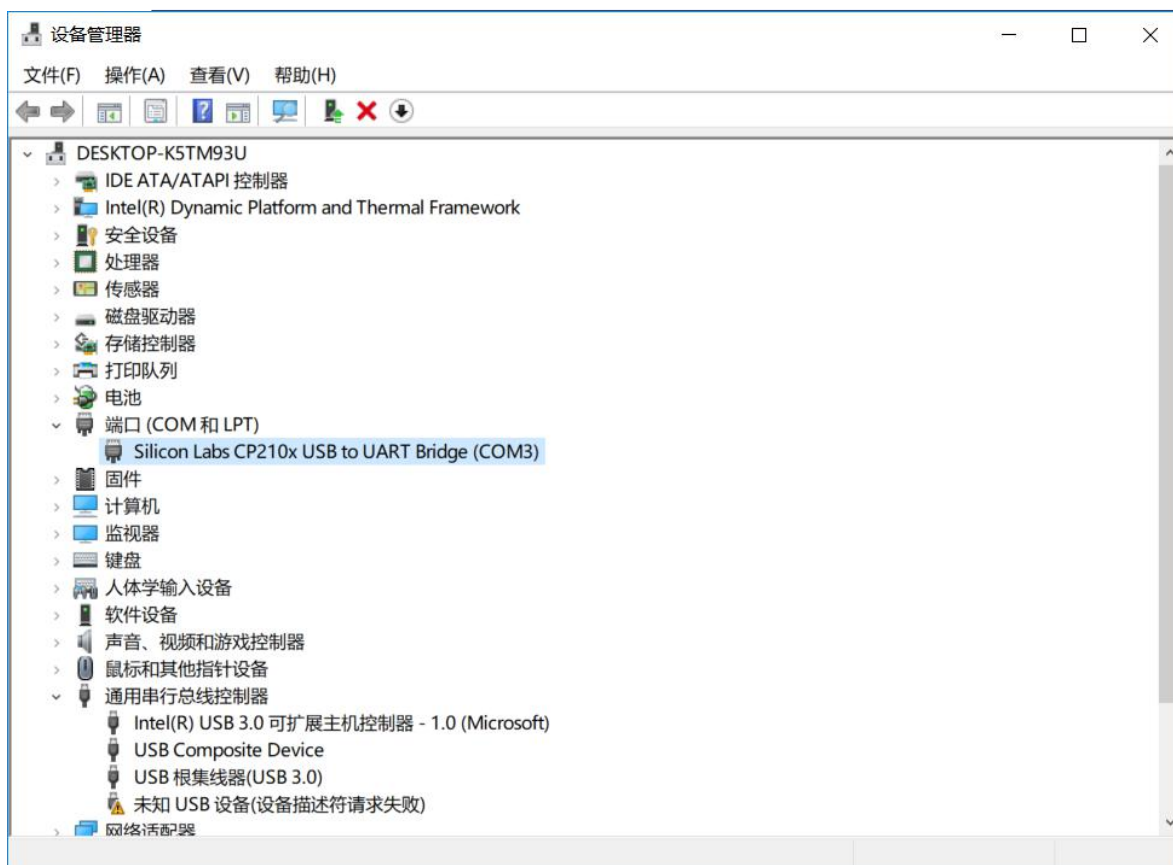


FIG7 YDLIDAR TG30 DRIVER INSTALLATION CHECK

## Evaluation Software Usage

YDLIDAR provides Point Cloud Viewer, a point cloud data visualization software for TG30 real-time scanning. Users can intuitively observe the TG30 scanning effect chart. GDL real-time point cloud data and real-time scanning frequency are provided on YDLIDAR. At the same time, the version information of TG30 can be read, and the scan data can be saved offline to an external file for further analysis.

Before using the YDLIDAR software, make sure that the TG30 USB adapter board serial port driver is installed successfully, and interconnect the TG30 with the USB port of the PC. Run the evaluation software: PointCloudViewer.exe, select the corresponding serial port number and model number.

You could tick the square box to choose power off protection function. Meanwhile, users could choose language and software type on the top right corner.



FIG8 YDLIDAR TG30 EVALUATION SOFTWARE

*Note: The Lidar does not turn on the power off protection function by default. This function needs to send the scan command continuously to make it work normally. If the scanning frequency is stopped, the Lidar will stop scanning.*

If the connection is correct, you will see the following screen:

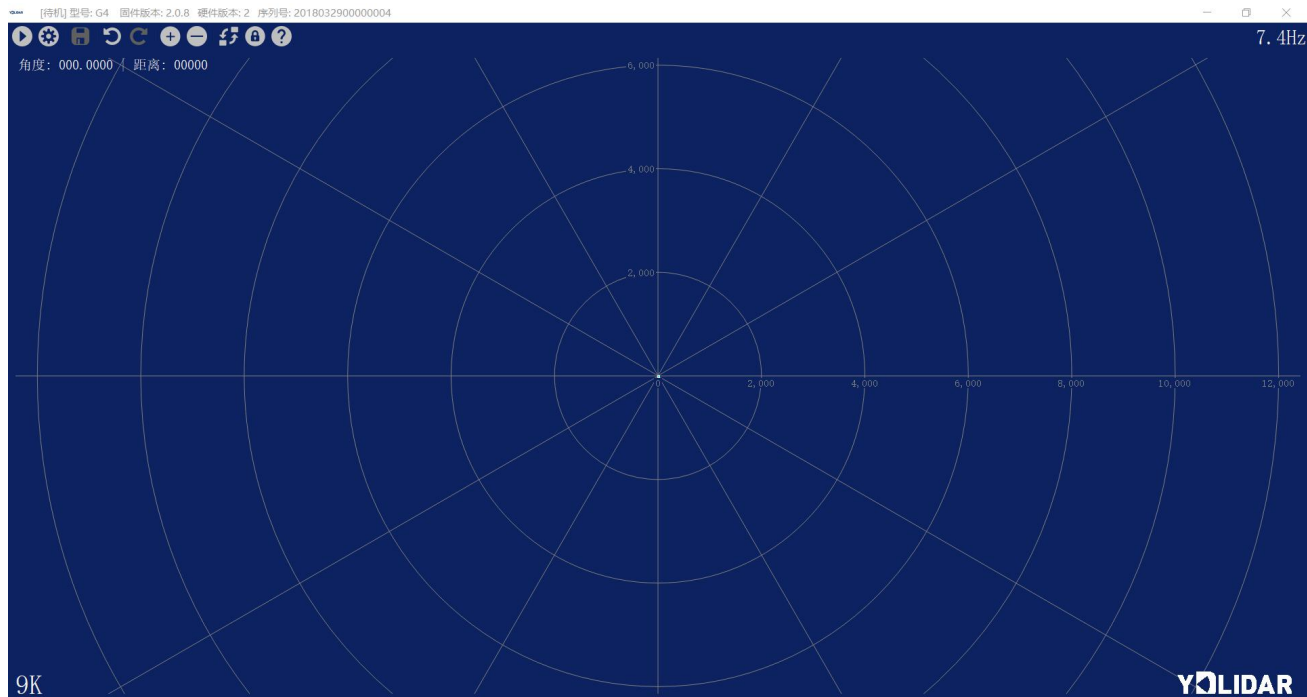




FIG9 POINTCLOUD VIEWER INTERFACE

## START SCANNING

Click  to start scanning and display the environment point cloud. Click  to stop it.

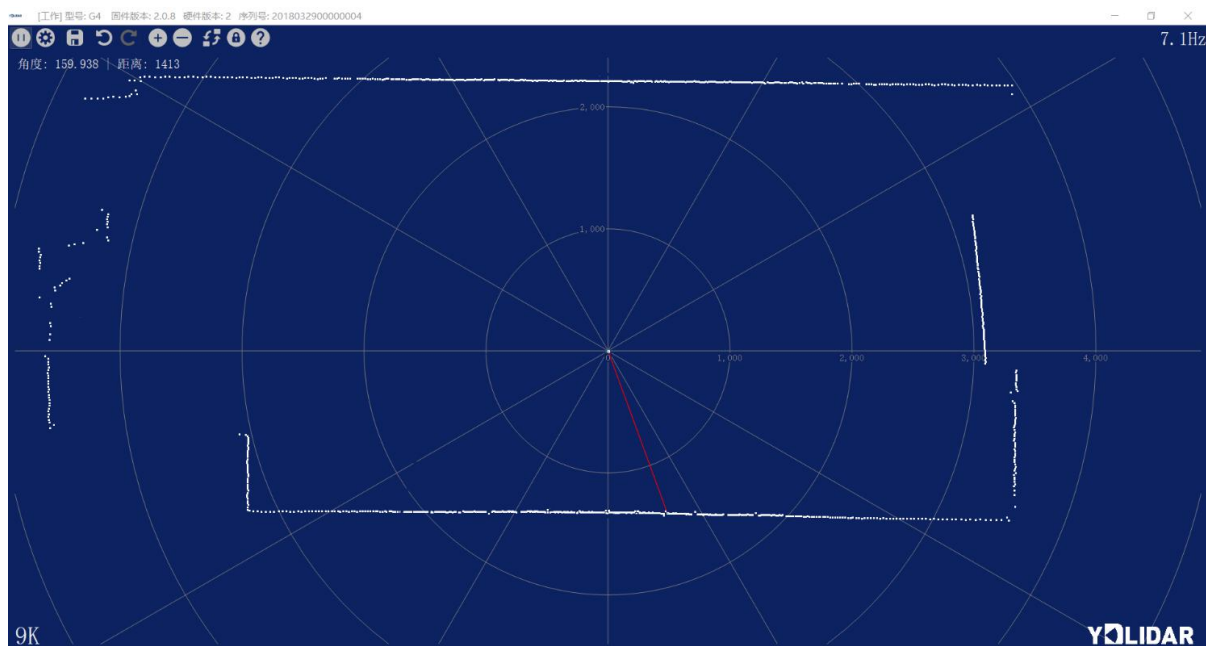



图 10 LIDAR SCANNING POINT CLOUD DISPLAY



## SYSTEM SETTINGS

Click System Settings , and the following settings box will pop up:

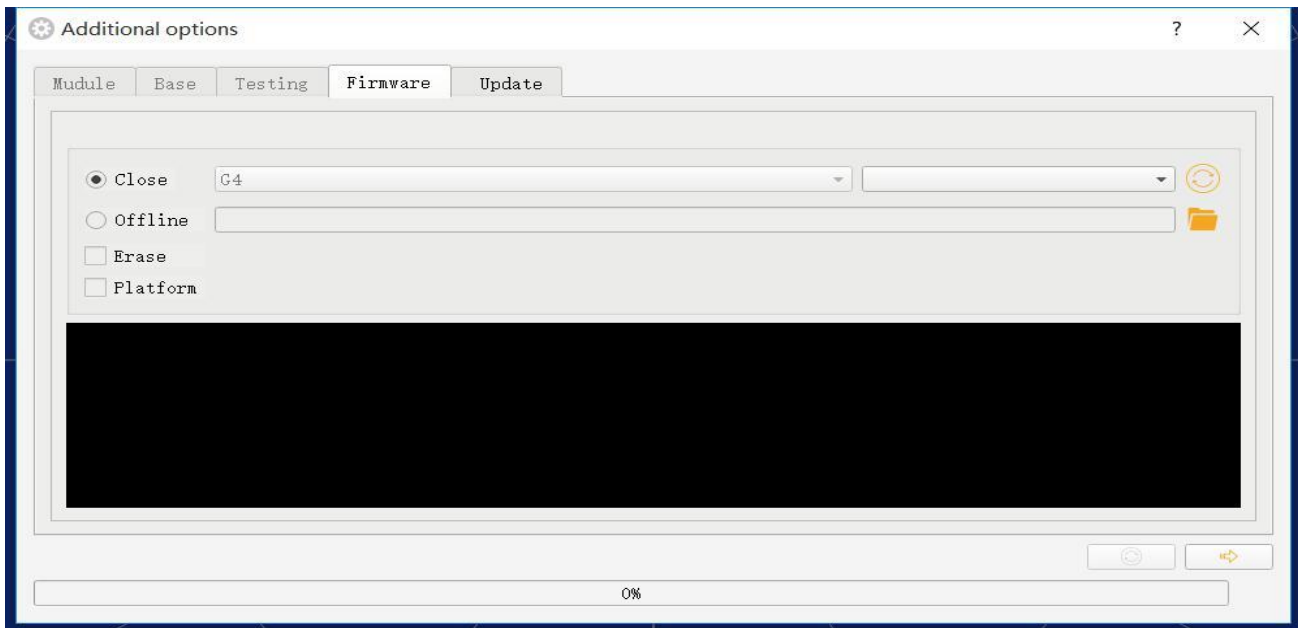



FIG11 CLIENT SETTINGS BOX

As shown in the figure, you could configure and detect lidar on setup page, as well as firmware updates and software updates.

## SAVE DATA


During lidar scanning, click , Save the point cloud data as prompted. The system will save the point cloud information scanned in a circle according to the following format.

```


angle:9.5469    ,    distance:4654
angle:9.8125    ,    distance:4709
angle:10.094    ,    distance:4763
angle:10.625    ,    distance:4947
angle:11.125    ,    distance:6204
angle:11.203    ,    distance:0
angle:11.391    ,    distance:6253
angle:11.766    ,    distance:0
angle:12.609    ,    distance:0
angle:12.719    ,    distance:7895
  
```

FIG12 POINTCLOUD DATA SAVE FORMAT



## SCANNING DIRECTION

The scanning direction (rotation direction) of the lidar can be adjusted by clicking  .  
When the lidar is in the scanning state, you need to click the scan control again after switching the scanning direction.

## SCAN FREQUENCY

 is used to adjust the scanning frequency (motor speed) of the lidar. Click any one of them, the system will pop up the frequency setting bar, which can be adjusted automatically according to the demand. When the lidar is in the scanning state, you need to click the scan control again after adjusting the scan frequency.

## FIRMWARE UPGRADE

Click system settings, and choose firmware, as shown in Fig 11. Click  to obtain the latest firmware. When there is new version, click  to update lidar firmware.

*Note: During the process of firmware updating, remain normal power supply, stable communication and normal network connection, donot pull out serial port cable.*

## SOFTWARE UPGRADE

The client software will be version-changed and users can update to the latest version for a better experience.

Click System Settings and select Update, as shown below:



FIG13 SYSTEM UPDATE PAGE

Select the configuration as shown above, click 'check for updates', if there is no new version, the system will prompt no update; when there is a new version, the software version information will be filled in the information box, click ➡ to update the client software.

## LINUX ROS OPERATION

There are many Linux versions, this article only uses Ubuntu 16.04, Kinetic version ROS as an example.

### Document Description

Download the latest ROS driver package for YDLIDAR TG30 on GitHub.

[https://github.com/YDLIDAR/ydlidar\\_ros/tree/TG30](https://github.com/YDLIDAR/ydlidar_ros/tree/TG30)

### Device Connection

Under Linux, the TG30 and PC interconnect processes are consistent with those under Windows. See Device Connection under Window.

### ROS Driver Installation

Before doing the following, make sure that the Kinetic version ROS environment is installed correctly.

- (1) Use the command to create the catkin\_ws workspace and copy the ROS driver package ydlidar\_ros-TG30 to the catkin\_ws/src directory. Switch to the catkin\_ws workspace and compile again.

```
$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws
$ catkin_make
```

- (2) After the compilation is complete, add the catkin environment variable to the ~/.bashrc file and make it effective.

```
$ echo "source ~/catkin_ws/devel/setup.bash" >> ~/.bashrc
$ source ~/.bashrc
```

- (3) Add a device alias /dev/ydlidar to the TG30 serial port.

```
$ cd ~/catkin_ws/src/ydlidar/startup
$ sudo chmod +x initenv.sh
$ sudo sh initenv.sh
```

### RVIZ Installation

- (1) Online installation.

```
$ sudo apt-get install python-serial ros-kinetic-serial g++ vim \
```

```
ros-kinetic-turtlebot-rviz-launchers
```

- (2) If there is a problem with the installation, update the source cache and reinstall it.

```
$ sudo apt-get update
```

## RVIZ scan result checking

Run the launch file and open rviz to view the TG30 scan results, as shown in the following figure:

```
$ roslaunch ydlidar lidar.launch
```

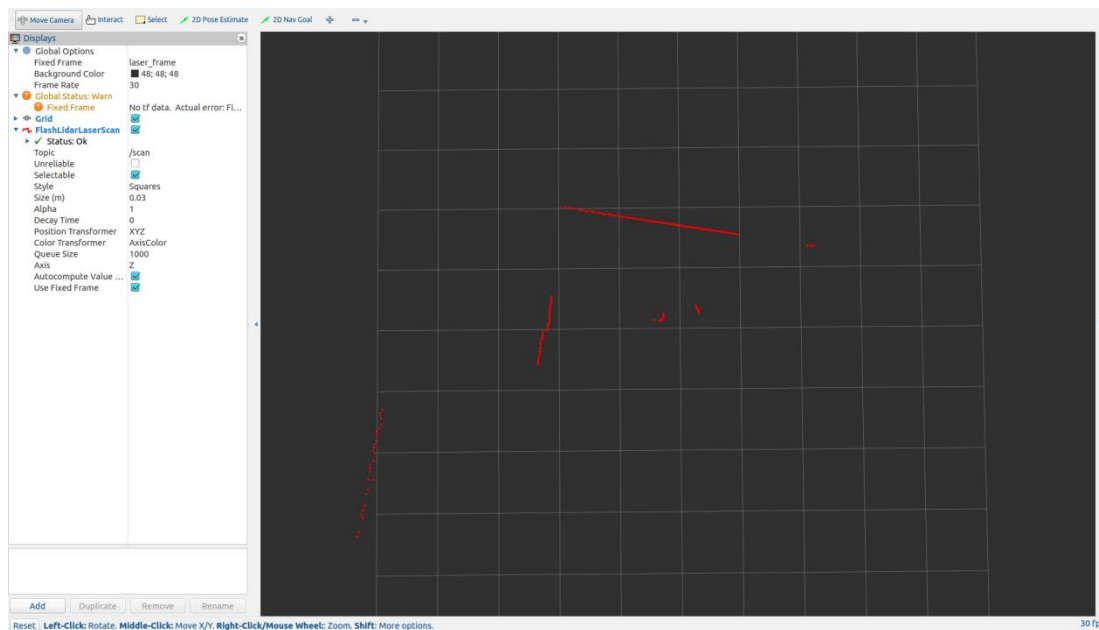


FIG15 YDLIDAR TG30 RVIZ

## Modify Scan Angle

The scanning data seen by running the launch file is displayed by default with 360-degree data. To modify the display range, you need to modify the configuration parameters in the launch file. The specific operation is as follows:

- (1) Go to lidar.launch directory and use vim to edit lidar.launch, The contents are as shown in the figure:

```
$ roscd ydlidar/launch
$ vim lidar.launch
```

```
<launch>
  <node name="ydlidar_node" pkg="ydlidar" type="ydlidar_node" output="screen">
    <param name="port" type="string" value="/dev/ydlidar"/>
    <param name="baudrate" type="int" value="230400"/>
    <param name="frame_id" type="string" value="laser_frame"/>
    <param name="angle_fixed" type="bool" value="true"/>
    <param name="intensities" type="bool" value="false"/>
    <param name="angle_min" type="double" value="-180" />
    <param name="angle_max" type="double" value="180" />
    <param name="range_min" type="double" value="0.08" />
    <param name="range_max" type="double" value="16.0" />
    <param name="ignore_array" type="string" value="" />
  </node>
  <node pkg="tf" type="static_transform_publisher" name="base_link_to_laser4"
    args="0.2245 0.0 0.2 0.12 0.0 0.0 /base_footprint /laser_frame 40" />
</launch>
```

FIG 16 LIDAR.LAUNCH FILE

(2) The TG30 lidar coordinates follow the right-hand rule within ROS, with an angle range of  $[-180, 180]$ . "angle\_min" is the start angle, and "angle\_max" is the end angle. The specific scope needs to be modified according to actual use.

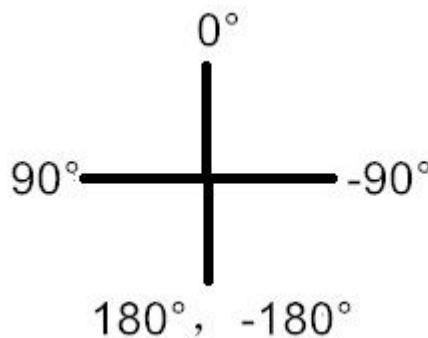


FIG17 YDLIDAR TG30 COORDINATES DEFINITION

## CAUTION

### Ambient Temperature

When the working environment temperature of TG30 is too high or too low, it will affect the accuracy of the distance measuring system. It may also damage the structure of the scanning system and reduce the life of the TG30 lidar. Avoid use in high temperature ( $>50$  degrees Celsius) and low temperature ( $<0$  degrees Celsius) conditions.

### Ambient lighting

TG30 use 905nm narrow pulse laser source, optimized optical and electric design enable strong light interference resistance , thus it could meet indoor and outdoor application requirements.

## **Power Supply**

During the development process, since the drive current of the USB interface of each platform or the USB interface of the computer may be too low to drive the TG30, the external power supply of the +5V to the TG30 needs to be provided through the USB\_PWR interface of the USB interface board. It is not recommend to use mobile phone power bank because the voltage ripple of power bank is too large.