YDLIDAR

YDLIDAR TG SERIES
USER MANUAL

CONTENTS

YDLIDAR TG SERIES LIDAR DEVELOPMENT KIT

The development kit of YDLIDAR TG series lidar (including TG15,TG30,TG50 etc, hereinafter referred to as TG) is an accessory tool provided for performance evaluation and early development of the TG. Through the TG development kit, and with the evaluation software, users can observe point cloud data scanned by TG on your environment or development on the SDK.

Development Kit

The TG development kit has the following components：

TG Series Lidar   USB Type-C Cable   USB Adapter Board

FIG1 YDLIDAR TG DEVELOPMENT KIT

CHART1 YDLIDAR TG SERIES LIDAR DEVELOPMENT KIT DESCRIPTION

Item	Qty.	Description
TG lidar	1	Standard version of the TG series Lidar. The TG has an integrated motor drive for motor control.
USB Type-C Cable	1	Use with USB adapter board to connect TG 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 TG, 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 TG is evaluated and developed under windows, TG and PC need to be interconnected. The specific process is as follows：
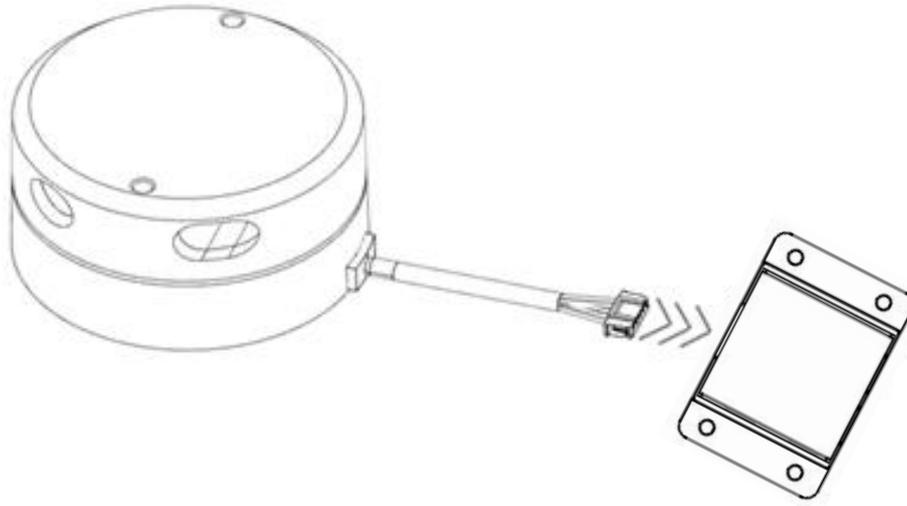

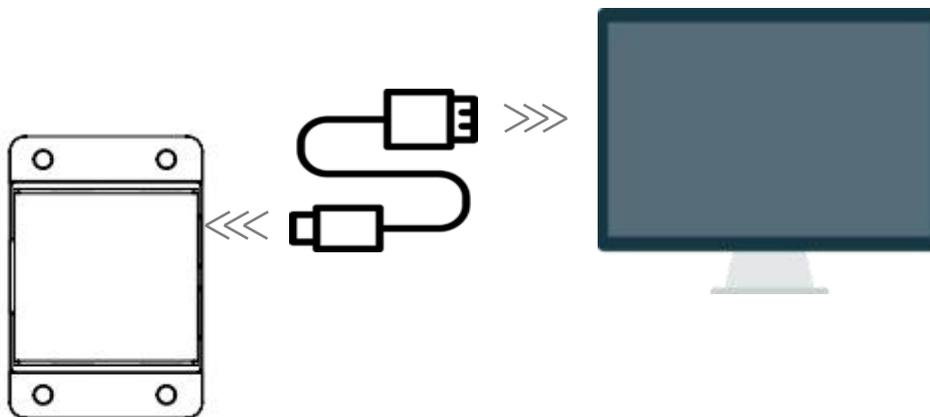FIG2 YDLIDAR TG DEVICE CONNECTION STEP 1

FIG3 YDLIDAR TG DEVICE CONNECTION STEP 2

Connect the adapter board with TG 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 TG is powered on. The motor does not rotate.

If supply current is not sufficient, please connect with auxiliary power supply.
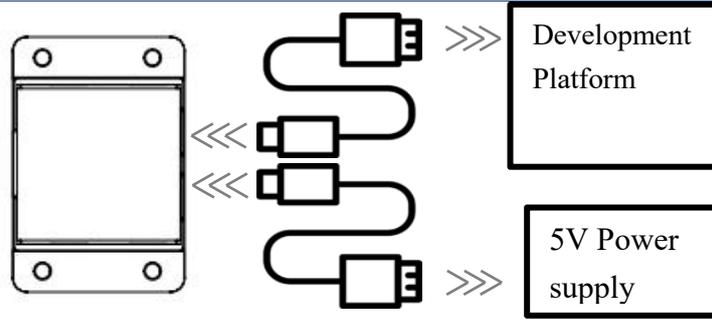
FITG YDLIDAR TG AUXILIARY POWER SUPPLY

Driver Installation

To evaluate and develop the TG 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://ydlidar.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 TG DRIVER VERSION SELECTION

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

FIG6 YDLIDAR TG 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 TG and PC interconnection).

Note: Users can also choose Type-C on TG to get started quickly. Connect the PC and TG directly with Type-C data cable, and download the vcp serial port driver of TG on the official website. After that, start PointCloud Viewer to scan the map to observed the data.
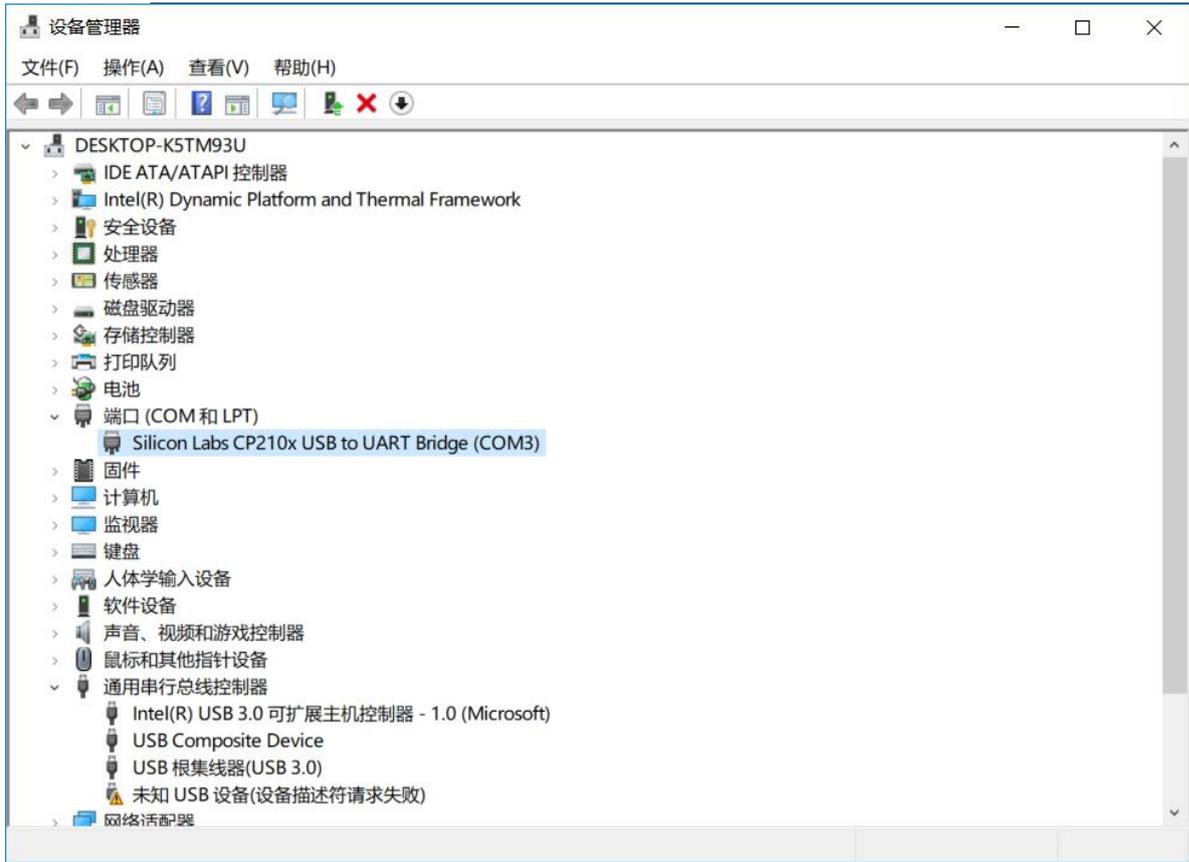
FIG7 YDLIDAR TG DRIVER INSTALLATION CHECK

Evaluation Software Usage

YDLIDAR provides Point Cloud Viewer, a point cloud data visualization software for TG real-time scanning. Users can intuitively observe the TG 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 TG 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 TG USB adapter board serial port driver is installed successfully, and interconnect the TG 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 TG 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.

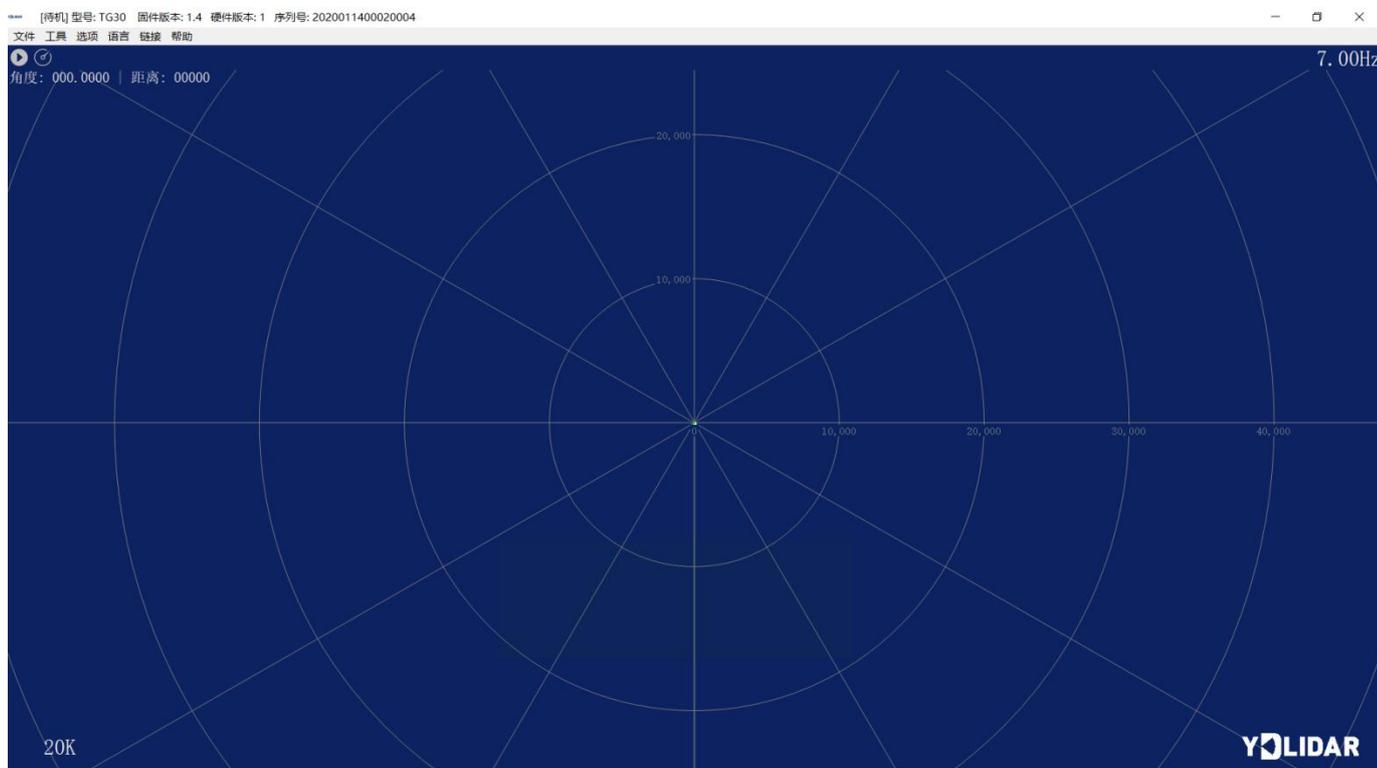If the connection is correct, you will see the following screen：

FIG9 POINTCLOUD VIEWER INTERFACE

START SCANNING

Click ▶ to start scanning and display the environment point cloud. Click ⏸ to stop it.
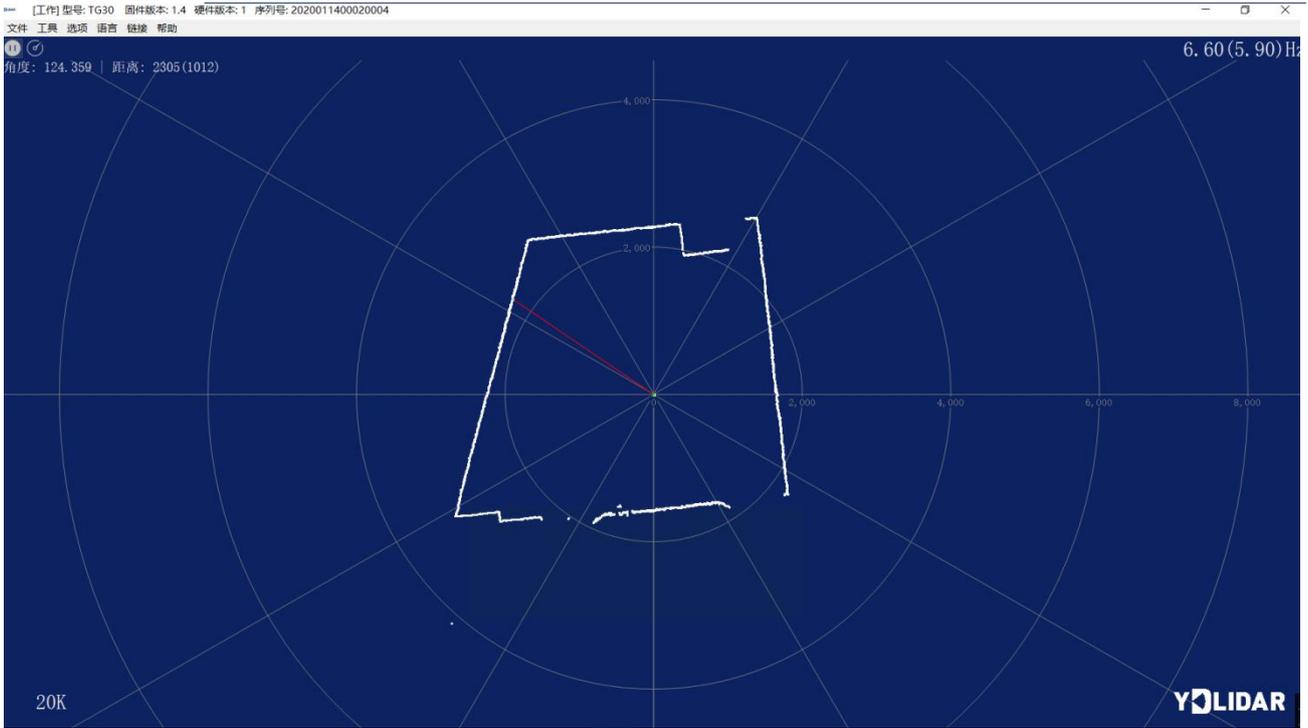
FIG10 LIDAR SCANNING POINT CLOUD DISPLAY

SCAN FREQUENCY

⊘is used to adjust the scanning frequency (motor speed) of the lidar. Click an drag to adjust 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.
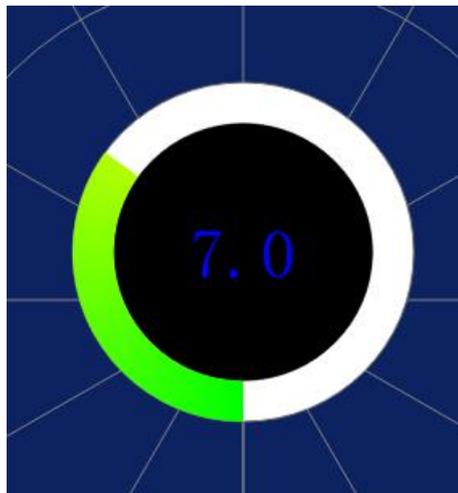

FIG11 SCAN FREQUENCY ADJUSTMENT

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 TG on GitHub.

https://github.com/YDLIDAR/ydlidar_ros/tree/TG

Device Connection

Under Linux, the TG 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 to the catkin_ws/src directory. Switch to the catkin_ws workspace and compile again.

```
$ mkdir -p ~/catkin_ws/src
$ cd ~/catkin_ws/src
$ catkin_init_workspace
$ 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 TG serial port.

```
$ cd ~/catkin_ws/src/ydlidar_ros/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 TG scan results, as shown in the following figure:
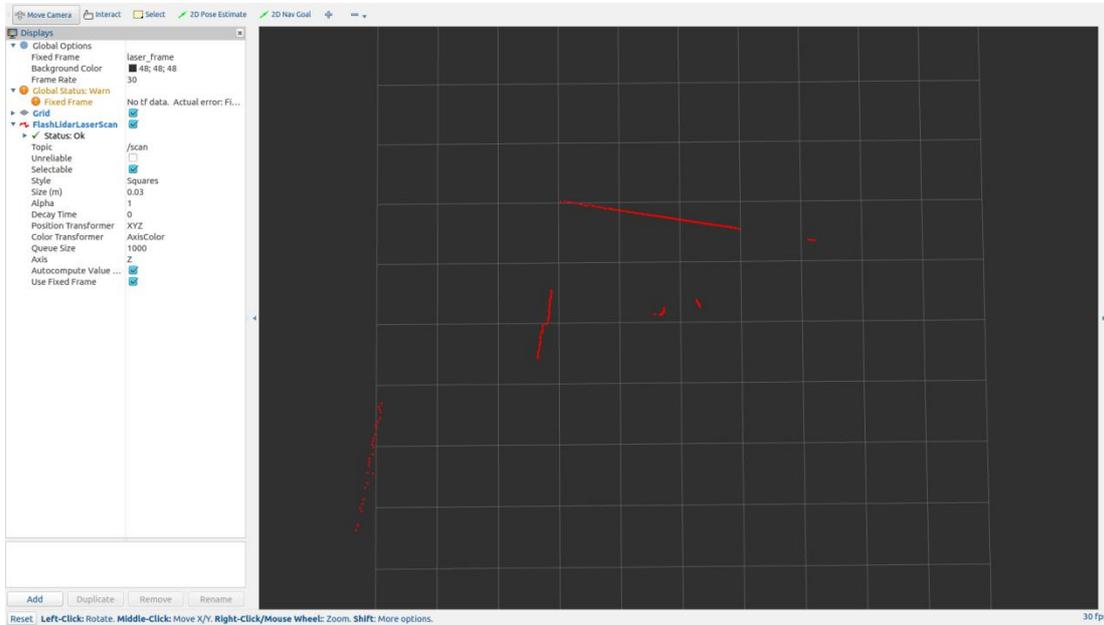
```
$ roslaunch ydlidar lidar.launch
```


FIG12 YDLIDAR TG 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 13 LIDAR.LAUNCH FILE

（2）The TG 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.
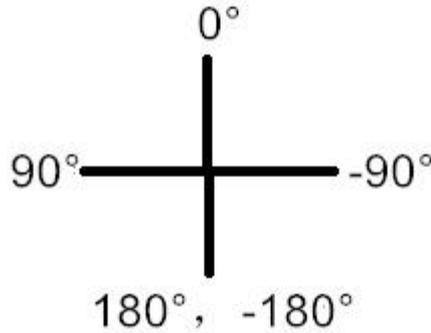

FIG14 YDLIDAR TG COORDINATES DEFINITION

CAUTION

Ambient Temperature

When the working environment temperature of TG 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 TG lidar. Avoid use in high temperature (>50 degrees Celsius) and low temperature (<0 degrees Celsius) conditions.

Ambient lighting

 TG 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 TG, the external power supply of the +5V to the TG 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.