YDLIDAR

YDLIDAR TX8
USER MANUAL

Doc#：01.13.000002

Contents

YDLIDAR TX8 DEVELOPMENT KIT

The YDLIDAR TX8 (hereafter abbreviated as TX8) development kit is designed to facilitate users' performance evaluation and early development of the TX8. By using the TX8 development kit and matching evaluation software, point cloud data scanned by TX8 to the environment can be observed on the PC or developed on the SDK.

Development Kit

The TX8 development kit has the following components:

CHART 1 YDLIDAR TX8 DEVELOPMENT KIT DESCRIPTION

Item	Qty	Description
TX8 Lidar	1	Standard version of the TX8 Lidar.
USB cable	1	Use with USB adapter board to connect TX8 and PC. It is both a power supply line and a data line.
USB adapter board	1	This component is used for USB to UART functions, enabling TX8 and PC to be quickly interconnected. Also supports the serial port DTR signal to the TX8 motor stop control. A MicroUSB Power Interface (PWR) for auxiliary power supply is also provided.
PH2.0-8P cable	1	This component meets the user's development needs in a multi-platform environment.

Note: USB adapter board has two MicroUSB interfaces: USB_DATA, USB_PWR.

USB_DATA: Data supply multiplex interface. In most cases, just using this interface can meet the power and communication needs.

USB_PWR: Auxiliary power interface. The USB interface of some development platforms has a weak current drive capability, and auxiliary power can be used.

WINDOWS USAGE GUIDE

Device connection

When evaluating and developing TX8 under windows, you need to interconnect TX8 and PC. The specific process is as follows:
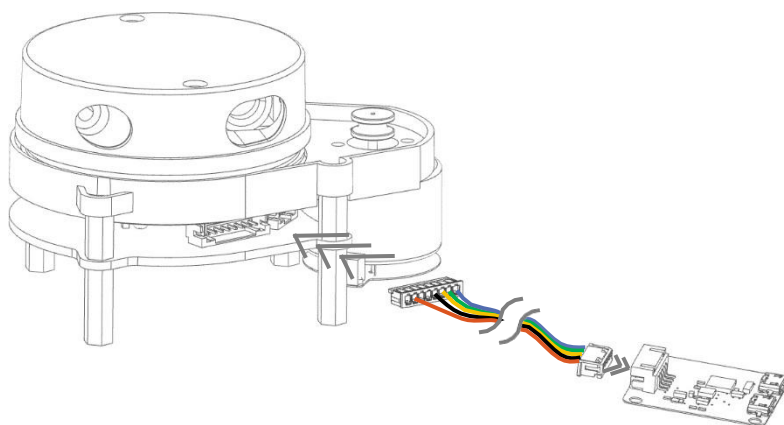

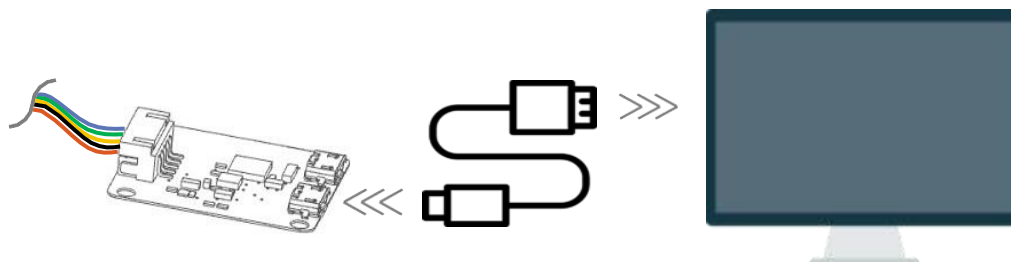FIG 1 YDLIDAR TX8 CONNECTION STEP 1

FIG 2 YDLIDAR TX8 CONNECTION STEP 2

Connect the adapter board and TX8 first, and then connect the USB cable to the USB port on the adapter board and the PC. Note that the USB interface's Micro interface is connected to the USB adapter's USB_DATA. After the TX8 is powered on, it is in idle mode and the motor does not turn.

The drive current of the USB interface of some development platforms or PCs is weak, and the TX8 needs to access the +5V auxiliary power supply, otherwise the radar will work abnormally.
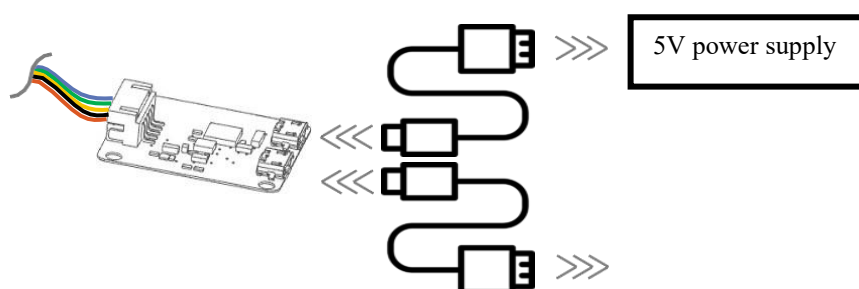

5V power supply

FIG 3 YDLIDAR TX8 AUXILIARY POWER SUPPLY

Driver Installation

To evaluate and develop the TX8 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 extracting 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.

FIG 4 YDLIDAR TX8 DRIVER VERSION SELECTION

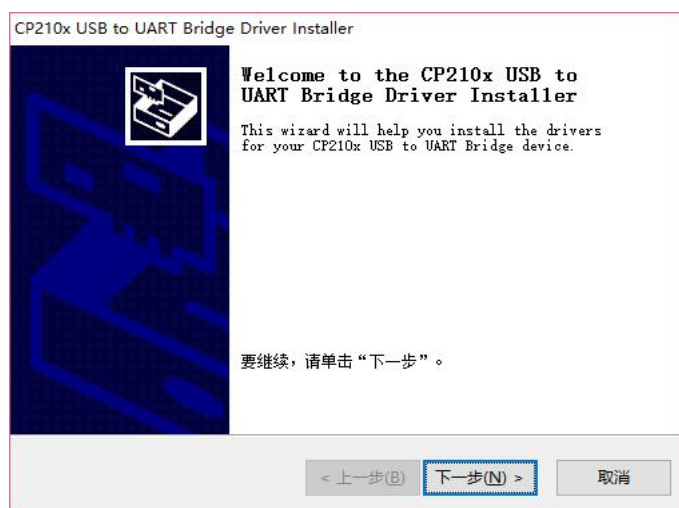Double-click the exe file and follow the prompts to install it

FIG 5 YDLIDAR TX8 DRIVER INSTALLATION I

After the installation is complete, you can right-click My Computer and select Properties. Under the 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 TX8 and PC interconnection)
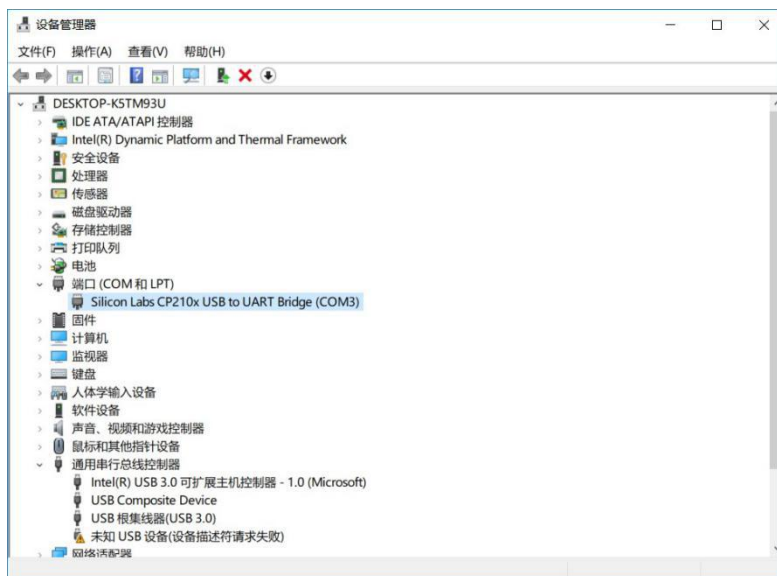

FIG 6 YDLIDAR TX8 DRIVE INSTALLATION II

Software

YDLIDAR provides Point Cloud Viewer, a point cloud data visualization software for TX8 real-time scanning. The user can intuitively observe the TX8 scan effect picture using this software. YDLIDAR provides TX8 real-time point cloud data and real-time scanning frequency, and TX8 version information can be read at the same time. And can save the scan data offline to an external file for further analysis.

Before using YDLIDAR, make sure that the TX8 USB adapter board serial port driver is installed successfully, and check whether the TX8 and PC USB ports are successfully interconnected. Run the evaluation software: PointCloudViewer.exe, select the corresponding serial port number and model number.

FIG7 YDLIDAR TX8 EVALUATION SOFTWARE
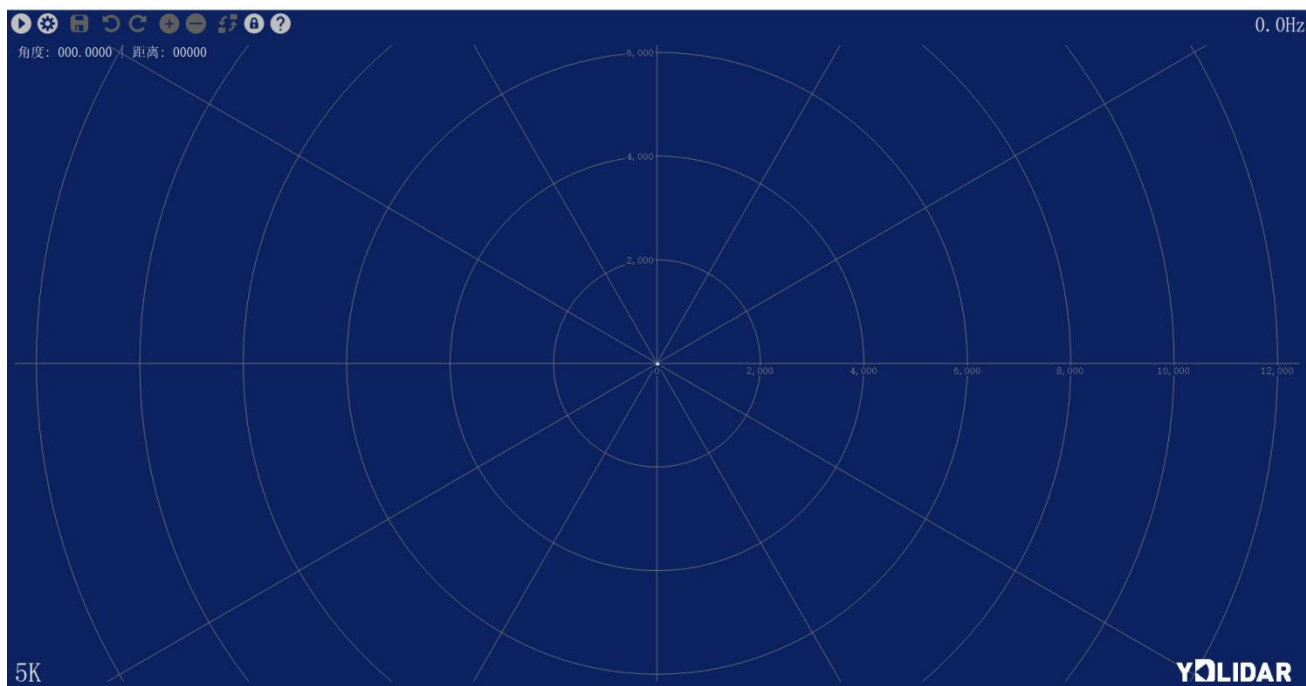
After confirmation, you can see the following screen：

FIG 9 POINTCLOUD VIEWER EVALUATION SOFTWARE STARTUP DISPLAY

START SCANNING

Click ▶ to start scanning and display the environment point cloud.

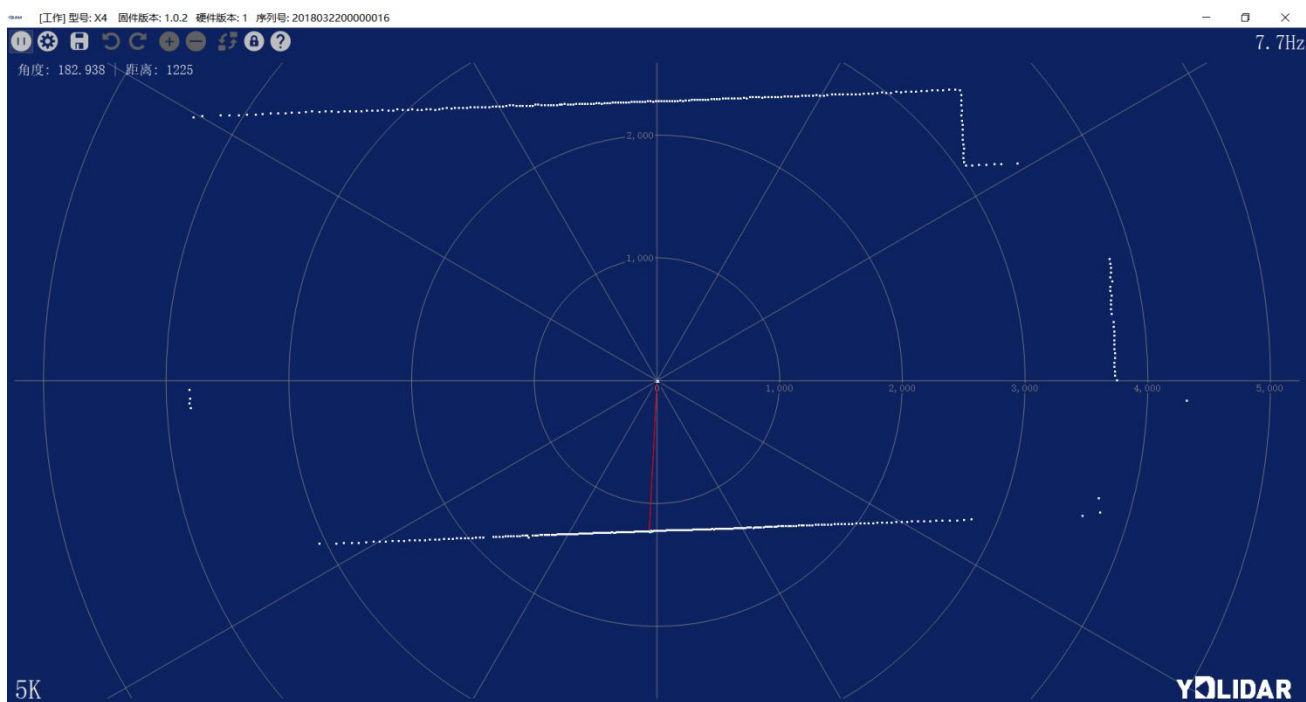Clicking ❚❚ to stop it, as shown below:

FIGURE10 LIDAR SCANNING POINT CLOUD DISPLAY

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
```

FIGURE 10 POINT CLOUD DATA SAVE FORMAT

SOFTWARE UPGRADE

The client software may need upgrade and users can update to the latest version for a better experience.

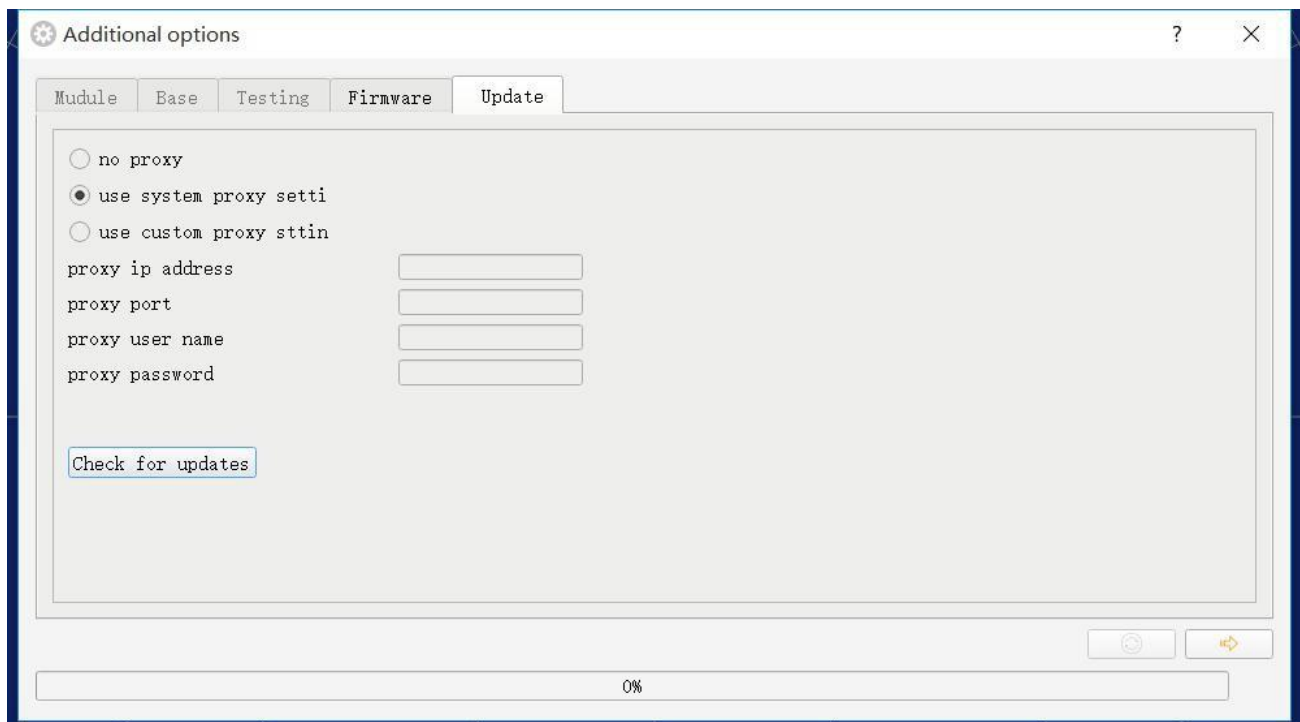Click System Settings and select Update, as shown below:

FIGURE 13 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

Because 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 TX8 on GitHub
https://github.com/YDLIDAR/ydlidar_ros/tree/T4;

Device connection

Under Linux, the TX8 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 ydlidar_ws workspace and copy the ROS driver package ydlidar in the TX8 package to the ydlidar_ws/src directory. Switch to the ydlidar_ws workspace and compile again.

```
$ mkdir -p ~/ydlidar_ws/src

$ cd ~/ydlidar_ws

$ catkin_make
```

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

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

$ source ~/.bashrc
```

（3） Add a device alias /dev/ydlidar to the TX8 serial port.

```
$ cd ~/ydlidar_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 re-install it.

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

RVIZ Check the scan results

Run the launch file and open rviz to view the TX8 scan results, as shown in the following figure:
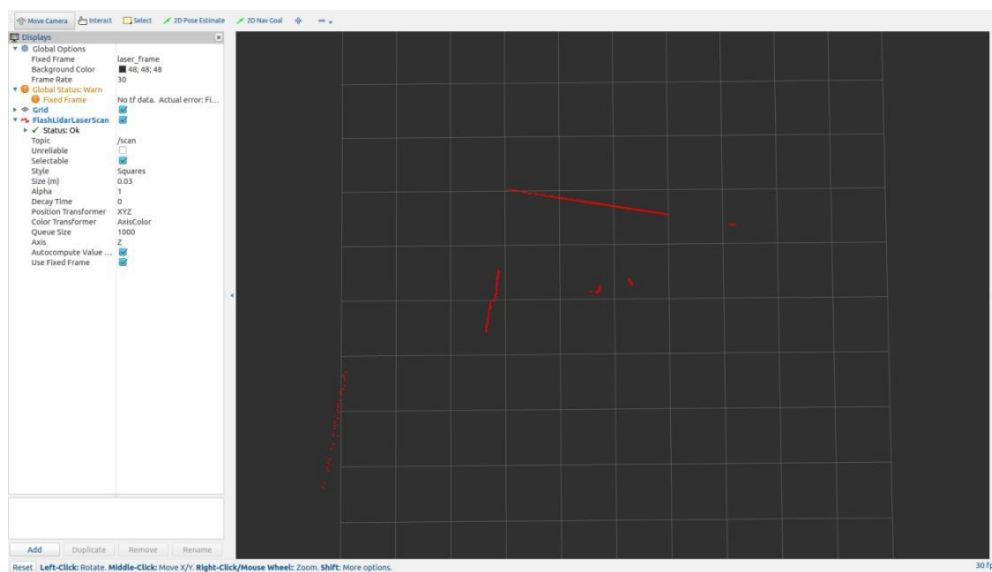

FIG12 YDLIDAR TX8 RVIZ

Modify the scan angle problem

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 TX8.launch's directory and use vim to edit TX8.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="115200"/>
    <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="8.0" />
    <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 15 LIDAR.LAUNCH
FILE

（2）The TX8 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.
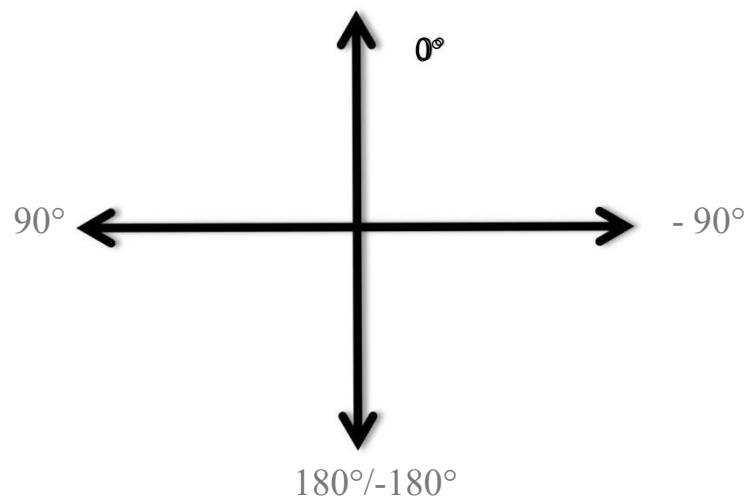The specific scope needs to be modified according to actual use.

FIG14 YDLIDAR TX8 COORDINATES DEFINITION

USE CAUTION

Temperature

When the working environment temperature of TX8 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 TX8 lidar. Avoid use in high temperature (>40 degrees Celsius) and low temperature (<0 degrees Celsius) conditions.

Ambient lighting

TX8 uses a 905nm narrow pulse laser light source. Reasonable optics and circuit design make it highly resistant to strong light interference, which can meet various indoor and outdoor environment applications.

Power demand

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 TX8. An 5V external power supply is needed. It is not recommended to use mobile phone power bank because the voltage ripple of some brands of power bank is too large.