SCANTECH™

Tracking 3D Scanner

TrackScan Series

User Manual

V1.3.0

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Introduction

Please read user manual before start.

After reading, keep it safely for next time review.

Basic Label

This manual will use the following labels to describe different significance, so please red carefully and make sure understand all of labels.

Danger	Fail to obey the announcement will cause dangerous situation or injuries and deaths.
Warning	Fail to obey the announcement may cause dangerous situation or injuries and deaths.
Caution	Fail to obey the announcement may cause minor injury.
Attention	Fail to obey the announcement may damage product or surrounding.

Safety Announcement

Notice	During scanning process, must obey announcement and use product correctly.

Please use it correctly

To avoid malfunction of the KSCAN series and to ensure proper use, please observe the following precautions.

Normal Announcement

Caution	➢ Before starting work, please confirm the function and performance of this product, and the equipment can operate normally. ➢ If the product malfunction, please turn off the power immediately for preventing other damage. ➢ Please don't change temperature suddenly during product use, otherwise condensation will cause equipment failure.

Attention	➢ For out of the working range, and modified products, the company does not guarantee its function and performance. ➢ When this product is combined with other equipment, it may not be able to satisfy the function and performance depending on the conditions of use and the environment. Therefore, please pay attention to it before use.

Operation Announcement

Warning	➢ Please choose the correct power supply voltage. Otherwise malfunction will cause failure or fire. ➢ Please do not disassemble or modify the unit. Otherwise malfunction will cause failure or fire.

Attention	➢ In order to use this product properly and safely, please try to avoid the following places, otherwise it may cause malfunction. ● high humidity or dust; ● Corrosive or flammable gas; ● Splashes of water, oil, chemicals; ● static electricity. ➢ Dirty dirt, water or oil stains may affect the use of the product and cause measurement deviations; ● When it is attached to the surface of the product glass: blow off the dirt with clean air. When the soil is dirty, wipe it off with a soft cloth dampened with alcohol. ● When it is attached to the surface of the object: please blow off the dirt with clean air or wipe off the dirt with a clean soft cloth. ➢ If the measuring object vibrates, it may cause a deviation in the measured value. ➢ After turning on the power, wait about 5-10 minutes before use. Since the circuit will not stabilize immediately after the power is turned on, the measured value may be deviated.

Accident Announcement

Attention	➢ Turn off the power immediately when the following phenomenon occurs. If you continue to use it, it may cause equipment failure. ● Water or foreign matter inside the device； ● The device is dropped, or the casing is damaged; ● The device emits smoke or an unusual smell.

Storage Announcement

Attention	➢ Do not wipe the product with a damp cloth, volatile oil, thinner, etc. Otherwise, the product may be discolored or deformed. When the soil is dirty, use a cotton cloth to remove the diluted neutral detergent, wring it out, wipe it, and then wipe it off with a soft cloth. ➢ Please try to avoid the following places for storage； ● high humidity or dust； ● Corrosive or flammable gas.

Notes on Regulations and Standards

Safety Announcement

The laser wavelengths of the TrackScan series are as follows:

Type	TrackScan Series
Blue wavelength	450nm
Red wavelength	660nm

According to the ICE60825-1, the laser grade of KSCAN series used is Class II.

Notes of Class II lasers is follows:

Warning	➢ If you do not control and adjust according to the procedures specified here, you may injure the human body (eyes, skin, etc.). Therefore, please be sure to observe the following items. About Class II laser products： ● Please don't stare at laser and specular light； ● Please do not intentionally point the laser towards people, especially the eyes； ● Please pay attention to the reflected light path of the laser. The laser will be specular and diffuse. If there is danger of being reflected by the reflected light, please cover the reflected light with a baffle； ● Do not use a concentrator, magnifying glass or microscope to observe the laser output within 100mm. ➢ This product does not have a mechanism to turn off the laser irradiation when disassembling. Please do not disassemble it.

Contents

1 Introduction to Tracking 3D Scanners

The camera of the TrackScan 3D scanner can obtain the laser projected onto the scanned object, the laser deforms with the shape of the object, and as the camera is accurately calibrated in advance, it is possible to calculate the linear 3D information projected by the laser line; The tracker obtains the exact spatial position of the TrackScan 3D scanner in real time through reflective marker point tracking technology; Using the linear 3D information obtained in step 1 and the spatial relative position of the scanner in step 2, the 3D information of the position through which the laser passes is continuously acquired as the scanner moves, creating continuous 3D data. The common focal length of the scanner is called the reference distance, and the common focal length range is called the depth of field. Red light reference distance is 300mm, depth of field is 200mm; blue light reference distance is 370mm, depth of field is 260mm.

2 Precautions before using

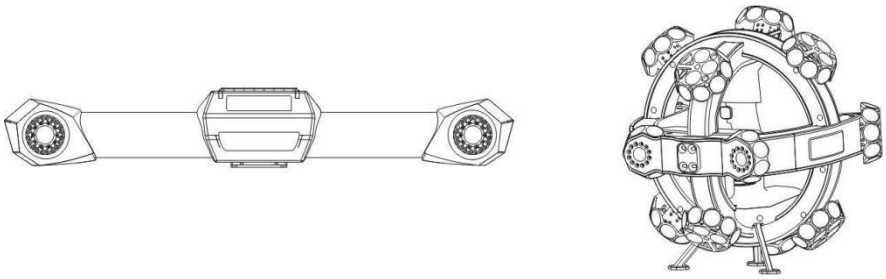
This chapter provides a brief description of the scanner's product configuration, product structure and device connection.

2.1 Product configuration

Please remove the scanner from the outer packaging and verify that the following standard configuration items are present in the waterproof box.

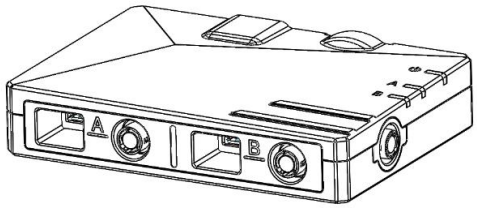
Standard configuration:

（1）TrackScan tracking 3D scanner: as shown in Figure 2-1.



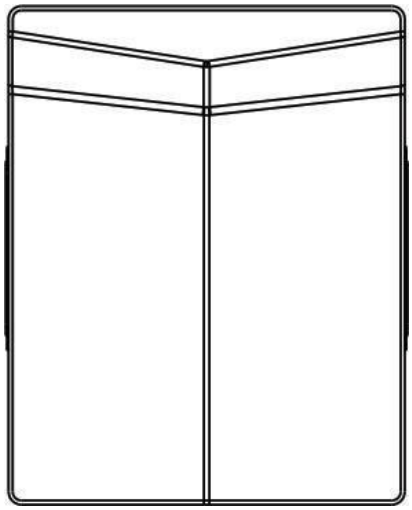
2- 1 Tracking 3D Scanner

（2）Relay box：The relay box connects the scanner and the tracker to synchronize and transmit data, and provides power supply for the tracker and the scanner. A and B logo each contains a set of interfaces: power cable and data cable. It can be connected to the scanner and tracker respectively. The power interface connects to the power adapter, and the data port connects to the computer for data transmission. As shown in Figure 2-2.



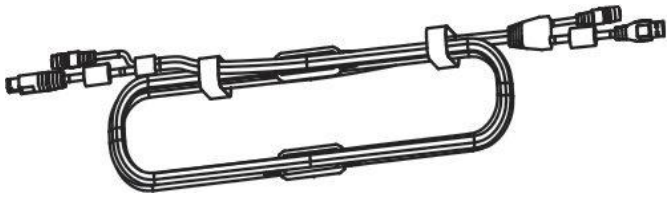
2- 2 Relay Box

（3）Calibration Board：It is mainly used to calibrate the camera parameters. In order to ensure good data quality, camera calibration is performed using a quick calibration plate before the scanner is started or when temperature changes or poor scan data quality occurs. As shown in Figure 2-3.



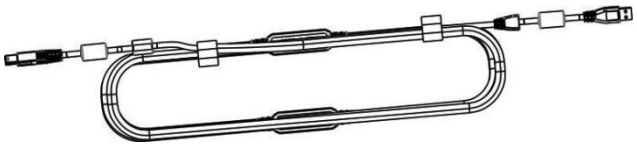
2- 3 Calibration Board

（4）Power data cables: respectively as a tracker and scanner connected to the relay box cable. One cable: Type A interface with the power supply interface to connect the relay box, Type B interface with the power supply interface to connect the scanner. Another cable: Type A interface and power interface to connect the relay box, Type B interface and power interface to connect the tracker. As shown in Figure 2-4.



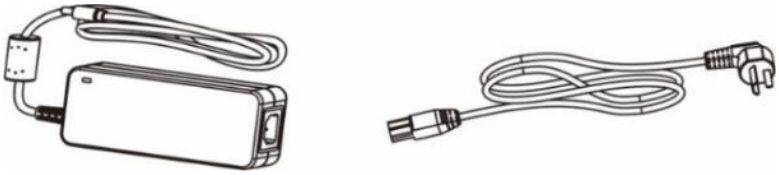
2- 4 Power Data Cable

（5）USB Cable：Type A interface connects to PC and transmits scan data to PC; Type B interface connects to relay box. As shown in Figure 2-5.



2- 5 USB Cable

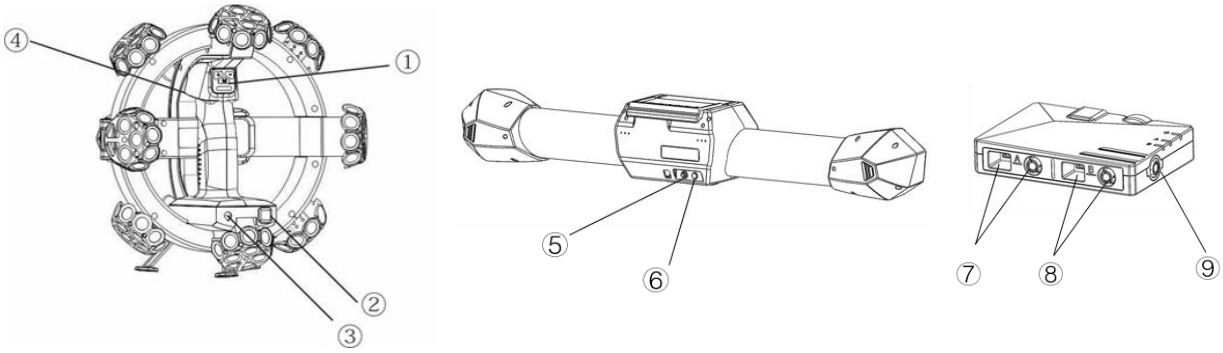
（6） Power adapter: Connects to relay box to provide external power. As shown in Figure 2-6.



2- 6 Power Adapter

2.2 Product Structure

（1）The product structure is shown in Figure 2-8.



2- 7 Product Structure

①-Back button; ②-Data cable Type B interface; ③-Data cable power interface；

④-Front Button； ⑤-Data cable Type B interface; ⑥-Data cable power interface；

⑦-Data cable power interface+Type A interface；

⑧-Data cable power interface+Type A interface； ⑨-Power interface

（2）The names and functions of some structural components are detailed in Table 2-1.

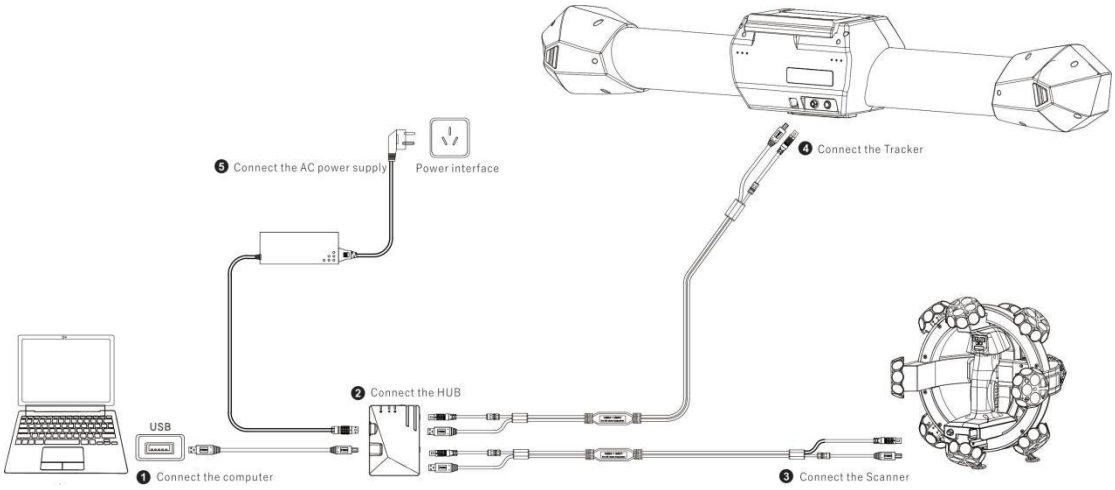
Table 2- 1 Names and descriptions of some components

Name	Functions	
④-Front Button	P22: Click to turn on/off the scanner, double click to switch laser lines in the order of multiple red, parallel blue and single red. P42: Click to turn on/off the scanner, double click to switch laser lines in the order of multiple blue, parallel blue and single red.	
①-back button	M button	Switchable menu key functions in order to adjust the zoom ratio, adjust the laser exposure parameters and operate the view；
	+ button	①Under the Adjust Zoom function: Zoom in View； ②Under the function of adjusting the laser exposure parameters: each press the exposure parameters increase by 0.5ms；
	- button	①Under the Adjust Zoom function: Zoom out View； ②Under the function of adjusting the laser exposure parameters: each press the exposure parameters decrease by 0.5ms；

Attention	The function of all keys in the back button only works when the scanning software is running.

2.3 Tracker and Scanner connection

Device connection includes connecting the tracking device power+data cable to the relay box and the scanner device power+data cable to the relay box. The power adapter is connected to the relay box and the USB cable of the relay box is connected to the computer. The connection cable includes the power adapter connection cable, the power data cable, and the USB cable. The power adapter provides power to the repeater box. The USB cable is connected to the Type B port of the repeater box and the USB 3.0 port of the computer at both ends. As shown in Figure 2-8.



2- 8 Tracker and Scanner Connection

3 Software Installation

This product requires the installation of the scanning software TViewer, the following is a description of the required operating environment and installation steps for the software.

3.1 Computer configuration requirements

Scanning software for real-time processing of scanning data transmitted in real time during the scanning process, the selection of the appropriate hardware configuration can effectively improve the efficiency of the entire scanning system. About the configuration requirements of the computer parameters for the installation of scanning software. As shown in sheet 3-1.

3- 1 Computer Configuration Requirements

Name	Recommended configuration	Minimum Configuration
CPU	I7 ， 8cores 16threads	I7，6cores 12threads
Ram	32G	
Graphics Memory	4G	
Interface	USB3.0	
Operation System	Win10	

Software installation package TrackScanVX.XX.exe that needs to be installed before using the device.

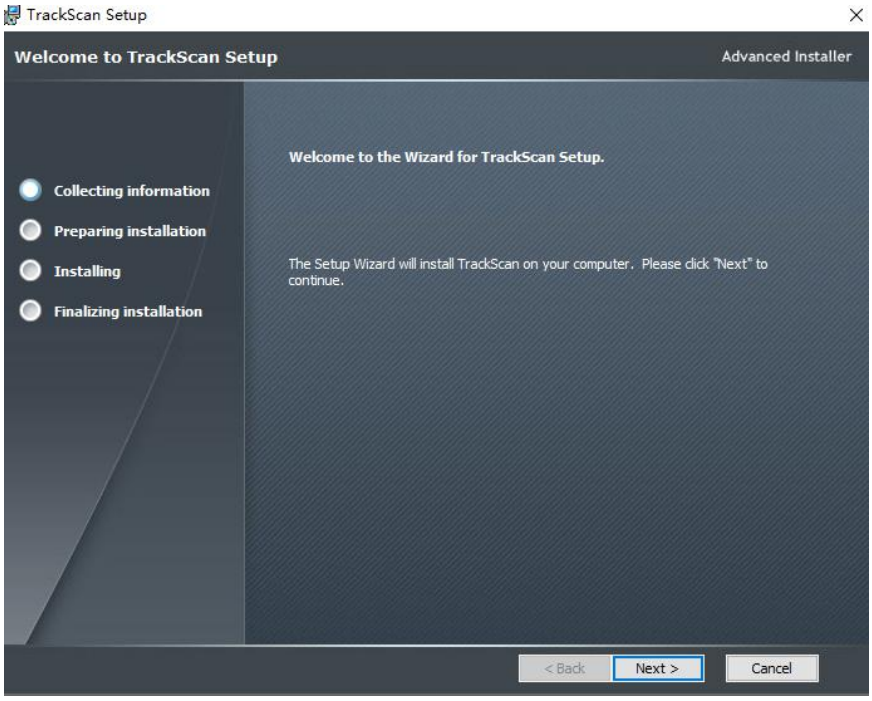
Notice	TrackScanVX.XX.exe in VX.XX for the software installation package version number, later may be due to software upgrades and version number changes, such as changes, without notice. EN is the language version corresponding to the installation package (English).

Attention	①Please close all anti-virus software before software installation; ②All software installations require administrator privileges.

3.2 Scanning software installation

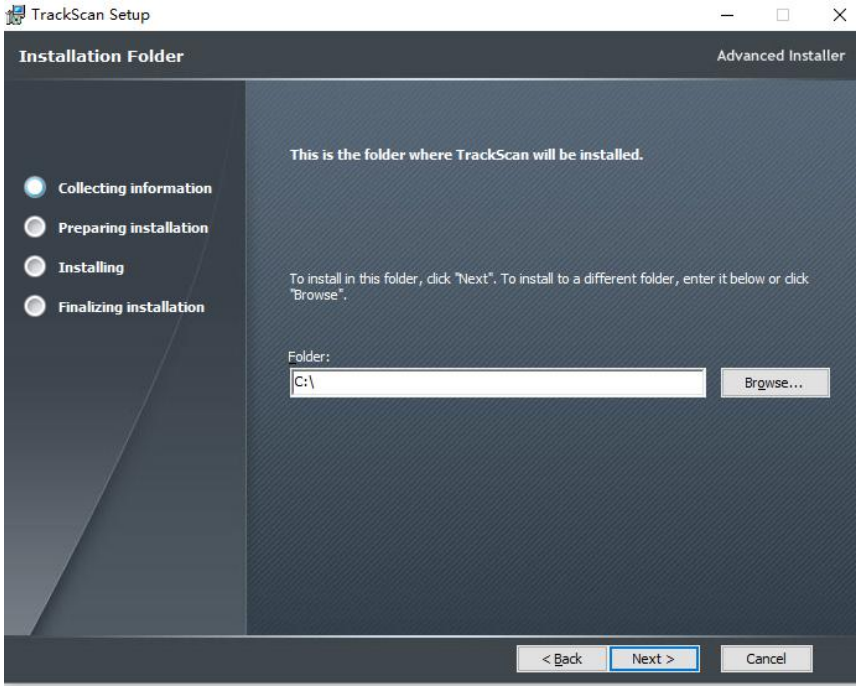
This section will scan the software TrackScanVX.XX.exe.installation package to install the computer steps to explain, here mainly to install to the Windows 10 system as an example to explain.

（1）Right-click on the TrackScanVX.XX.exe. installation package, select Run as administrator, click on "Next". As shown in Figure 3-1.



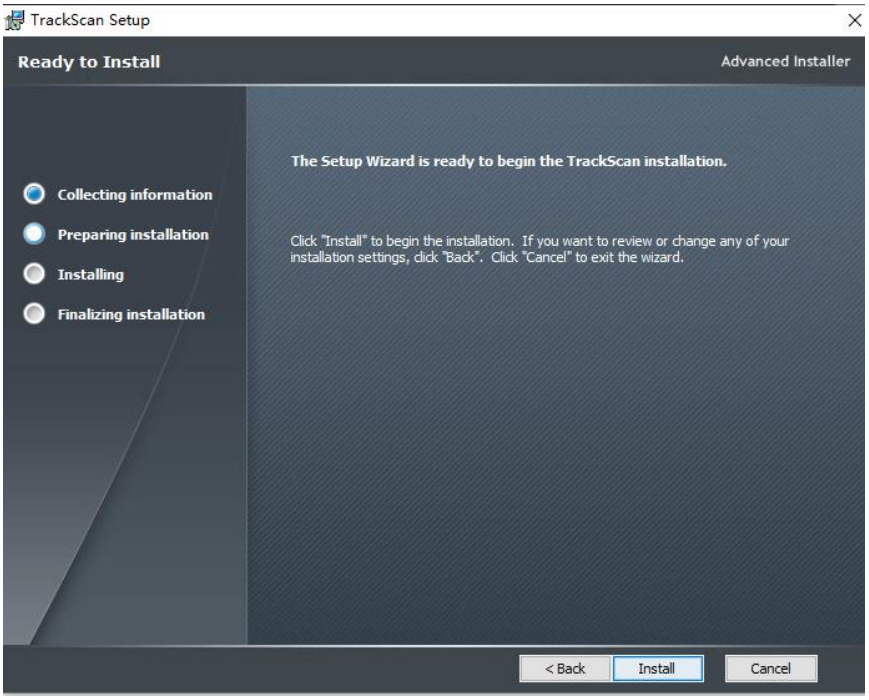
3- 1 TrackScanVX.XX Installation Steps

（2）Select the installation directory and click "Next". As shown in Figure 3-2。



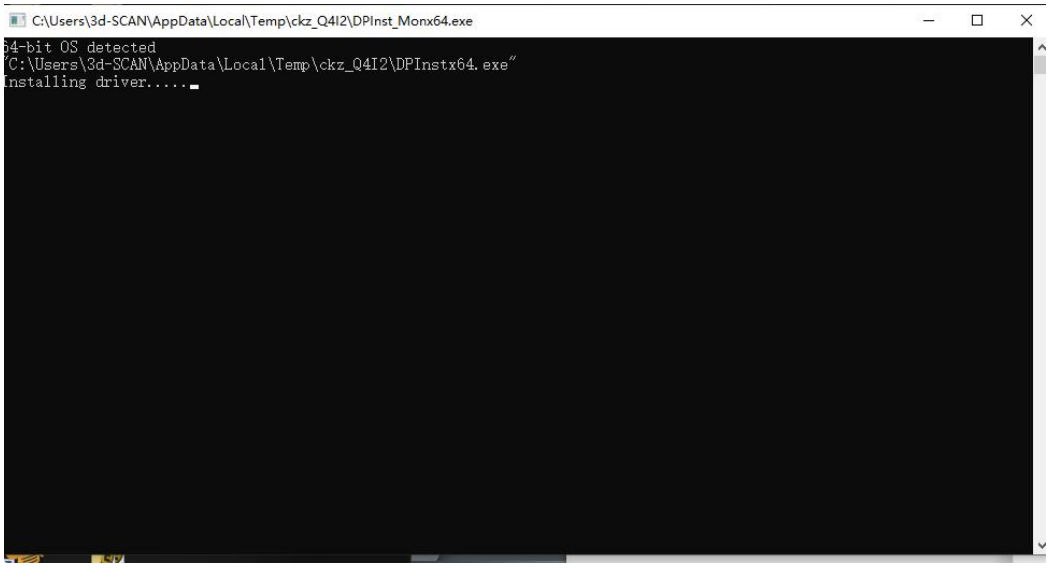
3- 2 TrackScanVX.XX Installation Steps

（3）Click "Install". As shown in Figure 3-3.



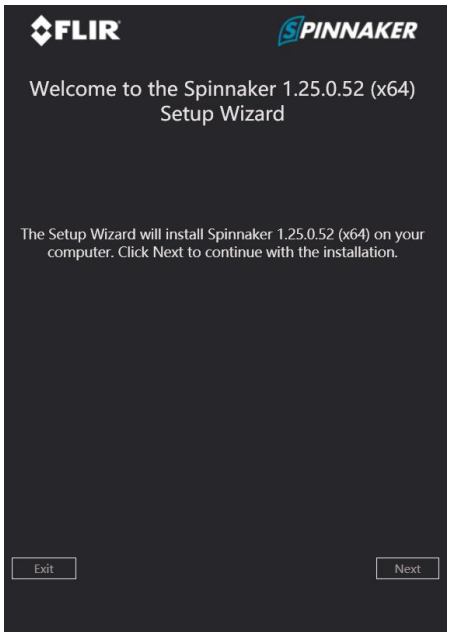
3- 3 TrackScanVX.XX Installation Steps

（4）During the installation process, a pop-up box will appear, when the box shows "Please press any key to continue", press any key on the keyboard to complete the installation. As shown in Figure 3-4.



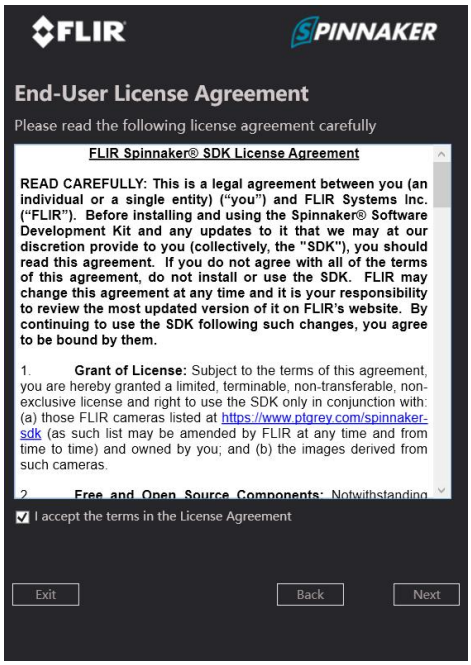
3- 4 TrackScanVX.XX Installation Steps

（5）The dialog box for installing the camera driver will pop up, click "Next". As shown in Figure 3-5.



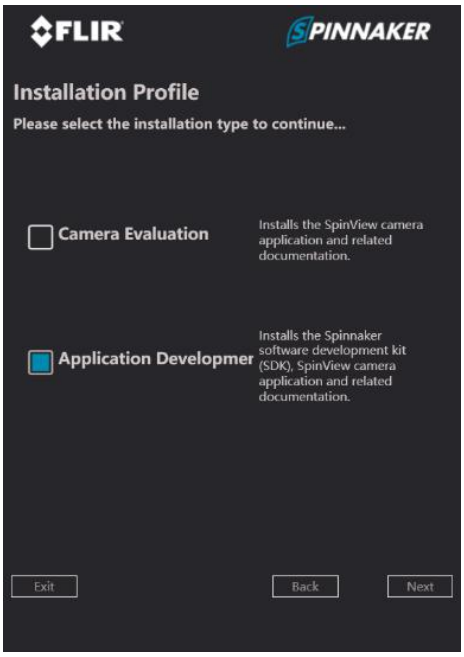
3- 5 Camera driver installation

（6）Click "I accept the terms in the License Agreement", and click "Next". As shown in Figure 3-6.



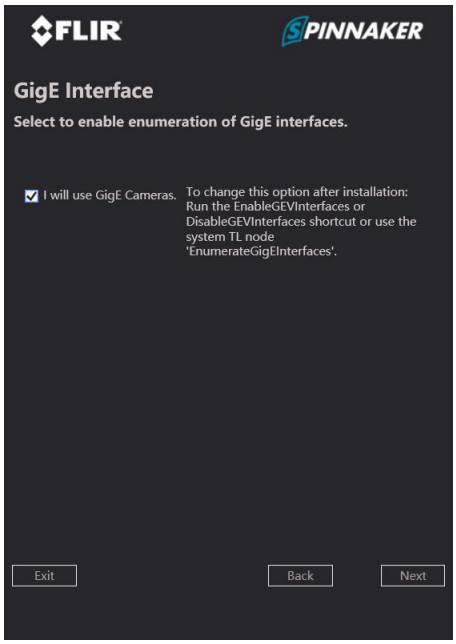
3- 6 Camera driver installation

（7）Then click "Next", select "Application Developmer" and click "Next". As shown in Figure 3-7.



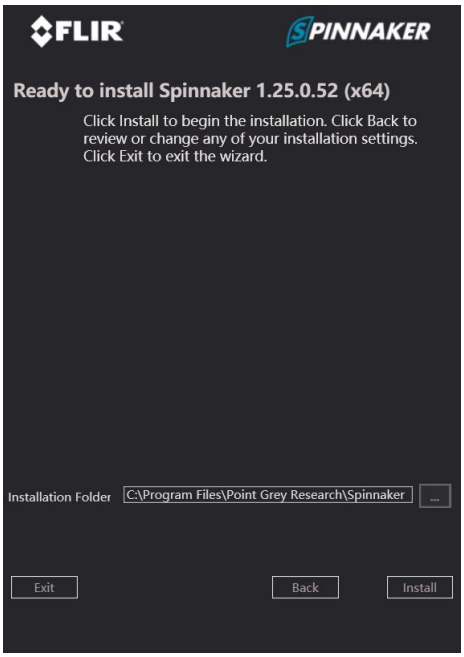
3- 7 Camera driver installation

（8）After clicking "Next", check the box "I will use GigE Cameras" and click "Next". As shown in Figure 3-8.



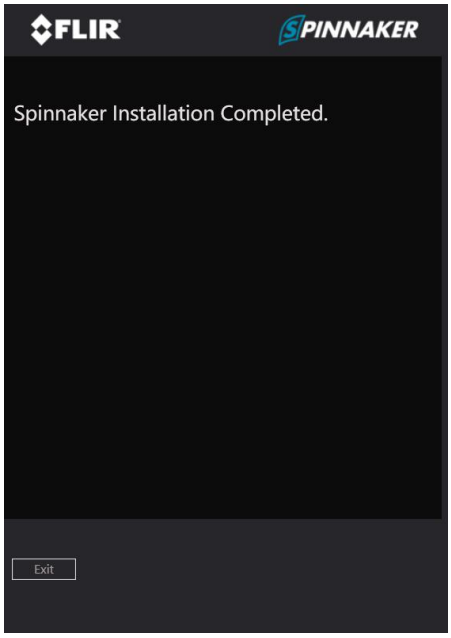
3- 8 Camera driver installation

（9）Click "Install" and wait for the installation to finish. As shown in Figure 3-9.



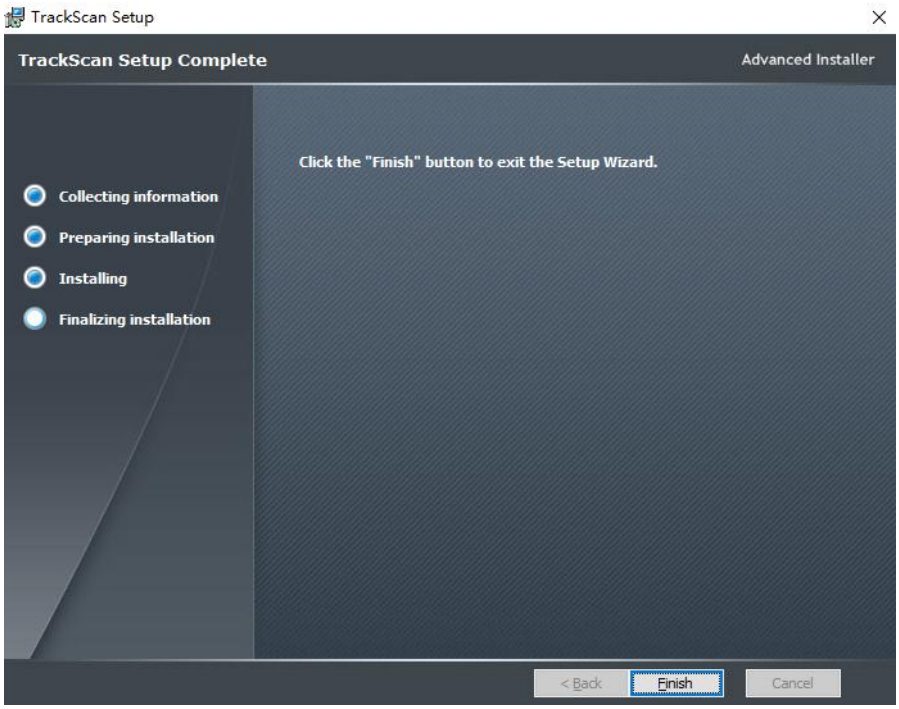
3- 9 Camera driver installation

（10）Camera driver installation completed. As shown in Figure 3-10.



3- 10 Camera driver installation

（11）After the installation of the camera driver, click "Finish" to complete the installation of TrackScanVX.XX.exe. As shown in Figure 3-11.



3- 11 TrackScanVX.XX Installation Steps

（12）After clicking "Finish", a shortcut will be automatically created on the desktop.

3.3 Software Uninstallation

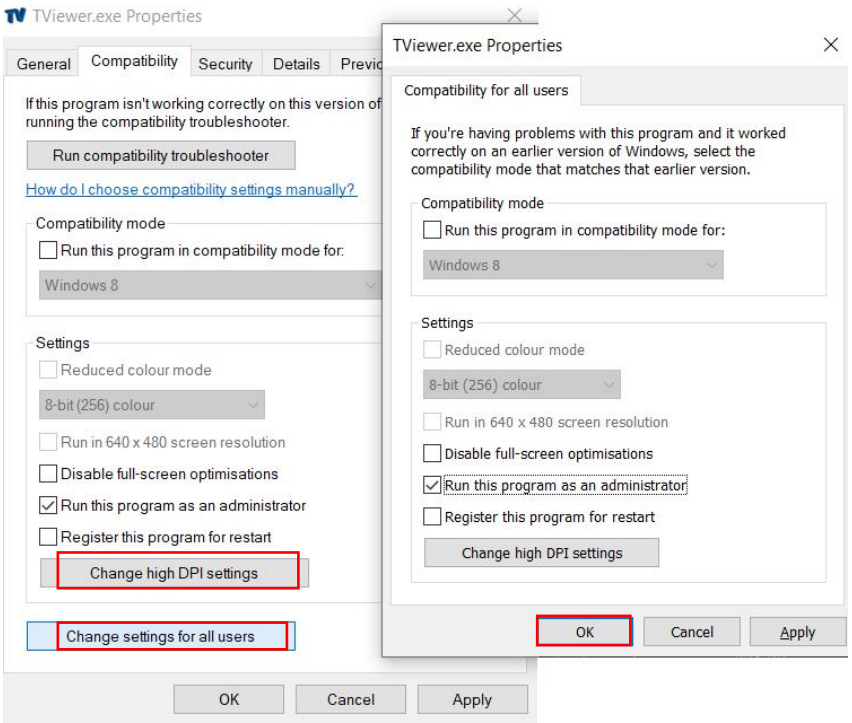
If you want to uninstall or re-install the software, you can enter the software name in the Start menu to enter the uninstall procedure; go to "Control Panel - Uninstall a Program" on your computer and select the appropriate software to uninstall. As shown in Figure 3-12.

3- 12 Software Uninstallation

3.4 Software operating environment settings

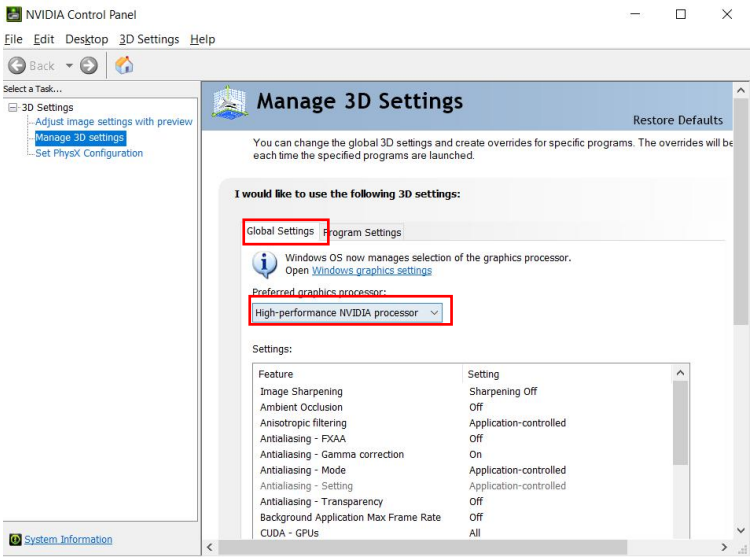
After the installation, in order to ensure the use for software, you need to set the permissions for the software: run the scanning software with administrator privileges, set the scanning software to run with the graphics card.

To grant administrator privileges: right-click the software icon, click "Properties", select the "Compatibility" tab in the properties window, check the "Run this program as administrator", and then click the "Change all user settings" button. Click "Change all user settings", check "Run this program as administrator" again in the pop-up dialog window, and then click "OK" (Figure 3-13). Do the same for the "Scanner/LowPartSW/scansense_console.exe" program in the software directory to give administrator privileges.



3- 13 Give administrator privileges to run the setup

Select the graphics card to run: Right click on the desktop, select "NVIDIA Control Panel" in the menu, in the NVIDIA Control Panel, select "Manage 3D Settings" - " Program Settings" - "Preferred Graphics Processor for this Program" - select "High Performance NVIDIA Processor" (if this option is not available, just skip it) - "Add" – "TViewer.exe" - "Apply ". As shown in Figure 3- 14.



3- 14 Software graphics card runs

3.5 Manage configurations file

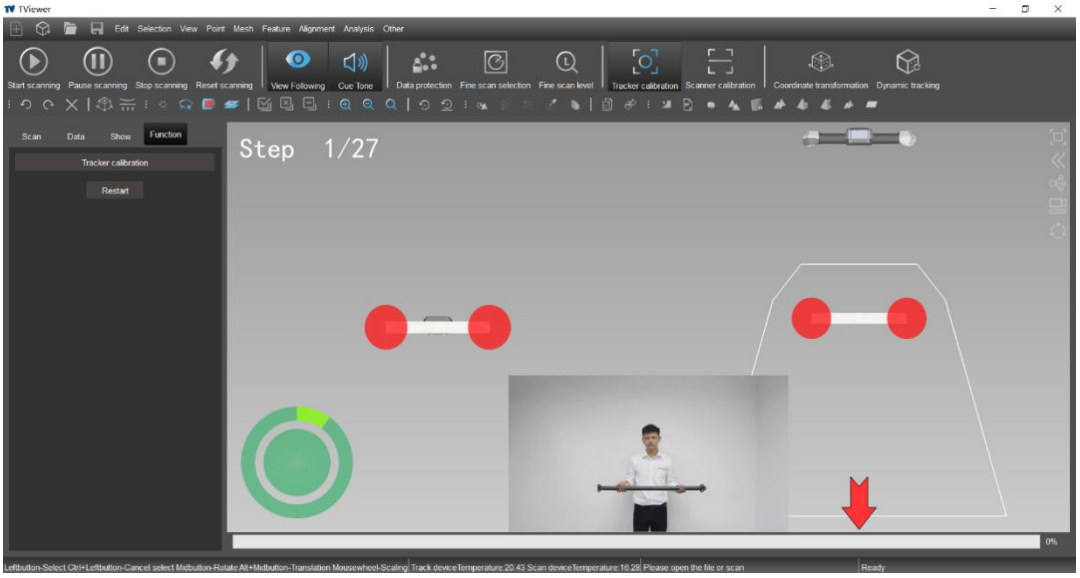
Configure TViewer before first time use: right click on the TViewer icon, click on "Open file location", inside the "LowPartSW" folder, replace it with the “SET” folder inside the USB stick.

4 Basic scanning process

The quick operation process includes: tracker calibration, scanner calibration and scanning of laser patch (points).

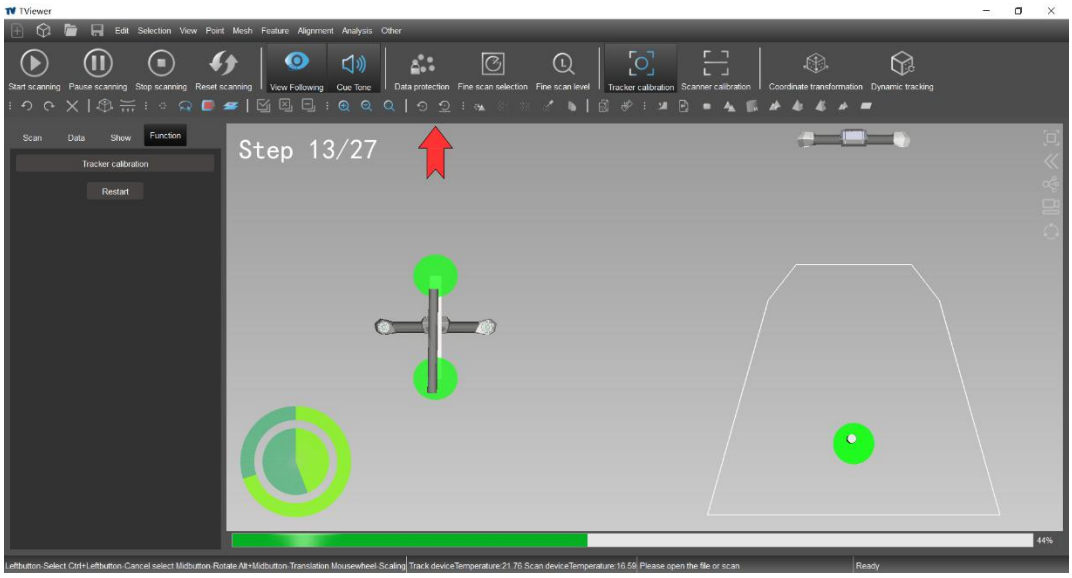
4.1 Calibration

（1）Click on the tracker calibration and place the matching calibration bar into the tracking area (the bar is placed horizontally with the plane facing forward, as in picture 4-1), the arrow in the image shows the direction of the bar movement, align the grey bar with the white one until they turn green and move the bar position.



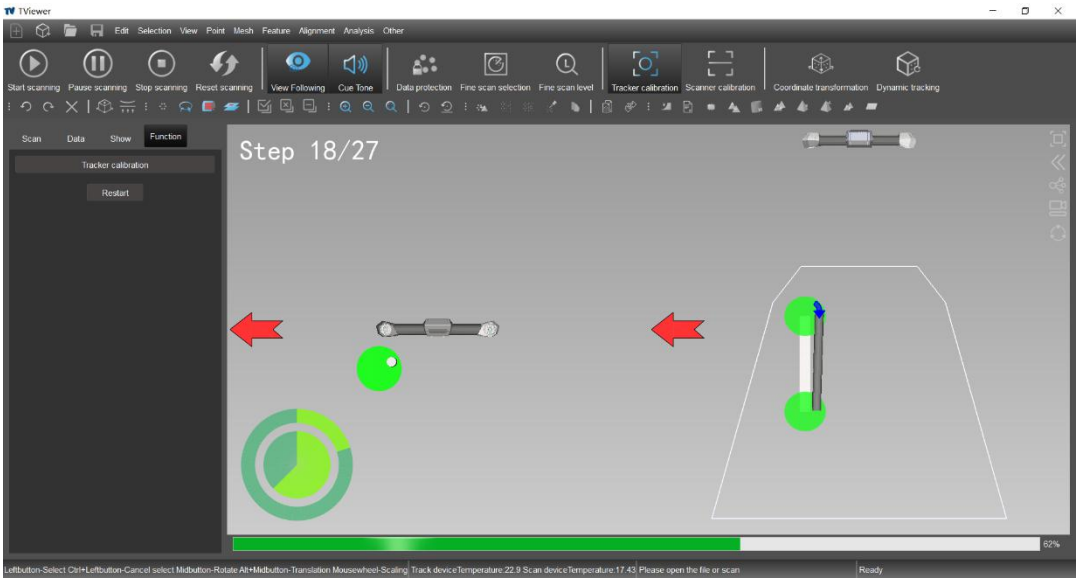
4- 1 Tracker calibration

（2）In step 13, the calibration bar is set vertically (refer to the calibration interface video) for calibration, as shown in Figure 4-2.



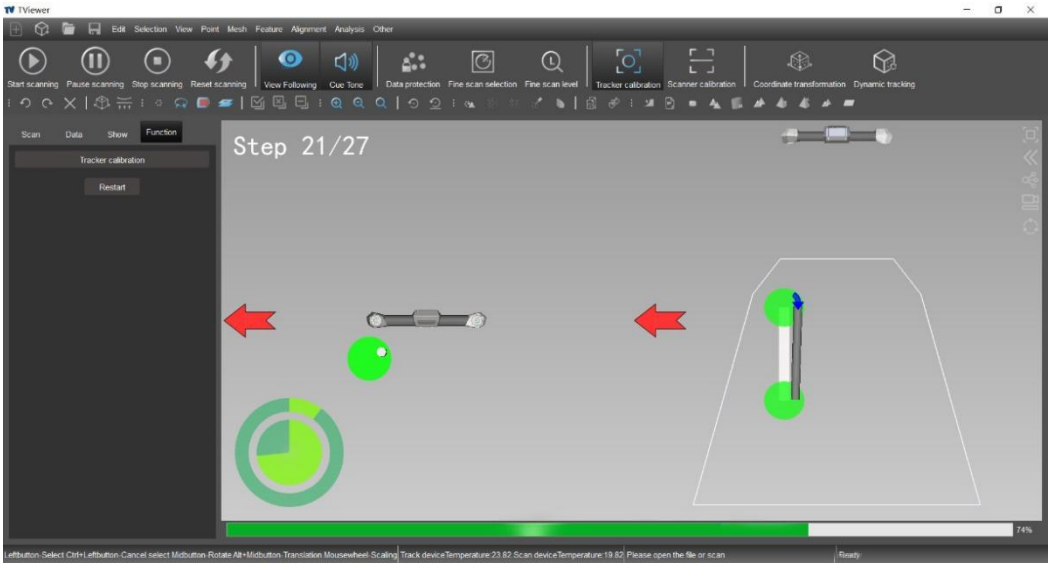
4- 2 Tracker calibration

（3）In step 18 change the attitude of the calibration bar (refer to the calibration interface video, picture 4-3), point the tilt side up towards the tracker and start the calibration.



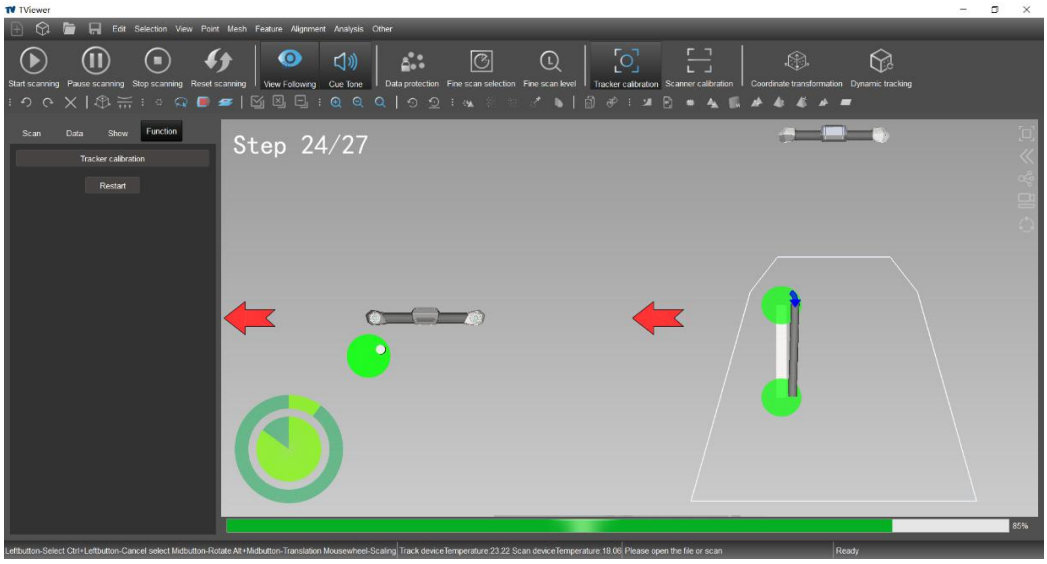
4- 3 Tracker calibration

（4）In step 21, change the attitude of the calibration bar (refer to the calibration interface video, picture 4-4) and start the calibration with the tilt side facing the tracker.



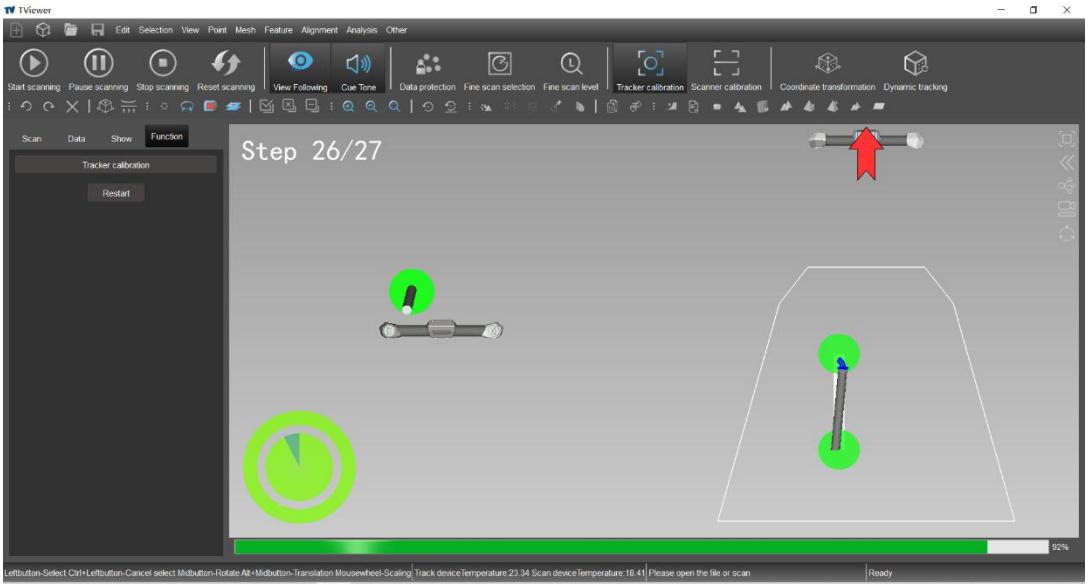
4- 4 Tracker calibration

（4）In step 24 change the attitude of the calibration bar (refer to the calibration interface video, picture 4-5), point the tilt side up towards the tracker and start the calibration.



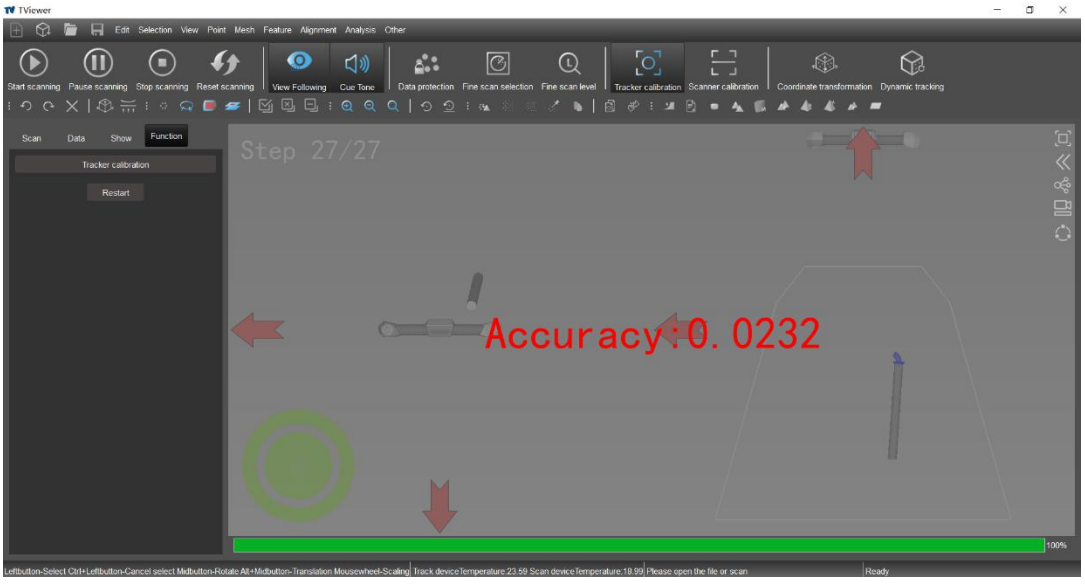
4- 5 Tracker calibration

(6) In step 26, change the attitude of the calibration bar (refer to the calibration interface video, picture 4-6), point the tilt side down towards the tracker and start the calibration.



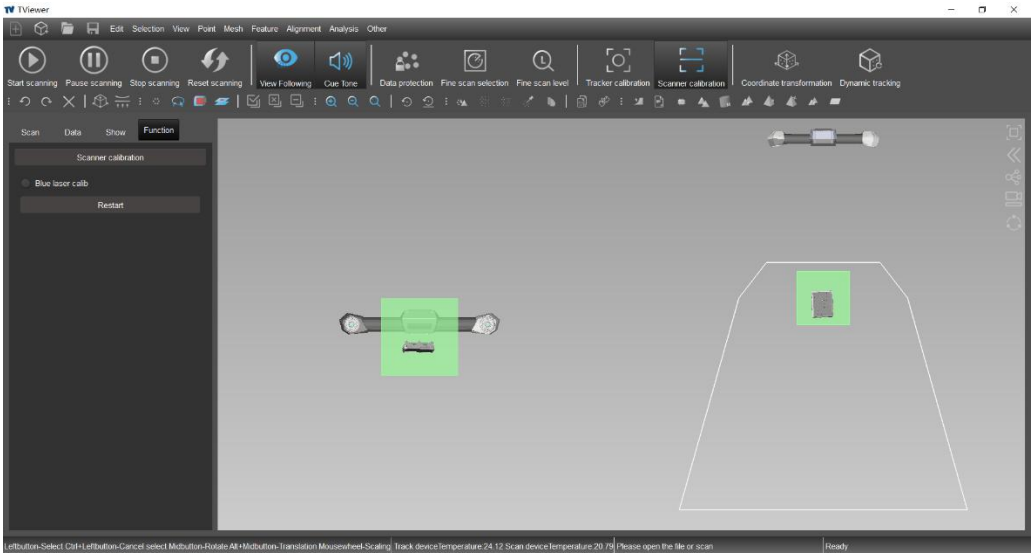
4- 6 Tracker calibration

（5）The display shows the calibration accuracy when the calibration is complete, as shown in Figure 4-7.



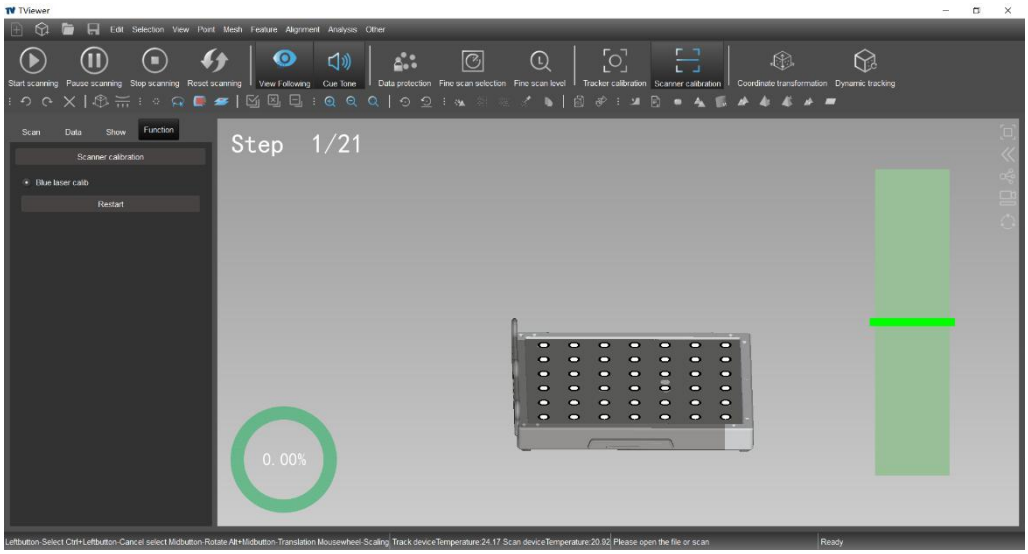
4- 7 Tracker calibration

（6）Open the Fast Calibration Board, put the board in the direction of the arrow, place the board steadily in the tracking range and move it to the software specified position until the block turns green (Figure 4-8).



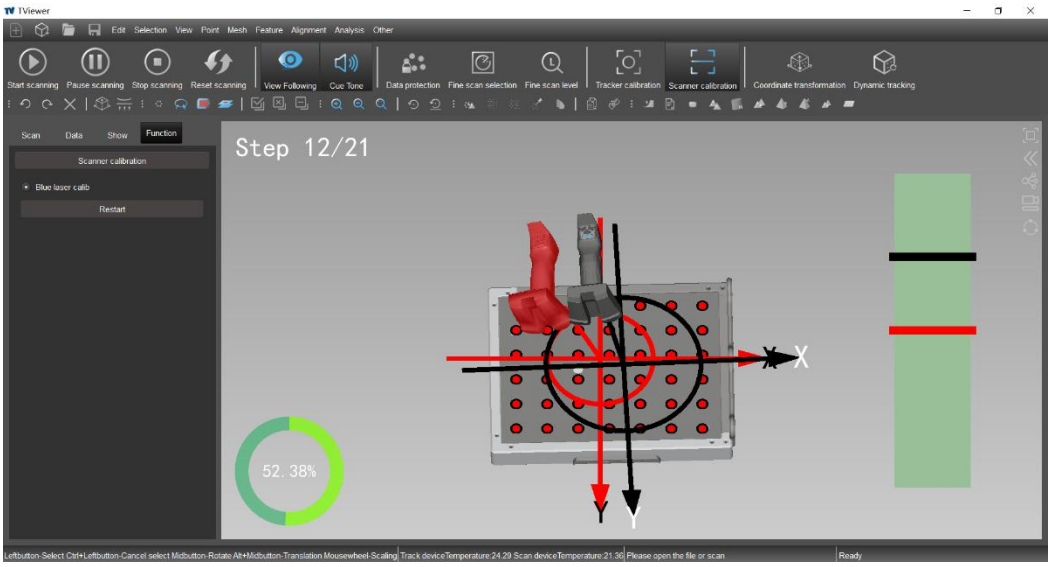
4- 8 Scanner calibration

（7）Click on Red Calibration or Blue Calibration in the interface to enter the scanner calibration interface, the red calibration interface is shown in Picture 4-9 and has 28 steps. When calibrating please note the video prompts for the scanner angle.



4- 9 Scanner calibration

（8）When calibrating, place the scanner according to the position in the software, align the grey scanner with the orange one (as in picture 4-10) until the orange colour turns green, indicating that the step is passed, and after 22 steps, the blue light calibration is finish.

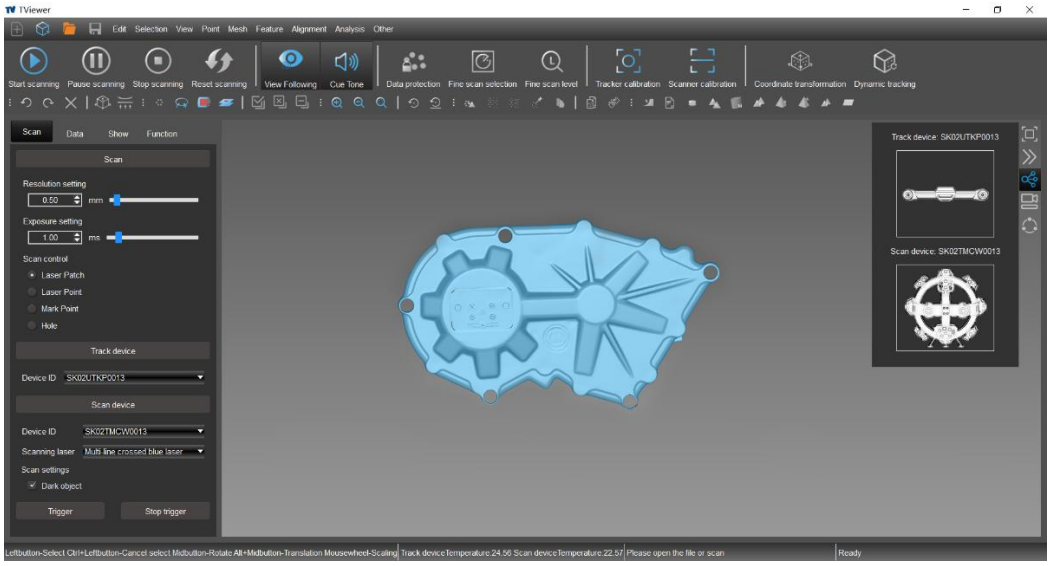


4- 10 Scanner calibration

4.2 Scanning laser patch (points)

Befre scanning the laser patch (point), set parameters such as, resolution, exposure, scanning control etc.

When scanning, watch the angle of the scanner (in the tracking range) and the distance between the scanner and the part, move the scanner steady and use the laser to collect the complete data. When the data processing is complete, the scan is finished.



4-11 Scanning laser patch data

5 Cautions

(1) Do not disconnect the power supply of the equipment during use;

(2) he device must be connected with the USB3.0 port;

(3) The device must be directly connected to the port on the pc and don't insert into a USB hub;

(4) If the computer is installed with protection software (Norton, Computer Manager, Windows Defender, etc.), will cause some unexpect stuttering;

(5) Do not unplug the dongle during using of the software.

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