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Shenzhen, Guangdong, China, to request written permission to use Materials on this manual for purposes or for all other questions relating to this manual.

To avoid personal injury, property damage, or accidental damage to the product, please read all the information in this chapter before using the product. This equipment is for professional technicians or maintenance personnel to use.

### **Precautions**

- Before installation and commissioning, please read this manual carefully, check the equipment list, and if you have any questions, contact the dealer or Smartsafe immediately.
- The operator must have a basic understanding of four-wheel alignment.
- The operator must have knowledge of the safe use of lifts and the safe maintenance of vehicles.
- After the vehicle maintenance is completed, all loosened bolts and components need to be checked and tightened as required to ensure safety.
- Do not install the WA613F wireless 3D wheel aligner on a vibrating object or a tilted surface. Avoid direct sunlight and moisture.
- Unauthorized disassembly of the equipment is prohibited to prevent component damage, affect inspection, and increase difficulty and cost of maintenance. For damages caused by unauthorized disassembly, the company will not provide any warranty.
- The camera of the WA613F wireless 3D wheel aligner is a key optical component for inspection and needs to be kept clean.

### **Safety Information**



Do not operate the four-wheel alignment system in a flammable and explosive environment.



It is strictly prohibited to place any flammable or spontaneously combustible materials (such as cloths contaminated with machine oil and cloths contaminated with flammable solvents) next to the equipment.



Place the equipment away from fire sources, and also place appropriate fire extinguishers next to the equipment.



**Do not look directly at the laser emission!** Avoid exposing the eyes or skin to direct or scattered radiation.

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# 1. Overview

## 1.1 Product Introduction

The WA613F is a wireless 3D wheel aligner with a brand new industrial design form. It is used to detect the relative positions and angles between vehicle wheels in order to determine the wheel alignment parameters. This guides automobile maintenance technicians in adjusting the wheel alignment parameters to meet the requirements of automobile design, ensuring smooth and safe driving, reducing fuel consumption and tire wear.

The wireless 3D wheel aligner is easy to operate, unaffected by the levelness of the platform, and the tilt of the vehicle body will not affect its accuracy. Dynamic measurement is enabled by pushing the vehicle or rolling the wheels, thus improving the efficiency and accuracy of the measurement.

## 1.2 Features and Characteristics

- Ready to use out of the box, no assembly or wiring required; factory calibration-free.
- Compatible with multiple platforms, can be adapted to large scissor lifts and four-post lifts.
- With the ST13 intelligent link terminal, measurement data is wirelessly transmitted, allowing you to observe the measurement process and results at any time, making it convenient for chassis adjustment.
- Equipped with a large capacity battery, it is not required to connect to power during the measurement process, making it safer.
- Supports two types of four-wheel alignment measurement methods: standard measurement and quick measurement. It can measure key parameters such as toe-in, camber, caster, kingpin inclination, and thrust angle. It also supports additional measurements such as wheelbase, track width, axle offset, wheel offset, diagonal, and center offset.
- Covers four-wheel alignment data for over 50,000 global vehicle models, and supports user customization.
- Generates professional inspection reports, supports comparison of data before and after tuning, and supports report sharing.

### 1.3 Measurement Range

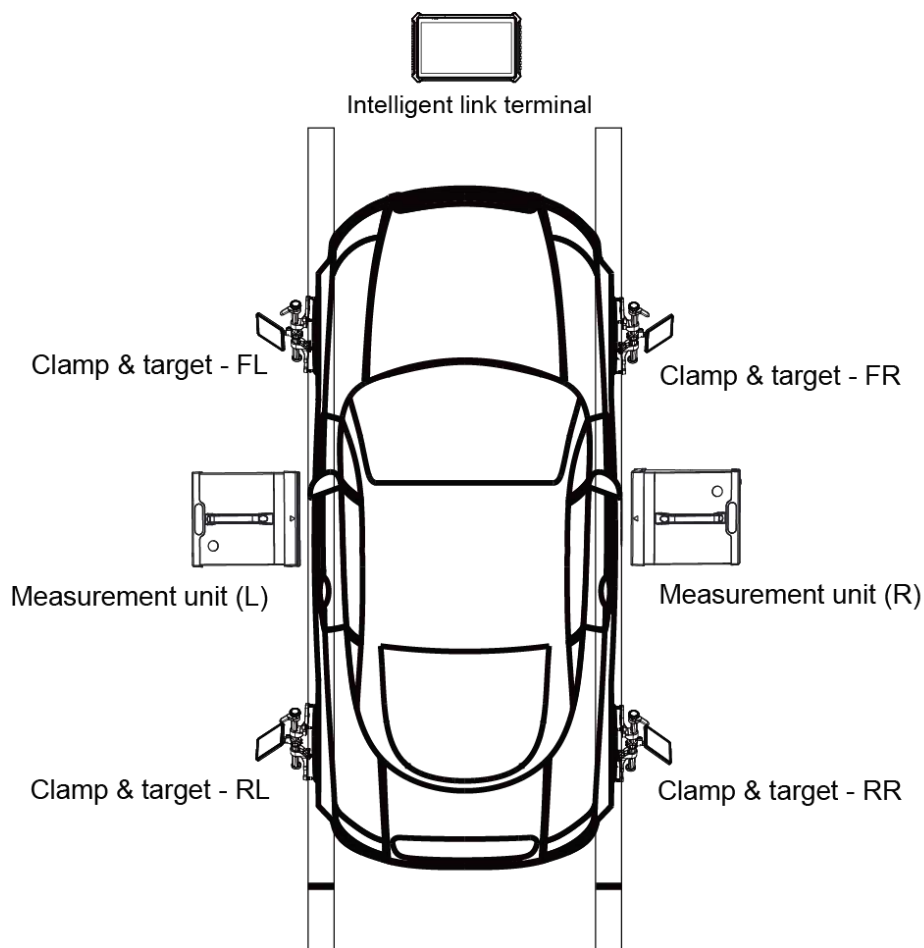
Vehicle specifications supported	
Wheelbase	1940 mm ~ 4600 mm
Track width	1290 mm ~ 1900 mm
Rim diameter (using three-point rim clamp)	275 mm ~ 640 mm
Tire diameter (using four-point tire clamp)	470 mm ~ 1100 mm

### 1.4 Operating Environment Requirements

Environmental parameters	Requirements
Operating temperature	0°C ~ 45°C
Operating humidity	20% ~ 90%
Storage temperature	-20°C ~ 70°C
Storage humidity	10% ~ 90%
Operating atmospheric pressure	86 kpa ~ 106 kpa
ESD protection	Air discharge 8 kV, contact discharge 4 kV
Light requirements	It is recommended for indoor use, and avoid using in strong sunlight environments.
Lift way height difference	front and rear difference < 2 mm

## 1.5 Instructions for Use

The coordinated operation diagram of the WA613F wireless 3D wheel aligner is shown in the figure below. The whole system is mainly composed of the data acquisition section and the ST13 intelligent link terminal. The components of the data acquisition section consist of 2 measurement units and 4 targets.



## 2. Instrument Structure

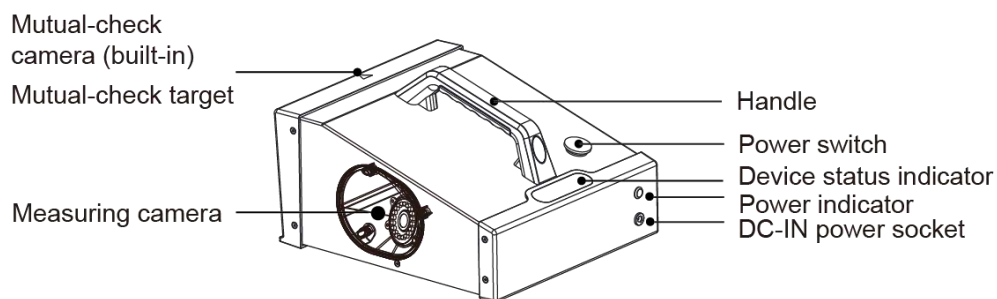
### 2.1 Overall Structure

The WA613F wireless 3D wheel aligner mainly consists of measurement units (right/left), clamps & targets (FR/FL/RR/RL), ST13 an intelligent link terminal, turntables, a steering wheel fixture, and a brake pedal fixture, all paired with a standard four-post lift.

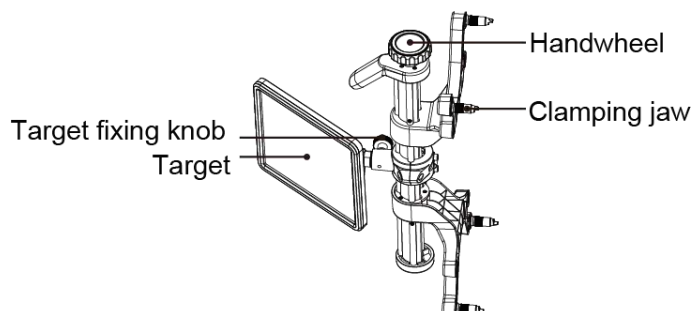
Note: Products with different configurations have different components and accessories. Please consult the dealer or refer to the product packing list for specifics.

### 2.2 Measurement Unit Assembly

The WA613F wireless 3D wheel aligner has 2 measurement unit assemblies (right/left).



### 2.3 Clamp and Target



Note: The handwheel is used to adjust the height of the clamping jaw.



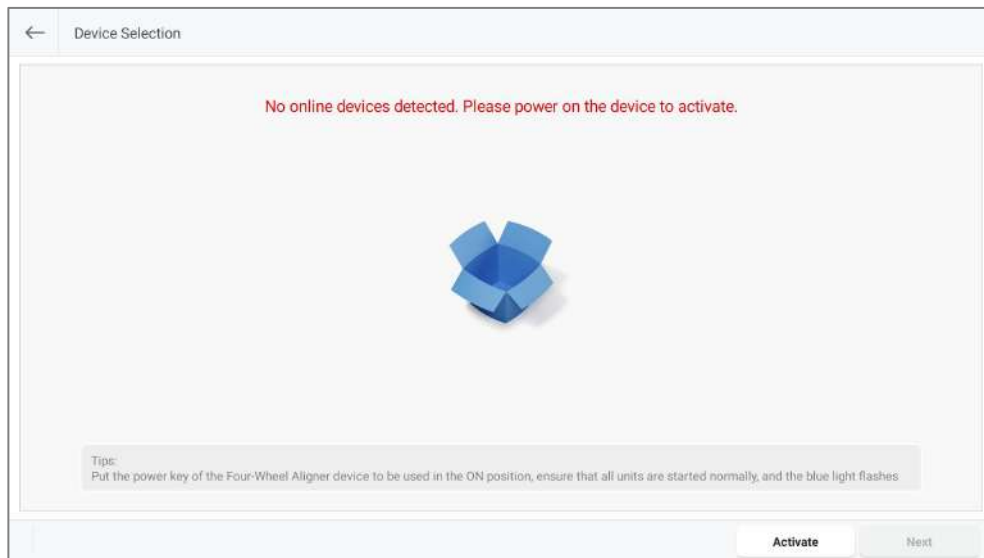
## 3. Four-wheel Alignment Operation Steps

### 3.1 Device Activation

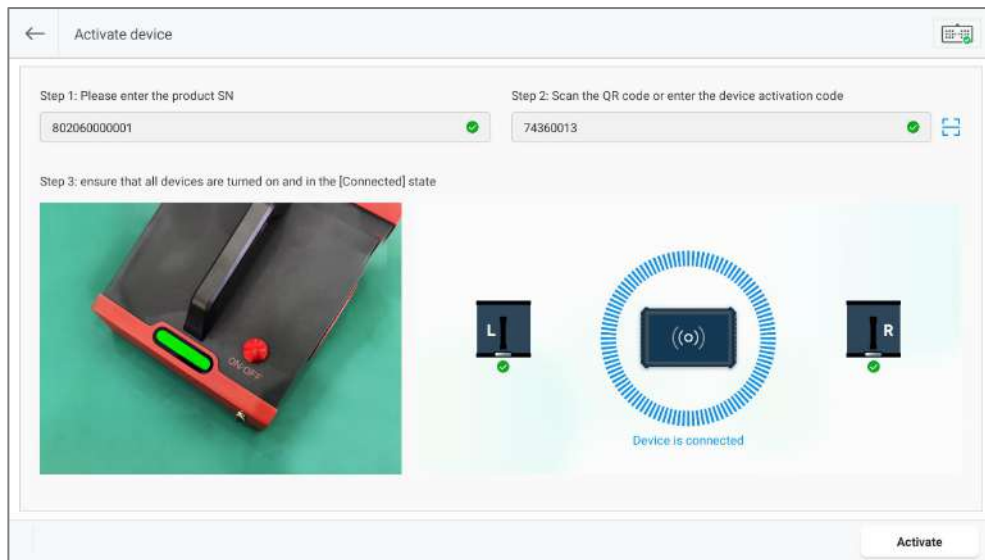
When using WA613F for the first time, it is necessary to activate WA613F on the inspection tablet (ST13 intelligent link terminal).


Note: Before activating the device, ensure that the WA613F is in a normal startup state, and that the tablet (ST13 intelligent link terminal) is in a connection attempt state (i.e., the measurement unit is in a flashing blue light state).

- 1) Enter the main interface of the four-wheel alignment measurement program by clicking on the [Four-Wheel Alignment] application on the tablet.
- 2) Click the [Four-Wheel Alignment] icon on the main interface to enter the device activation interface, select the device, and click [Activate].

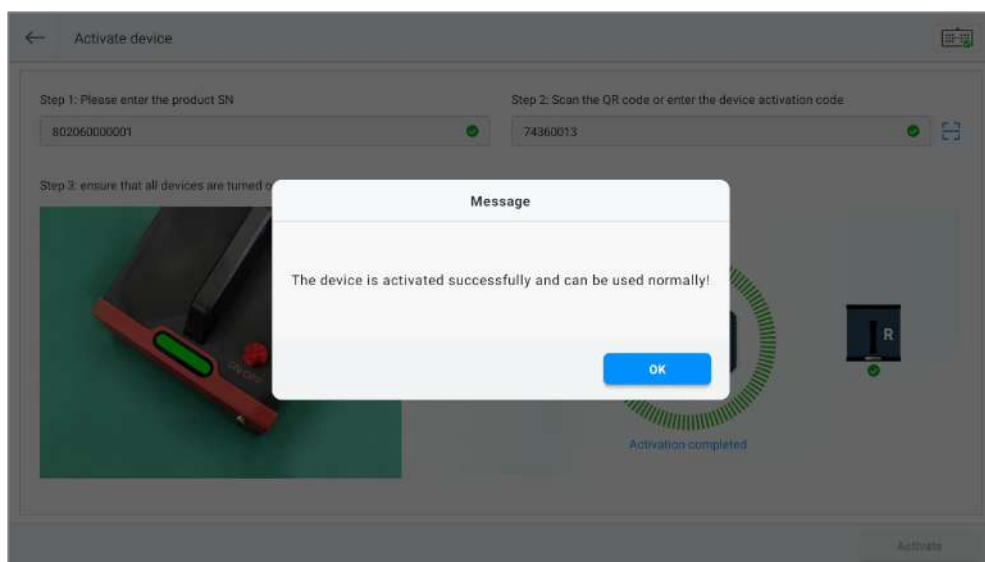


3) Enter the serial number and activation code for WA613F, then click [Activate].



Note: you can click  to scan the device activation code (QR code).

4) Activation is successful.



## 3.2 Routine Inspection

Enter the main interface of the four-wheel alignment measurement program by clicking on the [Four-Wheel Alignment] application on the tablet. The main interface displays 6 functions: four-wheel alignment, quick inspection, inspection records, database, device management, and system settings.

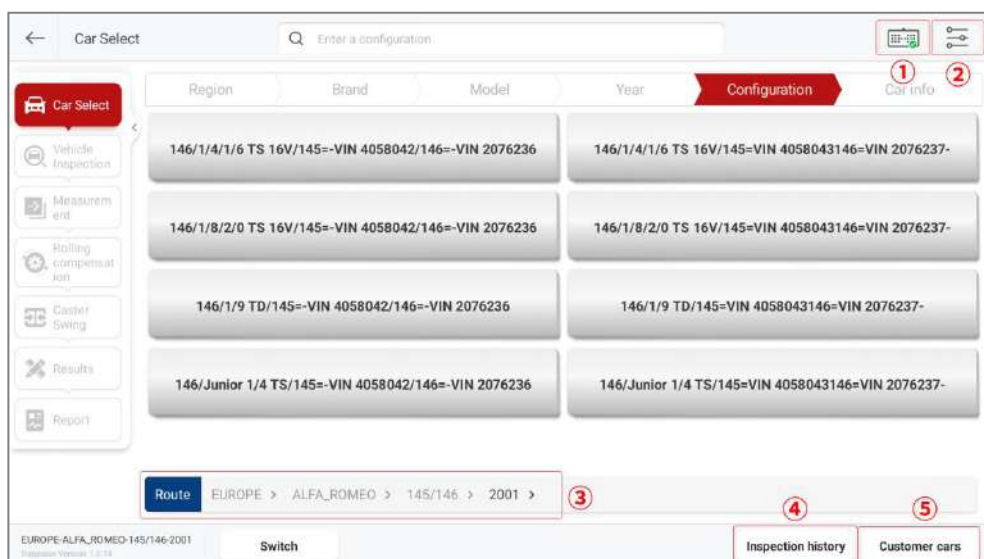


### 3.2.1 Car Selection

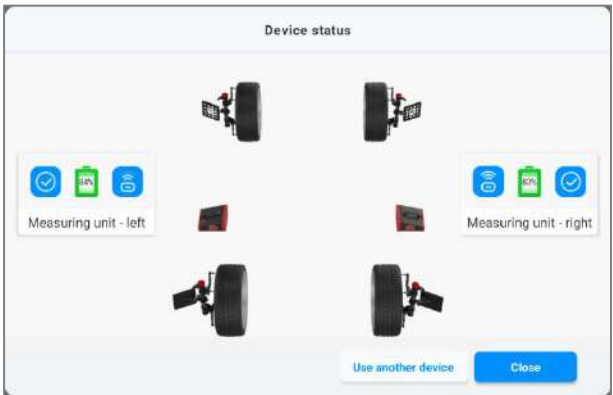
Click the [Four-wheel Alignment] icon on the main interface to enter the routine four-wheel alignment inspection interface, and first select the car.

According to the information of the car to be detected, select the [Region] -> [Brand] -> [Model] -> [Year] -> [Configuration] in order, and then enter the [Car info] interface.

Note: You can enter relevant information in the search box at the top of the screen for quick search.



**Screen button instructions are as follows:**

<p>① <b>Device status</b> (📶)</p>	<p>Clicking this button allows you to quickly view device status, battery level, network connection signal, and other information (when all devices are online, the icon is displayed in green ; when there is a low battery level, the icon is displayed in red 📶; when there is an device status abnormality or malfunction, the icon is displayed in orange 📶; when some devices are online or in the process of connecting, the icon is displayed in blue 📶).</p> 
<p>② <b>Parameter settings</b> (⚙️)</p>	<p>Clicking this button allows you to quickly enter the "Parameter Settings" interface.</p>
<p>③ <b>Path</b></p>	<p>Reflects the selected car's region, brand, model, year, and configuration information.</p>
<p>④ <b>Inspection history</b></p>	<p>Used to directly select previously detected cars based on historical inspection records.</p>
<p>⑤ <b>Customer cars</b></p>	<p>To view the saved customer cars information for directly selecting the cars.</p>

In the “cars” interface, you can view the standard data of the vehicle, and you can also modify the configuration and add custom data as needed.

The screenshot shows the 'Car Select' interface with a sidebar on the left containing icons for Car Select, Vehicle Inspection, Measurement, Rolling compensation, Caster Swing, Results, and Report. The main area displays a table of vehicle parameters for Front and Rear axles. The table has columns for Parameter, Min, Standard, and Max. The parameters listed are Front Total Toe, FL Toe, FR Toe, FL Camber, FR Camber, Left Caster, and Right Caster. At the bottom, there are buttons for Modify configuration, Unit settings, Reselect, and Confirm car.

Front axle		Rear axle	
Parameter	Min	Standard	Max
Front Total Toe	-00.34°	-00.17°	00.00°
FL Toe	-00.17°	-00.09°	00.00°
FR Toe	-00.17°	-00.09°	00.00°
FL Camber	-01.50°	-01.17°	-00.84°
FR Camber	-01.50°	-01.17°	-00.84°
Left Caster	02.17°	02.67°	03.17°
Right Caster	02.17°	02.67°	03.17°

At the bottom of the interface, there is a text field containing 'EUROPE-ALFA ROMEO-145/146/2001-146/1/4/1/6 TS 16V/145+ VIN 4058042/146+ VIN 2D...' and buttons for 'Modify configuration', 'Unit settings', 'Reselect', and 'Confirm car'.

Screen button instructions are as follows:

This function is used to customize the configuration information. Click [Modify configuration] to enter the following interface:

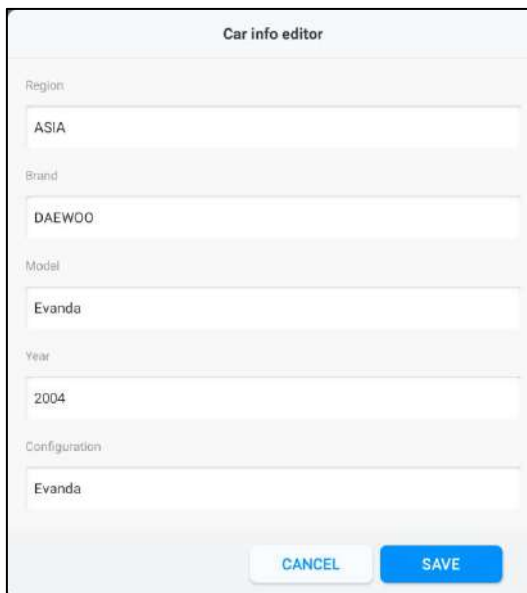
**[Modify Configuration]**

This screenshot is identical to the one above, but the 'Modify configuration' button at the bottom is highlighted with a blue border. The table of parameters remains the same.

After modifying the parameter value, click [Save]. In the pop-up window, enter the configuration name and click [OK] to save the modified configuration to the custom database.

The 'Save Configuration' pop-up window has a title bar 'Save Configuration'. Below it is a text input field with the placeholder text 'Enter the configuration name'. At the bottom right, there are two buttons: 'CANCEL' and 'OK'.

If you need to modify the model information of custom data, you can click [Car info editor] to modify the corresponding information and then click [Save].

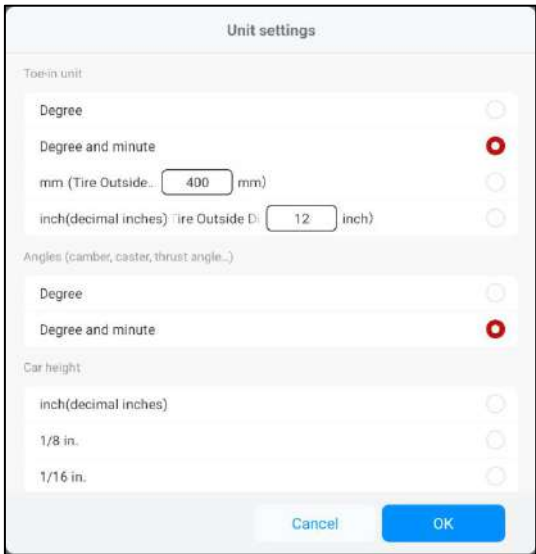


[Cancel]: Cancel editing and return to the car information confirmation interface.

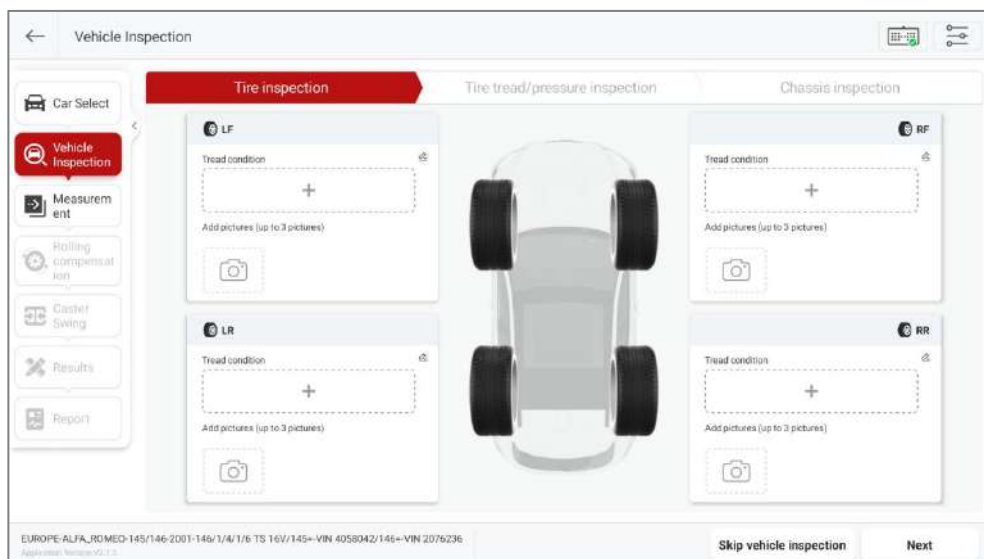
[Confirm Configuration]: Confirm that the configuration has been modified and return to the car information confirmation interface.

### [Unit Settings]

This function is used to modify the units of toe-in, angle, car height, track width, and wheelbase, etc.

	 <p>The 'Unit settings' dialog box allows users to configure measurement units. It includes sections for 'Toe-in unit', 'Angles (camber, caster, thrust angle...)', and 'Car height'. The 'Degree and minute' options are selected with red dots. Input fields show '400 mm' and '12 inch'.</p>
<b>[Reselect]</b>	Select a car again according to [Region] -> [Brand] -> [Model] -> [Year] -> [Configuration].
<b>[Confirm car]</b>	Confirm car information and enter the Vehicle Inspection interface.

### 3.2.2 Vehicle Inspection



Complete relevant vehicle inspections such as the vehicle tire inspection, tread and tire pressure inspection, and car height measurement, then click [Next] to enter the

measurement preparation interface. You can click [Skip Vehicle Inspection] and enter the measurement preparation interface without the need for a vehicle inspection.

### 3.2.2.1 Tire Inspection

After checking the tread condition, click the [+] button, select the tread condition options for each tire in the pop-up window, and you can attach the corresponding reference photos (up to 3). After completing the tire inspection, click [Next] to enter the “Tread and Tire Pressure Inspection” interface.

The screenshot shows a pop-up window for tire inspection. At the top, there are four tabs: LF (selected), RF, LR, and RR. The LF tab is active, showing a list of tire conditions on the left and a list of specific wear types on the right. Each item has a checkbox next to it. The 'Tire normal' checkbox is checked. At the bottom right, there are 'Cancel' and 'OK' buttons.

LF		RF	LR	RR
Tire normal	<input checked="" type="checkbox"/>			
Inside wear	<input type="checkbox"/>			
Feathered wear	<input type="checkbox"/>			
Aging	<input type="checkbox"/>			
Wear limit	<input type="checkbox"/>			
Damage/puncture	<input type="checkbox"/>			
Valve aging	<input type="checkbox"/>			
Unlicensed tires	<input type="checkbox"/>			
Outside wear	<input type="checkbox"/>			
Bilateral wear	<input type="checkbox"/>			
Spotty wear	<input type="checkbox"/>			
Underinflation crushing	<input type="checkbox"/>			
Bulge	<input type="checkbox"/>			
Coaxial tread pattern/brand inconsistent	<input type="checkbox"/>			
Hub damage	<input type="checkbox"/>			



### 3.2.2.2 Tire Tread/Pressure Inspection

After completing the tread and tire pressure inspection, click the corresponding input box on this interface to enter the inspection value. Under the “Tread Depth” option, you can click [+] or [-] to increase or decrease the input box to correspond to the number of grooves for different types of tires (2 to 5).

Here, you can click the [Connect tread detection tool] to connect to the corresponding tread detector (purchased separately) for tread inspection.

After completing the tread and tire pressure inspection, click [Next] to enter the “Car Height Measurement” interface.

The screenshot displays the 'Vehicle Inspection' interface with the 'Tire tread/pressure inspection' tab selected. The interface is divided into four quadrants for wheel inspection: LF (Left Front), LR (Left Rear), RF (Right Front), and RR (Right Rear). Each quadrant contains a 'Tread Depth' input field with a '+' or '-' button, a 'Tire pressure' input field, and 'Tire Diameter' and 'Tire Width' input fields. A central car diagram shows the wheel positions. At the bottom, there is a 'Connect tread detection' button and a 'Next' button. The footer includes vehicle information: 'EUROPE: ALFA ROMEO 145/146/2001-146/1/4/1/6 TS 16V/145+ VIN 4058042/...' and 'Skip vehicle inspection' and 'Unit settings' buttons.

### 3.2.2.3 Chassis Inspection

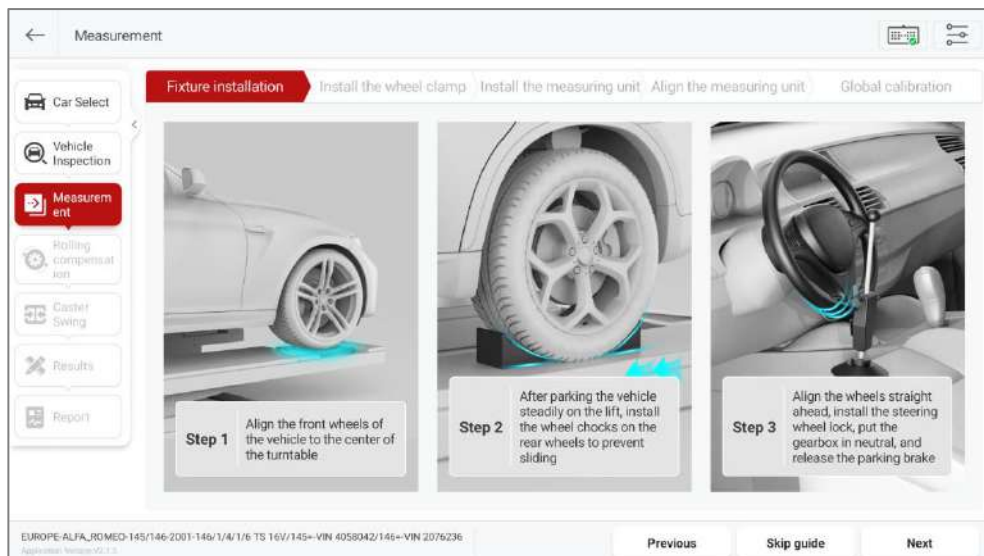
Follow the on-screen prompts to check the chassis of the vehicle and add relevant photos (up to 5) and notes, and click the corresponding options to mark the status of each component (normal/warning/repair). After completing the chassis inspection, click [Next] to enter the Measurement interface.

The screenshot displays the 'Vehicle Inspection' screen with the 'Chassis inspection' tab selected. The interface includes a left sidebar with navigation options: Car Select, Vehicle Inspection (highlighted), Measurement, Rolling compensation, Caster Swing, Results, and Report. The main content area is divided into three sections: 'Component introduction' (describing the wheel bearing's function and recommended life), 'Related symptom' (listing unstable steering and noise), and 'Overhauling method' (providing a four-step procedure for inspection and replacement). On the right, a 'Default (show all)' dropdown is followed by a list of components: Drivetrain, Engine and transmission accessories, Front suspension, Rear suspension, Front brake, Master cylinder and booster, and Rear brake. Each component has a status indicator (Normal, Warning, or Repair) and a count of items marked. At the bottom, a VIN field is populated with 'EUROPE-ALFA\_ROMEO-145/146-2001-146/1/4/1/6 TS 16V/145--VIN 4058042/146--VIN 2076236', and a 'Next' button is visible.

### 3.2.3 Measurement Preparation

Install the fixture and device according to the screen instructions, and then perform measurement scanning.

#### 3.2.3.1 Fixture Installation



Click [Fixture Installation] and install the relevant fixtures according to the on-screen instructions.

- 1) Align the front wheels of the vehicle to the center of the turntable.
- 2) After parking the vehicle steadily on the lift, install the wheel chocks on the rear wheels to prevent sliding.
- 3) Align the wheels straight ahead, install the steering wheel lock, put the gearbox in neutral, and release the parking brake.

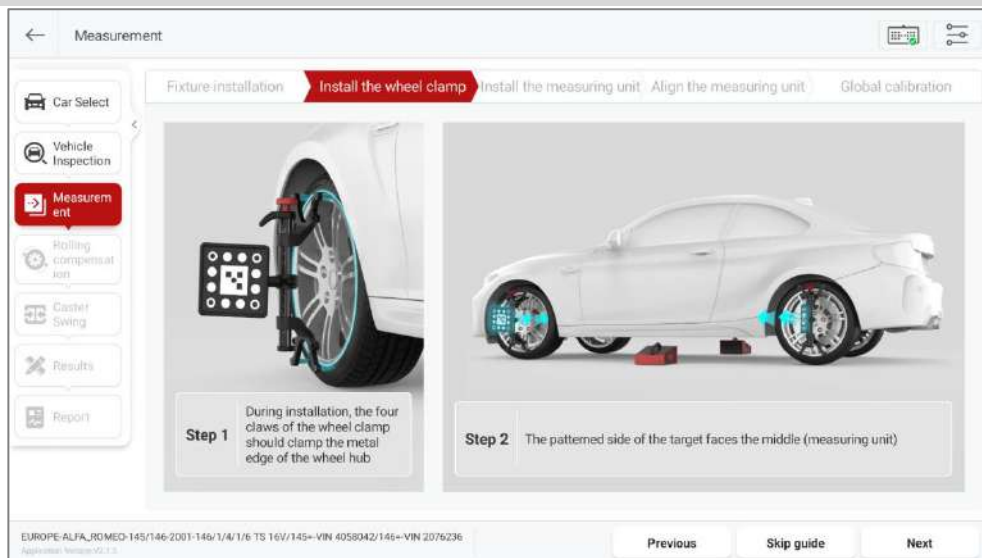
#### 3.2.3.2 Device Installation

After the fixture installation is complete, click [Next] to enter the device installation guide interface and install the relevant device according to the on-screen instructions.

##### 1) Clamp installation

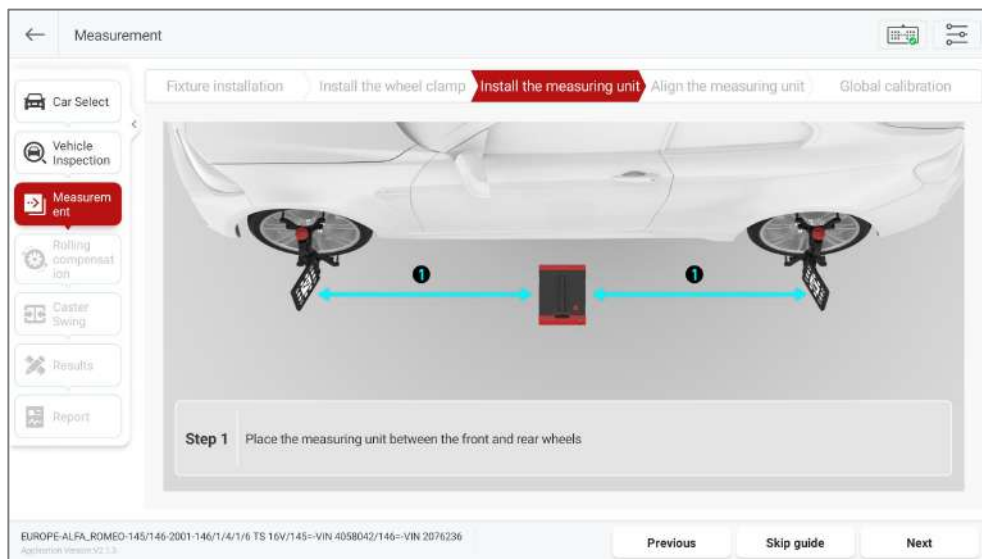
Please align the clamps with the center of the tires, according to the diagram, clamp the 4 clamping jaws of the clamp onto the metal edge of the wheel rim, and orient the patterned side of the target towards the center (measurement unit).

Note: The clamps must be vertical to the ground, with an allowable error range of  $-15^{\circ}$  to  $15^{\circ}$ .



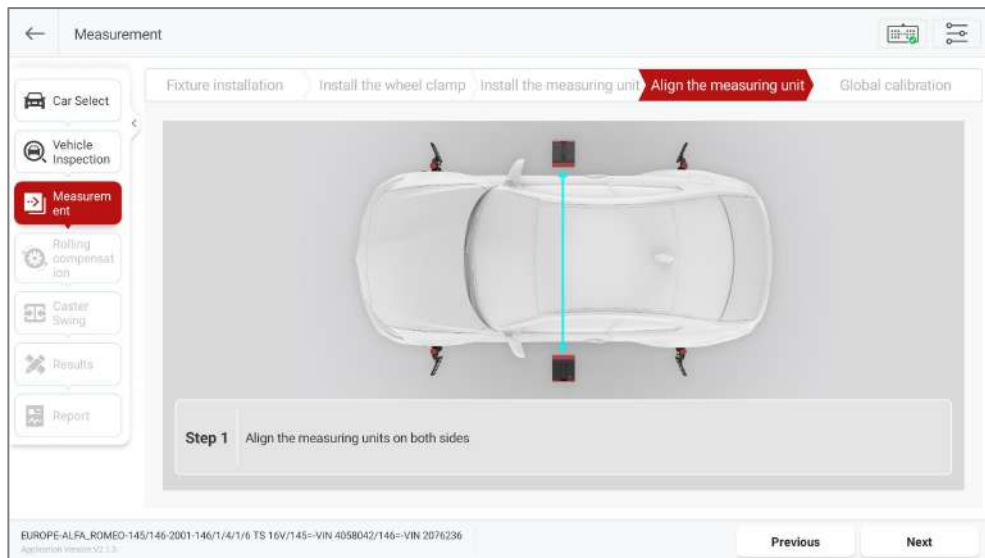
## 2) Measurement unit installation

Place the measuring unit between the front and rear wheels.



### 3) Measurement unit alignment.

To ensure that the two measurement units are aligned with each other, visually check that one unit is on the same longitudinal axis as the opposite one.

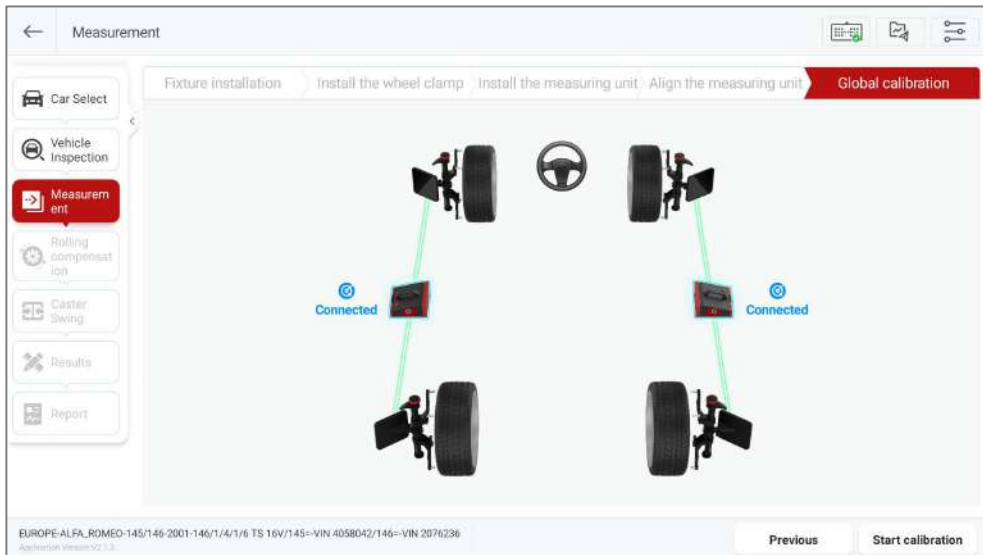


After the clamps and measurement units are all installed, the indicator lights on the measurement units flash blue quickly, indicating that the measurement units are searching for the ST13 intelligent link terminal. The indicator lights then flash blue slowly, which indicates the device is networking internally. When both measurement units are successfully connected to the tablet, the indicator lights will be steady on green.

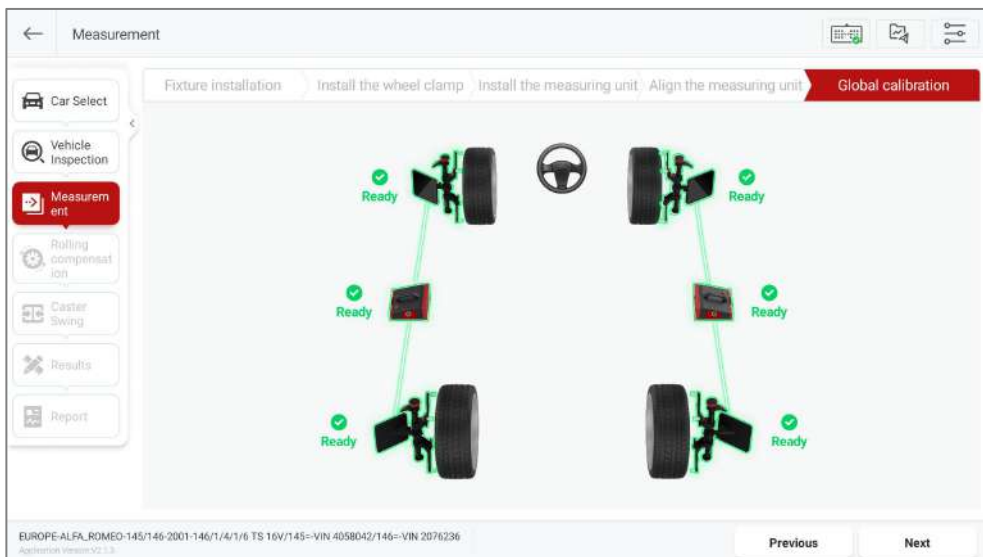
### 3.2.3.3 Global Calibration

After the device is installed, click [Next] to enter the global calibration interface.

After confirming that both measurement unit icons show “Connected”, click [Start Calibration].



After calibration is complete, the measurement unit and target icons display “Ready”.

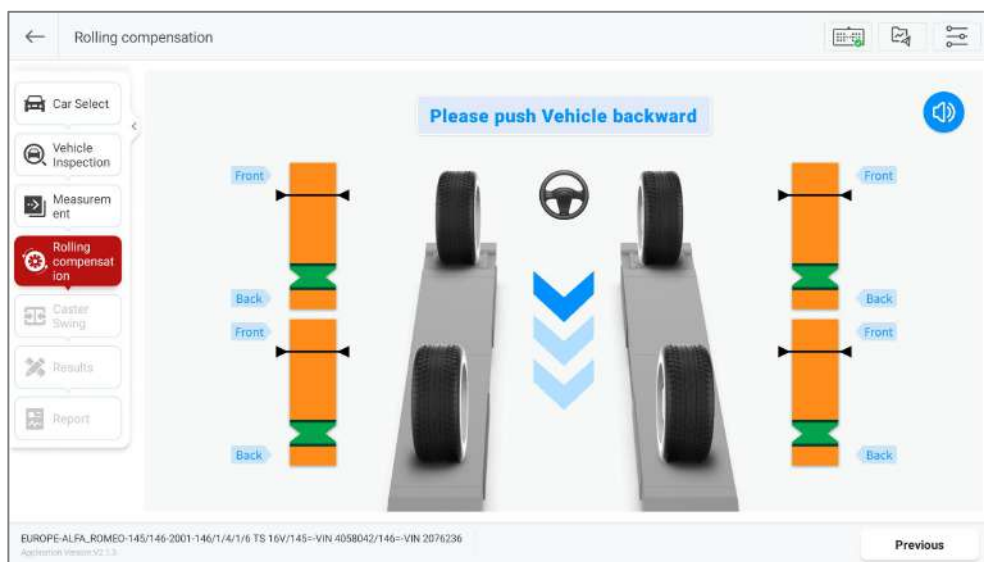


After the device installation is complete, click [Next] to enter the “Rolling Compensation” interface, and push the vehicle according to the prompts on the interface and complete the rolling compensation.

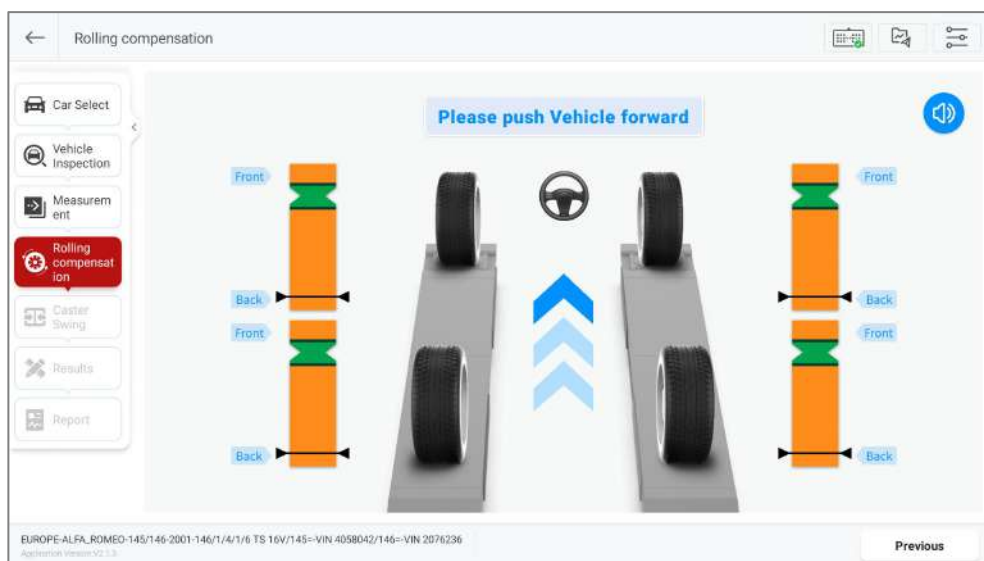
### 3.2.4 Rolling Compensation

The rolling compensation operation is as follows:

- 1) According to the interface prompt, first slowly push the vehicle backward until all the pointers stay in the green zone, as shown in the figure below.



- 2) When the interface prompts “Please push vehicle forward”, slowly push the car forward until all pointers stay again in the green zone.



When the interface prompts “Rolling compensation completed”, the rolling compensation is complete and it automatically enters the “Caster Swing” interface.



### 3.2.5 Caster Swing

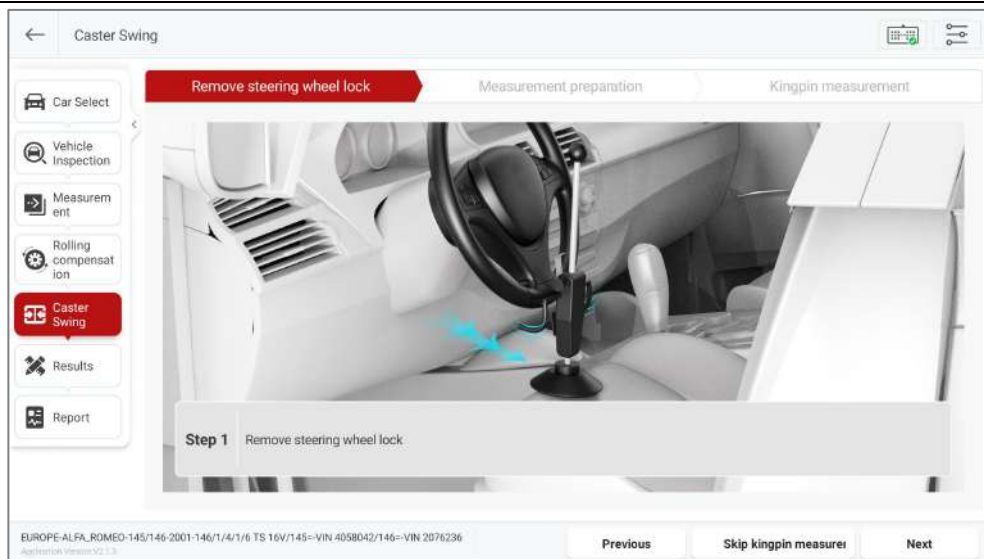
Caster Swing is specific to front wheels, including kingpin inclination and caster. The kingpin inclination angle can distribute the vehicle weight evenly on the bearings, protecting them from damage and making the steering force uniform and steering light. The presence of a caster angle can make the intersection point of the steering axis and the road surface in front of the tire touchdown point, which can use the resistance of the road surface to keep the car moving straight.

#### 3.2.5.1 Preparations

Prepare the following according to the on-screen prompts:

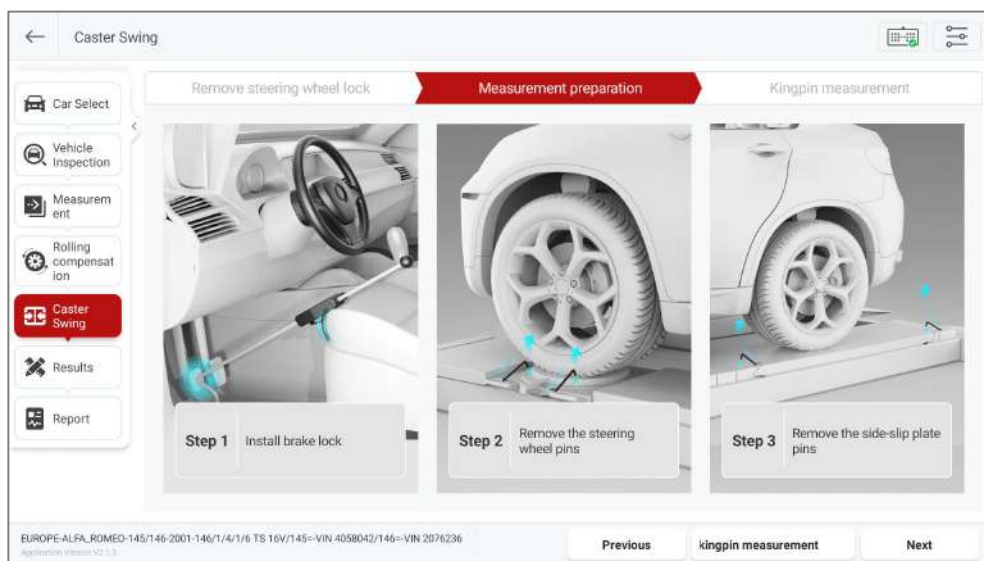
- (1) Remove the steering wheel lock.





## (2) Measurement preparation

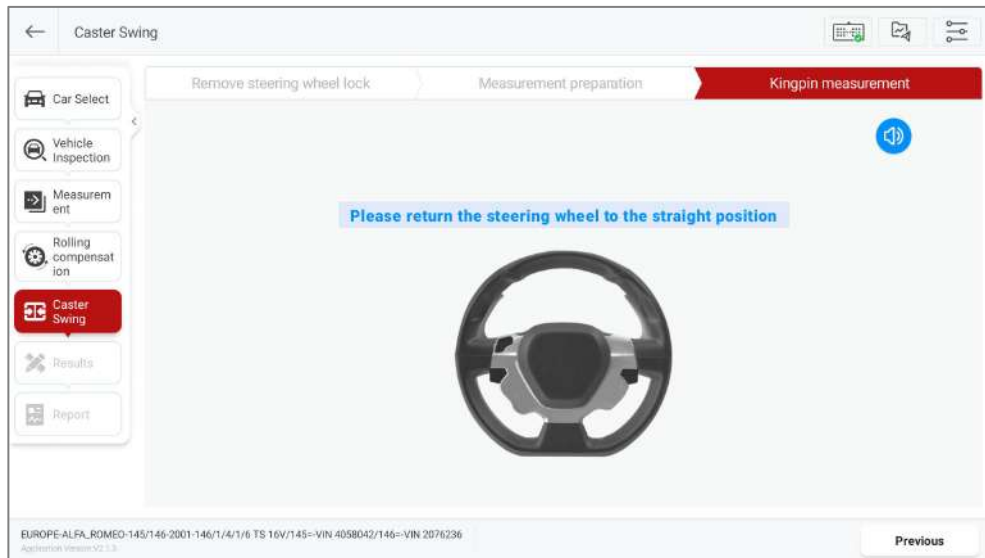
- 1) Install the brake lock.
- 2) Remove the turntable pin.
- 3) Remove the side slip plate pin.



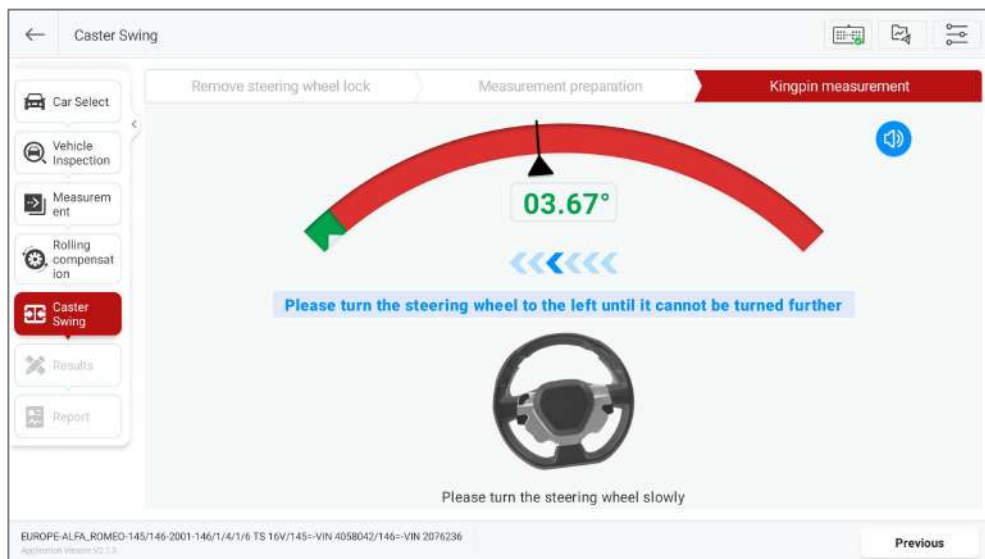
After the preparation is completed, click [Next] to enter the “Kingpin Measurement” interface.

### 3.2.5.2 Kingpin Measurement

- 1) Adjust the steering wheel to the straight-ahead position, that is, the two front wheels have equal toe-in.

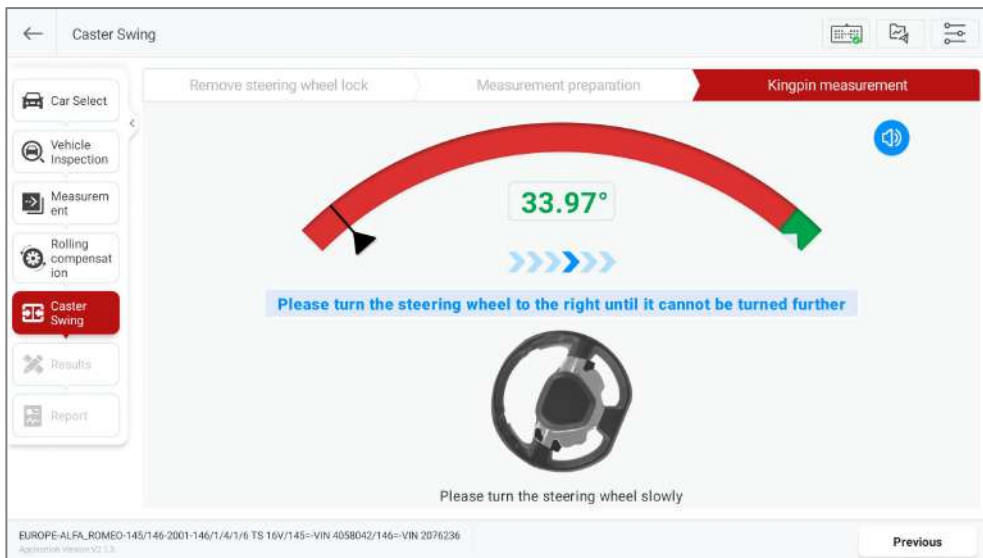


- 2) According to the system prompt, turn the steering wheel left or right (slowly and steadily turn the steering wheel), and when the wheel angle reaches or exceeds the set angle ( $12^\circ$ ), the system prompts to turn the steering wheel in the opposite direction.

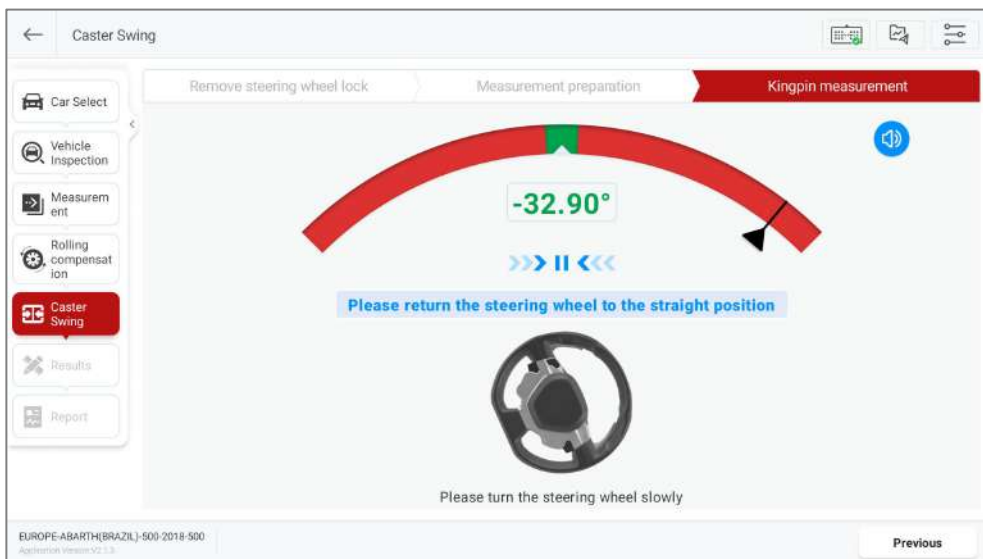


- 3) According to the interface prompt, slowly and steadily turn the steering wheel.

When the wheel angle reaches or exceeds the set angle ( $12^{\circ}$ ), the system prompts to straighten the steering wheel.



- 4) According to the system prompt, return the steering wheel to its initial position.



After the kingpin measurement is completed, switch to the “Results” interface.

Note: If you need to adjust the chassis, and the lift has shaking or is lifting, please click the [G] button to perform “Global Calibration” to ensure that the height of the two bridges of the lift is consistent.

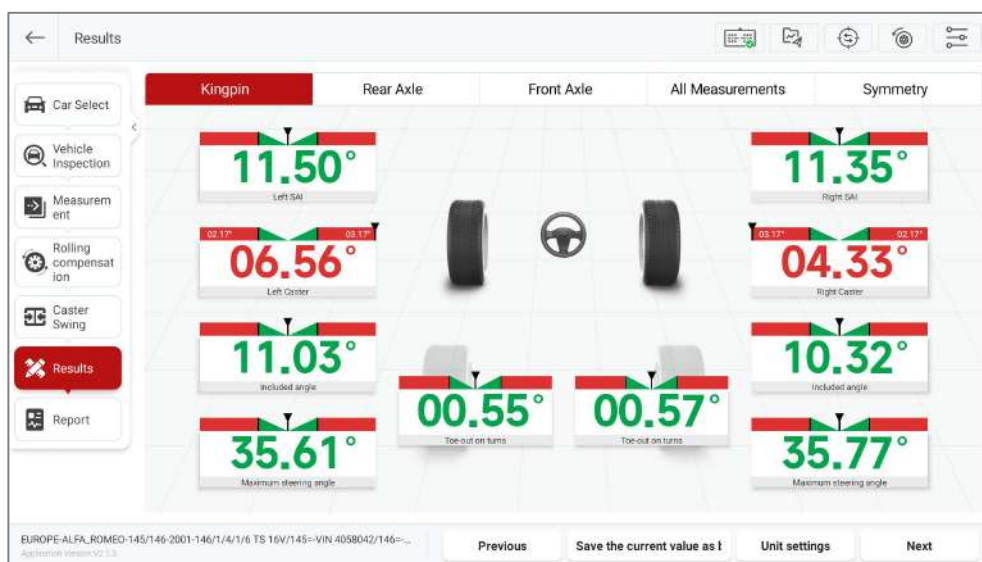
### 3.2.6 Measurement Results

This function is used to view and save measurement results. The displayed by default are the “Kingpin” measurement results. To view the separate measurement results for “Rear Axle”, “Front Axle”, “All Measurements” and “Symmetry”, and other items, simply click the corresponding buttons at the top of the screen.

Click [Unit Settings] to modify the display unit of the measurement item.

Before maintenance, please click [Save the current value as before repair]. The measurement results will be updated in real-time after the maintenance is completed.

Click [Next] to save the current measurement results and enter the “Report” interface.



### 3.2.7 Inspection Report

This function is used to view, save, and share the inspection reports. On the right side of the screen, you can click to view the inspection reports for four-wheel alignment, before and after repair, before repair, current value, symmetry, tire inspection, chassis inspection, and other inspection reports to view them separately.

**SmartSafe**

Report shop: 101 Telephone: 25 Email: 8 Address: 1

Work order number: 070400702986 Inspection time: 2020-12-15 22:02 Inspector: gt

### Four-Wheel Alignment Report

Customer: VIN: Car description: EUROPE-ABARTH(BRAZIL)-500-2018-500 License plate number: Kilometers: Color: Company: Landline number: Mobile number: Email: Address:

Four-Wheel Alignment				
	Front left	Front right	Rear left	Rear right
Tread depth	0.0PSI	0.0PSI	0.0PSI	0.0PSI
Tire pressure	0.0PSI	0.0PSI	0.0PSI	0.0PSI
Tire Width	0mm	0mm	0mm	0mm
Rolling diameter	0mm	0mm	0mm	0mm
Car height	0mm	0mm	0mm	0mm

	Before repair	Min value	Standard value	Max value	After repair
Left	00.83°	-00.12°	00.00°	00.12°	00.83°
Right	00.83°	-00.12°	00.00°	00.12°	00.83°

EUROPE-ABARTH(BRAZIL)-500-2018-500 Application Version: V2.1.3

Edit customer information Share report Print report Save the report Close

Screen button instructions are as follows:

[Edit customer information]

Modify or add customer information.

### Customer Information

Clear

**Car info**

License plate number

VIN

Manufacturer

ALFA\_ROMEO

Model

145/146

Year

2001

Kilometers

Color

**Personal information**

Name

Landline number

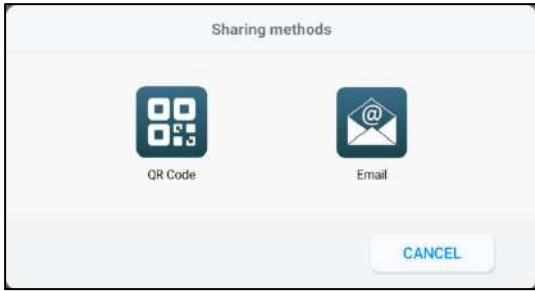
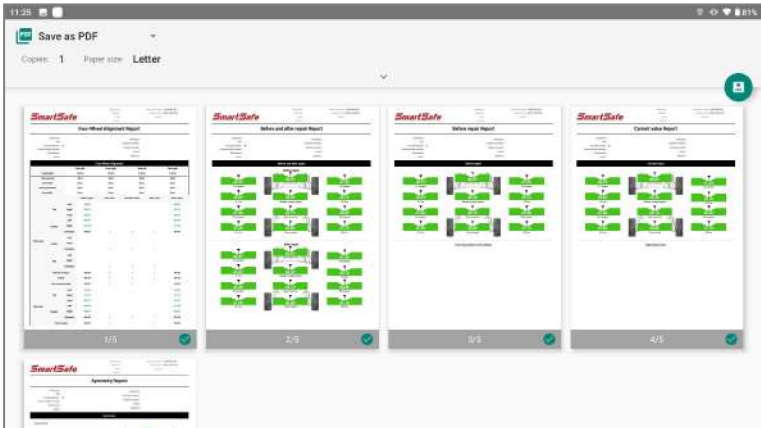
Mobile number

Email

Company

Address

CANCEL SAVE

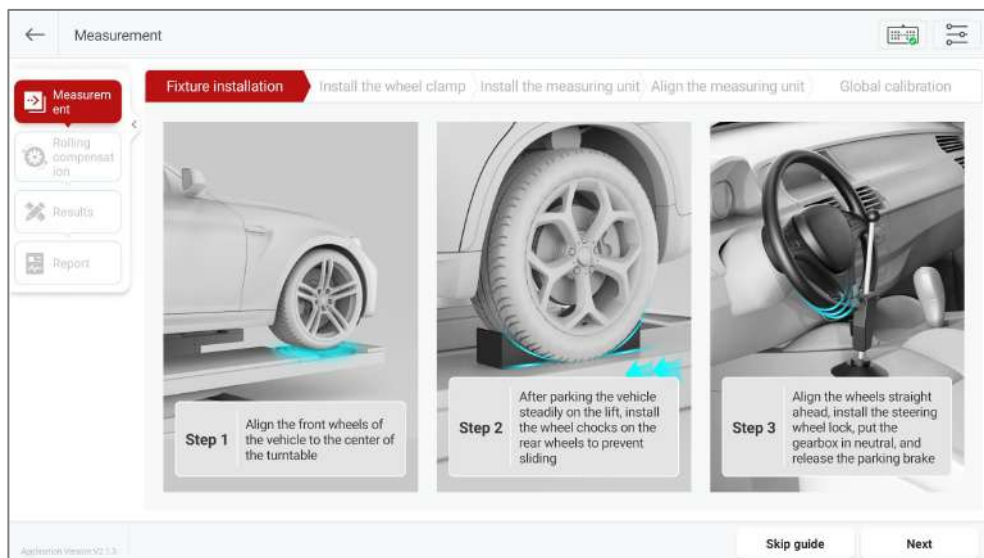
[Share Report]	<p>The inspection report can be shared via QR code or email.</p> 
[Print Report]	<p>You can print the current inspection report or select “Save as PDF” in the upper left corner of the pop-up to save the report as a PDF document.</p> 
[Complete the test and save the report]	<p>Save the inspection report on the ST13 intelligent link terminal, and you can click [Inspection Records] on the main interface to query and manage all saved inspection reports.</p>

### 3.3 Quick Inspection

Quick inspection does not include vehicle selection and vehicle inspection steps, and does not perform kingpin measurement. If you need to operate all measurement functions, please select [Four-wheel Alignment] for routine inspection.

### 3.3.1 Measurement Preparation

Click [Quick Inspection] on the main interface to enter the following screen:

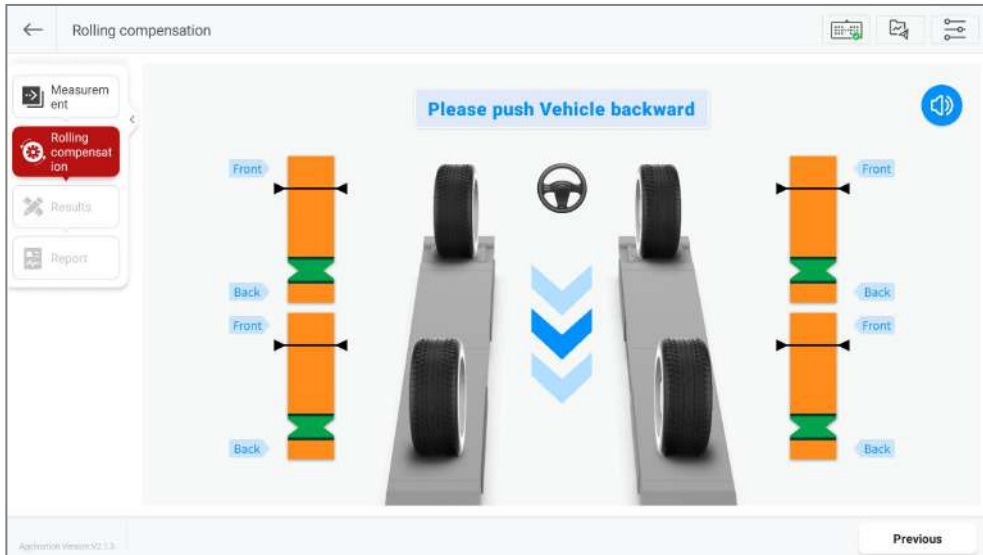


Follow the on-screen instructions to complete the steps such as fixture installation, clamps installation, measurement units installation, measurement unit alignment, and global calibration. After completing the measurement preparation, click [Next] to enter the “Rolling Compensation” interface.

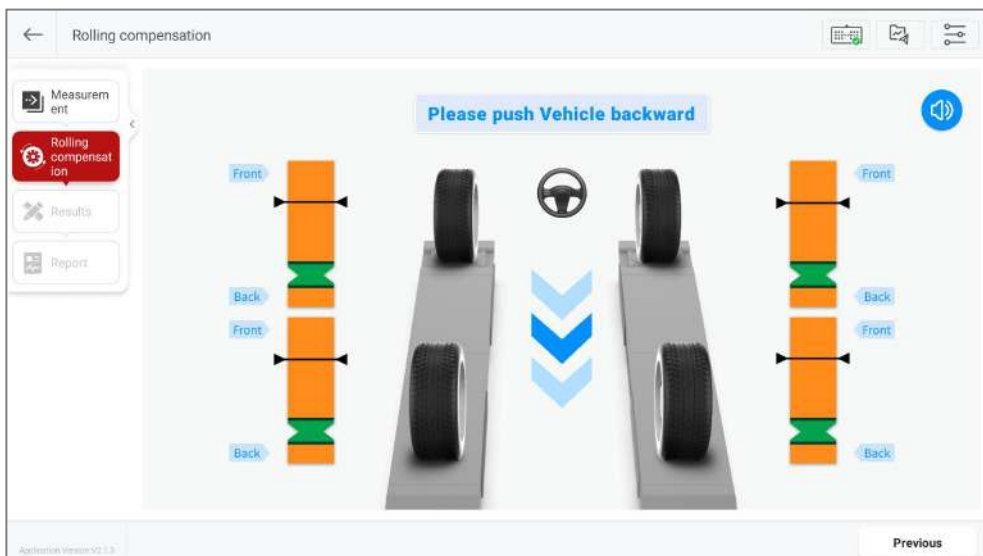
### 3.3.2 Rolling Compensation

The rolling compensation operation is as follows:

- 1) According to the interface prompt, first slowly push the vehicle backward until all the pointers stay in the green zone, as shown in the figure below.



- 2) When the interface prompts "Please push car forward", slowly push the vehicle forward until all pointers stay again in the green zone.

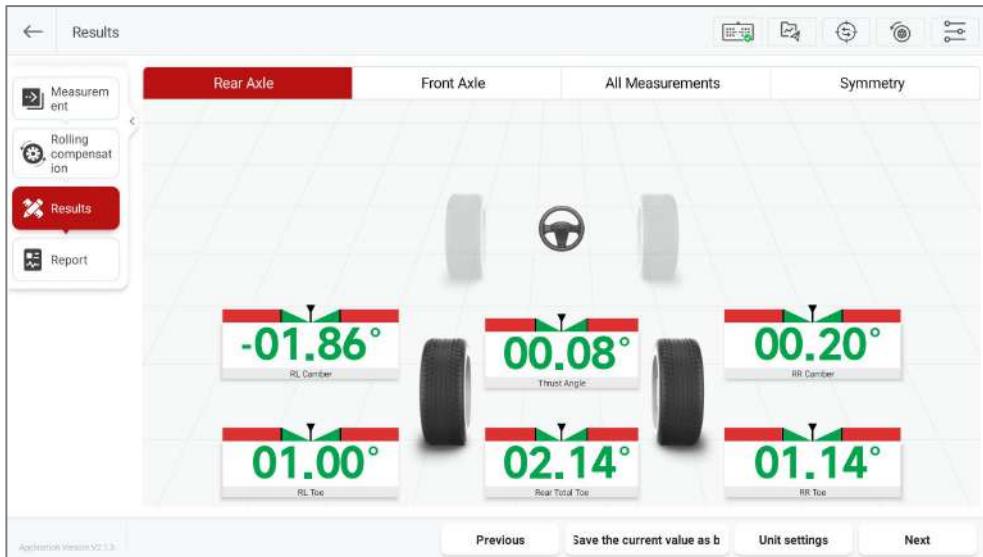


When the interface prompts "Rolling compensation completed", the rolling compensation is complete and it automatically enters the "Results" interface.



### 3.3.3 Measurement Results

This function is used to view and save measurement results. The displayed by default are the “Rear Axle” measurement results. To view the separate measurement results for “Front Axle”, “All Measurements” and “Symmetry”, simply click the corresponding buttons at the top of the screen.



Save the measurement results before maintenance. The measurement results will be updated in real time after the maintenance is completed. Click [Next] to save the current measurement results and enter the “Report” interface.

### 3.3.4 Inspection Report

This function is used to view, save, and share inspection reports. On the right side of the screen, you can click to view inspection reports for four-wheel alignment, before and after repair, before repair, current value, symmetry, etc.

Report

SmartSafe

Repair shop: Work order number: 1755815421182  
Telephone: Inspection time: 2024-12-09 13:29  
Email: Inspector:  
Address:

### Four-Wheel Alignment Report

Customer: VIN: Company:  
Car description: 0 Landline number:  
License plate number: Mobile number:  
Kilometers: Email:  
Color: Address:

Four-Wheel Alignment				
	Front left	Front right	Rear left	Rear right
Tread depth	0.0mm	0.0mm	0.0mm	0.0mm
Tire pressure	0kPa	0kPa	0kPa	0kPa
Tire Width	0mm	0mm	0mm	0mm
Rolling diameter	0mm	0mm	0mm	0mm
Car height	0mm	0mm	0mm	0mm

	Before repair	Min value	Standard value	Max value	After repair
Left	00.83°				00.83°
Right	00.83°				00.83°

Application Version: V2.1.3

Edit customer information Share report Print report and save the report

Screen button instructions are as follows:

<b>[Edit Customer Information]</b>	Modify or add customer information.
<b>[Share Report]</b>	The inspection report can be shared via QR code and email.
<b>[Print Report]</b>	Print the current inspection report or save the report as a PDF document.
<b>[Complete the test and save the report]</b>	Save the inspection report on the inspection tablet, and you can click [Inspection Records] on the main interface to query and manage all saved inspection reports.

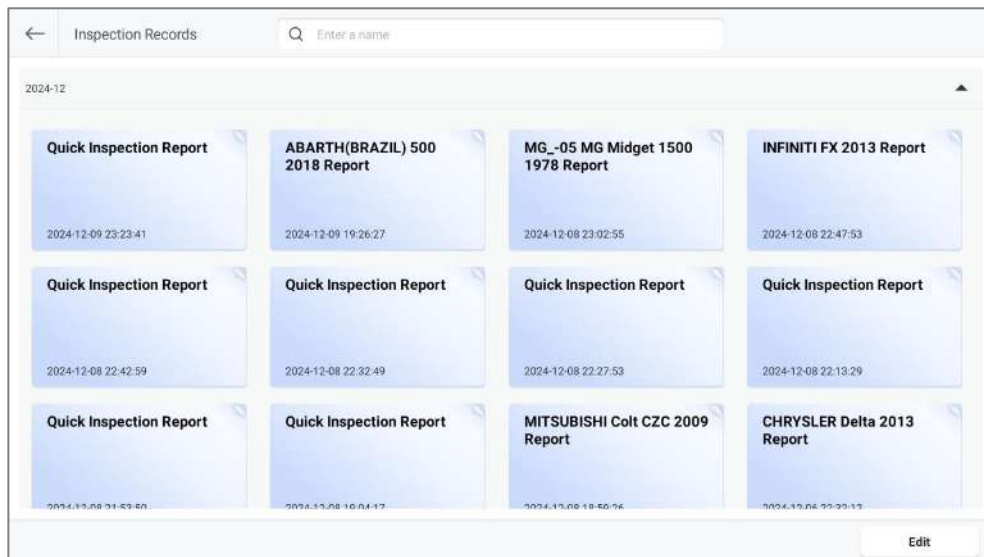
## 3.4 Inspection Records

This function is used to view and manage saved inspection reports.

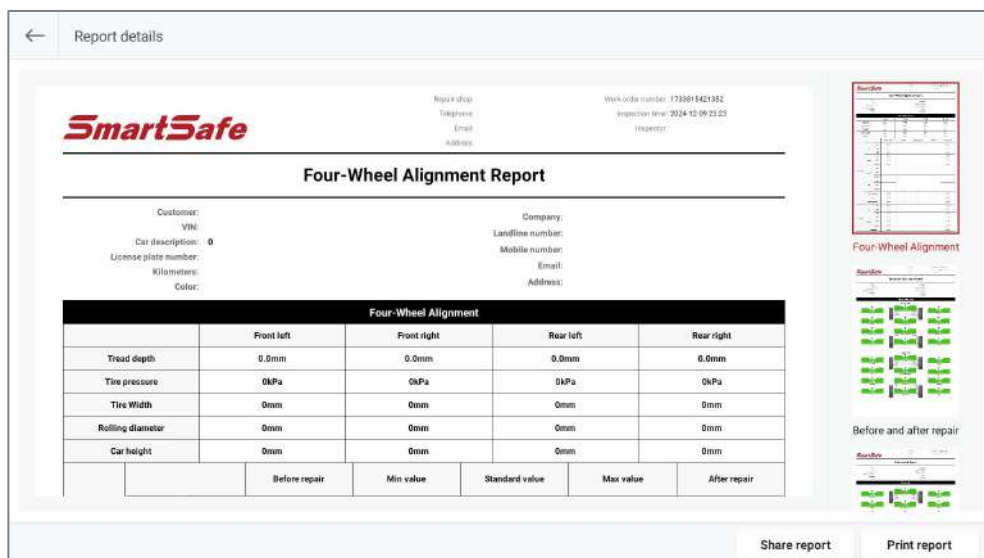
Click the [Inspection Records] on the main interface to enter the "Inspection Records" interface. The inspection records are classified according to the inspection time. Click

the downward/upward arrow on the right side of the corresponding time to expand/collapse the record list.

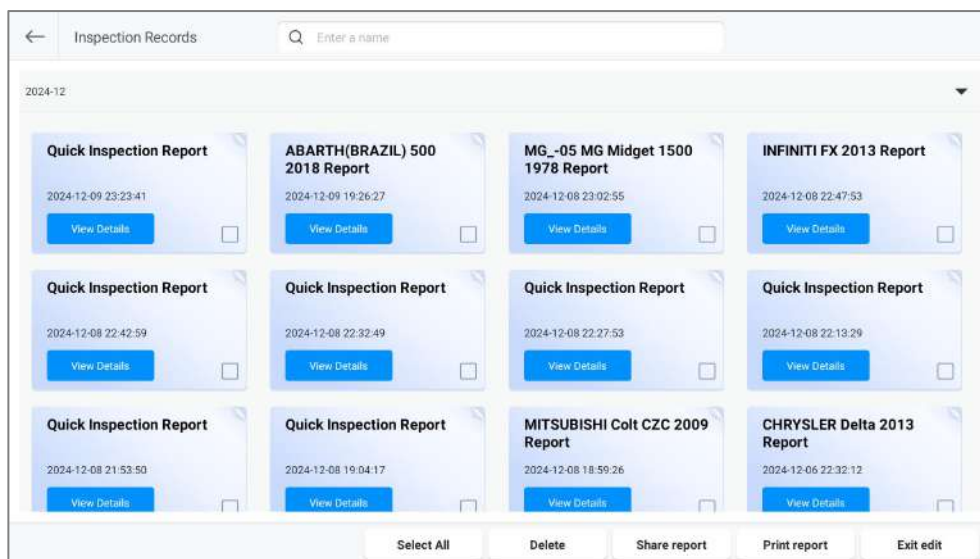
In the search box at the top of the screen, you can enter keywords of the report name to quickly search and find the corresponding inspection report.



Clicking on a single record allows you to view the details of the inspection report, and you can also share and print the inspection report.



Click [Edit] to manage the inspection report.



Screen button instructions are as follows:

<b>[View Details]</b>	View the details of this inspection report.
<b>[Select All]</b>	Select all expanded inspection reports.
<b>[Delete]</b>	Delete the selected inspection report.
<b>[Share Report]</b>	Share the selected inspection report, only one report can be shared at a time.
<b>[Print Report]</b>	Print the selected inspection report, only one report can be printed at a time.
<b>[Exit Edit]</b>	Exit edit mode.

### 3.5 Database

This function includes standard database and custom database. Standard database includes information about various series of products produced by numerous manufacturers both domestically and internationally during their production period, and it can update the content in the database in a timely manner through system upgrades.

### 3.5.1 Standard Database

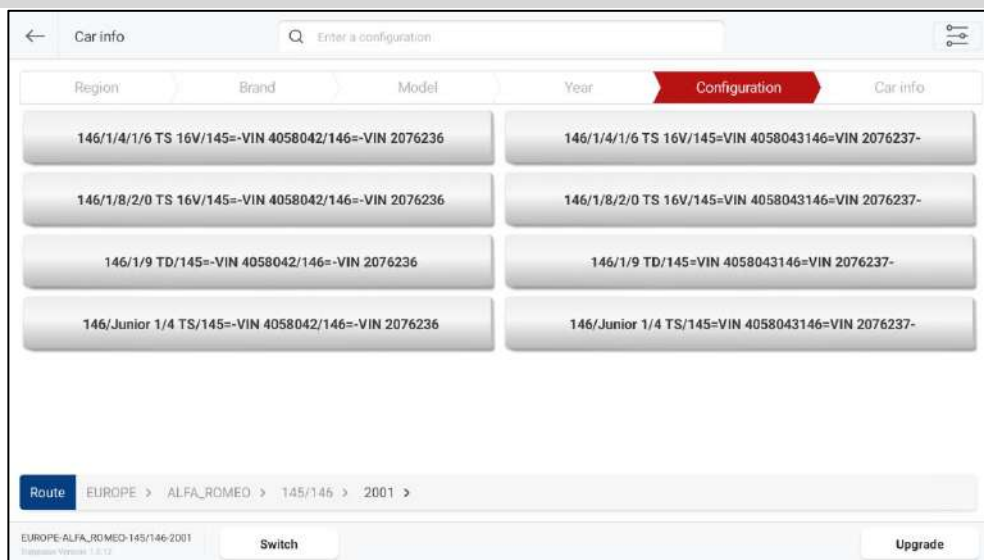
Click [Database] on the main interface, then select [Standard Database].



In the standard database, select the vehicle by [Region] -> [Brand] -> [Model] -> [Year] -> [Configuration] (you can quickly search by entering the corresponding keywords in the search box at the top of the screen) and enter the "Car info" interface to view the corresponding vehicle's parameter information.

Click [Upgrade] at the bottom of the screen to upgrade the standard database to the latest version.

Note: After the database upgrade, the original custom data will not be lost.



In the “Car info” interface, you can click [Unit Settings] to modify the value display unit for the corresponding parameters.

The 'Car info' interface displays a table of wheel alignment parameters. The table is organized into two main sections: 'Front axle' and 'Rear axle'. Each section has columns for 'Parameter', 'Min', 'Standard', and 'Max'. The parameters listed are Front Total Toe, FL Toe, FR Toe, FL Camber, FR Camber, Left Caster, and Right Caster. The units for all parameters are in degrees.

Front axle		Rear axle	
Parameter	Min	Standard	Max
Front Total Toe	-00.24°	00.00°	00.24°
FL Toe	-00.12°	00.00°	00.12°
FR Toe	-00.12°	00.00°	00.12°
FL Camber	-02.00°	-01.50°	-01.00°
FR Camber	-02.00°	-01.50°	-01.00°
Left Caster	02.15°	02.65°	03.15°
Right Caster	02.15°	02.65°	03.15°

At the bottom of the interface, there are buttons for 'Modify configuration', 'Car info editor', and 'Unit settings'.

The 'Unit settings' dialog box allows users to select the unit of measurement for different parameters. The 'Toe-in unit' section has three options: 'Degree', 'Degree and minute' (selected), and 'mm (Tire Outside... 400 mm)' and 'inch(decimal inches) Tire Outside D 12 inch'. The 'Angles (camber, caster, thrust angle...)' section has two options: 'Degree' and 'Degree and minute' (selected). The 'Car height' section has three options: 'inch(decimal inches)', '1/8 in.', and '1/16 in.'.

At the bottom of the dialog box, there are 'Cancel' and 'OK' buttons.

Click [Modify Configuration] to modify the corresponding parameter values as needed, then click [Save].

The screenshot shows the 'Car info' configuration screen. At the top, there are tabs for 'Region', 'Brand', 'Model', 'Year', 'Configuration', and 'Car info' (which is active). Below the tabs, there are two main sections: 'Front axle' and 'Rear axle'. Each section contains a table with columns for 'Parameter', 'Min', 'Standard', and 'Max'.

Parameter	Min	Standard	Max
Front Total Toe	-00.13°	00.00°	00.13°
FL Toe	-00.06°	00.00°	00.06°
FR Toe	-00.06°	00.00°	00.06°
FL Camber ⓘ	-01.93°	-00.65°	00.63°
FR Camber ⓘ	-01.93°	-00.65°	00.63°
Left Caster	01.56°	02.59°	03.62°
Right Caster	01.56°	02.59°	03.62°

At the bottom of the screen, there are four buttons: 'Save', 'Cancel', 'Car info editor', and 'Unit settings'.

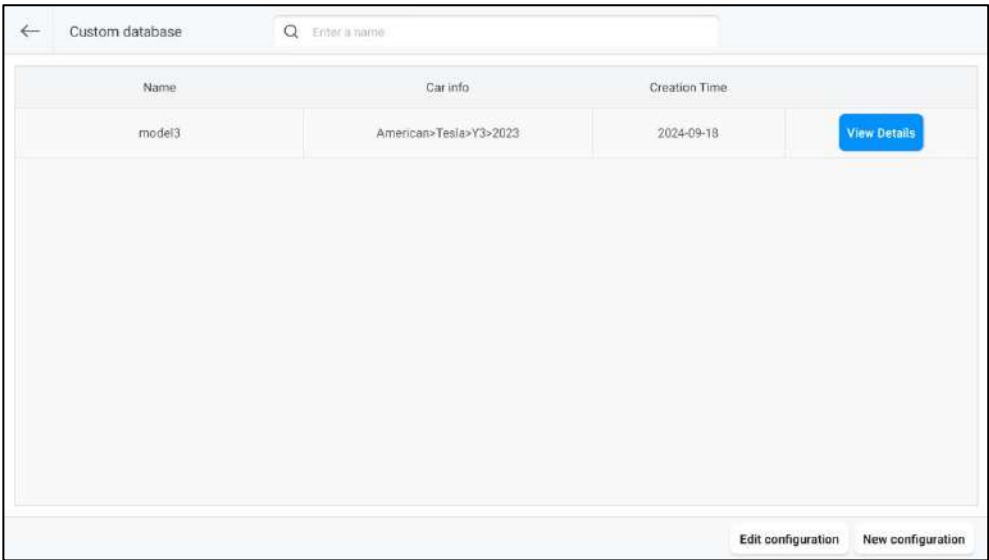
In the pop-up dialog, enter the configuration name in the pop-up dialog box, and click [OK] to save the modified configuration as a custom configuration.

The screenshot shows a 'Save Configuration' pop-up dialog box. It has a title bar that says 'Save Configuration'. Inside the dialog, there is a text input field with the placeholder text 'Enter the configuration name'. Below the input field, there are two buttons: 'CANCEL' and 'OK'.

### 3.5.2 Custom Database

In addition to the standard database provided by the system, users can also add custom data to manually add vehicle model information that is not available in the standard data, making the system more suitable for maintenance station applications.

Enter the “Custom Database” management interface through [Database]-> [Custom Database] on the main interface.



Screen button instructions are as follows:

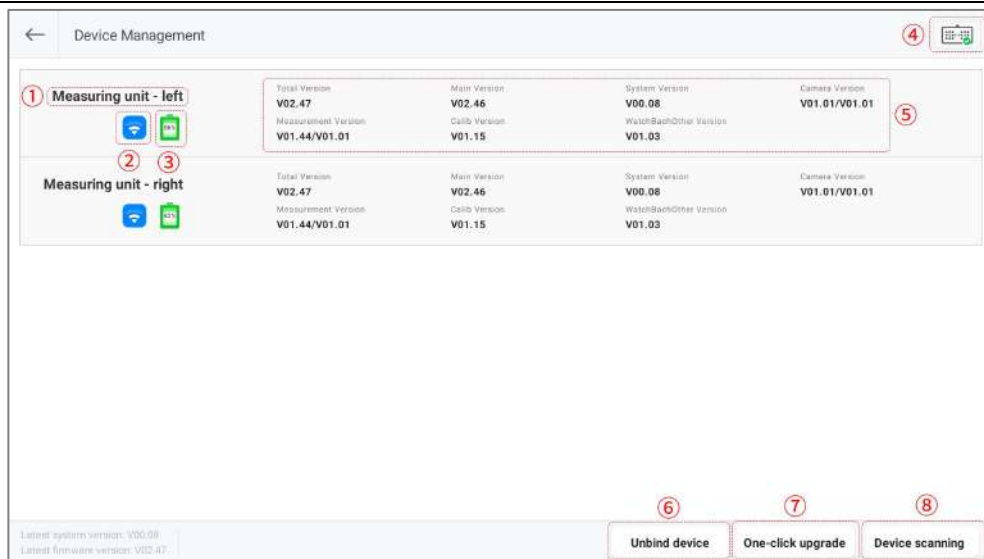
[View Details]	View the details of this custom data.
[Edit Configuration]	Used to select and delete single or multiple custom data.
[New Configuration]	Used to add new custom data.

### 3.6 Device Management





This function is used to view device status and version information, manage device systems, and firmware upgrades.

Click [Device Management] on the main interface to enter the following interface:





Screen buttons and display item descriptions are as follows:

① <b>Device name and identification</b>	Used to identify and distinguish different device.
② <b>Connection status</b>	When the device is not connected to the network, the icon is displayed in red. After the device is connected to the network, the icon turns blue and shows the network signal strength.
③ <b>Battery status</b>	<ul style="list-style-type: none"> <li>The icon is displayed as  when the device is not connected to the network.</li> <li>The icon changes to  after the device is connected to the network.</li> <li>The icon is displayed as a red  when the battery level is below 20%.</li> </ul>
④  <b>Device status</b>	Used to check device status. It allows you to check the network connection status of the measurement units and the tablet, the battery level of the measurement units, and the network signal strength of the measurement units.
⑤ <b>Version information</b>	Used to display the system version, firmware version, and other version information of the WA613F device.

⑥ <b>Unbind device</b>	This allows unbinding the WA613F device from the tablet.
⑦ <b>One-click upgrade</b>	<p>Used for one-click upgrading of the device firmware and system to the latest version.</p> <p>Note:</p> <p>When upgrading, please set the power switch of the two measurement units to “ON”.</p> <p>Please make sure that the battery level of each individual unit is above 80% or place the device on the charging base to charge.</p>
⑧ <b>Device scanning</b>	Used to scan and connect the device for networking.

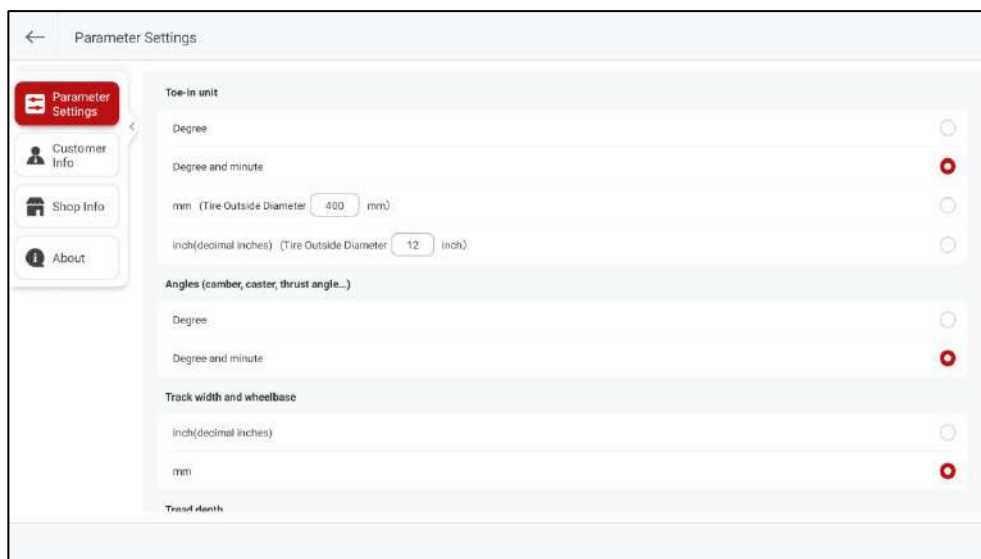
## 3.7 System Settings

This function is used for parameter settings, managing customer and store information, viewing application version and serial number, and other information.

### 3.7.1 Parameter Settings

Click [System Settings] on the main interface to enter the “Parameter Settings” page.

Users can switch between different display units for toe-in, angle, track width and wheelbase, tread depth, tire pressure, and vehicle height as needed.



### 3.7.2 Customer Information

Click the [Customer Information] on the left side of the screen to enter the “Customer Information” management interface.

The screenshot shows the 'Customer Info' management interface. On the left is a sidebar with navigation options: 'Parameter Settings', 'Customer Info' (highlighted in red), 'Shop Info', and 'About'. The main area features a table with columns: 'Customer name', 'Telephone', 'License plate number', 'VIN', 'Address', and 'Add time'. A single entry is visible for 'Jack' with telephone '123578965823', license plate 'B23458', VIN '1G1BL65P7TR234567', and address 'Chicago'. The entry was added on '2024-09-18'. At the bottom right of the table are 'Edit' and 'Add' buttons.

Customer name	Telephone	License plate number	VIN	Address	Add time
Jack	123578965823	B23458	1G1BL65P7TR234567	Chicago	2024-09-18

Click a single customer information, edit the corresponding information in the pop-up window, and click [Save] to modify the customer information.

The 'Modify customer info' pop-up window contains input fields for the following information:

- Customer name: Jack
- Telephone: 13568555582
- License plate number: yueDh8
- VIN: HSDHXXSBJDHDJDHDF
- Address: GU and CNN

At the bottom of the window are 'Cancel' and 'Save' buttons.

Click [Edit], select the checkbox in front of the individual customer information, and then click [Delete].

	Customer name	Telephone	License plate number	VIN	Address	Add time
<input checked="" type="checkbox"/>	Jack	123578965623	B23458	1G1BL6SP7TR234567	Chicago	2024-09-18

Click [OK] in the pop-up dialog to delete the selected customer information.

Hint

Are you sure you want to delete?

Cancel OK

After clicking on [Add], enter the corresponding customer information in the pop-up window, and then click [Save] to add the customer information.

Add customer info

Customer name

Telephone

License plate number

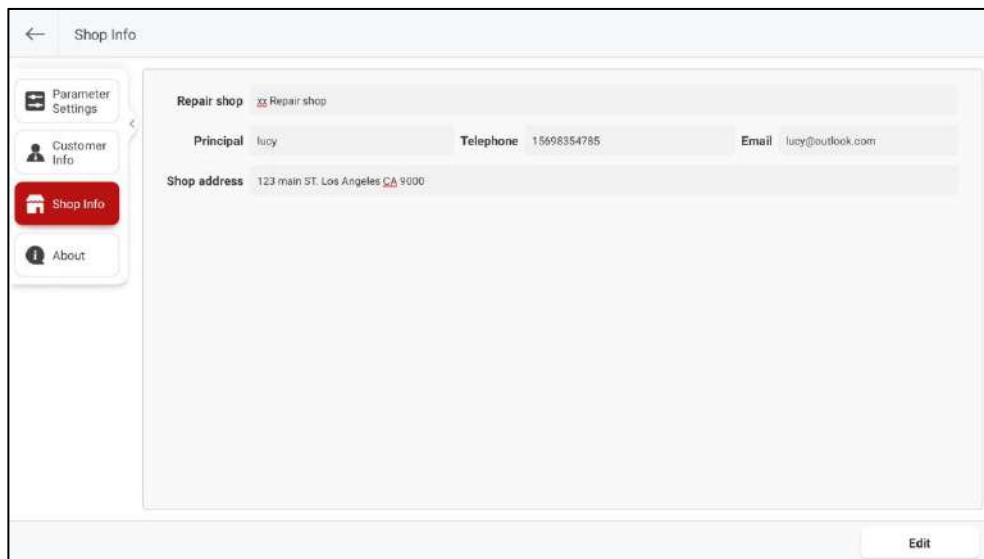
VIN

Address

Cancel Save

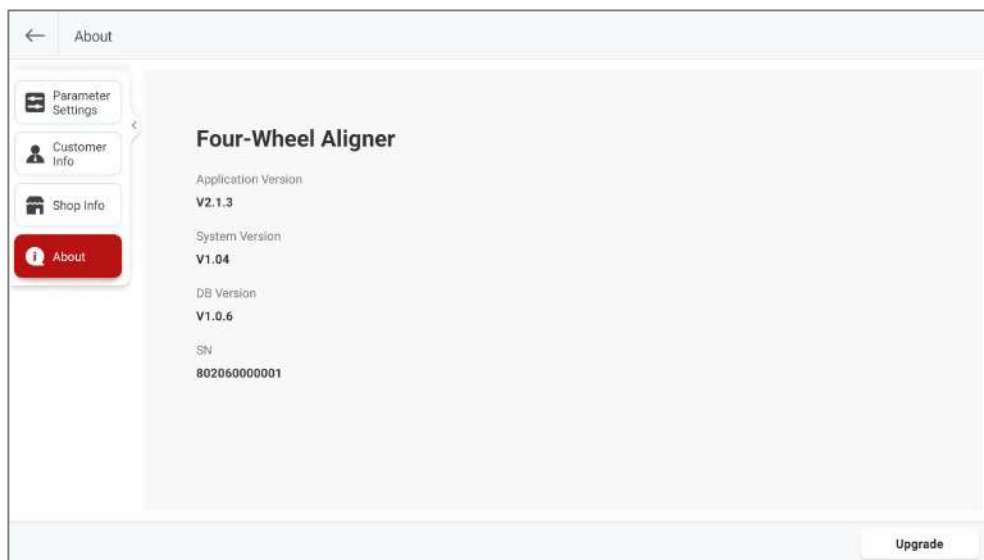
### 3.7.3 Store Information

Click the left side of the screen to enter the [Store Information] management interface. Click [Edit], then edit the corresponding store information, click [Save] to save the new store information.



### 3.7.4 About

Click [About] on the left side of the screen to view the version number, serial number, and upgrade management.



Click [Upgrade], the system will check for new application versions and upgrade the application to the latest version.

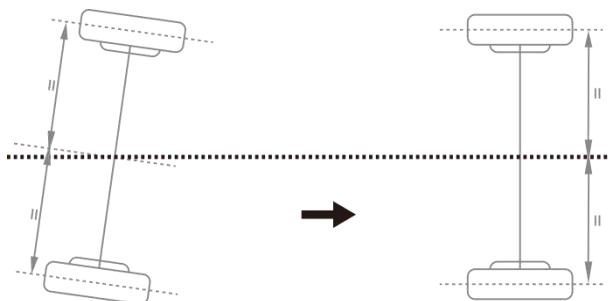
## 4. Terms

Four-wheel alignment angle refers to the relative angle between the suspension system and various moving components. Maintaining the correct four-wheel alignment angle ensures the stability of the vehicle's movement and reduces tire wear.

The main angles of the four-wheel alignment of a car include: camber, toe-in, caster, and kingpin inclination.

### 4.1 Geometric Center Line

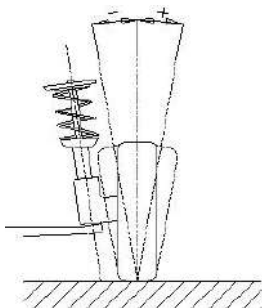
Longitudinal center plane of the vehicle body and the intersection of the horizontal plane passing through the front and rear axles of the vehicle.



### 4.2 Camber

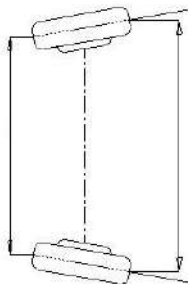
Camber is defined as an angle formed by the centerline of the tire and the vertical line as viewed from the front of the car, which is **positive when outward and negative when inward**, as shown in the figure below. The different angles can change the contact point and force point between the tire and the ground, directly affecting the tire's grip and wear condition, and changing the distribution of weight on the axle, avoiding abnormal wear of the bearings. In addition, the existence of the camber can be used to counteract the angular changes caused by the deformation of the suspension system components and the clearance between the moving surfaces after the vehicle body is subjected to loads. The existence of the camber also affects the direction of travel of the car, just as motorcycles can use the inclination of the body to turn. Therefore, the camber angle of the left and right wheels must be equal, so as not to affect the straight-line stability of the car under the balance of forces, and to improve the straight-line stability and avoid uneven tire wear in coordination with the toe-in. If there is no positive camber, the wheels will incline too much towards the inside when

fully loaded, thereby accelerating tire wear and wheel bearing wear. Therefore, this parameter can extend the life of tires and wheel bearings.



### 4.3 Toe-in (Angle)

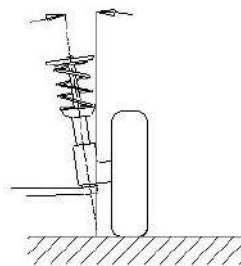
Toe-in is defined as an angle formed between the centerline of the tire and the longitudinal axis of the car, as viewed downward from the top of the car, which is **positive when inward and negative when outward**, as shown in the figure below. The total toe-in value is equal to the sum of the Toe-in values of the two wheels, which is the angle between the centerlines of the two tires. The function of the toe-in is to compensate for the tendency of the tire to roll inward or outward due to the camber angle and road resistance, in order to ensure the straight-line stability of the car. The parameter associated with the toe-in is the toe-out, also defined as the angle formed by the two tires when viewed from above the vehicle. However, the symbol definition is opposite to that of the toe-in angle, **negative when inward and positive when outward**. Due to some people being accustomed to using the toe-out, special attention should be paid to the difference between the toe-in and toe-out.



### 4.4 Kingpin Inclination

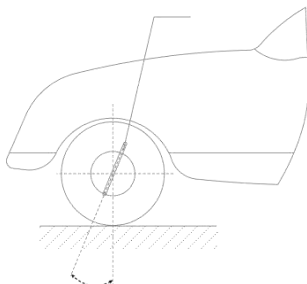
Kingpin inclination is defined as an angle formed by the centerline of the steering axis and the vertical line as viewed from the front of the vehicle, as shown in the figure below. The kingpin inclination angle can distribute the vehicle weight evenly on the

bearings, protecting them from damage and making the steering force uniform and steering light. On the contrary, if the kingpin inclination angle is 0, the reaction force between the vehicle weight and the ground will generate a large lateral shear stress on the axle, which can easily damage the axle and make the steering heavy. In addition, the kingpin inclination is also the source of the steering return force of the front wheels. The kingpin inclination has been set at the beginning of the vehicle suspension design and is usually non-adjustable.



## 4.5 Kingpin Caster

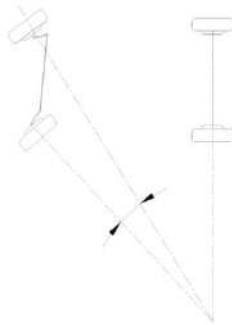
Kingpin caster is defined as an angle formed by the centerline of the steering axis and the vertical line as viewed from the side of the vehicle, which is negative when forward and positive when backward, as shown in the figure below. The presence of the kingpin caster angle can make the intersection point of the steering axis and the road surface be in front of the tire contact point. The resistance of the road surface to the tire can be used to keep the car going straight. The principle is similar to the front wheel of a shopping cart automatically turning in the direction you apply force and maintaining straight movement. The larger the caster angle, the better the straight-line stability of the car and the better the steering response when turning. However, it will make the steering heavier. The kingpin caster angle of a normal car is approximately between 1~4 degrees.





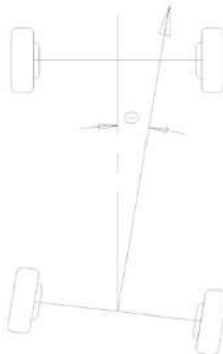
## 4.6 Toe-out when Turning 20°

Toe-out when steering is defined as the difference in steering angle between the two front wheels when turning 20°, as shown in the figure below. When turning, the angle that the inner wheel turns is usually greater than the outer wheel, with a difference of about 2 degrees. The purpose is to allow the car to turn smoothly with the instantaneous center of the rear axle extension line as the center of the circle when turning. In addition, when the turning angle of the inner wheel is larger, the resistance is also larger. The difference in resistance can cause the car to lean towards the side with greater resistance, making steering easier.



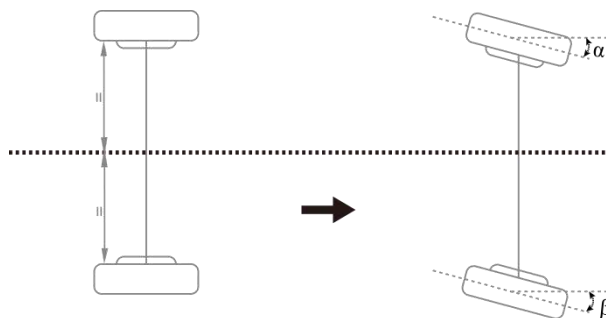
## 4.7 Thrust Angle

Thrust angle is defined as an angle formed by the bisector (thrust line) of the total toe-in angle of the rear wheels and the geometric centerline. It is generally specified that the value is positive when the thrust line is leftward and negative when the thrust line is rightward. If the thrust angle is not zero, the vehicle has a tendency for lateral movement. If this situation occurs, the toe-in of rear wheels should be adjusted.



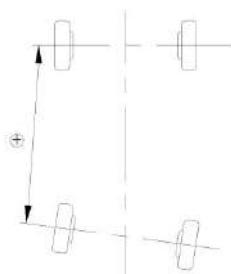
## 4.8 Max Steering Angle

The maximum steering angle of a car refers to an angle formed between the centerline of the front wheels when not steering and the front wheels turning to the extreme left or right.



## 4.9 Wheelbase Difference

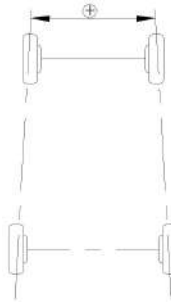
Wheelbase difference refers to the angle between the line connecting the centers of the two front wheels and the line connecting the centers of the two rear wheels (also known as wheelbase deviation). When the distance between the right wheel and the left wheel is greater, this state defines the wheelbase difference as a positive value. Conversely, when the distance between the right wheel and the left wheel is smaller, this state defines the wheelbase difference as a negative value. If the track widths of the front and rear wheels of the car are already known in the car's specifications, the wheelbase difference can be expressed in angular values, as shown in the figure below.



## 4.10 Track Width Difference

Track width difference refers to the angle formed by the line connecting the front left wheel and the contact point with the ground, and the line connecting the rear left wheel and the contact point with the ground (also known as the wheel track width deviation).

When the distance between the center lines of the two rear wheels is greater than the distance between the center lines of the two front wheels, this state defines the track width difference as a positive value. Conversely, it is a negative value. If the left and right wheelbase of the car is already known, the track width difference can be expressed in angular values, as shown in the figure below.

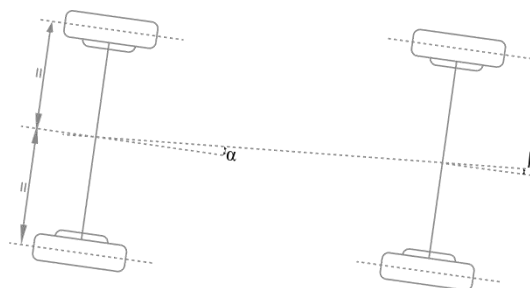


#### 4.11 Left (right) Lateral Offset (angle)

The relative offset between the rear left (right) wheel and the front left (right) wheel in the lateral direction of the car is the lateral offset on the left (right) side. When the rear left (right) wheel is more inclined outward than the front left (right) wheel, the left (right) lateral offset is positive, otherwise it is negative. The angle between the line connecting the center of the front and rear left (right) wheels and the thrust line is the left (right) lateral offset angle.

#### 4.12 Axle Offset (angle)

Axle offset refers to the relative offset of the front and rear axles in the lateral direction of a car. When the rear axle is offset to the right compared to the front axle, the axle offset is a positive value; otherwise, it is a negative value. The angle formed between the bisector of the track width difference angle and the thrust line is known as the axle offset angle.

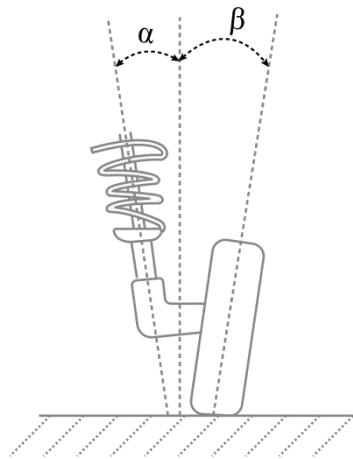


### 4.13 Delay (angle)

The relative offset in the longitudinal direction of a car between the two wheels on the same axle is referred to as "delay". When the right wheel on the front (rear) axle is behind the left wheel, the front (rear) delay is a positive value; otherwise, it is a negative value. The angle between the centerline connecting the two front (rear) wheels and the line perpendicular to the longitudinal geometrical centerline of the car is called the front (rear) delay angle.

### 4.14 Included Angle

The angle  $\gamma$  between the kingpin axis and the wheel axis is called the included angle, the value of which is the sum of the kingpin inclination  $\alpha$  and the wheel camber  $\beta$ , as shown in the figure below.



### 4.15 Wheel Alignment

Half of the difference between the left toe-in and the right toe-in of the front wheel.

### 4.16 Symmetric Value

The geometric dimensions of a vehicle are usually symmetrical and are used to preliminarily determine whether the vehicle has been involved in an accident and the condition of the chassis, assisting in four-wheel alignment.

## FCC Warning

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. This device should be installed and operated with minimum distance

20cm between the radiator & your body.

Specific Absorption Rate (SAR) information:

This device meets the government's requirements for exposure to radio waves. The guidelines are based on standards that were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The standards include a substantial safety margin designed to assure the safety of all persons regardless of age or health. FCC RF Exposure Information and Statement the SAR limit of USA (FCC) is 1.6 W/kg averaged over one gram of tissue. Device types: This device has also been tested against this SAR limit.

This device was tested for typical body-worn operations with the back of the This device kept 0mm from the body. To maintain compliance with FCC RF exposure requirements, use accessories that maintain an 0mm separation distance between the user's body and the back of This device. The use of belt clips, holsters and similar accessories should not contain metallic components in its assembly. The use of accessories that do not satisfy these requirements may not comply with FCC RF exposure requirements, and should be avoided.

Note: Indoor use only.

## Warranty

THIS WARRANTY IS EXPRESSLY LIMITED TO PERSONS WHO PURCHASE SMARTSAFE PRODUCTS FOR PURPOSES OF RESALE OR USE IN THE ORDINARY COURSE OF THE BUYER'S BUSINESS.

SMARTSAFE electronic product is warranted against defects in materials and workmanship for one year from date of delivery to the user.

This warranty does not cover any part that has been abused, altered, used for a purpose other than for which it was intended, or used in a manner inconsistent with instructions regarding use. The exclusive remedy for any automotive meter found to be defective is repair or replacement, and SMARTSAFE shall not be liable for any consequential or incidental damages.

Final determination of defects shall be made by SMARTSAFE in accordance with procedures established by SMARTSAFE. No agent, employee, or representative of SMARTSAFE has any authority to bind SMARTSAFE to any affirmation, representation, or warranty concerning SMARTSAFE automotive meters, except as stated herein.

### Disclaimer

The above warranty is in lieu of any other warranty, expressed or implied, including any warranty of merchantability or fitness for a particular purpose.

### Purchase Order

Replaceable and optional parts can be ordered directly from your SMARTSAFE authorized dealer. Your order should include the following information:

- Order quantity
- Part number
- Part name

### Customer Service Center

For any problem met during the operation, please call +86-0755-89589810.

If the device needs to be repaired, please send it back to SmartSafe, and attach the Warranty Card, Product Qualification Certificate, Purchase Invoice and problem description. SmartSafe will maintain and repair the device for free when it is within warranty period. If it is out of warranty, SmartSafe will charge the repair cost and return freight.

SmartSafe address:

3310, Building 11, Tian'an Cloud Park, Bantian Street, Longgang District,

Shenzhen, Guangdong, China

SmartSafe Website: <http://www.newsmartsafe.com>

**Statement:**

SMARTSAFE reserves the rights to make any change to product designs and specifications without notice. The actual object may differ a little from the descriptions in the manual in physical appearance, color and configuration. We have tried our best to make the descriptions and illustrations in the manual as accurate as possible, and defects are inevitable, if you have any question, please contact local dealer or after-sale service center of SMARTSAFE, SMARTSAFE does not bear any responsibility arising from misunderstandings.