Aston Technologies Inc

Wheel Alignment System

AWA-V8

www.astontechusa.com

SAFETY PRECAUTIONS

Warning: For safety, the equipment should be externally earth connected.

Warning: Power supply must be cut off when the equipment is maintained or repaired due to high voltage of some internal electric parts.

Warning: Pull out the counterweight pin located at the back bottom of the aligner column before the first installation of the aligner.

Warning: Do not install other software on the aligner computer.

Note: When the aligner is used on 2 post lift, the levelness of floor should be equal or less than 5 degrees.

Note: There should be no windows on the top, left and right sides of the aligner. If there is, curtain the windows.

PREFACE

The user's manual, introducing wheel alignment software, sensor installation, equipment debugging, operation and maintenance, can help user rapidly understand and master operation and use of wheel aligners. By carefully reading user's manual and seriously abiding by operation steps stipulated in the manual, users will surely enjoy better, more durable and stable service provided by the aligner.

 The manual is exclusively designed and compiled only for the aligner. The manufacturer will not undertake any responsibilities for any consequences resulted from operation instructions to any equipments other than the aligner. Also, the manufacturer or any of its branch firms will not undertake any responsibilities for the following situations: user's or the third party's accidents; abuse or misuse of the aligners; arbitrarily modify or repair the aligner; or any damages or losses caused by not strictly adhering to operation and maintenance stipulation in the manual. The manufacturer will also not undertake any responsibilities for any damages or problems caused by using optional accessories or wastage parts either not originally produced or ratified by the manufacturer.

Due to upgrading and improvements of products, the manufacturer will not undertake any responsibilities for possible modification of product specification or appearance and advise customers in advance.

This equipment only for use by qualified professionals and maintenance personnel.

CHAPTER 1 GENERAL INTRODUCTION

1.1 DEFINITION

Four-wheel aligner is used to test alignment parameters of vehicle wheels, components of suspension system and components of steering system. By comparing the measured parameters with designed parameters of vehicle manufacturer, it guides technicians to make relevant adjustment to wheel alignment parameters to achieve ideal driving performance, to guarantee the stability and safety of driving and ease of steering and to reduce the side tyre wear and gas consumption.

1.2 PURPOSE OF WHEEL ALIGNMENT

The purpose of wheel alignment is to adjust the suspension system and steering system to its correct position. After wheel alignment, the vehicle should achieve the following performances: Ease of steering and stable driving. While driving straight-ahead, the wheel does not run deviated. The steering wheel is on-center naturally. The steering wheel returns to its original position automatically after turning. Reduction of driving resistance and abnormal wear of tyre and chassis components. Enhancement of driving sense of comfort and reduction of oil consumption.

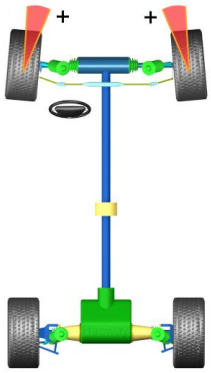
1.3 DEFINITION OF RELEVANT 4 WHEEL ALIGNMENT ANGLES

4-wheel alignment angles are present in the relative angles between suspension systems and every active component. Correct wheel alignment angles are the guarantee of driving stability and tyre wear reduction.
The angles mainly consist of camber, toe-in, caster, steering axle inclination and set-back, etc.

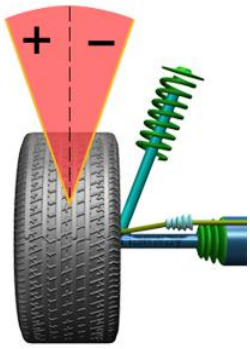
1.3.1. TOE-IN

Toe-in is the angle drawn by a line drawn through the plane of one wheel referenced to the longitudinal axis of vehicle. Toe-in in measured in positive or negative degrees. Positive toe-in is when the horizontal line intersects in front of the vehicle. Negative toe-in

is when the horizontal line intersects behind the wheel. Total toe-in is the total of the two front toe-ins, i.e. the angle formed by two horizontal lines through the planes of two wheels. The function of toe-in is to compensate the tendency of outward or inward rolling due to camber or ground resistance to guarantee the straight-ahead of driving.

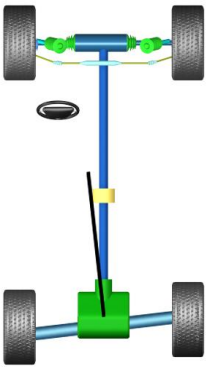


1.3.2. CAMBER



Camber is the inclination of the centerline of the wheel from the vertical as viewed from the front of vehicle. Camber angle is measured in positive or negative degrees. Positive camber is the outward tilt of the top of the tire. Negative camber is the inward tilt of the top of the tire. The difference of the angle may change the wheel contact point to the ground and the force point which may directly affect the adhesive force of wheel and the wearing condition. It can also change the force distribution to vehicle axles which may cause the abnormal wearing of the vehicle bearing. In addition, the existence of camber can offset the angle fluctuation caused by components deformation of suspension system or the active components play after the vehicle is loaded. The existence of camber will also affect the driving direction of the vehicle. Therefore, the camber of left and right wheel must be the same. Under the action of force balance, it won’t influence the directness of the vehicle. Cooperating with toe-in, it will improve the stability of driving directness to avoid the unevenness of wheel wearing. Without the camber, the wheel will incline internal excessively after the vehicle is full loaded which causes faster tyre wear and bearing wear. Therefore, this parameter can prolong the life of tyre and wheel bearing.

1.3.3. SET-BACK



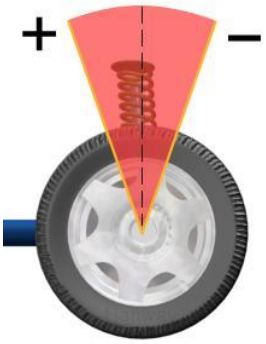
Setback is the symmetry degree between one front wheel or rear wheel and the other wheel of the same axle. Setback is measured in positive or negative degrees. Viewed from the driving direction, positive setback is the condition in which the right wheel is frontward of the left wheel.

Negative setback is the condition in which the right wheel is rearward of the left wheel. The value can also be indicated in mm.

The setback reflects the change of the vehicle wheelbase. When the setback value reaches some extent, the running of the vehicle will be deviated. The deviation direction is on the short wheelbase side.

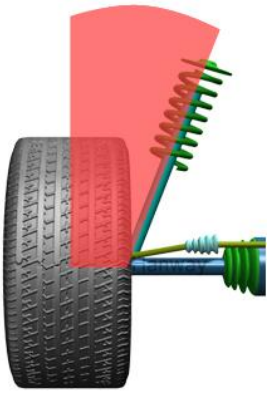
1.3.4. CASTER

Caster is the angle between an imaginary line drawn through the upper and lower steering pivots and a line perpendicular to the road surface (viewed from side of vehicle). If the top of the line tilts rearward, the vehicle is said to have "POSITIVE" caster. If the top of the line tilts forwards, the vehicle is said to have "NEGATIVE" caster. The caster makes the intersect point of steering axis and ground at the front of wheel contact point. The vehicle is kept driving straight-ahead with the resistance to tyre by the ground. The bigger the caster, the better the directional stability and the steering return ability. However, the force of steering is increased. Generally, the caster is set between 1~2 degree.



1.3.5. STEERING AXLE INCLINATION

Steering axle inclination (SAI) is the angle between the centerline of steering axis and the perpendicular line as viewed from the front of vehicle. With the SAI, the vehicle weight will be distributed evenly on bearing which protects the bearing and ease the turning of steering. On the other hand, if the SAI is set to 0, the vehicle weight and the counterforce of ground will produce great lateral stress which may damage the bearing and harden the turning of steering. Moreover, SAI is the power source of steering returning back to the center after front wheel turning. Generally, the SAI is preset with the design of vehicle suspension system which is non-adjustable.



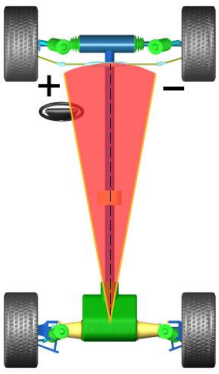
1.3.6. INCLUDED ANGLE

Included angle is the angle between wheel centerline and vehicle centerline. Included angle is the total of camber and SAI.

1.3.7. MAXIMUM STEERING ANGLE

The measurement method of maximum steering angle is the same to that of 20 degree angle. When the steering turns left or right to the maximum, measure the turning angle of inside or outside of the wheel.

1.3.8. THRUST ANGLE



Thrust angle is the angle between the line (thrust line) that divides the total angle of the rear wheels and the geometrical center line.
If the thrust line is on the left side, it is said to be “POSITIVE”. If the thrust line is on the right side, it is said to be “NEGATIVE”. If the thrust angle is not zero, the vehicle tends to run to the side direction. The rear wheel toe-in needs to be adjusted.

CHAPTER 2 PRODUCT CONFIGURATION

The wheel aligner consists of main cabinet, computer，targets, wheel clamps, turntables, steering holder and pedal depressor, etc..

2.1 TECHNICAL PARAMETERS

Temperature：-20℃--+70℃
Relative Humidity：less than90%
Power Supply：AC110/220 V±10%,　50 /60Hz
Ambient Air Pressure：70kPa—106kPa。
Power Consumption of Machine：≤500W
Technical index

Measuring Items		Precision	Measuring Range
Front Wheel	Toe	±1′	±24°
	Camber	±1′	±10°
	Caster	±2′	±20°
	Steering Axle Inclination	±2′	±20°
	Set-Back	±1′	±10°
Rear Wheel	Toe	±1′	±24°
	Camber	±1′	±10°
	Set-Back	±1′	±10°
	Thrust-Angle	±1′	±10°

2.2 FUNCTION AND CHARACTERISTICS

- Using independent intellectual property rights, new design concept and advanced technology to create the perfect four-wheel aligners.
- 360 degrees closed space comprehensive measurement of the vehicle chassis, using measuring principle of geometric center line and thrusting line, the steering wheel won’t slant after adjustment.

- System-wide collecting-distributing multi-language control platform., enabling mainframe to freely set (download) or change the current language platform, measurement unit, resolution and etc.
- Database covering more than 20,000 car models worldwide, intelligent update at any time.
- Special wireless network under windows platform, random networking and connecting extending equipment like ruler, PDA, damping tester, simulator and etc.
- Graded operation management and self repaired function, controlling and recovering misoperation.
- Personalized, humanized and intelligent operation control system
- Completely speeding up measurement and data transmission with high efficiency and reliability.
- Multi-language voice audio play, 3D animation navigation, built-in complete training course and simulate operation, enabling users to do alignment easily without being treated.

2.3 WHEEL CLAMP

4 clamps with aligner as shown in Fig. 1. Type size: 11'—25'; Size can be adjusted by changing grips' mounting position.

While in use, operate the adjusting knob to change the clamping grips to suitable gap, then stick 4 four grips one inside or outside rim. Adjust the knob to tighten the clamp with rim. At the same time, secure the clamps on the rims with binding tape.

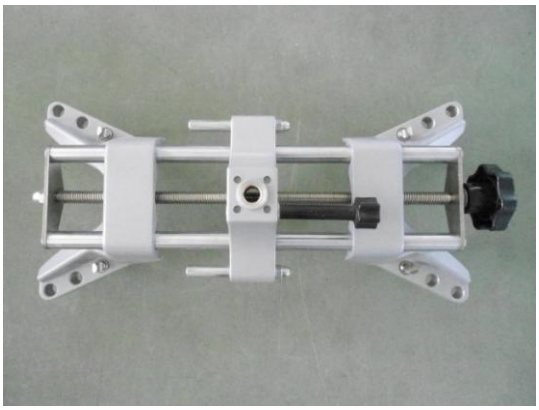


Fig. 1

Warning: The correct installation of the clamps is essential to the measured results. Try to avoid the matched weight or deformation area of rim and

meantime to keep contact between clamp and rim even. The clamps should be handled carefully lest any deformation should influence the accuracy.

2.4 TURNTABLE

The wheel aligner is equipped with 2 pieces of mechanical turntables or electronic turntables (Fig. 3):

Fig. 3

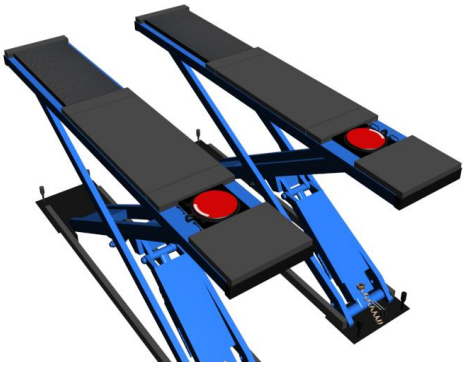


Fig. 4

The turntables are placed in front-top of lift when in use(Fig. 4). Before approaching of vehicle, the locking pins of the turntable should be locked in case of turning of the turntables. After driving the front wheel on the center of the turntable, draw out the pin to set the turntable in free condition to start the testing.

2.5 STEERING HOLDER AND BRAKE PEDAL DEPRESSOR

The wheel aligner is equipped with 1 steering holder and 1 brake pedal depressor as shown in Fig. 5

Fig. 5

Fig. 6

See Fig.6, while doing wheel alignment, put straight the steering wheel according to the prompt of the system. Use the steering holder to fix the steering in case the steering wheel turns during wheel adjustment, which may result in steering wheel off-center and wrong adjustment results.

Brake pedal depressor is used to depress the brake pedal to prevent the move of the vehicle, which may influence the measured results.

CHAPTER 3 OPERATION PROCEDURE

3.1 UNDERSTANDING THE CONDITION

Before wheel alignment, consult with the vehicle owner on any particular problem such as driving condition, problem phenomenon, recent wheel alignment history, if there is any collision or replacement of spare parts, etc. Then test drive the vehicle until the problems occur to get a brief understanding of the phenomena of the problems. Check the chassis components carefully if there is any wearing, deformation and looseness on tie rod end, boot, control arm, bearing, tripod ball joint, shock absorber, steering transmission mechanism, etc. Check if the tyre pressure, tyre specification and tyre lug are in consistence and the tyre wearing condition, etc. If any abnormality is detected, communicate with vehicle owner in time and take corresponding measure to solve the problems.

3.2 ALIGNMENT INSPECTION

Carry out alignment inspection to measure every alignment angle precisely.

3.3 VEHICLE ADJUSTMENT

Acknowledge the reason and position of the problem according to the inspection result. And then adjust the vehicle.

3.4 TEST DRIVING

After wheel alignment, test driving the vehicle to check if the abnormal condition is eliminated. If not, re-do the alignment adjustment.

CHAPTER 4 OPERATION GUIDANCE

4.1 PREPARATION WORK BEFORE TESTING

1. Adjust the distance of the two turntables according to the track width and lock the turntables and sliding plates of car lift. Drive the vehicle onto the lift until the front wheel is in the center of the turntable. Engage the hand brake of the vehicle to prevent vehicle moving and personal injury. And then draw out the locking pin of the turntables and sliding plates.
2. Consult with the vehicle owner on the vehicle condition and the phenomenon of the problem. Find out basic information of the vehicle like production country, manufacturer, model and production year etc.
3. Check the spare parts of the chassis suspension system and the steering system. Check the tyre pressure, tread and wear of the tyre.
4、Clamp installation. Fix the clamps on the inner or outer side of the rim according to different vehicle conditions. Try to avoid weight placing area and deforming area. Make sure the clamps and the rims have the same touching depth. The clamps should be kept in vertical position. Spin the knob of the clamp to fasten the clamps. And use binding tape to secure the clamp on the rim lest the clamp and sensor should drop and damage.
5、Targets installation. Install the small targets on the front clamps and big ones on the rear clamps and lock them with the surface vertical to the ground.
6. Startup of the four-wheel alignment program. Press the power switch on the cabinet control unit to electrify the system. Press the PC startup button to start the PC. The system enters the wheel alignment main interface after PC initialization to start the measurement.

Mote：Before installing targets, make sure that all the glass surface is clean so as not to affect measurement speed and precision.

4.2 START MEASUREMENT

For old users, operators can retrieve the saved data to start measurement directly.

4.2.1 AUTO MODEL DATA SELECTION

For new users, click the start button on the bottom of the screen shown in Fig.7 to enter auto model selection interface as shown in Fig.8.

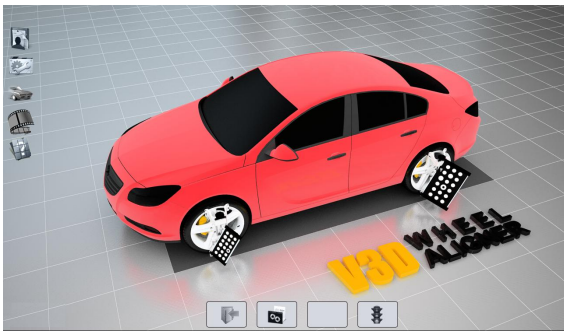


Fig.7

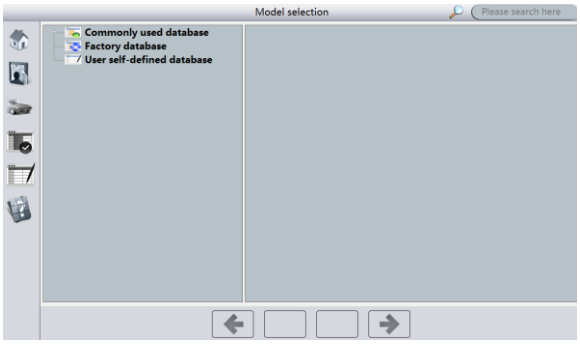


Fig.8

Vehicle database is divided into manufacturer database, user self-defined database and commonly used database, Manufacturer database is specifications. User self-defined database is the database input by users., Commonly used database, as is called, includes the vehicle models which are often used by users and they are selected from manufacturer data or user self-defined database. Users can add or delete the models in this database/ When searching a model, one way is to screw mouse wheel up and down,; the other way is to select the different options at the top of the screen and then input vehicle name and model in the text box. Fuzzy searching is to input the Chinese, English, spelling or the initial letter of vehicle name or model in the text box.

There are 6 buttons on the left side of the the data selection screen.

 Main interface，  User data，  Two wheels toe fast adjustment

 User self-defined database addition，  Data backup recover，  Help

4.2.1.1 COMMONLY USED DATABASE EDIT

In model selection screen click ( to enter commonly used database edit interface as shown in Fig.9.

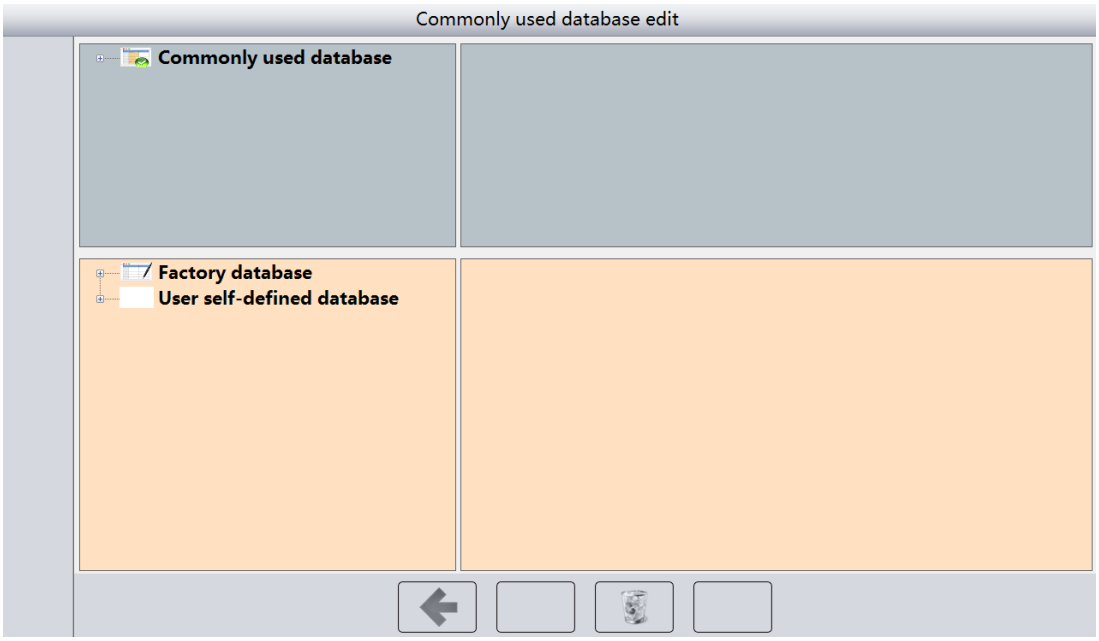


Fig.9

In commonly used database edit screen, users can add the model data from the manufacturer specification and user self-defined database or delete the data as per their need.

4.2.1.2 USER SELF-DEFINED DATABASE ADDITION

In model selection screen click  to enter user self-defined database addition interface. In this interface, click the box as shown in Fig.10,choose the manufacturer to be added or choose “ adding new manufacturer” as shown in Fig.11.

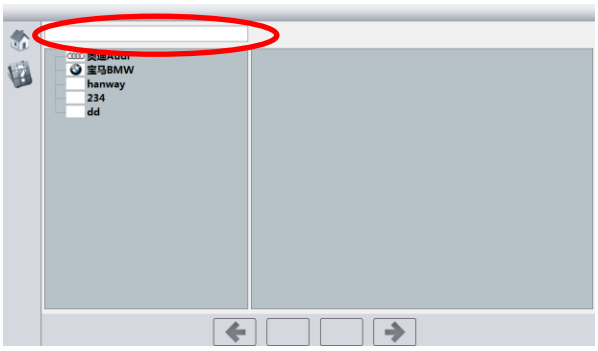


Fig.10

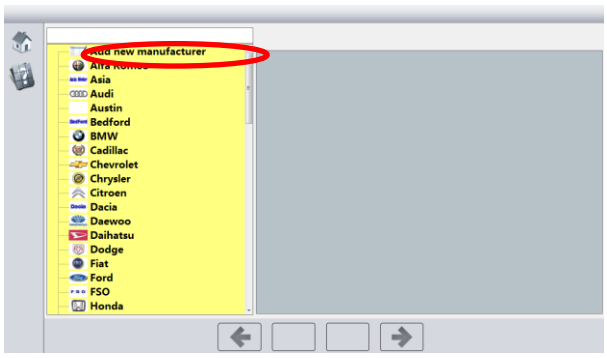


Fig.11

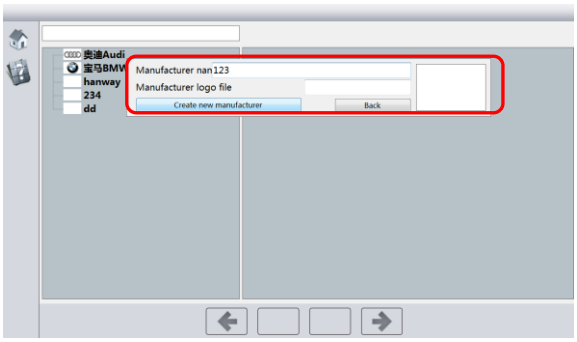


Fig.12

After adding, click the newly added manufacturer, then a box will appear on the right side of the screen as shown in Fig.13. Click it to enter data addition screen as shown in Fig.14.

Fig.13

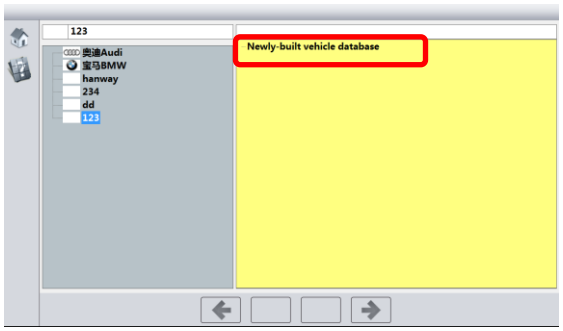


Fig.14

1. Enter data addition screen. Input the model, year and others and then the data as shown in Fig.15.

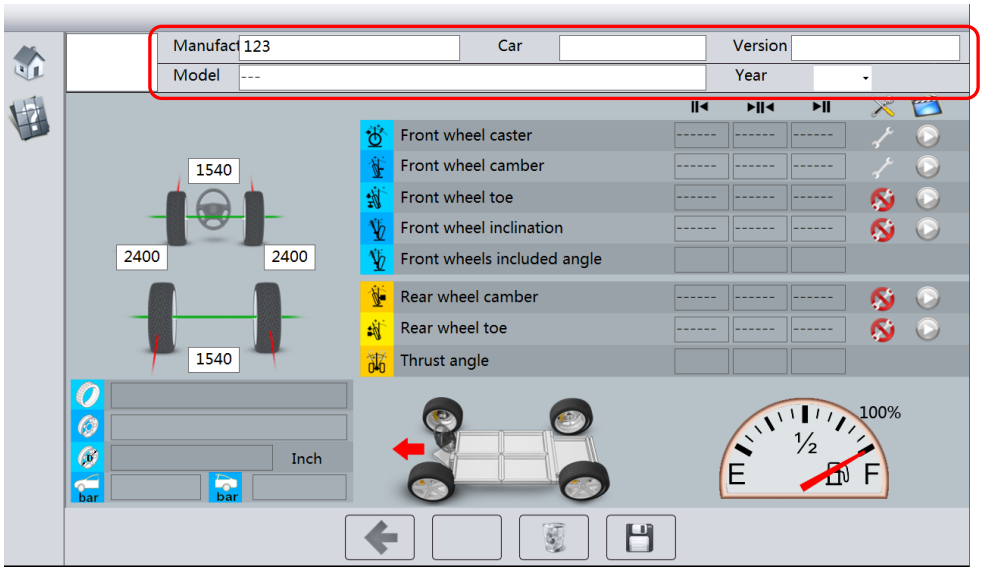


Fig.15

2. Data addition: Choose the items to be added, double click the mouse to add and note whether the vehicle can be adjusted or not. (See Fig.16) After addition, save and exit.

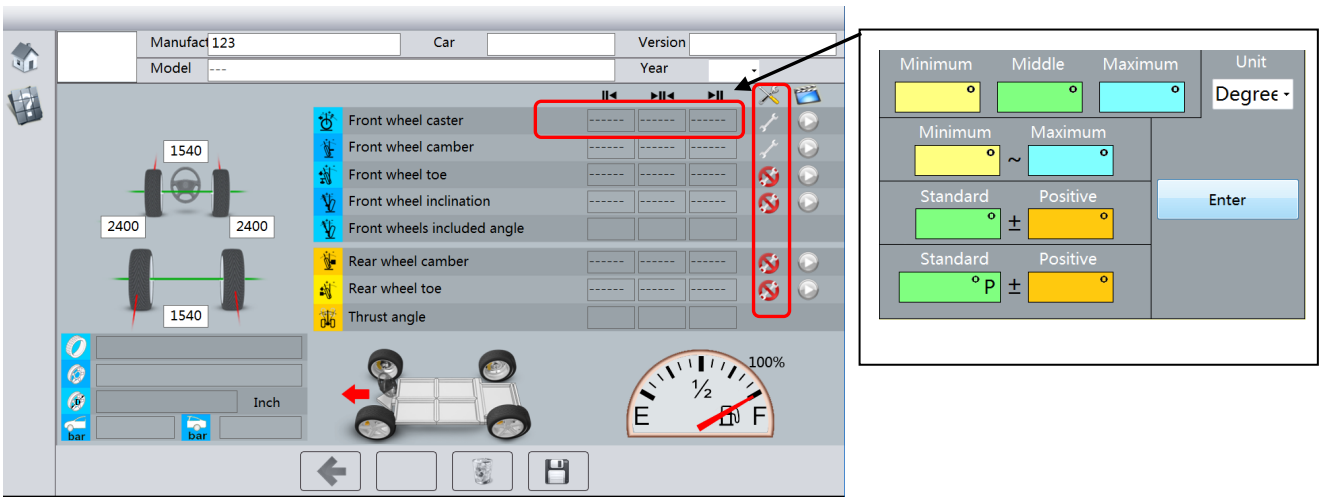


Fig.16

3. After data addition, users can go to the user self-defined database to check the added data.

4.2.2 MODEL DATA DISPLAY

Click directly when finding the model to be aligned. Enter data display interface of Fig. 17 .The values displayed are standard values, according to which auto is adjusted. Users can modify the rim size according to the vehicle condition.

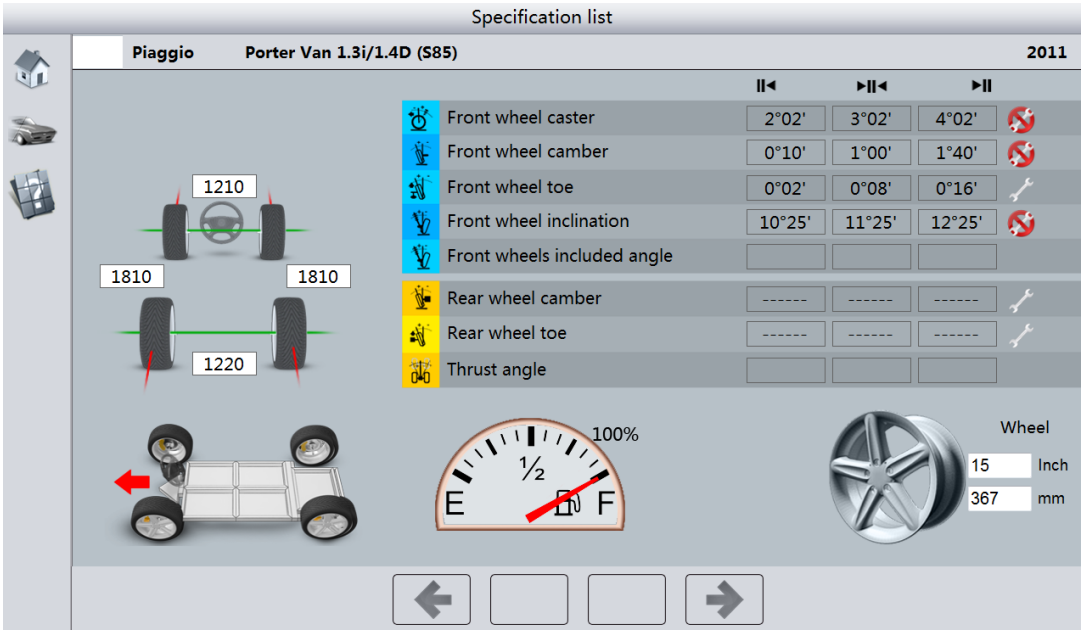


Fig. 17

4.2.3 CHECK UP SELECTION

Users can select the options to check as per their need. See Fig.18. The items can be reduced, added or canceled.

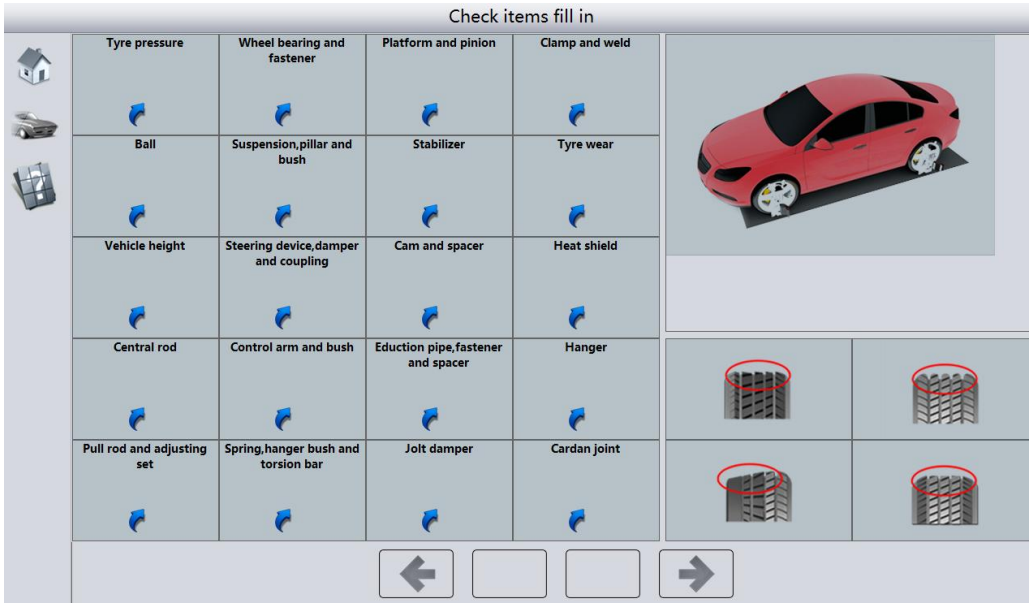


Fig.18

4.2.4 DRIVING GUIDE INTERFACE

Connect a camera to see the position or direction of the car when driving. (Users can choose to use or cancel this option in the service menu)

4.2.5 PUSH COMPENSATION

Due to rim deformation, installation error of rim clamps or other operations, the targets fixed on rims may not be on the same plane as the actual wheel. If error compensation is not carried out, the measuring value of wheel camber and toe will have big difference. Therefore, before alignment, rim run-out compensation to installed measuring system is the guarantee to accurate measuring results. Push the car forwards and backwards to compensate as shown in Fig.19.

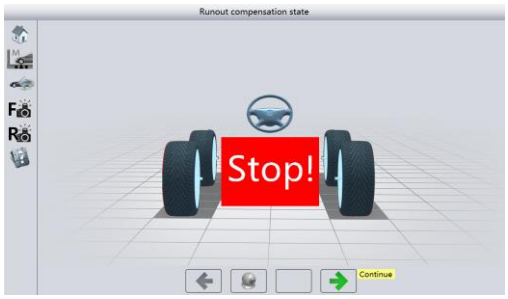


Fig.19

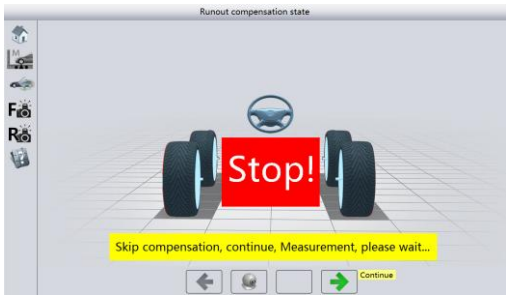


Fig.20

NOTE:

1.User must compensate the platform before measurement. After the compensation, if platform has no changes, for any future measurement of any car, no more compensation is needed. User can skip the compensation process as shown in Fig.20. Platform is compensated in the following way:

In the push compensation interface click the button  : it tells compensation must be done as shown in Fig.21. Click “confirm” to compensate.

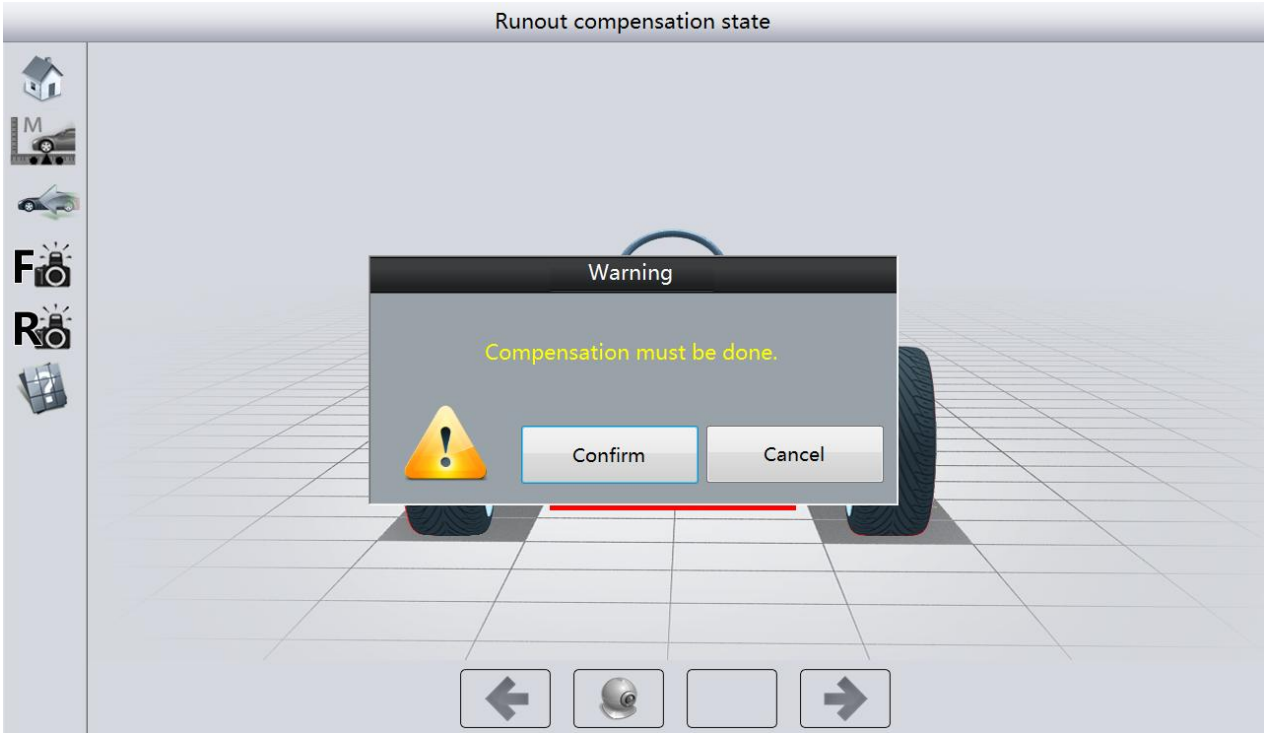


Fig.21

2. Compensation must be done if rims are not in good condition.

3. For two wheels fast measurement, rear targets are not necessary to use. Other operations are the same as four wheels measurement.

4.   Exposure adjustment icon:

The two icons are used to change the values when the targets and cameras are interfered by the ambient light. Both of the front and rear values range from 20 to 0. Adjust them until the targets are well displayed in the screen.

4.2.6 MEASUREMENT

After compensation, enter measurement screen. Pull up the hand brake and fix the foot brake, unplug the locking pin of turn plates and slide board, put straight steering wheel as shown in Fig.22.

Fig.22

4.2.6.1 4 POST LIFT, BIG SCISSORS LIFT OR PLATFORM MEASUREMENT MODE

Users can select 4 post, big scissors or platform option in the service settings.

12（20）degrees measurement is compulsory for caster measurement. Measure the different values and calculate caster by swinging steering wheel 12 (20) degrees to both left and right side. To skip caster measurement, click NEXT in the interface shown in Fig.23 to enter next screen.

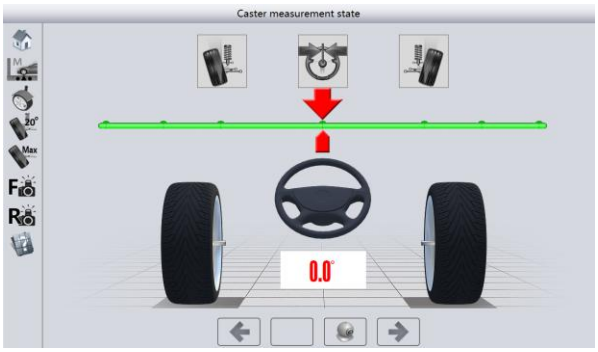


Fig.23

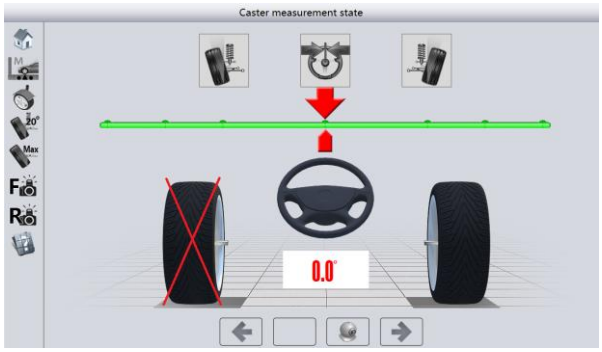


Fig.24

Note: 1.If front wheels are blocked, Fig.24 will appear. Check and remove the block.

2. There are three icons on the left of this screen,  standing for normal caster measurement; 

standing for 20 degrees caster measurement and 

standing for maximum turning angle measurement. The default measurement is normal caster measurement. User can select the other icons when necessary.

After 12(20) degrees measurement, software will enter Fig.25. Put straight the steering wheel and fix it, pull up hand brake and fix the foot brake. Click NEXT to enter adjustment interface.

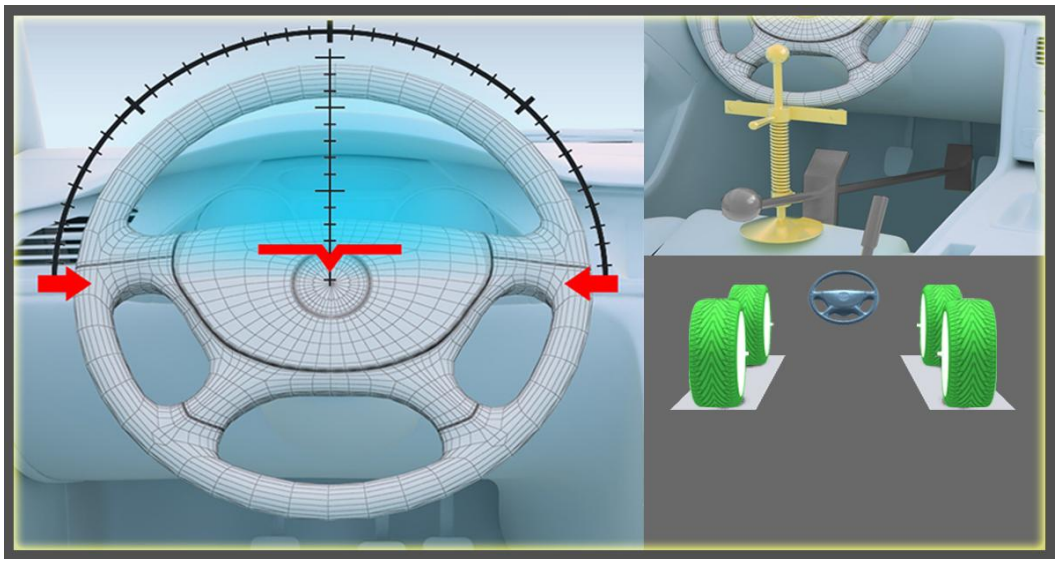


Fig.25

4.2.6.2 2 POST OR SMALL SCISSORS MEASUREMENT MODE

Users can select 2 post, small scissors option in the service settings.

As animation shows, put straight steering wheel and lock it,(Fig.26).Pull up hand brake and fix the brake pedal.

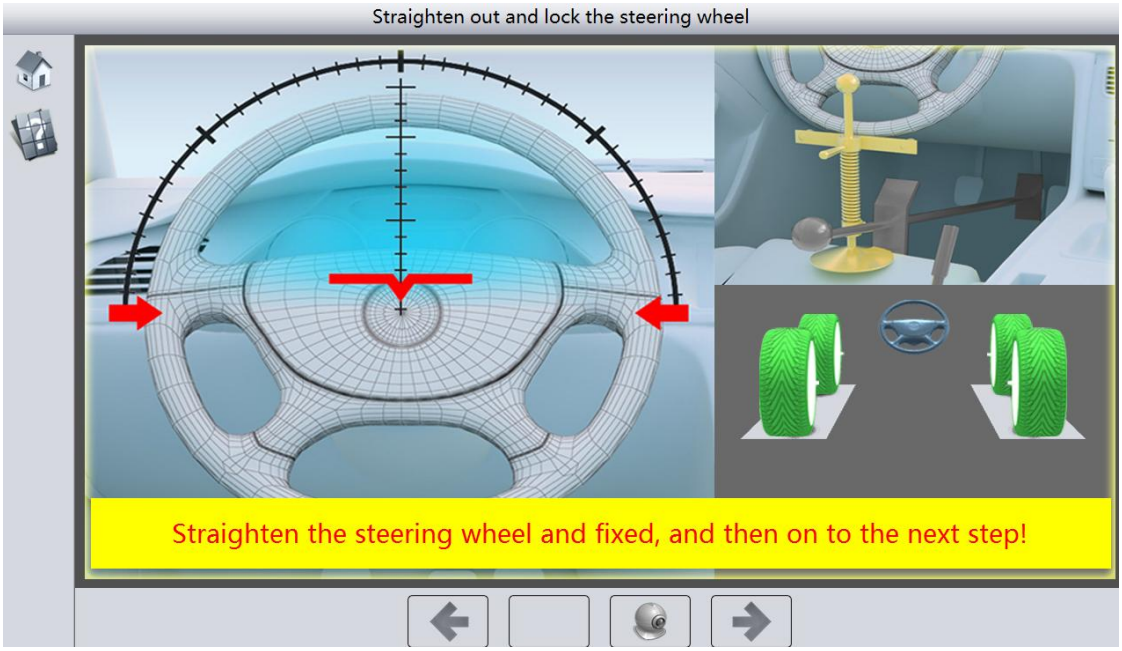


Fig.26

Click NEXT to enter car lifting screen as shown in Fig.27.According to the prompt lifting vehicles to measure four tyres from a distance to stop lifting ground vehicles, after waiting for vehicle stability, click the next button, enter the kingpin caster Angle measuring operation as shown in figure 28,Take off the steering wheel fixer, turn left and right by 12 (20) degrees. The software takes the level value changes during turning and calculates the caster finally.

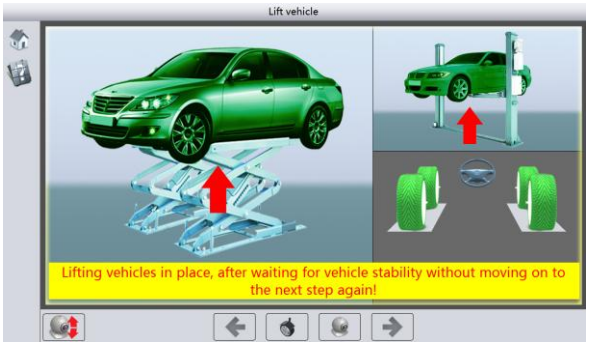


Fig.27

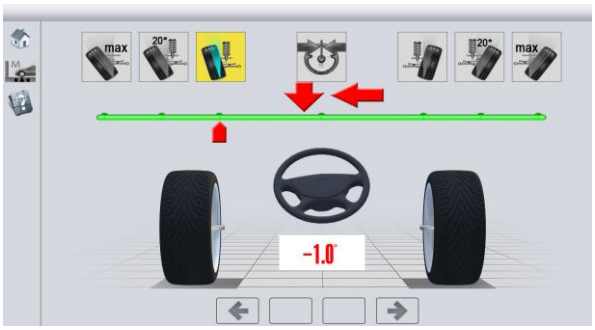


Fig.28

After caster measurement, put straight and fix the steering wheel as shown in Fig.29.

Click NEXT to enter car lifting screen as shown in Fig.30, when the car is lifted to a height that allows adjustment, stop and go to next operation.

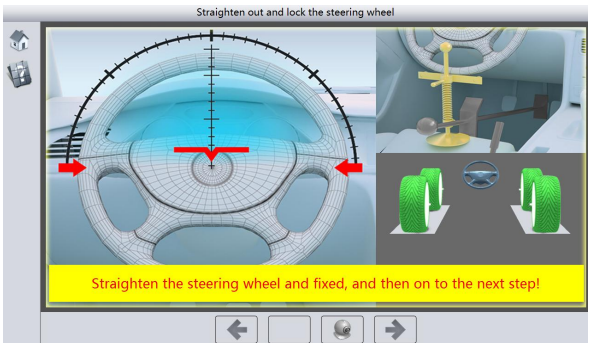


Fig.29

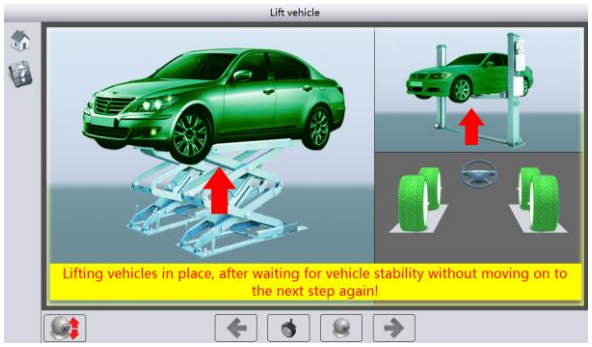


Fig.30

Warning: Targets shall not be blocked during measurement.

4.2.7 VEHICLE ADJUSTMENT

After initial measurement, enter vehicle adjustment interface. Put straight the steering wheel and then lock it in case it turns to affect measurement and adjustment. In addition, it can ensure the car is going in straight direction after adjustment.

4.2.7.1 REAR WHEELS ADJUSTMENT

Enter rear wheels adjustment interface as shown in Fig.31.

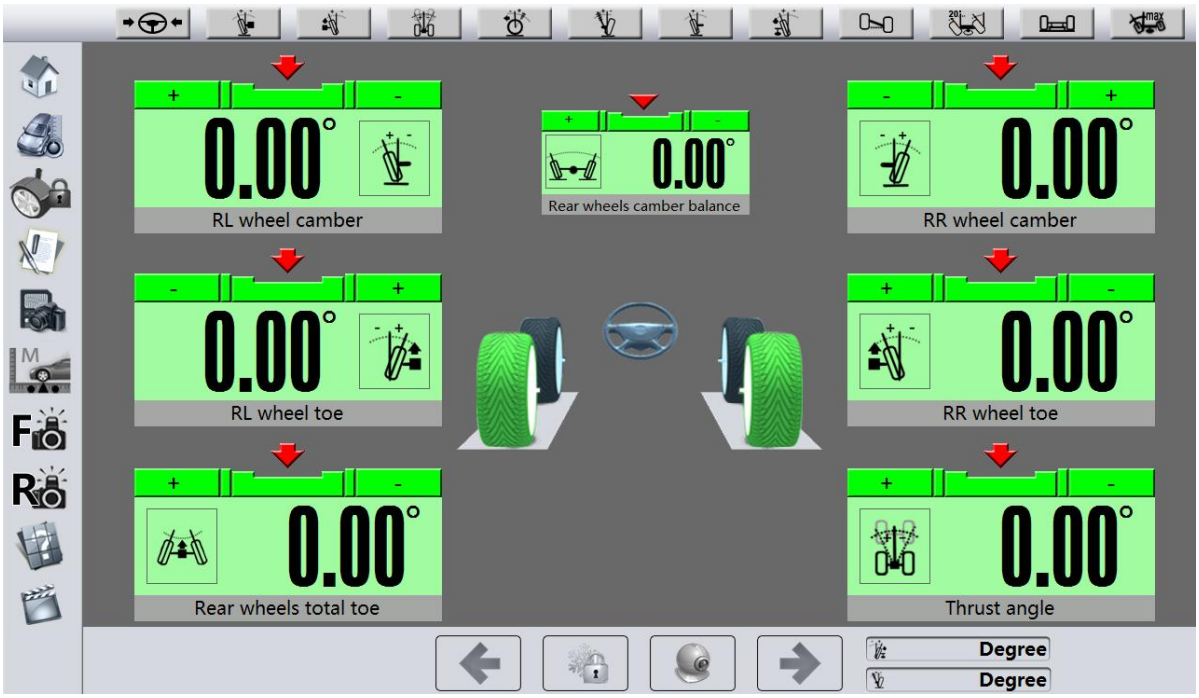


Fig.31

Here, the two green wheels means rear wheels adjustment. Values are displayed in 3 lines. The top line shows camber with rear left camber on the left, rear right camber on the right and their difference in the middle. The second line shows toe with rear left individual toe on the left and rear right individual toe on the right. The bottom line shows rear wheels total toe and thrust angle.

On the top of the green data display area, there is a narrow red and green bar, which displays the standard specifications. From the left to the right are minimum value, middle value and maximum value. The measured values will turn to red if they are out of the range of specification. In this interface at the upmost top is a row of shortcut:

 Rear wheels camber  Rear wheels toe  Rear wheel thrust angle  Front wheel caster  Front wheel inclination  Front wheel camber  Front wheel toe  Setback  Toe out in turn  Toe curve  Maximum turning angle

To adjust a certain angle, click the single angle adjustment. It can avoid visual mistakes and easy to use. Users can click the blank area to enter single angle adjustment interface, or click a data displaying area to enter single wheel adjustment interface. See Fig.32 and Fig.33.

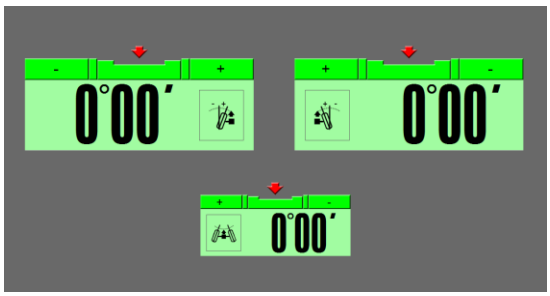


Fig.32

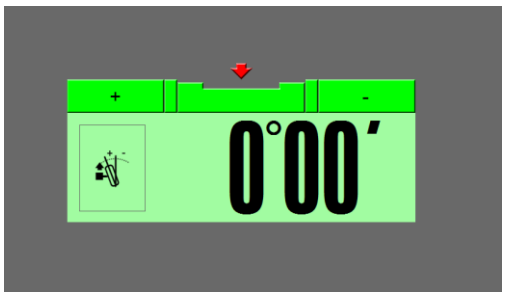


Fig.33

In the rear wheels adjustment, move the mouse to the left or the right screen, a shortcut menu will appear as follows:

 Back to main window  Full car adjustment  Front wheel caster and KPI lock  Initial measurement reading  Help  Video guide  Screenshot  Front target exposure adjustment  Rear

wheel target exposure adjustment

Note: When doing caster and KPI adjustment, the front wheel caster and KPI should be unlocked by clicking this icon  , which will be turned to  , and then adjustment can be done. If not doing adjustment, the caster and kPI must be locked and it will be defaulted as locked in the adjustment screen.

4.2.7.2 FRONT WHEEL ADJUSTMENT

After completing rear wheel adjustment and enter into the front wheel adjustment interface. (Fig. 34)

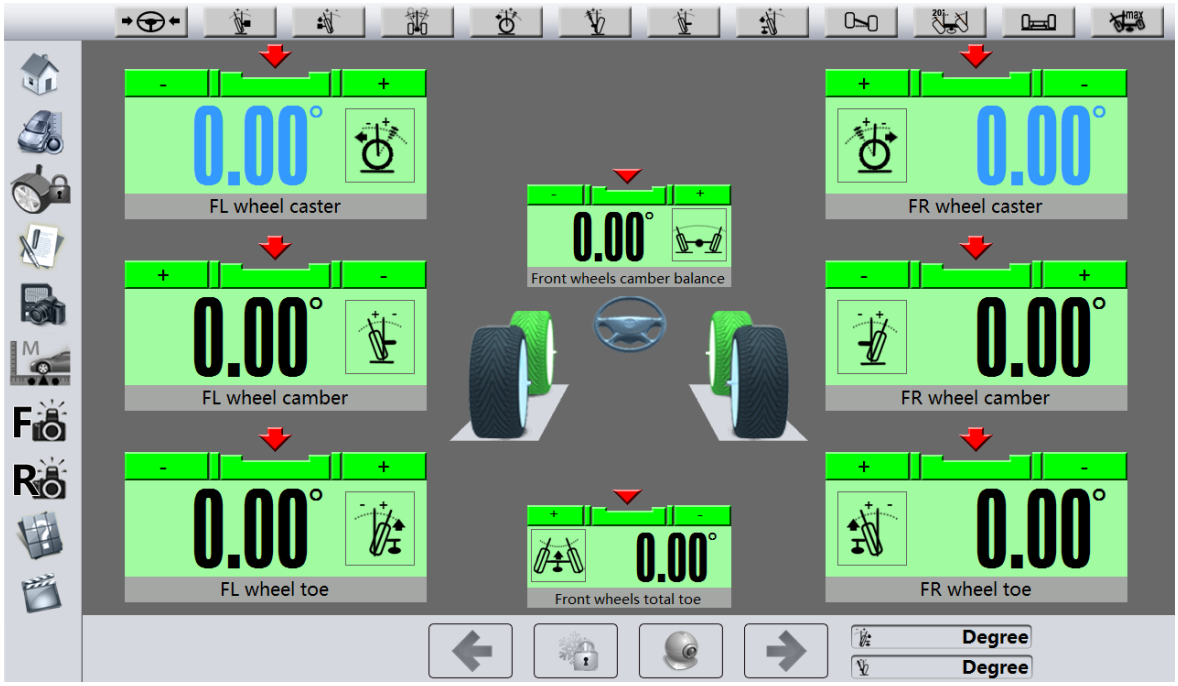


Fig. 34

Here, the two green wheels mean front wheels adjustment. Values are displayed in 3 lines. The top line shows caster with left wheel caster on the left and right caster on the right. The second line shows camber with left wheel camber on the left and right camber on the right. The bottom line shows toe with left wheel individual toe on the left, total toe in the middle and right individual toe on the right.e.

On the top of the green data display area, there is a narrow red and green bar, which displays the standard specifications. From the left to the right are minimum value, middle

value and maximum value. The measured values will turn to red if they are out of the range of specification. Like the rear wheel adjustment, users can click the shortcut button or move the cursor to any point of the display area to enter single item adjustment image or single wheel adjustment image.

The steering wheel check

In 4 post lift, big scissors or platform measurement mode,
Normal car measurement to car adjustment interface as Fig.35. Car adjustment is finished, click  button, enter steering wheel check-in operation as Fig.36. Turn the steering wheel on the left and right according to arrow prompt, and turn it to the middle position. Back to car adjustment interface, check whether data is correct or not. If not correct, please continue to adjust car until no need to adjust.

图 35

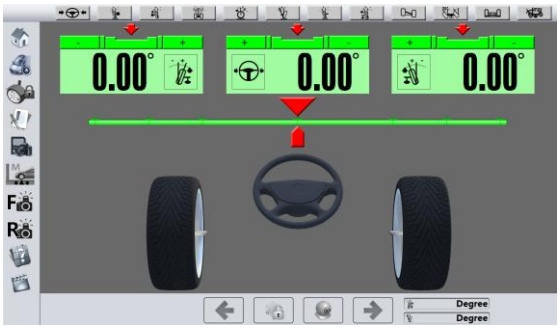


图 36

At the right bottom of the front wheel adjustment and rear wheel adjustment interface are 2 buttons which convert toe unit and other angles unit respectively. Toe units are : degree, degree minute, millimeter and inch. Other angles only have degree and degree minute.
Vehicle adjustment sequence:
Generally, the vehicle adjustment sequence will be as follows: Rear wheel adjustment before front wheel alignment. For front wheel adjustment, caster should be done before camber. Toe-in should be the last to adjust.
The wheel alignment program is based on thrust line measuring principle. Due to the difference of rear wheel toe-in, the car will produce a thrust line which forms the thrust angle with the geometric vehicle center line. The thrust line reflects the actual driving direction of the vehicle. Due to the thrust angle, the front wheel must be turned to the direction of the thrust line to keep the vehicle straight forward. Therefore, if the thrust angle compensation is not carried out to the front wheel toe-in, the steering wheel must be turned to one side when driving straight forward. When applying adjustment, the thrust angle has to be compensated to the front wheel toe-in. That is why the front wheel has to

be adjusted before the rear wheel. For front wheel adjustment, influenced by the vehicle chassis structure, the toe-in will change following the camber and caster adjustment. If the toe-in is adjusted first, the toe-in will be inaccurate due to the later caster and camber adjustment. Therefore, the adjustment sequence must be followed.

NOTE:

1. When doing two wheels fast measurement, only two front wheels data will be displayed and adjusted.
2. In 4 post lift, big scissors or platform measurement mode, if the car needs lifting, user needs to click the button  in the adjustment screen to freeze the data. Lift the car to a height that allows adjustment as shown in Fig.37,（For 2 post and small scissors mode, the car has already been lifted to the height that allows adjustment, so it is not necessary to freeze the data.) When the car is stable, click the button again to unfreeze the data and adjust the car.

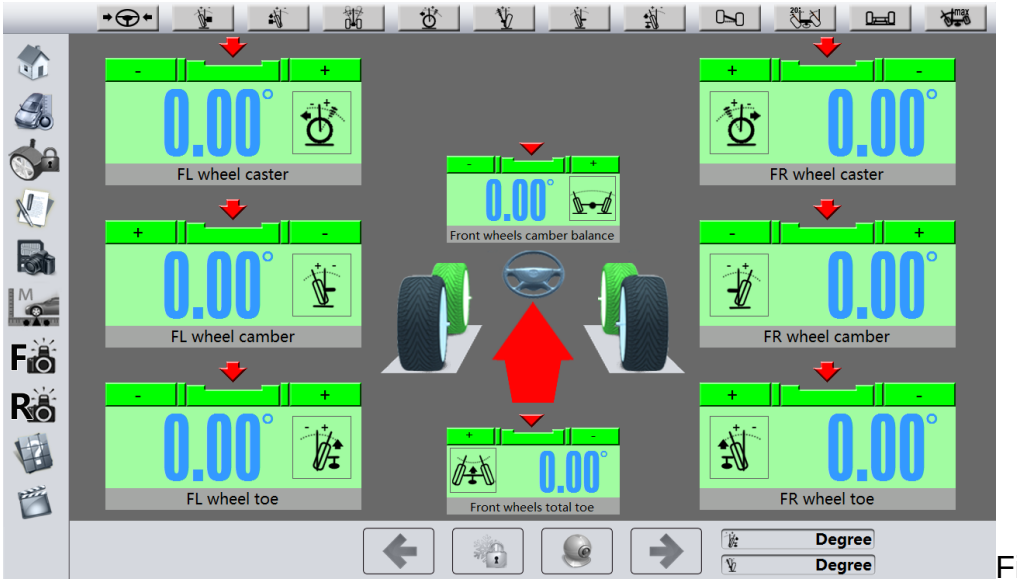


Fig.37

After completing the adjustment and enter the next option, data after adjustment is shown in Fig.38.

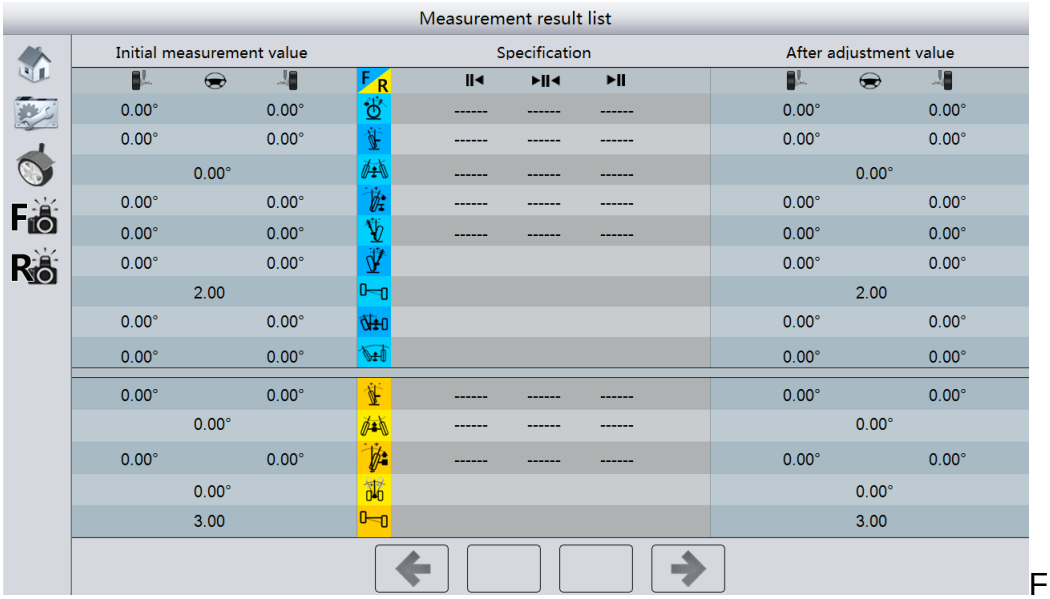


Fig.38

The left column of the form shows the primary data measured. The middle column is the measurement items. The right column shows the data after adjustment. If the data is in the standard range, the box is in green. If the data is beyond the standard, the box is in red.

4.2.8 CLIENTS DATA INPUT

In the data display interface after adjustment, click NEXT to save the measurement results and exit to the main interface if not saving the results.

After finishing the measurement and adjustment, input some basic information of the customer and some records of the maintenance in the interface as in Fig. 39. From the top to the bottom, input customer's name (must), license No., telephone, address, test time (automatic input) and test record. Below the basic information, users may input the vehicle information. The program will automatically input the information if the car model is selected before testing. The information can be either stored in the computer or printed out. After finishing the test, click exit to the main interface.

Printout: Click the print button at the bottom of the screen to enter preview as shown in Fig.40. Users can select the format needed at the upper right corner of the screen.

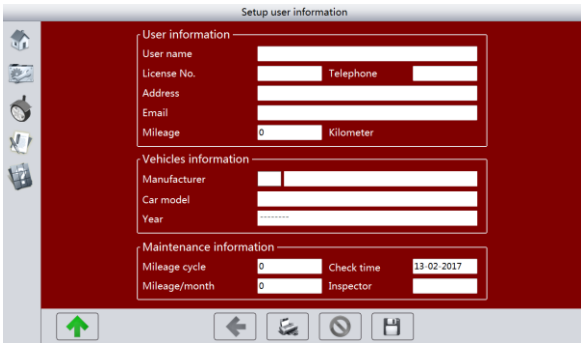


Fig.39

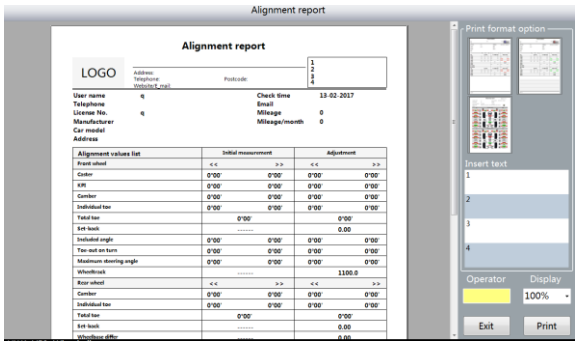


Fig.40

After measurement, click to return to the main interface.

 Back  Print  Finish measurement

 Save

CHAPTER 5 SOFTWARE SETTINGS

This part of the manual introduces relative settings of the system software. Please read it carefully.

5.1 STARTUP OF WHEEL ALIGNMENT SOFTWARE

Click the shortcut icon to enter the software as shown in Fig.41.Wait for initialization.

Fig. 41

There are 4 buttons on the left side of the alignment system main interface:

 Client's data  Direct adjustment entrance  Two wheels toe adjustment  Help  Photo review, to review the screenshot taken in the adjustment screen

There are 4 buttons on the bottom of the alignment system main interface:

 Exit  Service  Open auxiliary video  Start measurement

5.2 SERVICE MENU SETTINGS

Click  button and input password as shown in Fig.42. After the correct password to enter four-wheel-location service settings interface shown in Fig.43.

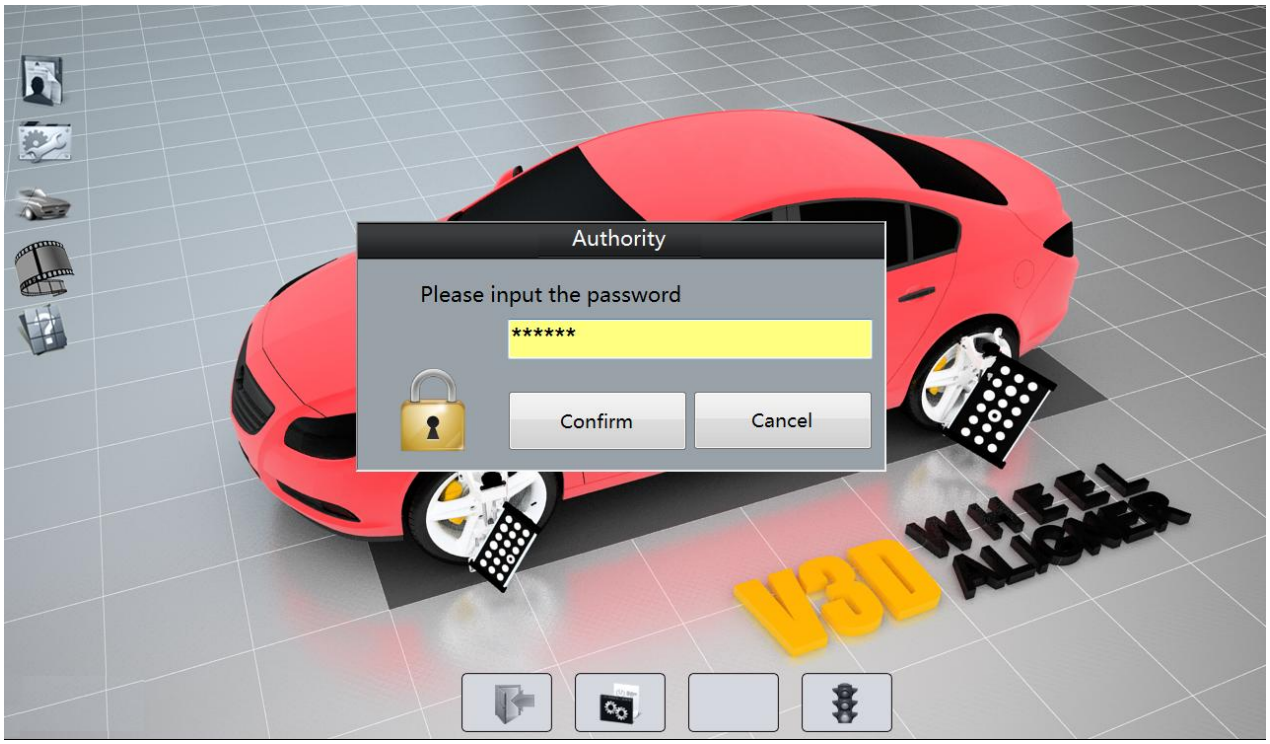


Fig. 42

5.2.1 SYSTEM SETTINGS

Software language, car lift models, compensation, clamp type, target type, auxiliary options and password can be set in this interface.

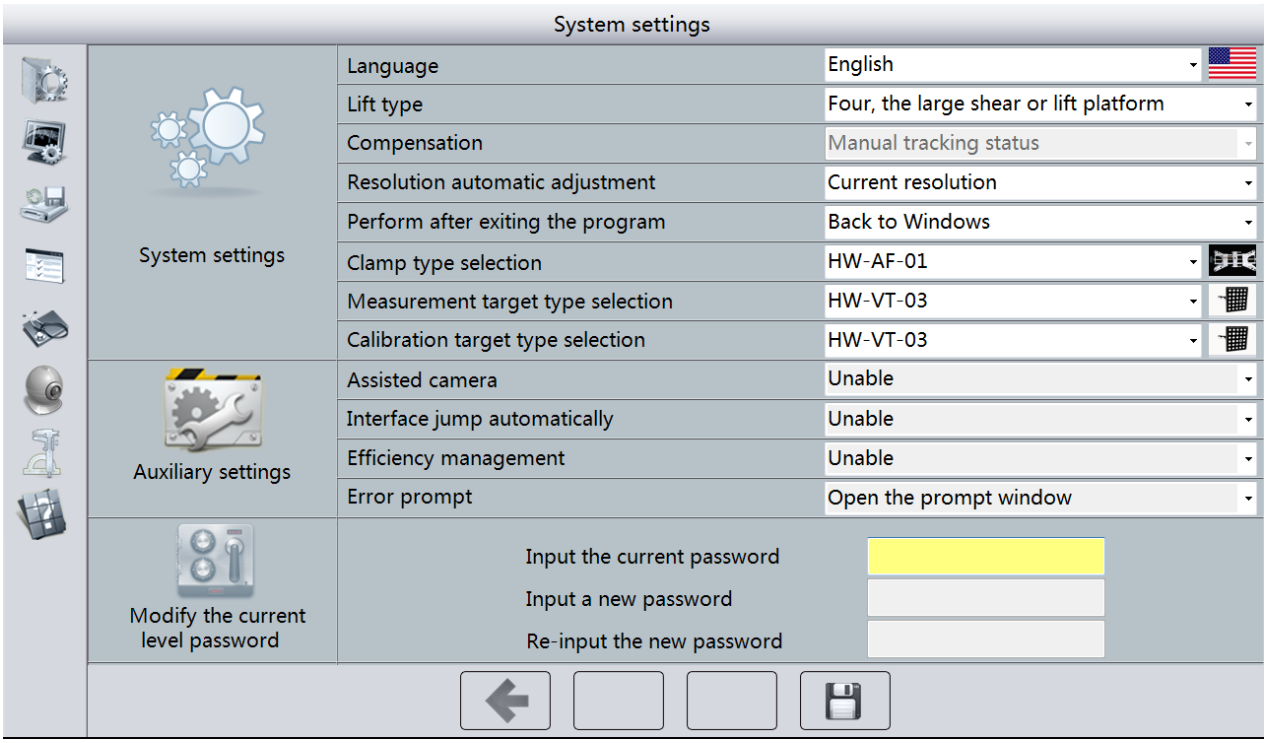


Fig. 43

NOTE: In the system settings screen, clamp and targets can be selected in accordance with the real clamps and targets types provided with the machine.

System settings Display settings Database management Check-up selection settings Diagnosis Camera situation settings Calibration settings Help

5.2.2 DISPLAY SETTINGS

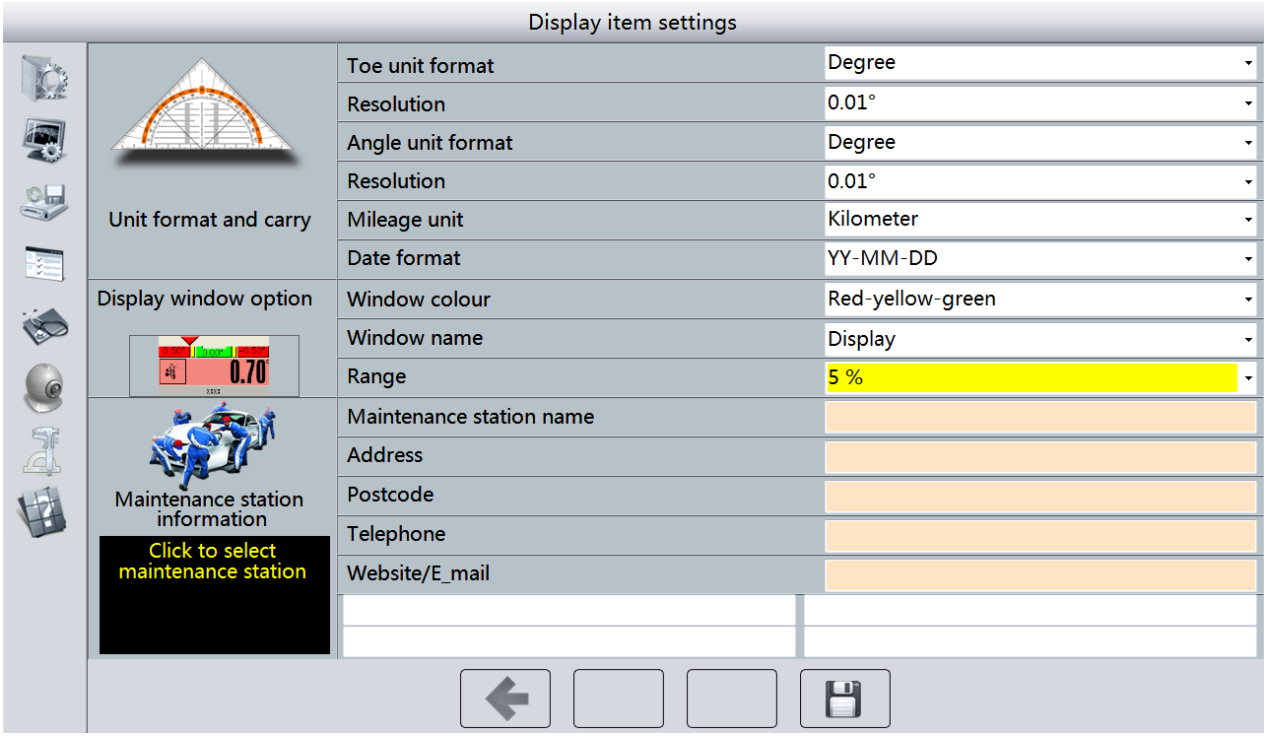


Fig. 44

This interface is to set unit and carry, display window, interface management and maintenance station information as shown in Fig. 44

5.2.3 DATABASE MANAGEMENT

Use database management to back-up, recover and upgrade database etc as shown in Fig. 45.

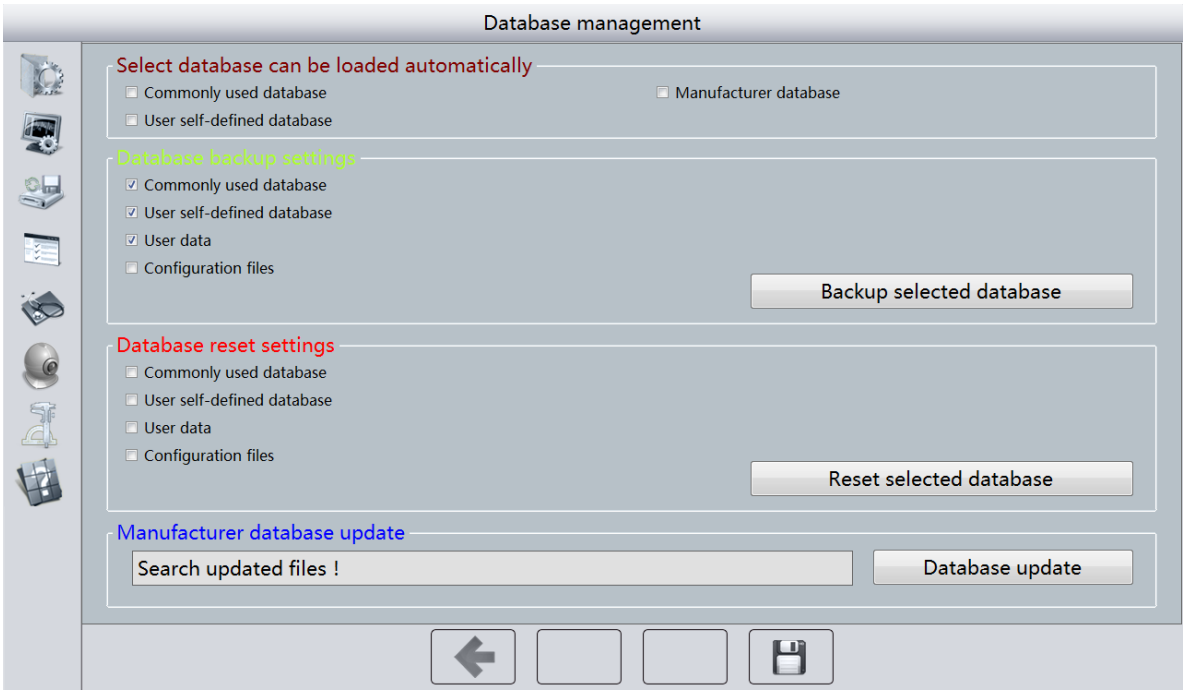


Fig. 45

Notes: If user appear wrong prompt when backup database or restore, please exit the software, and run it as administrator can backup database or restore.

5.2.4 CHECK-UP SETTINGS

In this interface, user can select checking tire pressure, ball joint, vehicle body height and etc. (See Fig.46)

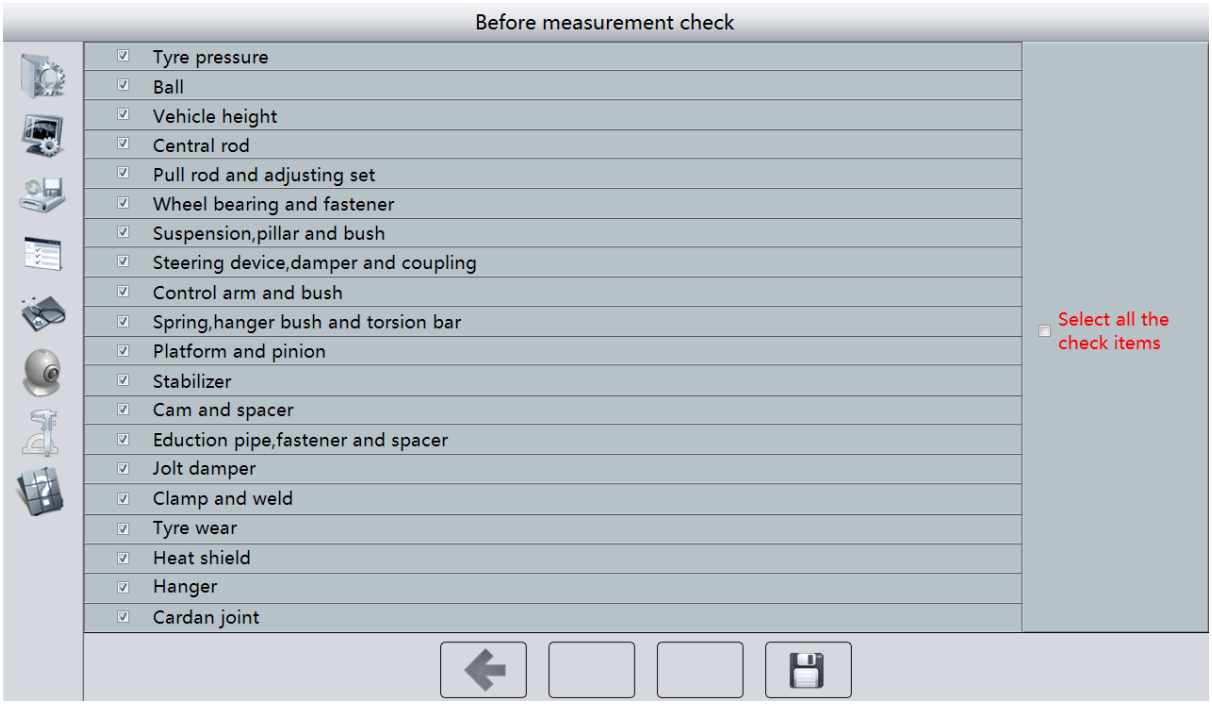


Fig.46

5.2.5 DIAGNOSIS

This function is to test cameras, targets, power supply and beam height. See Fig.47.

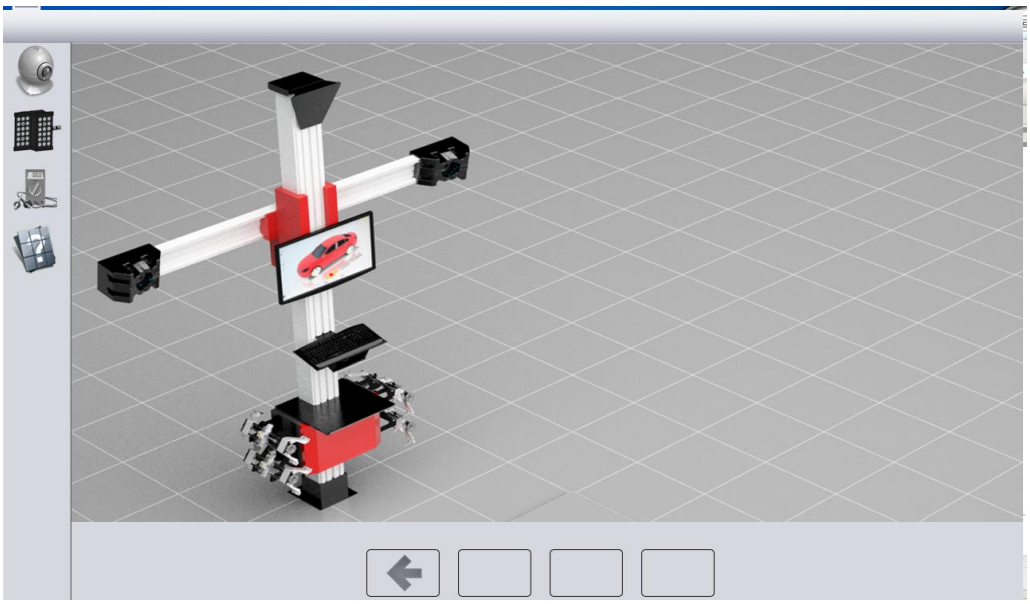


Fig. 47

 Camer test  Targets test  Internal power test  Help

5.2.5.1 CAMERA TEST

Check targets situation in the camera.

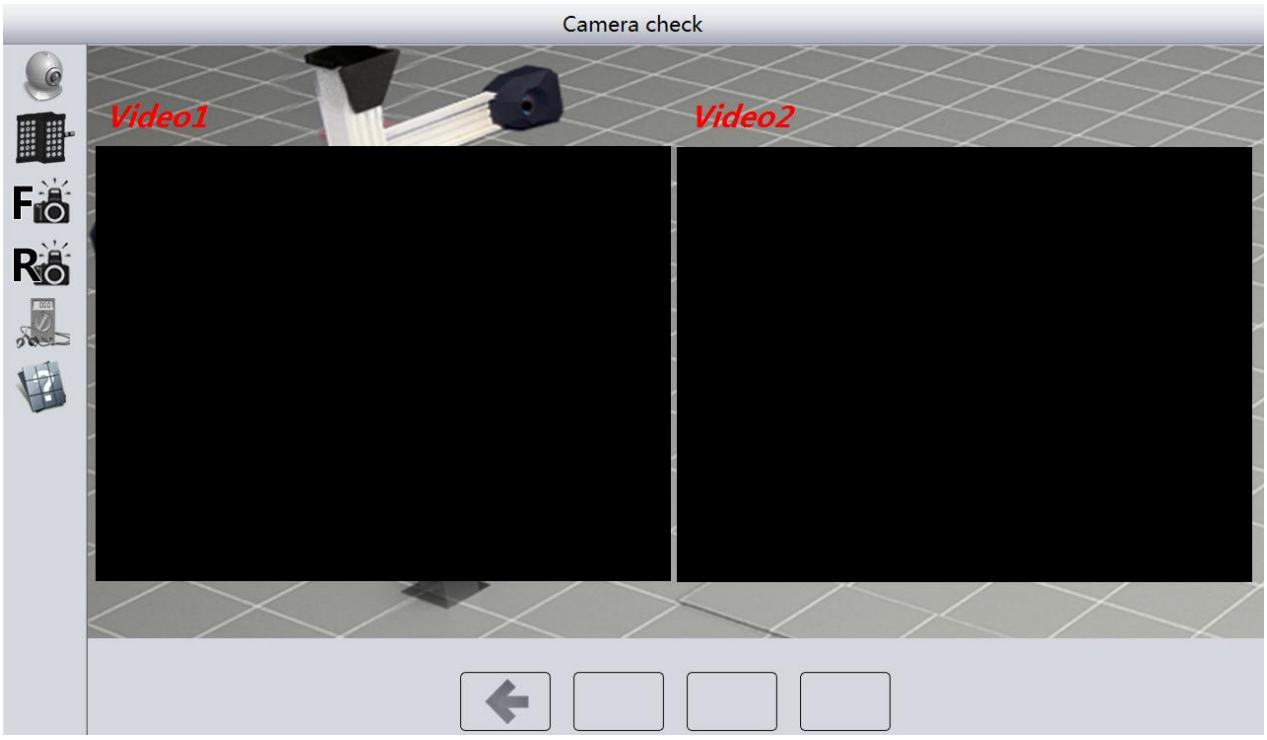


Fig.48

5.2.5.2 TARGETS TEST

Check targets reliability, space distance parameter etc.

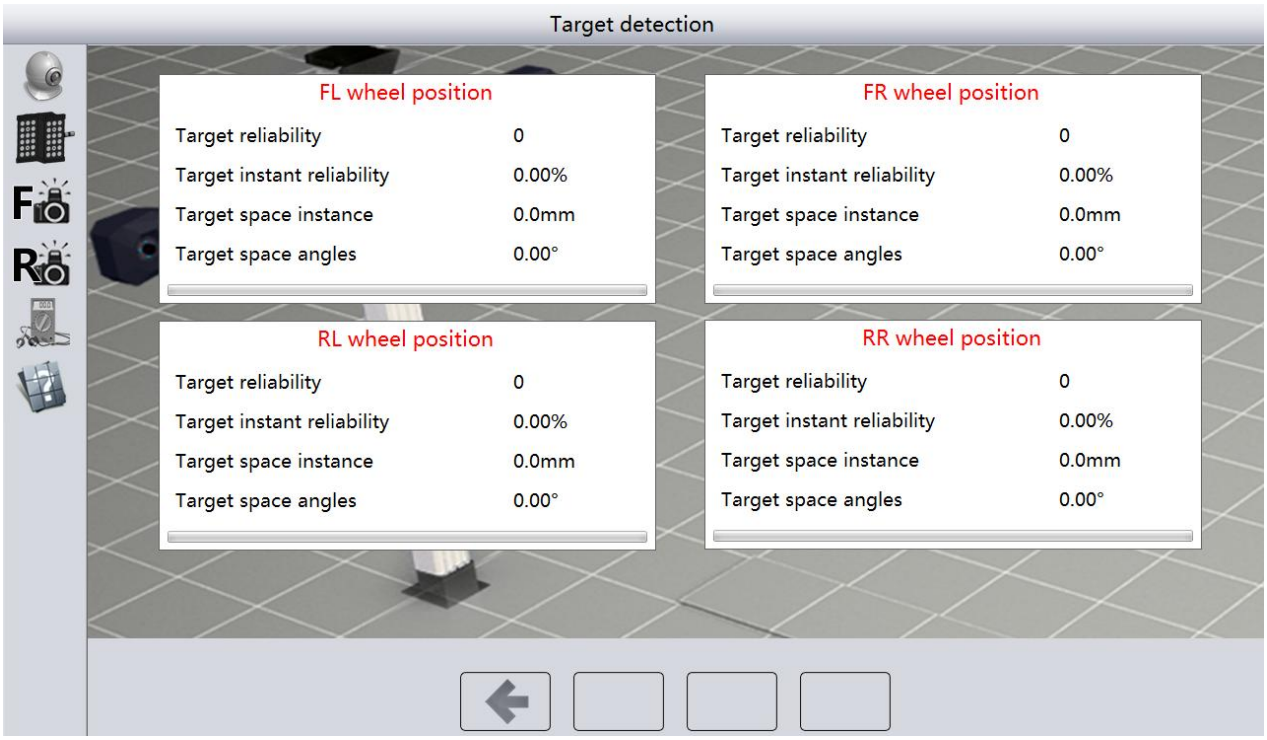


Fig.49

5.2.5.3 INTERNAL POWER TEST

Check camera direction indicator lights and internal working power.

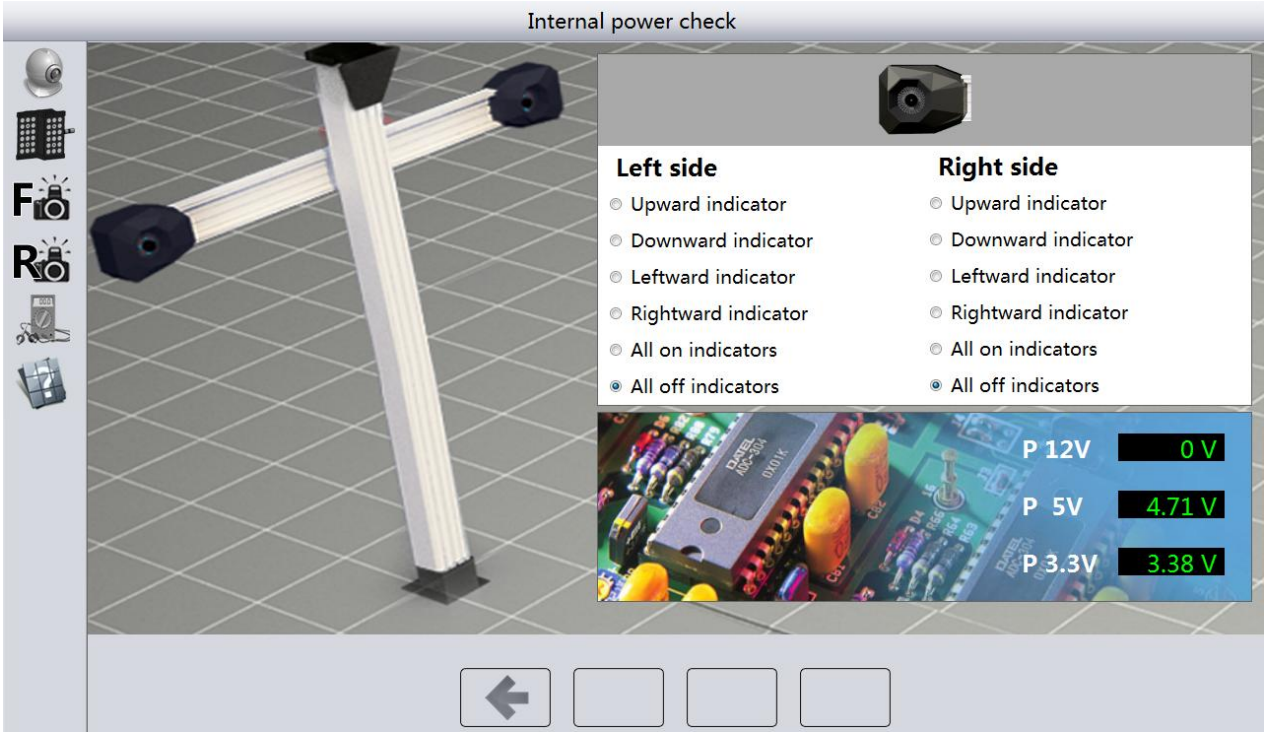


Fig.50

5.2.6 CAMERA SITUATION SETTINGS

Click and enter camera situation settings, click the next step,see the picture as Fig.51. Click the next step and enter camera direction settings, click the corresponding situation in the software according to camera indication as Fig.49. Click the next step to confirm.

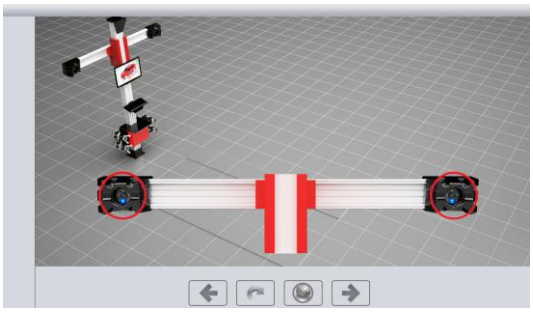


Fig.51

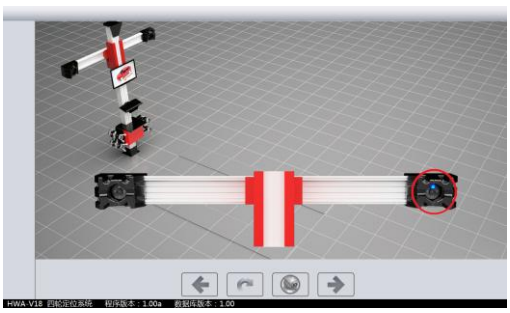


Fig.52

5.2.7 CALIBRATION SETTINGS

Set camera, targets, camera direction. See the picture as Fig.53

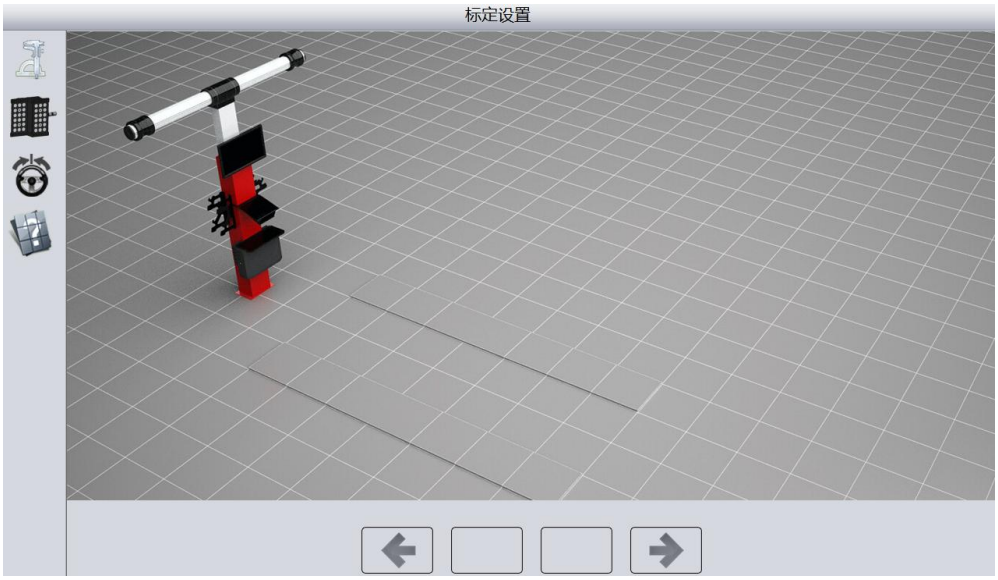


Fig. 53

 Camera calibration  Targets calibration  Direction auxiliary calibration  Help

5.2.7.1 CAMERAS CALIBRATION

Enter cameras calibration interface as shown in Fig.54, click continue start calibration. Follow the software instruction to put the calibration rig and then operate step by step as shown in Figs. 55-59.

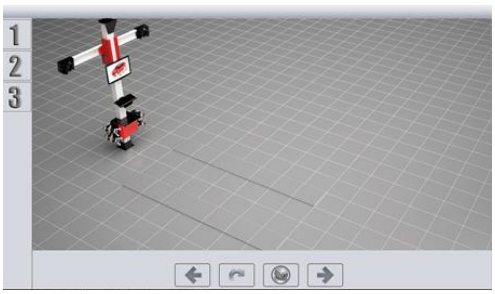


Fig. 54

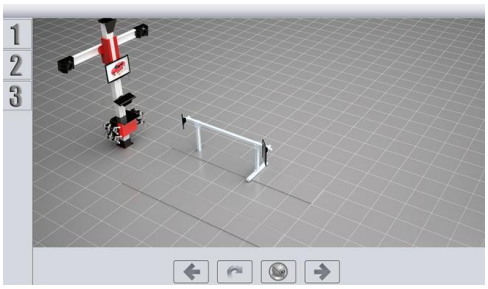


Fig. 55

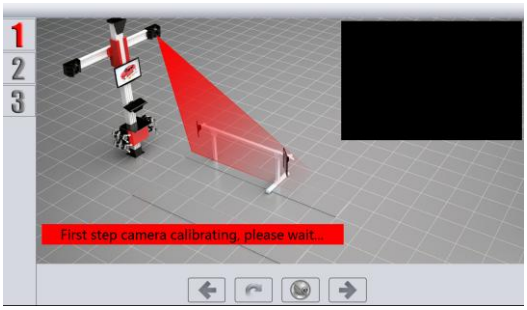


Fig. 56

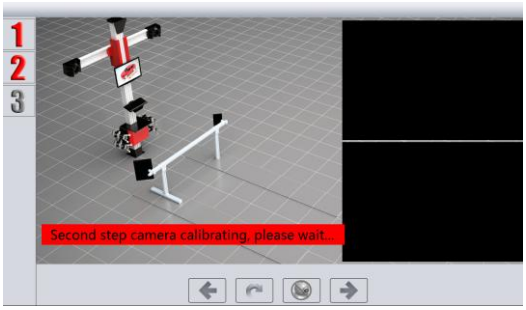


Fig. 57

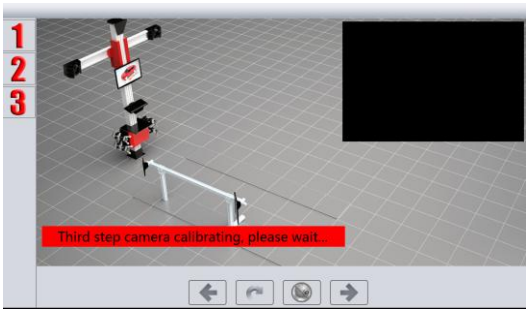


Fig. 58

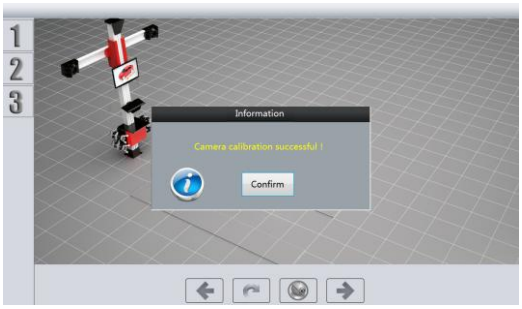


Fig. 59

5.2.7.2 TARGETS CALIBRATION

Enter targets calibration interface as shown in Fig.60, click one of the targets and in the screen shown in Fig.61 click the target again. When the target on the calibration bar turns red and a prompt appears at the bottom of the right corner of the screen, rotate the target counterclockwise to the camera direction until all indicating lights are on. When an opposite arrow appears on the screen, rotate the target clockwise to the camera direction until all indicating lights are on. When an opposite arrow appears on the screen, rotate the targets counterclockwise again until all the indicating lights on, when the target on the calibration bar turns green, calibration is finished. The other 3 targets are calibrated in the same way.

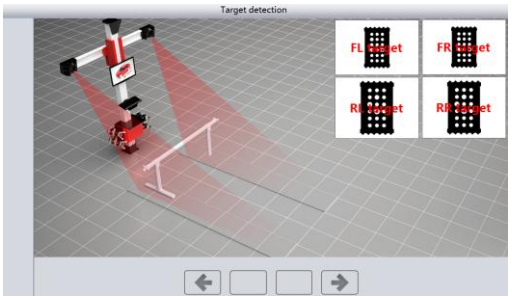


Fig. 60

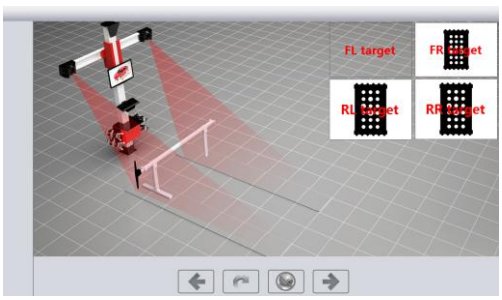


Fig. 61

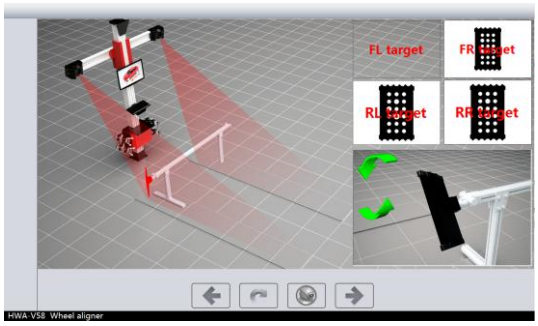


Fig. 62

5.2.7.3 THE STEERING WHEEL AUXILIARY CALIBRATION

After adjust vehicles, the steering wheel is not straight when test vehicles, please do the steering wheel calibration operation, method as follows:

1)Adjust the steering wheel and keep vehicle run in a straight line, record excursion angle at this time.

2) Test vehicle is finished, click service button to enter system settings, click calibration button to input calibration password, click  steering wheel auxiliary calibration button to appear the prompt frame, click confirm as Fig. 63, Set OK and exit service settings, do the normal measurement.

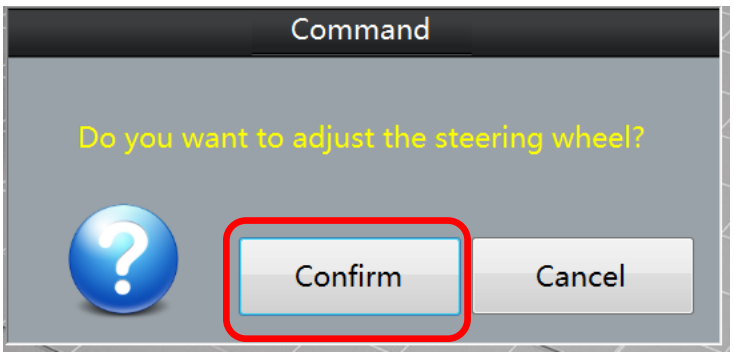


Fig. 63

3）Adjust vehicle interface as Fig.64, click the steering wheel auxiliary calibration button, enter it as Fig.65, Operation according to prompt, then back to main interface and enter service settings, enter calibration, click  the steering wheel auxiliary calibration and appear the prompt, click confirm. The steering wheel calibration is finished.

Fig. 64

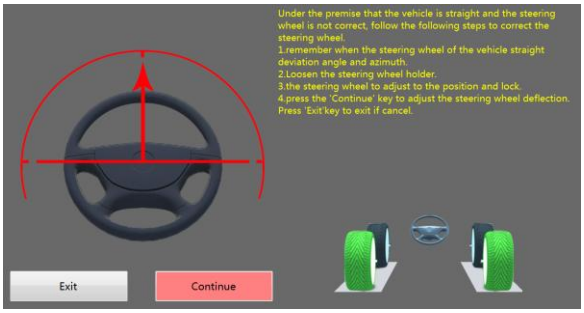


Fig. 65

5.3 SAVE AND EXIT

After system service option settings, click  to save and exit.

CHAPTER 6 MAINTENANCE

6.1 COMPUTER MAINTENANCE

- Users should have certain knowledge to computer software and hardware so normal computer operation can be carried out.
- The main cabinet and the monitor should be placed on the working platform steadily. The system should be kept away from radiation source and heat source. Explosion to heat, sun, cold and humid should be avoided.
- Do not insert any articles into main cabinet and monitor.
- Do not move or shake the computer during the operation.
- Do not turn on the computer frequently.
- Do not modify the BIOS setup randomly.
- Do not delete the unknown files in the hardware randomly in the event of computer shutdown.
- Do not run other software in the main cabinet to avoid virus.
- Clean the keyboard, main cabinet and display periodically with neutral detergent or absolute alcohol. Oily or corrosive material should be strictly avoided to contact computer.
- Unauthorized takedown computer, amendment of internal connection and board are forbidden in the event of internal device damage.

6.2 PRINTER MAINTENANCE

- Read the user's manual carefully.
- Install the printing drive procedure correctly to guarantee the printer setup.
- Please replace the ink cartridge in time if the printing is not clear after a period of application.

6.3 MAINTENANCE OF CLAMPS

- Clean and lubricate clamps periodically to keep it moving smoothly.
- Handle clamps attentively to avoid collision and impact for fear of affect the measuring accuracy.

6.4 MAINTENANCE OF TARGETS

- Clean targets in time.
- Handle targets attentively when in use to avoid inaccurate measurement caused by collision or impact.

6.5 MAINTENANCE OF TURNTABLES

- Lubricate the turntables periodically to keep it flexible.
- Please insert the locking pin when moving vehicle on turntable to prevent damage.

CHAPTER 7 PROBLEMS AND SOLUTIONS

7.1 THE COMPUTER CAN NOT START, NO INFORMATION PROMPTS AVAILABLE.

- Check the power supply and the plug contact.
- Check the fuse of mainframe power socket . Replace it if necessary.
- Check whether the power cable disconnects and replace new cable.
- Check whether the power cord is connected ,the mainframe and display are switched and the indicator light is on.
- Check whether the contrast and brightness of display are set correctly.

7.2 THE COMPUTER CAN NOT ENTER WINDOWS INTERFACE.

- The hardware start file missing, please recover or install system
- Setting error of BOSS.
- Virus infection, run antivirus software.
- Hardware problem.

7.3 FAIL TO ENTER WHEEL ALIGNING PROGRAM.

- The wheel aligner program file missing or damaged, contact our technician to install new software.
- Supporting file of running wheel aligner file not installed or damaged, reinstall it.
- The wheel aligner program registry is damaged .
- The computer catches viruses, so please run antivirus software.

7.4 MOUSE OR KEYBOARD DOES NOT REACT.

- Wrong connection of mouse or keyboard or poor contact.
- Mouse or keyboard does not match the computer, so replace it.
- Mouse or keyboard is damaged.

7.5 PRINTER DOES NOT REACT.

- Check whether the power cord and the data wire of the printer are connected, the power is switched on, and the printer is on-line.
- Check whether the printer driving program is installed or set correctly.
- The printer has no paper or ink.
- The computer catches viruses.