3D WHEEL ALIGNMENT

USER MANUAL

Index

1. Equipment Important Notes

The automobile Four Wheel Alignment is a kind of precision electronic measuring instrumentation, which rolled up optics, electronics, machinery, computer, communication all into one. So in the usually uses, the attention maintenance is very important, and in order to provide faster, more accurate, better service to the customers, so the operators must be familiar with the use functions of the wheel alignment, and reasonable in use. Before using the wheel alignment, please referencing and following the safety information and maintenance procedure provided by vehicle manufactures. The following advises hope can help you maintaining the machine better.

1. 1 Daily Maintenance

1) The wheel alignment should be place in dry, avoiding the instrument corrosion, rust, or causing damage. Especially for the target bars, they must be assure being dustproof, sunscreen, waterproof.

2) When in the using process, the wheel alignment must be handled carefully, avoiding collisions, so as not to cause damage to effect the measurement accuracy.

3) Cleaning the surface of the instrument by using cleaning and dry soft cloth, especially attention to the surface of the target bars. The dust on the surface may lead that the camera can't recognize it. So we advise to clean the them termly.

4) Periodically cleaning and maintenance the turntable, wheel clamp, steering lock, break paddle depressor and other accessories. If necessary, please lubricate the mechanical parts.

5）Computer and printer:

The computer require the steady power supply.

Check up the printer's ink box if low periodically, if needed please read the instruction book for details.

1.2 Use a stable power supply

The fix power source for wheel alignment is: 220V (china mainland), 110V (western countries). If necessary, please use another power source voltage stabilizer.

1.3 Assembly and Setup

Installation and setup of a new aligner must be handled by a qualified Technical Representative.

All software is loaded onto the computer's hard drive. The software shipped with the unit serve as a backup and is not needed when performing alignments.

Instructions for operational setup of the aligner program are covered in detail in following sections of this User Manual. The setups for the PC hardware and Microsoft Windows are preset at the factory and should not be altered.

1.4 Installation of the wheel alignment

The beam(with cameras) must be located in the center of work station. The distance between the camera and the center of turntable is suggested at 1500-2000mm. (The installation drawing will be showed in following section.)

1.5 How to do positioning services better

Wheel alignment is a technical, positioning services technician first continuous access to relevant materials, to enrich their own theoretical knowledge, but also need to gather experience of chassis maintenance in practical work, and learn about the knowledge of the chassis from various new models, so that to insist on reasonable use in the practical positioning operation.

1.6 The benefit of saving data.

Saving data and the customer's information can add their imaging on service quality, for your side, you can save customers' record for reference when next time they come in, which will bring a big impact.

2. Major alignment system parts

2.1 Composition and description

1) Our 3D wheel alignment system consists of:

1 Digital camera x2
2 3D beam x1 Pillar x1
3 Brand Computer x 1 Target plate x4
4 19'' LCD Monitor x 1(32'' LCD TV optional)
5 Keyboard x 1/ Mouse x 1
6 Printer x 1
7 Fixed cabinet x1
8 4-point wheel clamp x 4
9 Mechanical turntable x 2
10 Brake paddle depressor x 1
11 Steering wheel lock x 1
12 Wheel clamp rack x 4
13 Wedge pad x2

2）Digital cameras, 3D beam and target plates

They are the main parts of 3D wheel alignment. Two cameras fix on both side of the 3D beam, to catch up the position of target plates, for calculating out the angles of the wheels, like Toe, Camber, Caster and etc.

3）Appendix description

a) 4-point wheel clamp

The wheel clamp is an adaptor to attach the target plate to the wheel firmly and securely. The wheel clamp should be designed for easy mounting to the wheel and target plate while maintain high precision. Our wheel clamp is precisely factory adjusted in factory to assure minimum run out error. The small wheel clamp tip is designed to easy penetrating very tight tire and rim on UHP wheels so that the wheel clamp base can firmly contact with the rim to minimize ROC.

It is acceptable to skip run out if meet the following condition: a) the rim is in good condition and b) all wheel clamp base are firmly contact the rim.

b) Turntables

The turntables provide friction free surface for front wheels assuring wheel alignment measurement and adjustment. It is very critical for the turntable to maintain friction free movement on forward-backward, right-left, and 360° rotating movements.

c) Steering wheel Lock

The Steering wheel Lock is used to lock steering wheel to level position before adjusting front Toe. If the steering wheel is not locked at level position or is not maintained level position during the front Toe adjustment, the steering wheel will not be level on test drive.

d) Break Paddle Depressor

It is very important to apply break on the vehicle during the wheel alignment service to prevent: a) vehicle rolling off the lift accident, b) error on Caster/SAI measurement and adjustment.

NOTE: A calibration frame is necessary after the camera is taken down from the beam or removed.

3. Installation and Debug

3.1 Computer Installation: Refer to the installation instruction of the computer. (The installation is completed before

go out of the factory, if need, please operate under the guidance of the professional r, or call the manufacturer)

3.2 Printer installation: Refer to the installation instruction of the printer. (The installation is completed before go out of the factory, if need, please operate under the guidance of the professional, or call the manufacturer)

3.3 Four wheel alignment system software installation: One key installation. (The installation is completed before go out of the factory, if need, please operate under the guidance of the professional, or call the manufacturer)

3.4 USB SensorLock driver installation: (The installation is completed before go out of the factory, if need, please operate under the guidance as below, or call the manufacturer)

(i) Plug in the USB SensorLock.

(ii) Go to "Computer Management"-> "DeviceManager". (Figure 3.4-1)

(iii) Find the device which is with a "!" on it and right click it to choose "Update Driver Software…"(Figure 3.4-2)

Figure 3.4-1

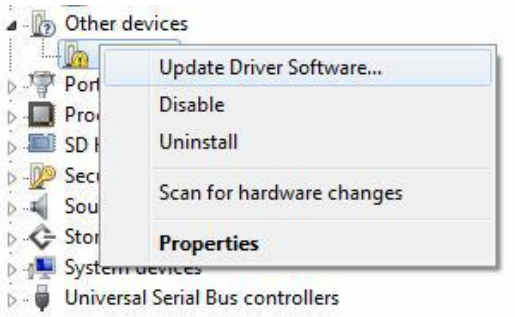


Figure 3.4-2

(iv) Choose "Browse my computer for driver software", and then locate it to the Folder on Disk E: "USB-Drivers\obj\winxp&2k". Press "Next".(Figure 3.4-3)

Figure 3.4-3

Figure 3.4-4

Then you'll get the driver installed and can find the device.(Figure 3.4-4)

3.5 Camera driver installation: (The installation is completed before go out of the factory, if need, please operate under the guidance as below, or call the manufacturer)

(i) Plug in the Cameras.

(ii) Same as (ii) on previous page.

(iii) You'll find two devices with "!" and have the same name. (Figure 3.5-1)

(iv) Right click one of them to choose "Update Driver Software…"

(v) Choose "Browse my computer for driver software", and then locate it to the Folder on Disk E. "Camera-Drivers\drivers". Push "Next"(Figure 3.5-2)

Do (iii) and (iv) for the other one with "!".

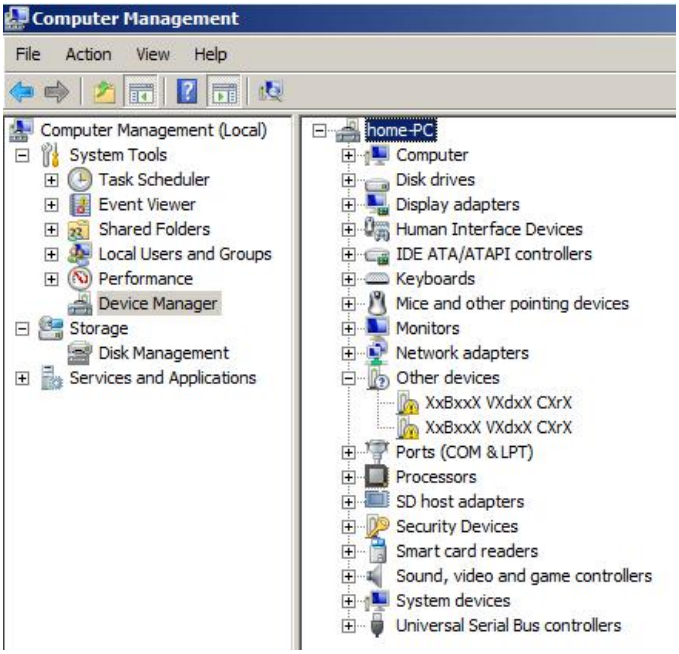


Figure 3.5-1

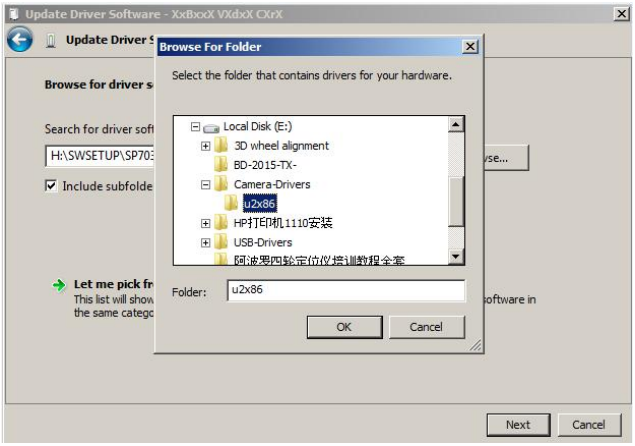
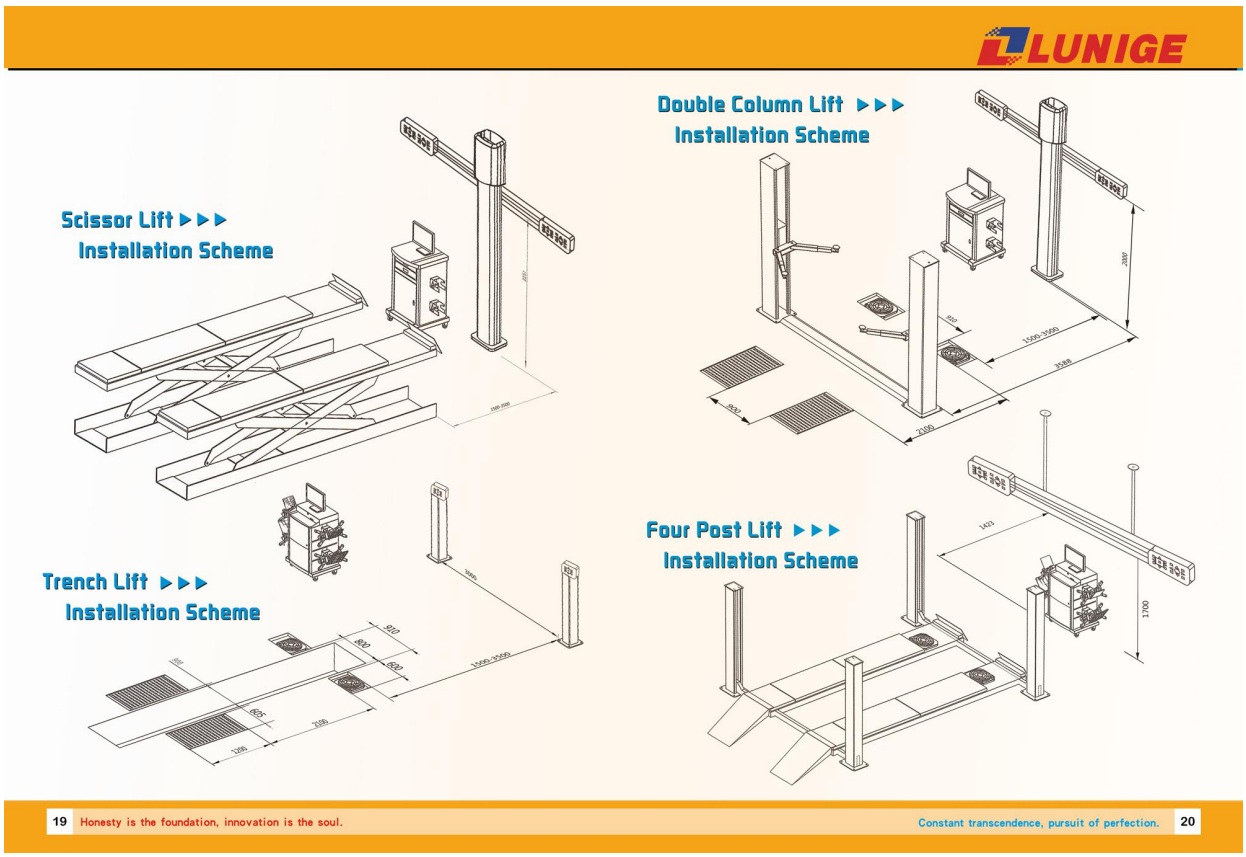


Figure 3.5-2

3.6 Installation drawing of 3D wheel alignment: You can choose a scissor alignment lift or 4 post alignment lift for the wheel alignment. (Figure 3.6-1)



4、Equipment operate steps

4.1 Basic Wheel Alignment Program

Before anything else is done verify that all the lock pins are in the turn plates and rear plates and properly locked

into place. Test drive the vehicle， and check for any symptoms. Drive the vehicle onto the rack and center the front wheels on the turn plates. Use the wedge pads to avoid vehicle slide. Then install the clamps with target plates(Mount the four lateral claw clamp securely on to the wheels).

4.1.1 Turn on the host computer

For the first time, check the USB sensorlock driver and camera drivers as No. 3.5 and 3.6 in this manual. Make sure they have been installed normally.

4.1.2 Run the software

Run the software.(You are suggested to right click this program and choose "Run as Administrator".) And open the camera view.(Figure 4.1.2-1)

Figure 4.1.2-1

4.1.3 Lift car lift

Lift the car lift until 4 target plates shows in the center of the views.

Meanwhile, check whether the target plates show correctly.(Front targets are red and rear ones are green.) (Figure 4.1.3-1)

At this time, the four lights on camera show green.(Figure 4.1.3-2)

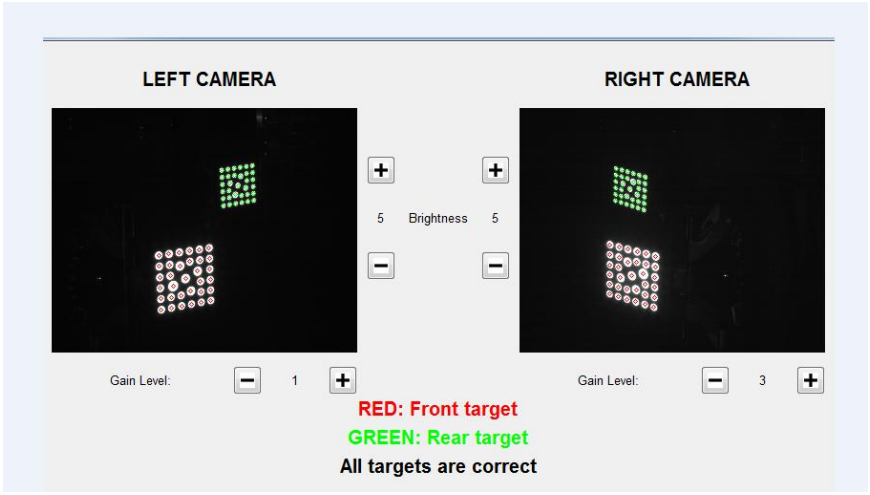


Figure 4.1.3-1

Figure 4.1.3-2

4.1.4 Select Vehicle Modules

Select vehicle module and start to measure.(Figure 4.1.4-2, 4.1.4-2)

Figure 4.1.4-2

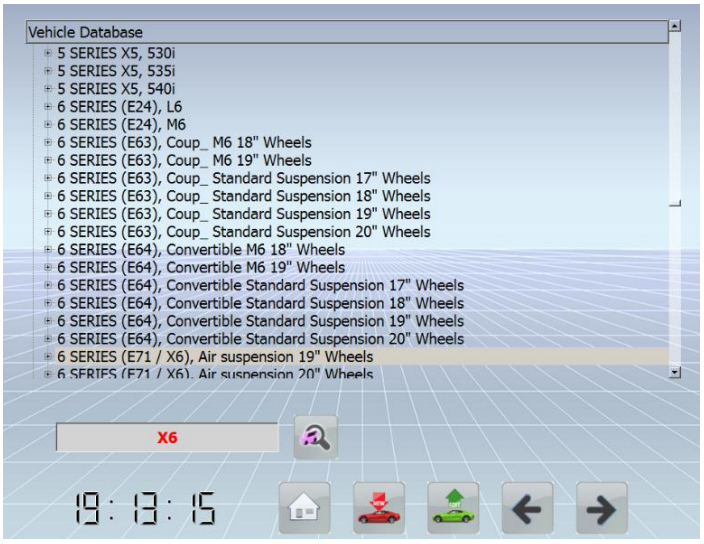


Figure 4.1.4-2

4.1.5 Display detail vehicle specifications(Figure 4.1.5-1) **4.1.6 Imput information of the customer**(Figure 4.1.6-1)

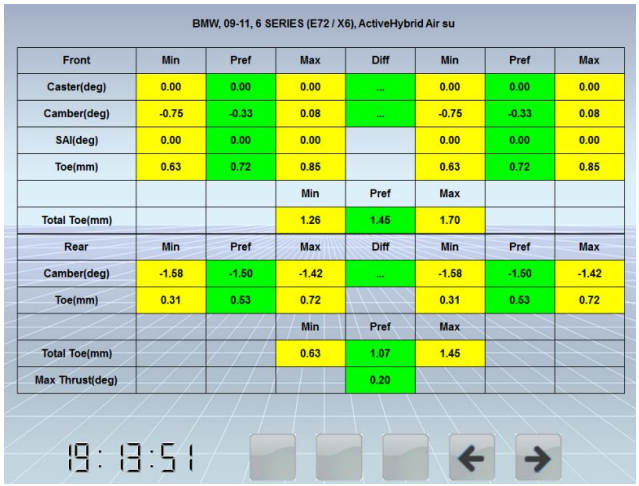


Figure 4.1.5-1

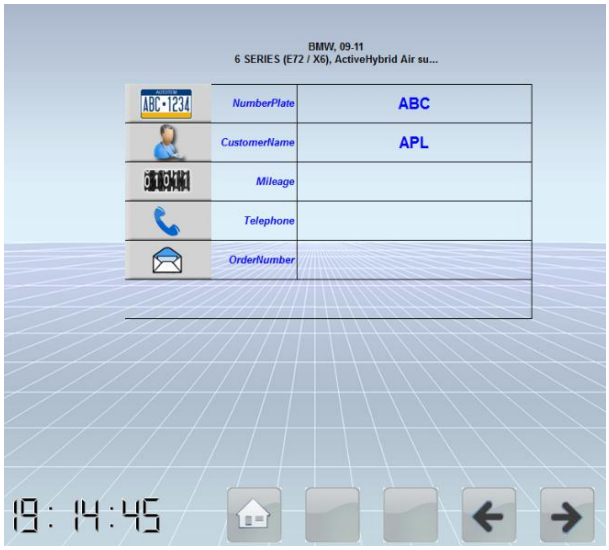
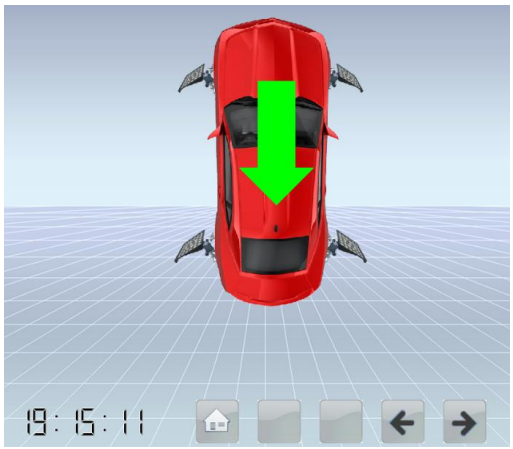


Figure 4.1.6-1

4.2 Measure alignment angles

4.2.1 Roll vehicle wheels

Take away the wedge pads. Then roll vehicle wheels following the instruction on screen.(Figure 4.2.1-1, 4.2.1-2)



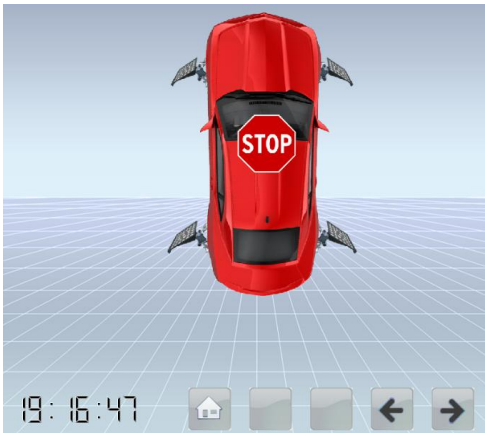


Figure 4.2.1-2

4.2.2 Turn the steering wheel(Optional, it can be skipped when you don't measure caster.)

Before turn the steering wheel, install brake lack, remove the turn table pins and remove shift-table pins.

Then turn steering wheel as the guidance on screen.(Figure 4.2.2-1)

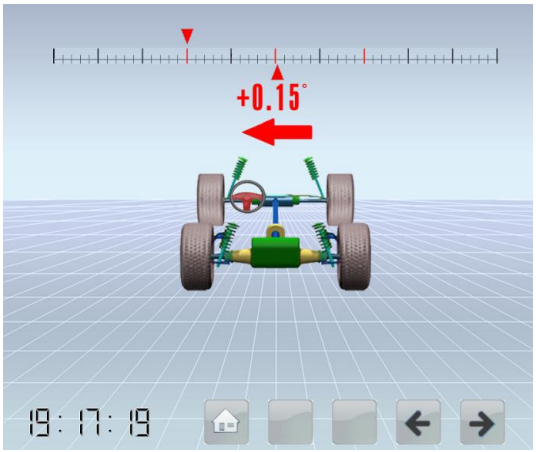


Figure 4.2.2-1

4.2.3 Display measurement result

The units of angles can be changed by clicking this button:(between degree and mm, or between decimal degree and degree minute)

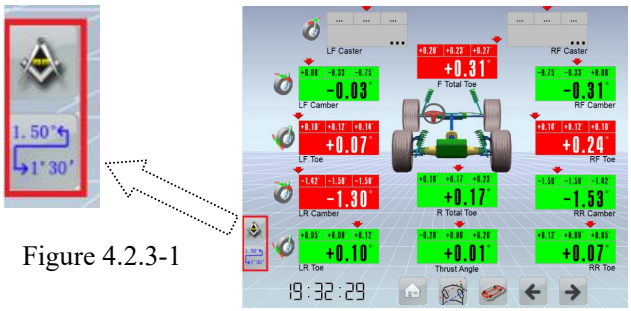


Figure 4.2.3-1

On this page, values of four wheels are printed on screen in three colors. GREEN means the value is between the standard MIN and MAX. RED means it is not. GRAY means either the value is missing (it is not measured or it is not available due to the corresponding target panel not being detected), or the standard MIN or MAX is not recorded in the database. The red arrow shows how closer the value is to the PREF value (0.5(MIN+MAX)).

4.2.3.1 Display Maximum steering angle(Optional) **(**Figure 4.2.3.1-1, 4.2.3.1-2)

Figure 4.2.3.1-1

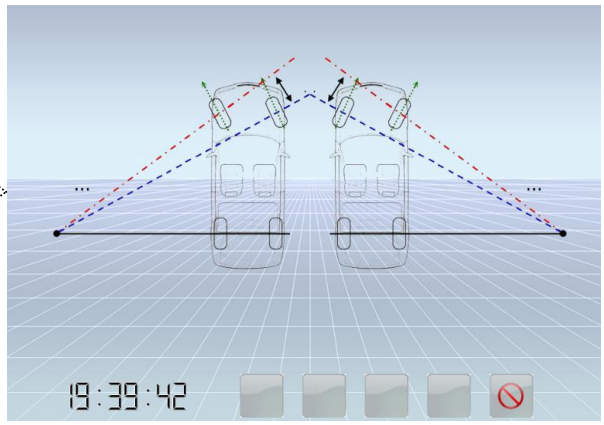
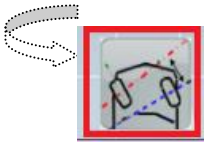


Figure 4.2.3.1-2



4.2.3.2 Display axis distance and wheel distance(Optional) (Figure 4.2.3.2-1, 4.2.3.2-2)

Figure 4.2.3.2-1

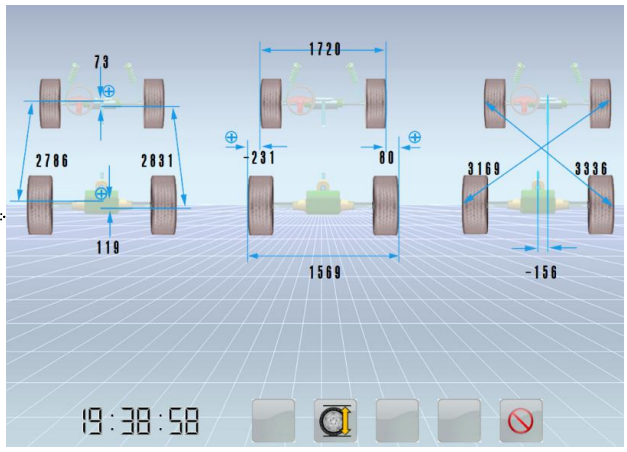


Figure 4.2.3.2-2

4.3 Adjust alignment angles

Note: Due to the car orientation angle are interrelated and connected, changing one of the angle, the other angles will changed along with its associated.

* Adjusted caster will change the camber, toe, and axle angle
* Adjustment will change the toe angle
* Adjust the toe will change camber
* Adjust the camber angle will change the sai

* Adjust the rear toe angle will change their thrust angle, it will change the single front wheel toe, but the total toe will not change.

4.3.1 The principles of adjust alignment angle are:

* Following the order: the rear wheel first, and the front second.

* Following the order: 1.caster, 2.camber, 3.toe

* The range of adjust the front wheel caster and camber should be kept within the range of regulatory parameters of the car and toe.

* Access to adjust image, can top the car, then adjust the positioning

* Access to adjust image, do not move the car unless the prompt picture appear.

* Adjust the front toe is required to first grasp steering wheel and then fix with the break lock.

* Process of adjustment toe need to get rid of the gap on the front wheel Ball (replace a new one if excessive wear)

Special Note:

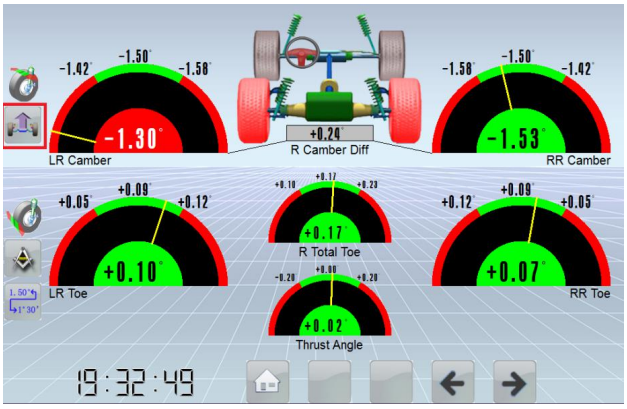
Four-wheel-location services in accordance with international standards, can not stand any chassis with a twist angle of elevation to the corrector. The reason is:

a）vehicle safety: an important vehicle body structure as the support bracket, produced by repeated twisting stress will fracture in the event of an accident caused by vehicle crew casualties.

b）injury to support: twisted stent scaffold internal damage will destroy the function of its shock absorption and reduce support life.

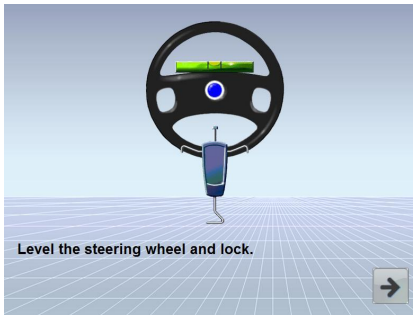
c）changing the inclination angle: a good twist to adjust the surface of the stent outside the angle, but also changed the angle and the friction within the radius. In theory, when the change in angle will cause changes in vehicle side line friction radius, will change the horizontal thrust wheel while driving, but changed the toe angle.

4.3.2 Rear wheel adjustment(Figure 4.3.2-1)

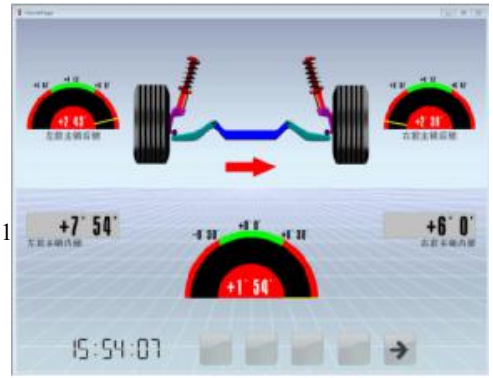


4.3.3 Front wheel adjustment(Figure 4.3.3-2)

Before the adjustment, level the steering wheel and lock it. (Figure 4.3.3-1)



Engine bracket adjustment (optional) (Figure 4.3.3-3)



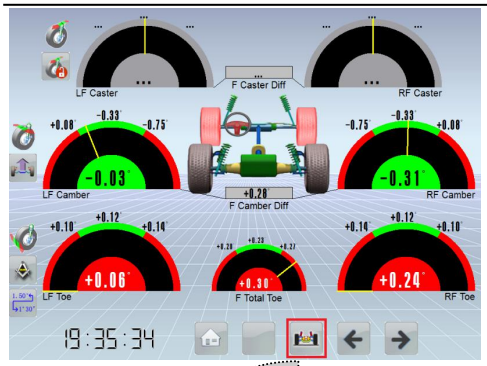


Figure 4.3.3-2

Figure 4.3.3-3

Results after adjustment

Figure 4.3.3-4

4.4 Save and print (Figure 4.4-1)

After adjustment, you can print the result or just save it in the system.

Click  to change the unit between degree and mm.

Click  to print the result.

Click  to choose saving this result or not..

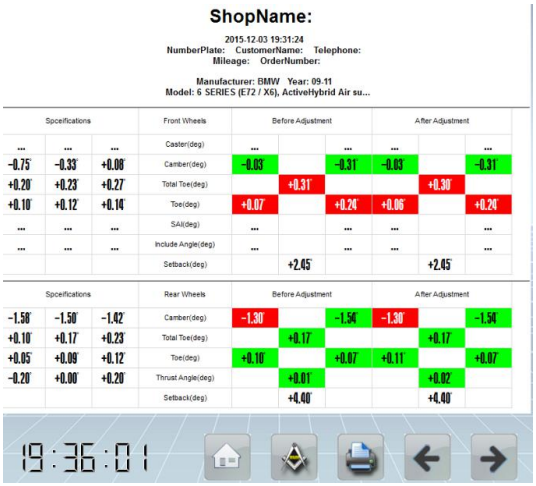


Figure 4.4-1

5.Other Guidances

5.1 Setting language

3D wheel alignment has Chinese, English, Spanish, Portuguese, Russian, Korean and thai language for choice.

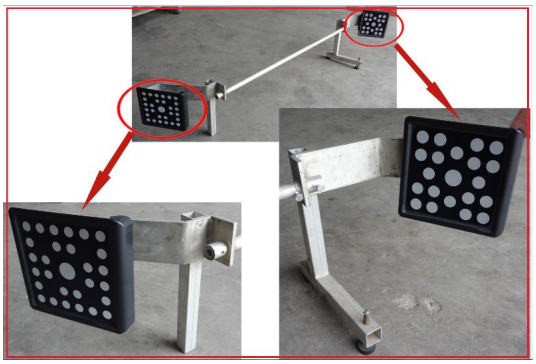
Click  on standy screen, then click  to choose the languge. It can be finished after click  and will go back to the previous screen.

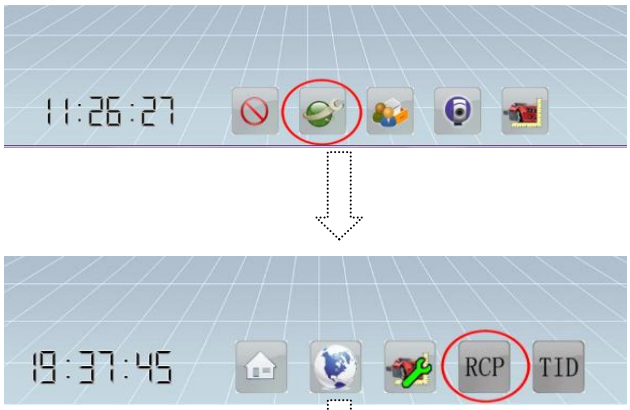
5.2 RCP Calibration guidance (The installation is completed before go out of the factory, if need, please operate under the guidance as below, or call the manufacturer)

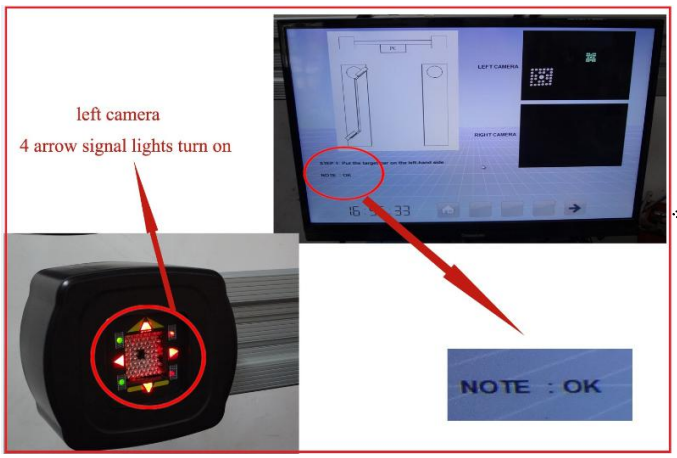
Calibration tool: calibration frame, target plates

Normally, RCP is necessary after the camera is taken down from the beam or removed

Steps are as below:





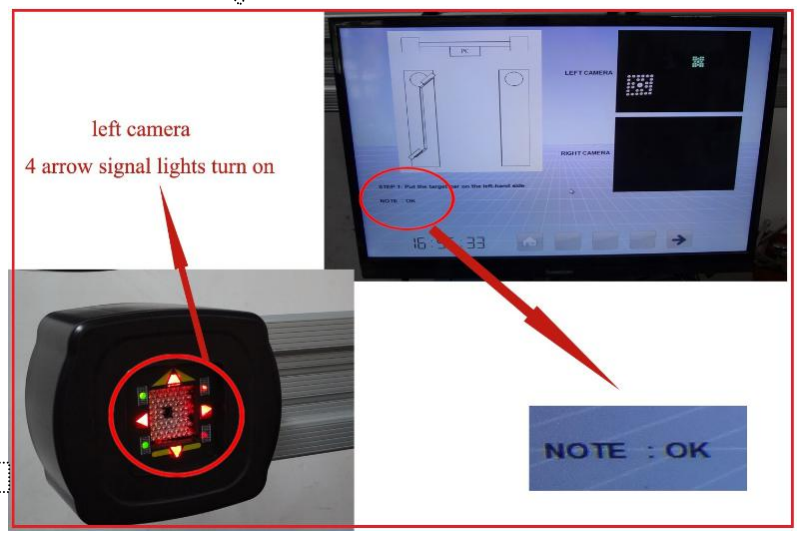


Step 1: put the calibration device on the left side of scissor lift

Step 2: put something under the calibration device

left camera

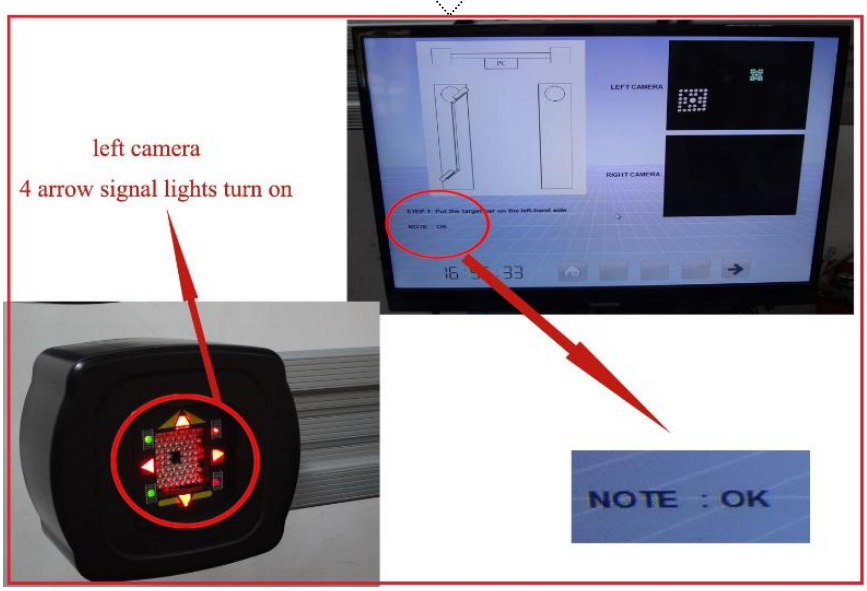
4 arrow signal lights turn on



Step 3: move the small thing to another position under the calibration device

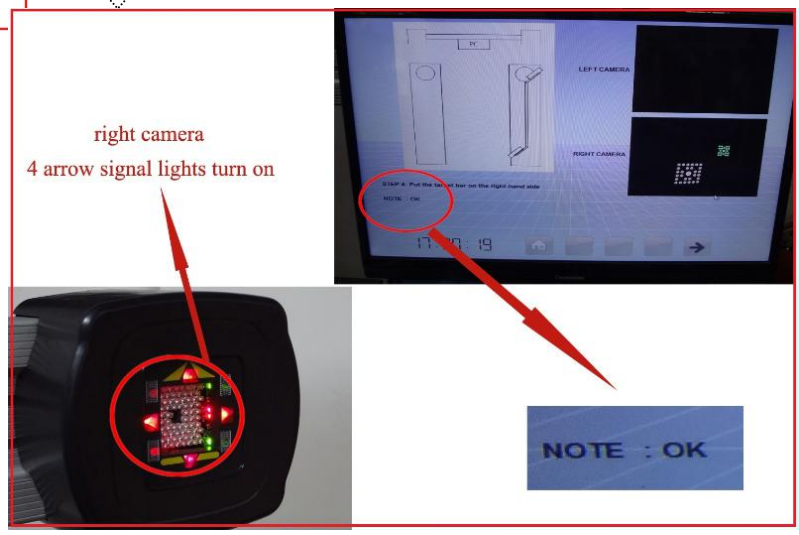
left camera

4 arrow signal lights turn on



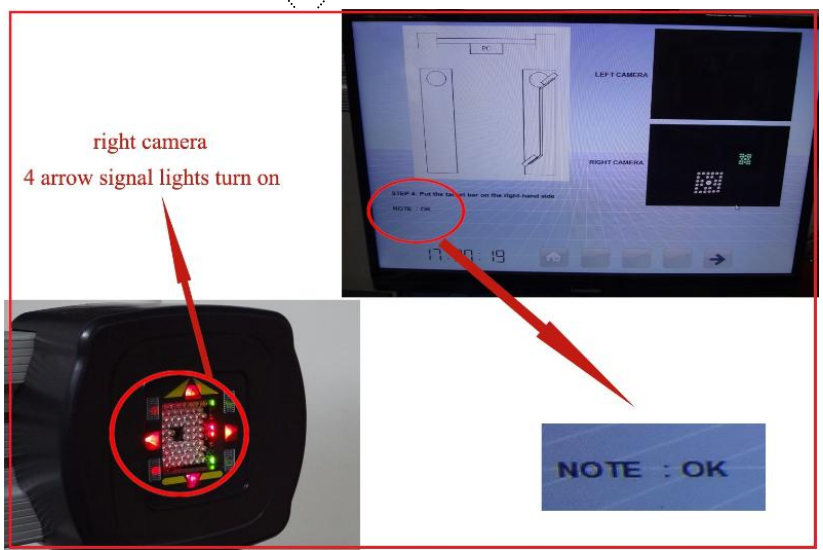
Step 4: put the calibration device on the right side of scissor lift

right camera
4 arrow signal lights turn on



Step 5: put the small thing under the calibration device

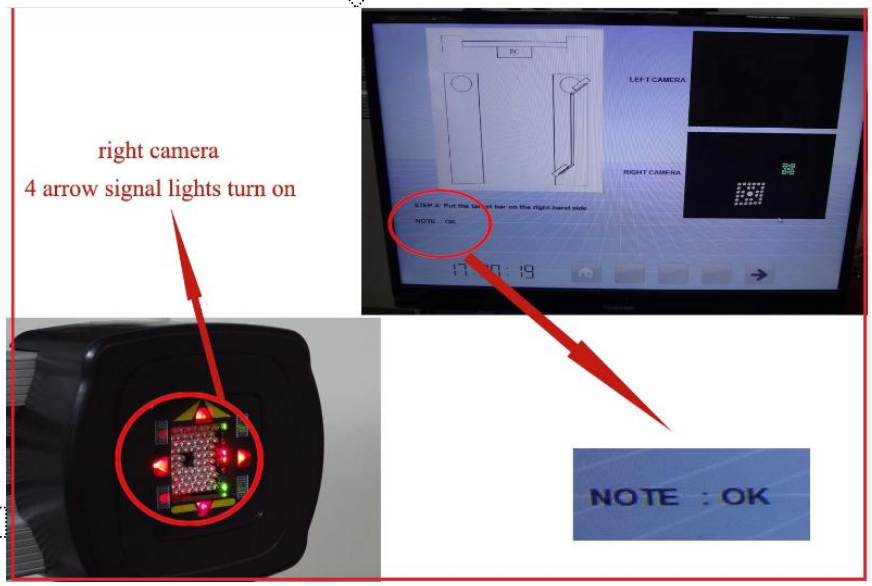
right camera
4 arrow signal lights turn on



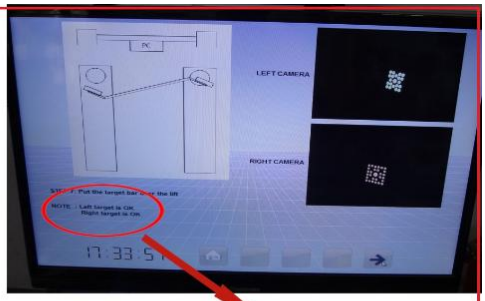
Step 6: move the small thing to another position under the calibration device

right camera

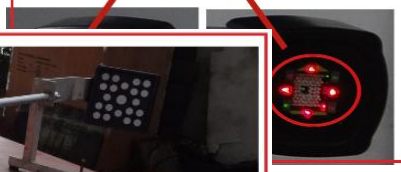
4 arrow signal lights turn on



Step 7: put the calibration device in front of scissor lift

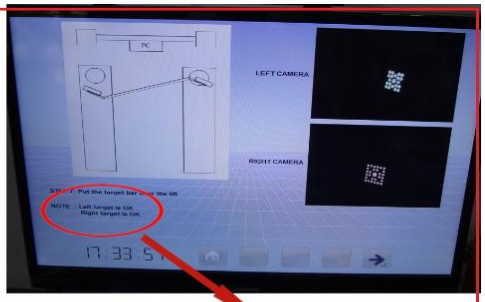


4 arrow signal lights turn on,
both left and right cameras



NOTE : Left target is OK
Right target is OK

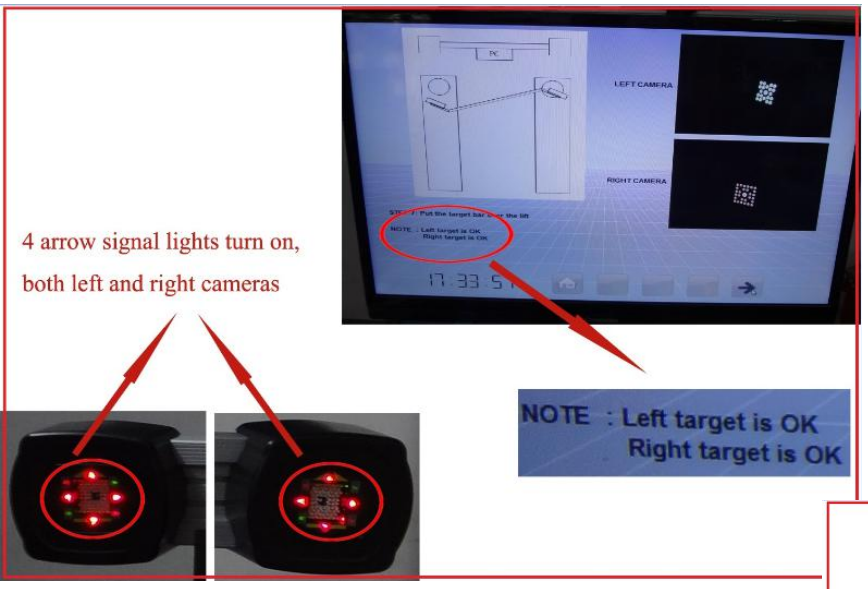
Step 8: move the calibration device backward

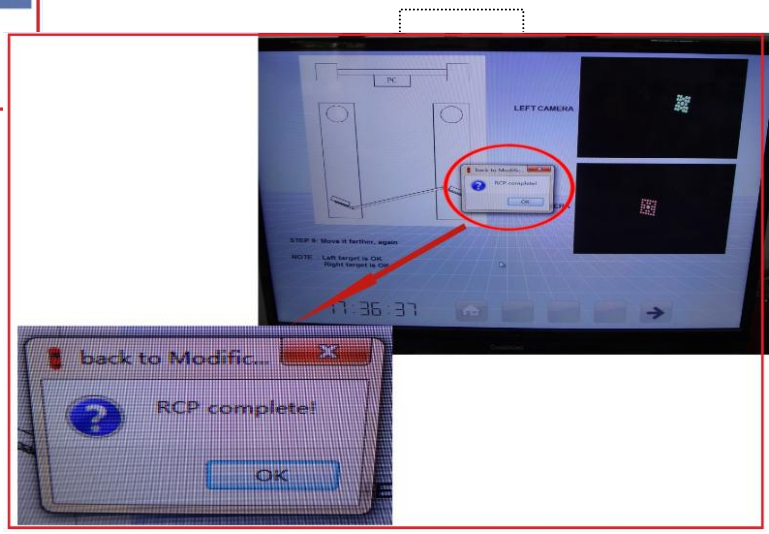


4 arrow signal lights turn on,
both left and right cameras

NOTE : Left target is OK
Right target is OK

Step 9: move the calibration device backward again





5.3 TID Calibration guidance(The installation is completed before go out of the factory, if need, please operate under the guidance as below, or call the manufacturer)(Figure 5.3-1)

TID calibration should be run when you install the target panel to the clamp. At the first time you set up this alignment, you need to do TID calibration for four target plates. After that, TID calibration is necessary only when you change new target panels. When you run the TID calibration, you need to lift the car up using the sub lift, and rotate the wheel forward or backward according to the instruction on screen. Make sure the wheel you rotate is the one you selection screen

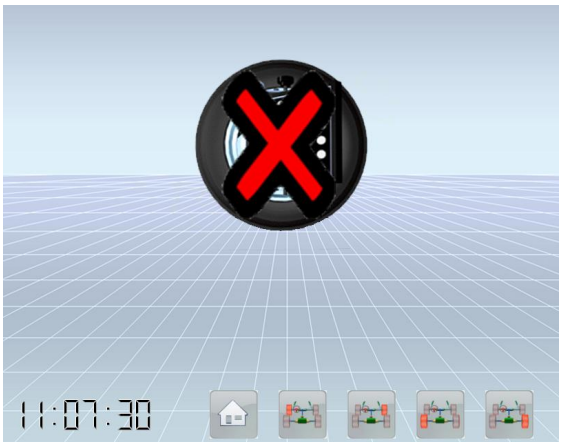
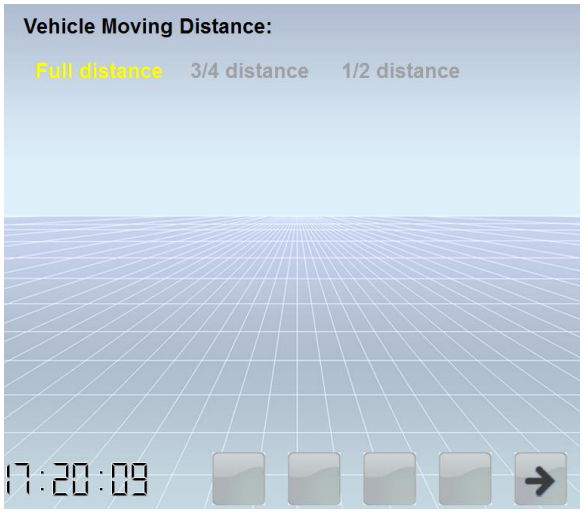


Figure 5.3-1

5.4 Vehicle moving distance setting

Our 3D wheel alignments have " shorter moving distance ", which will be helpful for some long vehicles.



5.5 Units exchange

Please noted that the total toe of the units must be degrees. Usually is mm, mm must be converted to angle units, conversion formula is:

1 mm = 0.16 degrees;

If the total toe is 1 ± 2 mm, this time, so “1” is the standard value and “2” is the tolerance value. Converting mm into the angle unit, the standard value is 1 × 0.16 ° = 0.16 °, tolerance value is 2 × 0.16 degrees = 0.32 degrees, entering “0.16” on the standard value column of the picture above, and entering “0.32” in tolerance column, as above yellow box office chart.

If the total toe value show a range, such as the showing total toe is 3 ~ 5mm, so now we have to calculate the standard values and tolerances, conversion formula is as follows:

The total toe standard value = (total toe maximum value + the total toe minimum value) / 2;

Total toe tolerance value= (total toe maximum value - the total toe minimum value) / 2;

If the range of the total toe is 3 ~ 5mm, then

Total toe standard value = (5 +3) / 2 = 4mm

Total toe tolerance value= (5-3) / 2 = 1mm

Therefore, we get the total toe is 4 ± 1 mm, then we need to convert mm into angle units, namely:

4 × 0.16 ± 1 × 0.16, the total toe is: 0.64 ± 0.16 degrees

Entering “0.64” on the standard value column of the picture above, enter “0.16 “in tolerance column, "±" no need.

5.6 Add new vehicle datas

You can add new datas if necessary.