



Atlas Edge 201 Wheel Alignment Machine

INSTALLATION & OPERATION MANUAL



INDIANA

5800 MASSACHUSETTS AVE.
INDIANAPOLIS, IN 46218

PHONE: (800) 262-1950
FAX: (317) 542-1448

DELAWARE

250 EXECUTIVE DRIVE, SUITE 1
NEWARK, DE 19702

PHONE: (800) 715-1950
FAX: (302) 894-9136

GEORGIA

2375 BUTTON GWINNETT DR., SUITE 100
ATLANTA, GA 30340

PHONE: (800) 768-4104
FAX: (678) 781-0149

ARIZONA

8399 W VAN BUREN ST., SUITE 210
TOLLESON, AZ 85353

PHONE: (800) 602-9928
FAX: (602) 490-3495

NEW HAMPSHIRE

8 INDUSTRIAL DRIVE
HUDSON, NH 03051

PHONE: (800) 360-0053

FLORIDA

11801 NW 100th RD., SUITE 8
MEDLEY, FL 33178

PHONE: (800) 305-5609

TEXAS

3206 INDUSTRIAL TERRACE., SUITE 102
AUSTIN, TX 78758

PHONE: (800) 512-7611

INDEX

CHAPTER 1 GENERAL INTRODUCTION	- 6 -
1.1 DEFINITION.....	- 6 -
1.2 PURPOSE OF WHEEL ALIGNMENT	- 6 -
1.3 DEFINITION OF RELEVANT 4 WHEEL ALIGNMENT ANGLES...	- 6 -
1.3.1 TOE-IN	- 6 -
1.3.2 CAMBER.....	- 7 -
1.3.3 SET-BACK	- 7 -
1.3.4 CASTER	- 8 -
1.3.5 STEERING AXLE INCLINATION (SAI).....	- 8 -
1.3.6 INCLUDED ANGLE.....	- 9 -
1.3.7 MAXIMUM STEERING	- 9 -
1.3.8 THRUST ANGLE.....	- 9 -
CHAPTER 2 PRODUCT CONFIGURATION	- 10 -
2.1 TECHNICAL PARAMETERS.....	- 10 -
2.2 G SERIES WHEEL ALIGNER FUNCTION & CHARACTERISTICS	- 11 -
2.4 SENSOR	- 15 -
2.5 WHEEL CLAMP.....	
.....	ERROR! BOOKMARK NOT DEFINED.
2.6 TURNTABLE.....	- 17 -
2.7 STEERING HOLDER AND BRAKE PEDAL DEPRESSOR.....	- 18 -
CHAPTER 3 EQUIPMENT INSTALLATION	- 18 -

3.1 CABINET ASSEMBLY	- 19 -
3.1.1 BOTTOM WHEEL INSTALLATION	- 19 -
3.1.2 RACKS INSTALLATION.....	- 19 -
3.1.3 CABINET TOP COVER INSTALLATION.....	- 19 -
3.2 ELECTRIC EQUIPMENT CONNECTION	- 20 -
3.3 SENSOR AND CLAMP INSTALLATION	- 22 -
CHAPTER 4 INITIALIZE SETTINGS	- 23 -
4. 1 STARTUP OF WHEEL ALIGNMENT SOFTWARE	- 23 -
4. 2 ALIGNMENT PROGRAM SETTINGS.....	- 24 -
4.2.1 SYSTEM SETTINGS.....	- 25 -
4.2.2 DISPLAY SETTINGS	- 26 -
4.2.3 ALIGNMENT PROGRAM SETTINGS	- 27 -
4.2.4 ADJUSTMENT DIRECTION OPTION	- 28 -
4.2.5 PRINT SETTINGS	- 29 -
4.2.6 CALIBRATION SETTINGS.....	- 30 -
4.2.7 CHECK-UP SETTINGS.....	- 31 -
4.2.8 DATE FORMAT SETTINGS	- 31 -
4.2.9 AUXILIARY SETTINGS.....	- 32 -
4.2.10 SENSOR DIAGNOSE.....	- 33 -
4.3 SAVE AND EXIT.....	- 33 -
4.4 AUTO MODEL DATA INPUT	- 34 -
CHAPTER 5 OPERATION PROCEDURE	- 35 -

5.1 UNDERSTANDING THE CONDITION	- 35 -
5.2 ALIGNMENT INSPECTION	- 36 -
5.3 VEHICLE ADJUSTMENT	- 36 -
5.4 TEST DRIVING	- 36 -
CHAPTER 6 OPERATION GUIDANCE	- 36 -
6.1 PREPARATION WORK BEFORE TESTING	- 36 -
6.2 START MEASUREMENT	- 37 -
6.2.1 AUTO MODEL DATA SELECTION	- 38 -
6.2.2 AUTO MODEL DATA DISPLAY	- 40 -
6.2.3 CLIENT'S DATA INPUT	- 41 -
6.2.4 RIM COMPENSATION	- 41 -
6.2.5 VEHICLE MEASUREMENT	- 44 -
6.2.6 VEHICLE ADJUSTMENT	- 47 -
6.2.7 CLIENTS DATA INPUT	- 51 -
CHAPTER 7 OPERATION GUIDE OF SENSOR	- 52 -
7.1 SENSOR ON-OFF	- 52 -
7.1.1 POWER-ON	- 52 -
7.1.2 POWER-OFF	- 52 -
7.2 SENSOR SETTINGS	- 52 -
7.2.1 LEVEL SETUP	- 53 -
7.2.2 DISPLAY MODE SETTINGS	- 53 -
7.2.3 SENSOR SETTINGS	- 54 -

7.2.4 PRODUCT INFO.....	- 55 -
7.2.5 RESTORE FACTORY SETTINGS.....	- 55 -
CHAPTER 8 MAINTENANCE.....	- 56 -
8.1 COMPUTER MAINTENANCE.....	- 56 -
8.2 PRINTER MAINTENANCE.....	- 56 -
8.3 MAINTENANCE OF CLAMPS AND SENSORS.....	- 56 -
8.4 MAINTENANCE OF TURNTABLES.....	- 57 -
CHAPTER 9 PROBLEMS AND SOLUTIONS.....	- 57 -
9.1 THE COMPUTER CAN NOT START, NO PROMPTS AVAILABLE.	- 57 -
9.2 THE COMPUTER CAN NOT ENTER WINDOWS XP INTERFACE.	- 57 -
9.3 FAIL TO ENTER WHEEL ALIGNING PROGRAM.....	- 57 -
9.4 MOUSE OR KEYBOARD DOES NOT REACT.....	- 57 -
9.5 PRINTER DOES NOT REACT.....	- 58 -
9.6 SENSOR FAILS TO START.....	- 58 -
9.7 THE SENSOR COMMUNICATION IS ABNORMAL.....	- 58 -
9.8 TOE-IN OR AXLE HAS NO VALUE.....	- 58 -
9.9 THE MEASURED VALUES ARE DISPLAYED UNSTABLY.	- 59 -

CHAPTER 1 GENERAL INTRODUCTION

1.1 DEFINITION

Four-wheel aligners are 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, aligners guide technicians to make relevant adjustments to wheel alignment parameters. This ensures ideal driving performance, guarantees the stability/safety of driving and ease of steering. Proper alignment also reduces tire shoulder wear and gas consumption.

1.2 PURPOSE OF WHEEL ALIGNMENT

The purpose of wheel alignment is to adjust the suspension and steering system to its correct position. After wheel alignment the vehicle should achieve the following performances: Ease of steering and stable driving, centered steering wheel, the steering wheel will return to its original position automatically after turning, reduction of driving resistance and abnormal wear of tire and chassis components, enhanced driving comfort and reduced 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 tire wear reduction.

The angles mainly consist of camber, toe-in, caster, steering axle inclination and set-back.

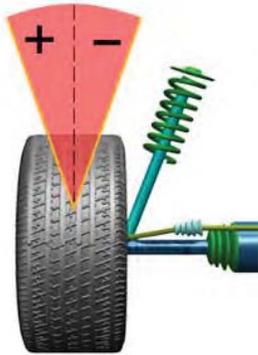
1.3.1 TOE-IN



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 is 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 front toe measurements, i.e. the angle formed by two horizontal lines

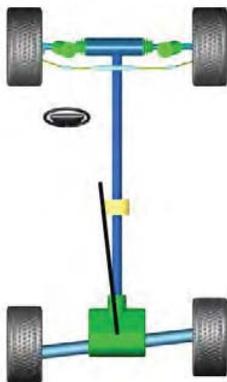
through the planes of the two front wheels. The function of toe-in is to compensate the tendency of outward or inward rolling due to camber or ground resistance to guarantee the straight-ahead of driving.

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 fully loaded which causes faster tire wear and bearing wear. Therefore, this parameter can prolong the life of tire and wheel bearing.

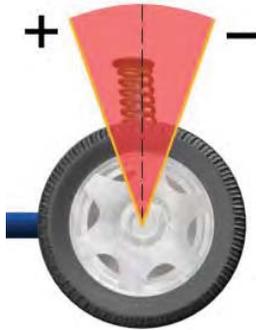
1.3.3 SET-BACK



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 tire 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 (SAI)



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.

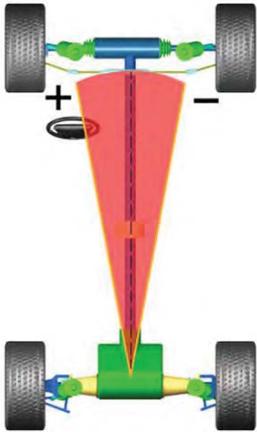
1.3.6 INCLUDED ANGLE

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

The measurement method of maximum steering angle is the same to that of 20 degree angle. When the steering is turned 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, sensors, wheel clamps, turntables, steering holder and pedal depressor.

2.1 TECHNICAL PARAMETERS

Relative Humidity: less than 90%

Power Supply: AC220/110 V \pm 10%, 50 /60Hz

Re-chargeable Battery Specification: 7.2V/3000mAH, Li-Ion

Power Consumption of Sensors: = 5W

Power Consumption of Machine: =300W

Technical index:

Measuring Items		Precision	Measuring Range
Front Wheel	Toe	$\pm 1'$	$\pm 24^\circ$
	Camber	$\pm 1'$	$\pm 10^\circ$
	Caster	$\pm 2'$	$\pm 20^\circ$
	Steering Axle Inclination	$\pm 2'$	$\pm 20^\circ$
	Set-Back	$\pm 1'$	$\pm 10^\circ$
Rear Wheel	Toe	$\pm 1'$	$\pm 24^\circ$
	Camber	$\pm 1'$	$\pm 10^\circ$
	Set-Back	$\pm 1'$	$\pm 10^\circ$
	Thrust-Angle	$\pm 1'$	$\pm 10^\circ$

2.2 G SERIES WHEEL ALIGNER FUNCTION AND CHARACTERISTICS

- Uses independent intellectual property rights, new design concept and advanced technology to create perfect four-wheel aligners.
- 360 degrees closed space comprehensive measurement of the vehicle chassis using measuring principle of Geometric Centerline and Thrust Line.
- High-precision CCD image sensor and angle sensor technology guarantees the accuracy of system measurement. Uses Zigbee wireless communication with high-frequency 2.4 GHZ, low power consumption, stable and reliable transport capacity.
- Mutual control of the sensor and control unit saves users the trouble of running back and forth.
- The systematic and distributive Multilanguage control platform can freely set (download) or replace, using the host computer, the current language platform, measurement unit and resolution.
- Data for more than 20000 domestic and foreign models with fuzzy query and database intelligent upgrading function.
- System internal self-test, self-diagnosis and one-key self repairing.
- Windows special wireless networks, free networking, optional inserting and connecting extended equipments such as measuring scale, PDA, damping tester and simulator.
- Rechargeable battery powered secondary network device (LCD Display) automatically replaces computer host to manage the whole system in case of power failure and ensures the unchanged accuracy of measurement system.
- Main cabinet equipped with LCD monitor with real-time displays for all states of the system measurement.
- Two modes of systematic self-calibration function: uniform system calibration and individual sensor calibration.
- Hierarchical operation management cooperating with self-repairing function limits and repairs unauthorized error operation.
- Adopts personalized, humanized and intelligent operation control system with simple and sensitive touch-key buttons. Photosensitive backlight controlled LCD indicating remaining battery capacity and communication signal.
- Equipped with photoelectrical coded disk automatically measures the rotating angle of the tire and compensates for deviation so as to make the result more accurate.
- Optical measurement system uses environment adaptive design to adapt to various working environments.
- 3D operation/navigation and built-in professional training course, combined with simulator, guides even less experienced technicians quickly and easily through the measurement process.

2.3 MAIN CABINET

Main cabinet acts as the operational control platform and also the carrier for other components of the wheel aligner which include the control unit, computer and printer. The cabinet is designed with places for placing sensors and wheel clamps.

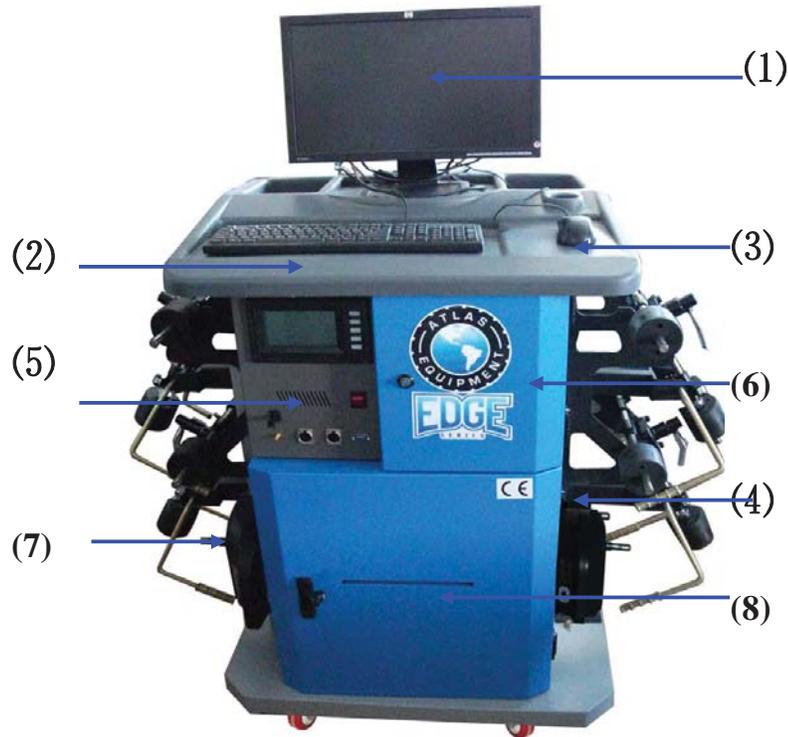


Fig. 1 Main Cabinet

- | | | |
|-----------------|----------------------|-------------|
| (1) LCD Monitor | (2) Keyboard | (3) Mouse |
| (4) Charge Plug | (5) Control unit box | |
| (6) Cabinets | (7) Sensor | (8) Printer |

Shown in figure 3 is the Control Unit which includes: power switch, computer startup button, LCD display unit, audio power amplifier, intelligent charging management unit, wireless/wire data transceiver management unit, power supply unit, interface unit, etc.

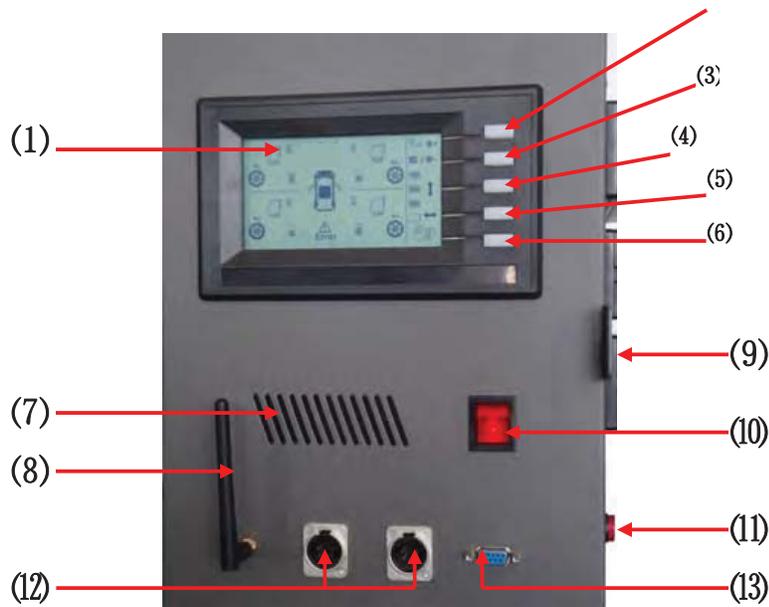


Fig. 3 G58 & G88 Control Unit

- | | | | |
|--------------------------------|--|---------------------------------------|---------------------|
| (1) LCD | (2) Volume + | (3) Volume - | (4) Charging option |
| (5) Forcible charging option | (6) Computer startup | (7) Loudspeaker | (8) Antenna |
| (9) Recharge stand | (10) Power switch | (11) Power failure measurement button | |
| (12) Wire communication socket | (13) Simulator communication interface | | |

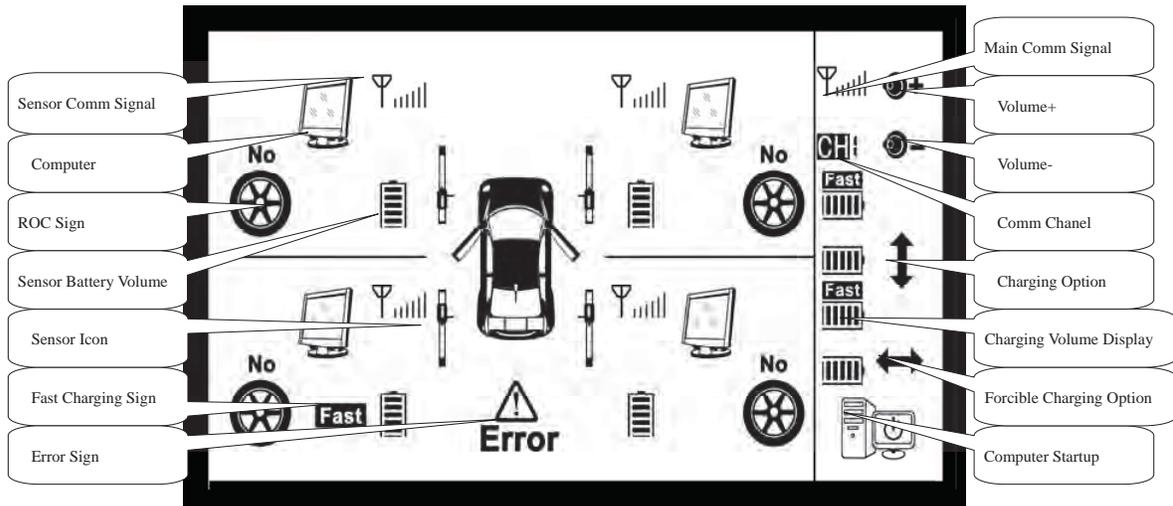


Fig. 3.1 LCD Display Unit

Control unit and its display as follows:

1. System startup

Press power switch of control unit (**button 10 in Fig. 3 for**) to power on the system. Press computer startup button to start computer (**button 6 in Fig. 3**). Alignment software will automatically run after computer's self check.

Note: Power voltage differs in different areas of the world (AC110V in America and Japan -

AC240V in Europe). The system’s applicative power voltage has been set up according to its use area. If user wants to change system power voltage settings, please contact manufacturer’s technician, to prevent damage to the system.

2. Charging operation

System offers two ways of charging: wire charging and desktop charging.

Wire charging: Insert the charging plug on the side of the cabinet into the charging port at the bottom of sensor head (Fig. 4). The system will automatically identify battery status and enter charging mode. Battery icon on the right side of control unit panel flashes a black progress bar showing charging status. The black progress bar will be shown full and stop flashing when battery is fully charged.

Desktop charging: Dismount battery from sensor and insert it into charging port on the side of control unit. Charging status is shown on the right side of control unit LCD. Operation is the same as the wire charging.



Fig. 4 Sensor Charging

(3) Forcible charging

System’s internal protective circuit will cut off battery’s power supply when battery is over discharged. Or, this charging way can be used to charge a battery which cannot be detected by the system.

Operation way:

In Fig. 3, press **button 4** to select corresponding battery, then press and hold **button 5** for several seconds. Corresponding battery icon will show “Fast” indicating being forcibly charged and system is activating the battery.

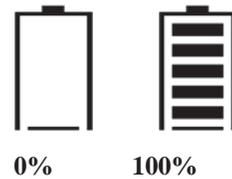


Fig.5 Battery Volume

3. Volume control: Press volume increase or decrease button to adjust the volume of audio output.

4. Communication status indication: Under wireless communication mode, LCD shows an antenna icon beside each sensor icon. The progress bar indicates the strength of sensor communication signal. When the sensor is shut off or communication with host machine is disconnected, a “Cross” will show under the antenna icon (Fig. 6). On the upper right side of the LCD, it shows the communication status and the present signal channel of the host. Under wire communication mode, the antenna icon disappears.

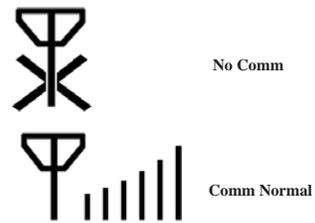


Fig.6 Communication Signal

The curve between sensor and host represents wire connection.

5. Optical beam block prompt: When the sensor toe-in or the optical axle measuring beam is blocked or the sensor does not emit the optical beam due to damage, the screen will show a line with cross between

left and right sensor toe or, between right and rear axle which represents the optical measuring beam is not received.

6. Rim Compensation: 4 wheel icons on the LCD screen represent if the wheel is compensated. If the rim is compensated, the screen will show “Yes”. If not, the screen will show “No”.

7. Error prompt: When the system status is abnormal, including no communication or measurement light pathways blocked, sensor LCD will show “Error”.

2.4 SENSOR

Sensors are the core measuring components of the wheel aligner system. Sensors contain high precision measuring components. During operation and storage, sensors should be kept clean and dry. Impact and collision should be avoided for fear of affecting the measurement accuracy. Sensor is shown as Fig. 7. G58 has wire communication connecting port and G88 has electronic turntable connecting port.

System is equipped with 4 sensors: front left, front right, rear left and rear right sensor. The 4 sensors are shown as Fig. 8.

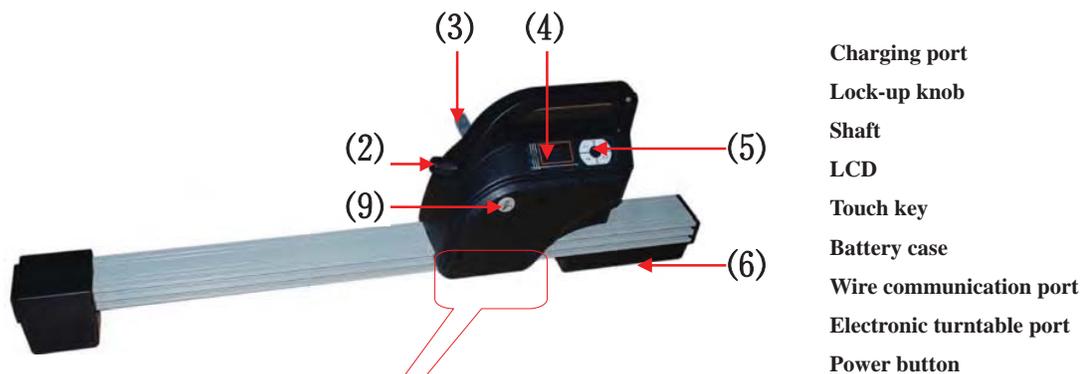


Fig. 7 Sensor

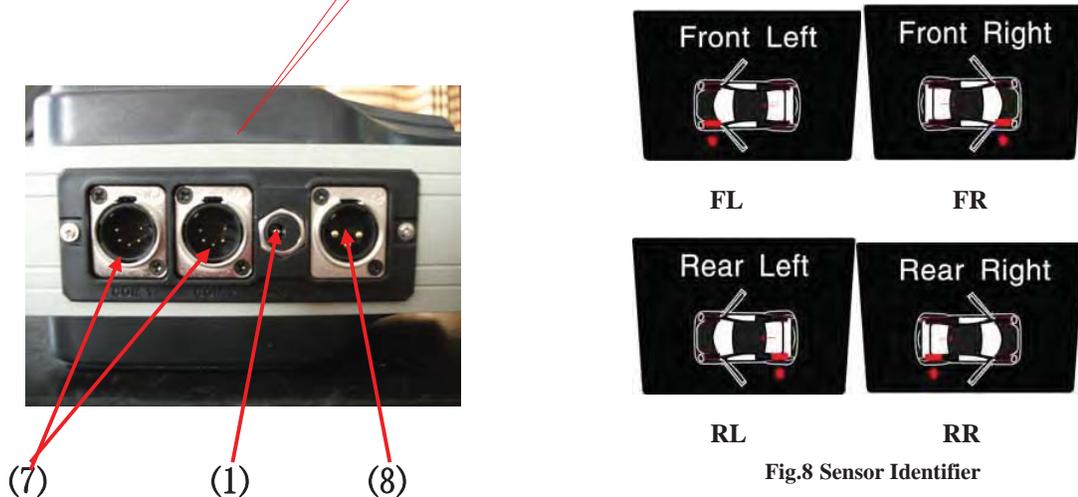
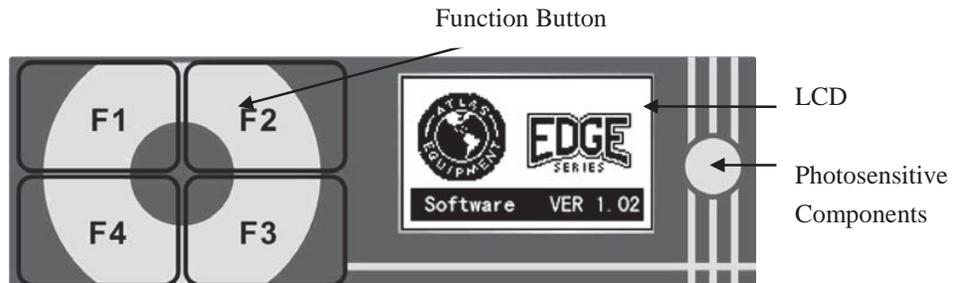


Fig.8 Sensor Identifier

The startup button of the sensor  is on the side of the sensor. Press this button to turn on sensor. Press this button and F1 button on the sensor panel to shutoff sensor. Operational panel is on the top of sensor as shown in Fig. 9.



F1, F2, F3 and F4 are function buttons, corresponding to F1 - F4 keys of computer keyboard, respectively. The left LCD on sensor panel is LCD display window, and left again is a photosensitive component to test environment light and turn on LCD backlit when environment gets dark.

One end of sensor is battery with an indicative label (Fig. 10).

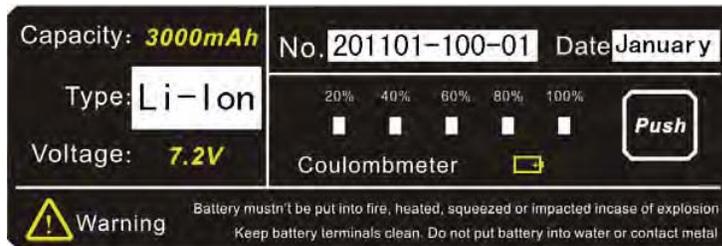


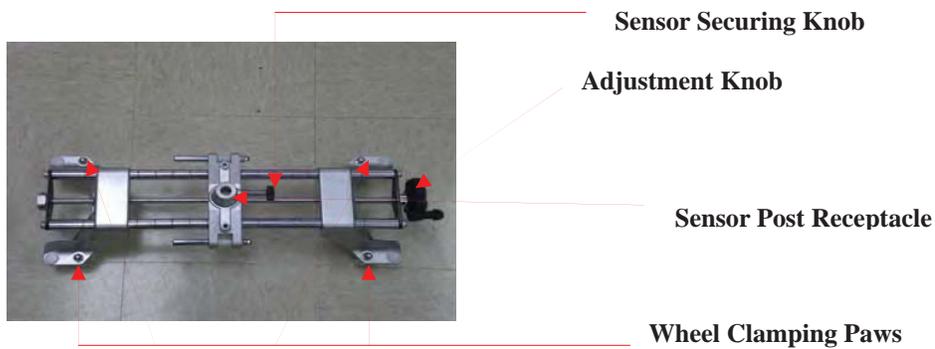
Fig. 10 Battery Label

Besides basic information like battery model, code and production date, the label also has the function of indicating the battery remaining volume. Pressing the button  causes indicator lights to show up the remaining volume. The system is currently equipped with large volume (3000mAh) Li-battery, consecutive working for more than 10 hours for a full battery charging.



Warning: For prolonging lifespan of battery, in the beginning 3 times of using battery, please run out of battery volume as possible before re-charging for more than consecutive 6 hours each time. In the process of charging, please turn off sensors. If not using aligner for more than 3 months, please charge battery for more than consecutive 8 hours before re-using aligner.

2.5 WHEEL CLAMP



The **Wheel Clamping Paws** are what hold the clamp to the vehicles wheel. These are adjusted by turning the **Adjustment Knob**. The Paws need to contact the wheel at 4 points. Be certain that the clamp is firmly attached to the wheel before you attach the sensor to the clamp. Attach the sensor by inserting the **Sensor Mounting Post** into the **Sensor Post Receptacle**. Tighten the **Sensor Securing Knob** to hold the sensor in place. The **Adjustment Knob** should always be straight up or, at 12 o'clock, when installed on the wheel.

2.6 TURNTABLE

The wheel aligner is equipped with 2 pieces of mechanical turntables or electronic turntables (optional), Fig. 13 and 14.



Fig. 13 Mechanical Turntables



Fig. 14 Electronic Turntable



Fig. 15

The turntables are placed in front-top of lift when in use (Fig. 15). 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. G88 can be equipped with electronic turntables and the connection is shown in Fig. 16. Insert one end of the wire into the middle jack at the bottom of front wheel sensor and the other end into the output jack of electronic turntable.



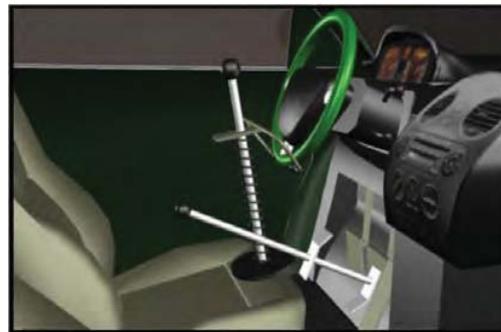
Fig. 16 Electronic Turntable Connection

2.7 STEERING HOLDER AND BRAKE PEDAL DEPRESSOR

The wheel aligner is equipped with 1 steering holder and 1 brake pedal depressor as shown in Fig. 17.



Fig. 17 Steering Holder and



**Fig. 18 Use of steering holder and
Brake pedal depressor**

See Fig.18, 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 EQUIPMENT INSTALLATION

Open the packing box when receiving equipment. Check to make sure that each component quantity is in accordance with the packing list, and then assemble the machine.

3.1 CABINET ASSEMBLY

Cabinet assembly is shown in Fig. 19, including bottom wheel, left and right racks and top cover.

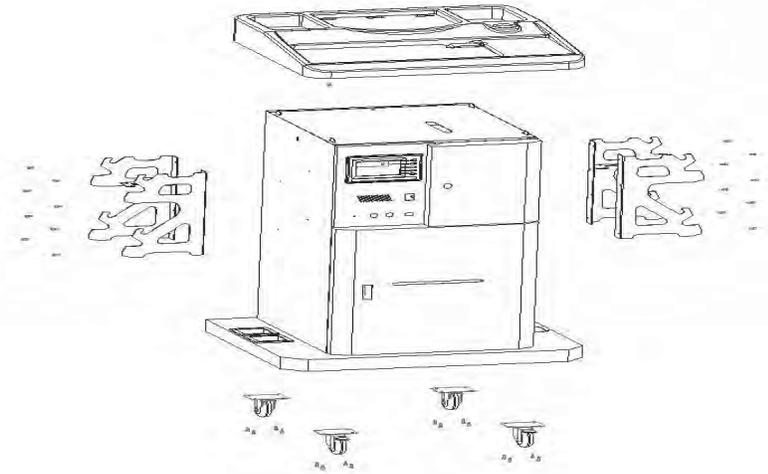


Fig.19

3.1.1 BOTTOM WHEEL INSTALLATION

4 universal wheels installed on the cabinet bottom, 2 with locks installed in the front side and 2 without locks installed on the back side of the cabinet. Each wheel is fixed with four M8 x 16 screws using a 14mm wrench to lock in. The screws and wrench are offered with the aligner. See Fig. 20.



Fig.20

3.1.2 RACKS INSTALLATION

There are two racks on the two sides of the cabinet. Install racks with the rubber mat side up. Each rack is fixed with four M5×8 hexagon socket head cap screw using a M5 Allen wrench to lock it on the side of the cabinet. The screws and wrench are offered with the machine. See Fig. 21.



Fig.21

3.1.3 CABINET TOP COVER INSTALLATION

Put the top cover on the cabinet with the thinner side in the front and the thicker side towards back. Insert the six lock catches on the cabinet into the button hole on the cover. When the cover is stable, push the cover according to the yellow arrow shown in

Fig. 22, and then fix it by tightening a M4×10 screw on the top of the inside of the back cabinet.



Fig. 22

3.2 ELECTRIC EQUIPMENT CONNECTION

The ports of host computer are shown in Fig. 23.

Put the mouse and keyboard on the cabinet cover. Insert the lead wire into the round hole on cover and out from the bottom of the cover to the mouse and keyboard ports on the back of the cabinet. See Fig. 24.

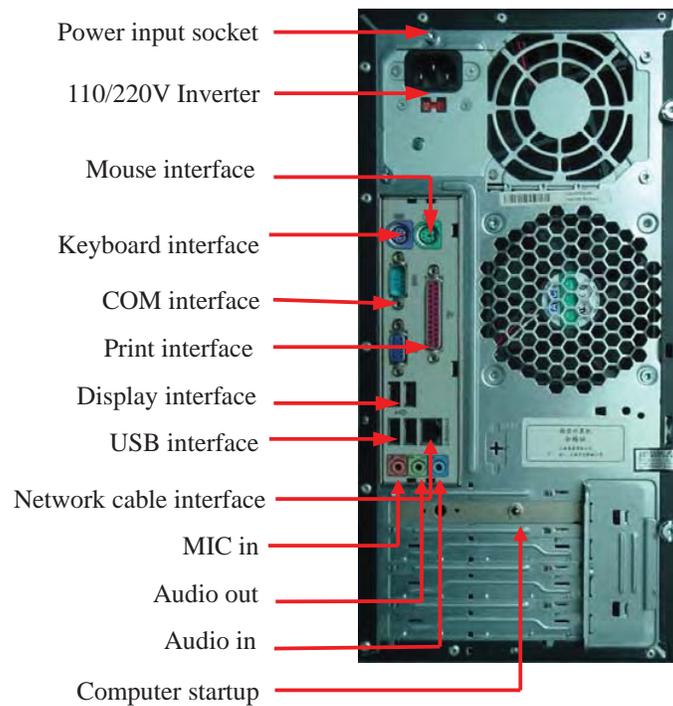


Fig. 23



Put computer display on the cabinet top cover. Insert the power wire and data wire of the display into the oblong hole on the top of the back cabinet and pull them out to insert into the power and data sockets on the display. Insert the other end of the data wire into the display interface on the host computer. Insert the power wire into the power socket at the top of the inside cabinet. See Fig. 25 and 27.



Fig. 25

Open the bottom door of the cabinet and put the printer on the division plate, the power wire and data wire are pulled out into the back cabinet. The data wire connects to the USB interface and the power wire is inserted into the power socket in the back cabinet. See Fig. 26 and 27.



Fig. 26



Fig. 27

The wire pulled out from cabinet connects with the computer as shown in Fig. 28.

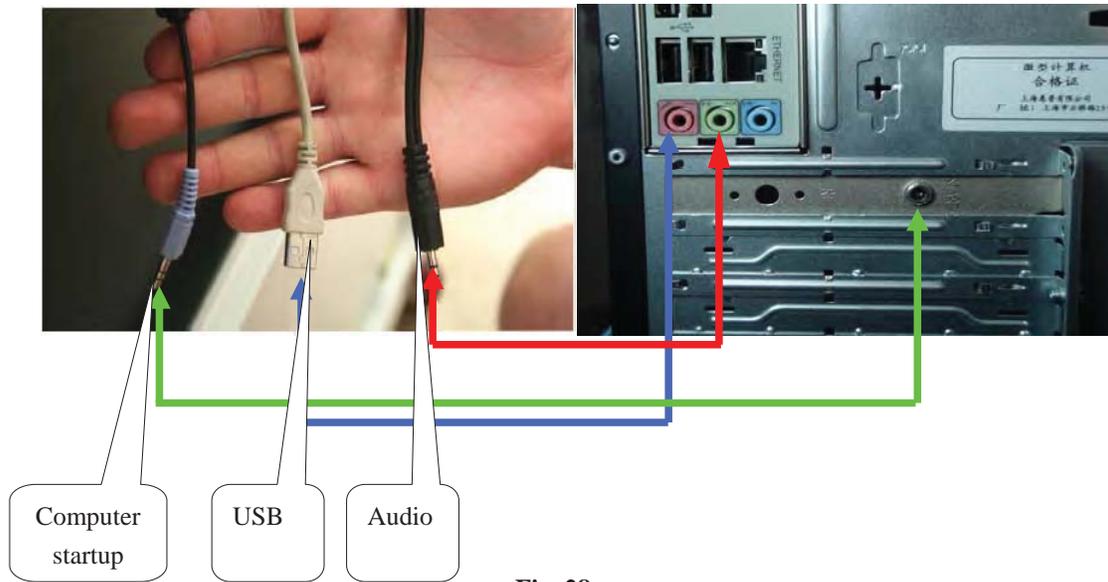


Fig. 28

The green arrow refers to the computer startup connection plug, the red arrow refers to the audio connection plug and the blue arrow refers to USB plug.

After all equipments are connected, put the mainframe box in the box behind the cabinet and close the cabinet with back door.



Fig.29

3.3 SENSOR AND CLAMP INSTALLATION

Take out the sensors from the packing case. Insert a sensor into the rubber case on the bottom of the cabinet with batteries down and axle out. Put the top in the slot of the rack. The other three are put in the same way (it is recommended that the left two sensors should be put on the left of the cabinet and the right two on the right of the cabinet so as to avoid confusion). Adjust the clamp to a suitable size and hang it on the rack.

See Fig. 30 and 31.



Fig. 30



Fig. 31



Warning: For safe operation protective ground connection is necessary through power wire's ground wire or cabinet body's ground point

CHAPTER 4 INITIALIZE SETTINGS

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

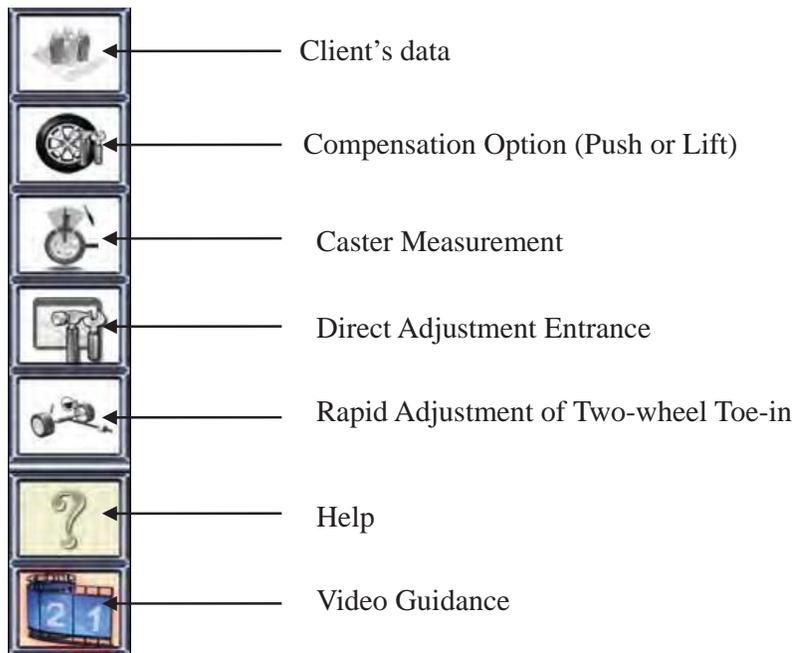
4.1 STARTUP OF WHEEL ALIGNMENT SOFTWARE

Press the main power switch on the front panel of the cabinet control unit to connect the power. Then press computer startup button to start the computer (Fig. 3). System enters the wheel alignment operation system after computer's self-diagnosis (Fig. 32).



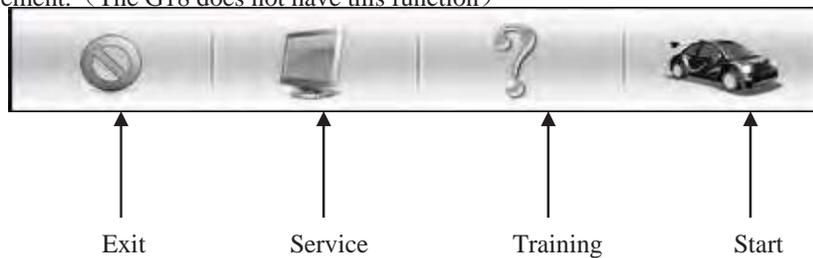
Fig. 32 Main Software Interface

Move the cursor to the left, up or right side of the main interface, the system will pop up a shortcut buttons bar shown as below:



4.2 ALIGNMENT PROGRAM SETTINGS

There are four buttons on the bottom of the alignment system main interface: Exit, Service, Training and Start Measurement. (The G18 does not have this function)



Press "Service" button to enter into the interface of alignment service settings, see figure 33. Factory password is set to "asdfghjkl", after the correct password to enter four-wheel-location services settings interface shown in Figure 34.



Fig.33 Input Password

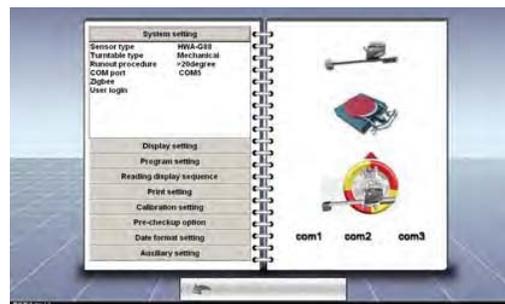


Fig. 34 Service Program Interface

4.2.1 SYSTEM SETTINGS

The first option of the service program interface is system settings which includes six sub-options:

4.2.1.1 SENSOR MODEL OPTION

From the factory sensor model has been set up. Users without permissions cannot change.

4.2.1.2 TURNTABLE OPTION

Click turntable option, the system pops up a selection box on the right side of the screen as Fig. 35. Click the corresponding icon to choose mechanical turntable or electronic turntable according to the turntable to use.



Fig. 35 Turntable Selection

4.2.1.3 COMPENSATION OPTION

Click compensation option (push or lift). The system pops up a selection box on the right side as in Fig. 37.

Click the corresponding icon to apply push compensation or lift compensation to vehicle rims.

Push compensation  is suitable to be conducted in wide working site. Four wheels can be compensated at the same time. It is divided into 90 degrees  and 180 degrees compensation . As per the prompt of system software, push the vehicle backwards for 90 degrees or 180 degrees and then push forwards by same degrees to the previous place.

Lift compensation  should be done on lifts. Lift the vehicle with jacking beam and loose hand brake and pedal brake simultaneously to set the wheel free. Compensate each wheel one by one according to the software prompt. Click the icon to choose 2-point compensation  or 3-point compensation  to compensate vehicle rim.

2-point compensation is done by rotating wheel from 0°-180° as one point and from 180°--360° as another point. 3-point compensation is divided as 0°--120°, 120°--240° and 240°--360°.

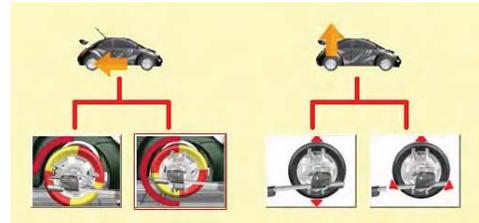


Fig. 37 Compensation Option

4.2.1.4 COMMUNICATION PORT OPTION

This option was preset before the aligner left the factory and users have no right to operate.

4.2.1.5 ZIGBEE SETTINGS

This option was preset before the aligner left the factory and users have no right to operate.

4.2.1.6 PASSWORD MODIFYING

It is used to modify the password, which is convenient for users to administrate and set limits of authority to prevent others from entering the menu and modifying the settings. As the right figure shows, input the original password on the top text box, then input the password that you want twice and confirm.

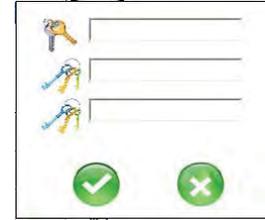


Fig.38 Password Setting

4.2.2 DISPLAY SETTINGS

Click the second bar on the system service setup interface to enter display settings (Fig. 39). The display setting includes four options: language, touch screen, 3D animation and speaker control.

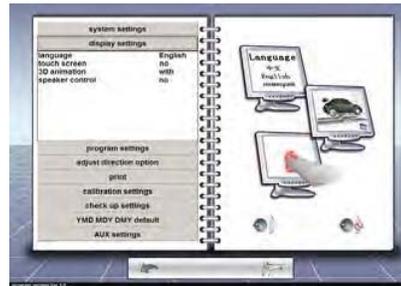


Fig. 39 Display Settings

4.2.2.1 LANGUAGE OPTION

Click language option. The system shows a national flag list of each country on the right side. Click corresponding flag to choose the language. The language can be customized with different languages.

4.2.2.2 TOUCH SCREEN

This option is for enable or disable touch screen operation when the wheel alignment system is equipped with touch screen.

4.2.2.3 3D ANIMATION GUIDANCE

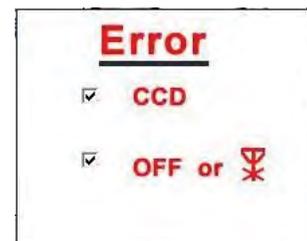
When this option is enabled, the system will pop up 3D animation guidance in corresponding interface to instruct users how to operate like sensors installation, clamps installation, compensation operation and vehicle adjustment, etc. The 3D animation will not show when the option is disabled.

4.2.2.4 SPEAKER CONTROL

Enable or disable the speaker to control the volume.

4.2.3.5 ERROR PROMPT

This option is for prompting Error when CCD measurement is blocked or sensor has no communication with aligner mainframe.



4.2.3 ALIGNMENT PROGRAM SETTINGS

Click the third bar on the system program settings to set up the alignment program (Fig. 40). The settings contain four options: operation and adjustment of caster, constant toe-in curve measuring tools, display unit of measuring data and carry setting.

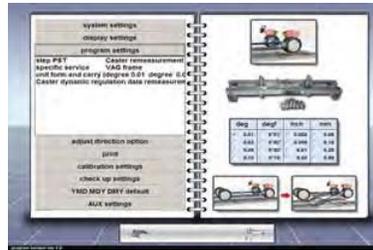


Fig. 40 Alignment Software Setting

4.2.3.1 STEP PRE-SETTINGS

The option has three sub-options: compensation, caster measurement and two-wheel toe-in rapid adjustment which are multi-selectable. If compensation and caster measurement are selected, the two operations must be done in the program before entering into the next operation. If the two options are not selected, users may skip the two options and go to the next operation directly. Two-wheel toe-in rapid adjustment is designed for some users considering for front wheel toe-in measurement only. If the option is not selected, the program will be screened.

4.2.3.2 SPECIFIC SERVICE

Some vehicles like Audi A6, PASSTB 5 and BMW, require constant toe-in curve value measurement while doing wheel alignment. This option is specially created for these series of cars. The operation can be enabled or disabled by this option.

4.2.3.3 UNIT FORM AND CARRY

Click this option, the system pops up the chart as Fig. 41. The measurement unit of toe-in is quite special. The system has several units for users to choose according to different using habits, such as degree, degree and minute, inch and millimeter. For other measurements, the system provides two options: degree and degree and minute. The carry resolution for each unit is divided into four options. Users can select different resolution according to different requirement. For higher accuracy, high resolution is required.

	degree	size	mm	inch
toe-in	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
other angle	<input checked="" type="radio"/>	<input type="radio"/>		
resolution	<input checked="" type="radio"/> 0.01	<input type="radio"/> 0°01'	<input type="radio"/> 0.05	<input type="radio"/> 0.002
	<input type="radio"/> 0.02	<input type="radio"/> 0°02'	<input type="radio"/> 0.10	<input type="radio"/> 0.005
	<input type="radio"/> 0.05	<input type="radio"/> 0°05'	<input type="radio"/> 0.20	<input type="radio"/> 0.01
	<input type="radio"/> 0.10	<input type="radio"/> 0°10'	<input type="radio"/> 0.50	<input type="radio"/> 0.02

Fig. 41 Unit Form and Carry

4.2.3.4 CASTER DYNAMIC ADJUSTMENT OPTION

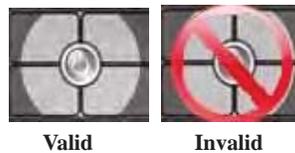
The option has two selections: **dynamic data regulation adjustment** and **data re-measurement regulation adjustment**.

Dynamic data regulation adjustment: monitors the change of caster when making the caster adjustment.

Data re-measurement regulation adjustment: calculates the difference between measured data and standard data to adjust the caster to the correct position directly. For example, by adding washers. Then re-measure the caster.

4.2.3.5 SENSOR CONTROLS COMPUTER

F1-F4 button of sensor is corresponding to F1-F4 of computer keyboard as well as those shown on the bottom of computer monitor. When selecting this function to be valid, user can press sensor button for operation, needless of operating on computer keyboard, thus avoiding user's movements back and forth between sensor and computer mainframe and saving operation time.



4.2.4 ADJUSTMENT DIRECTION OPTION

The interface of adjustment direction is show as below:

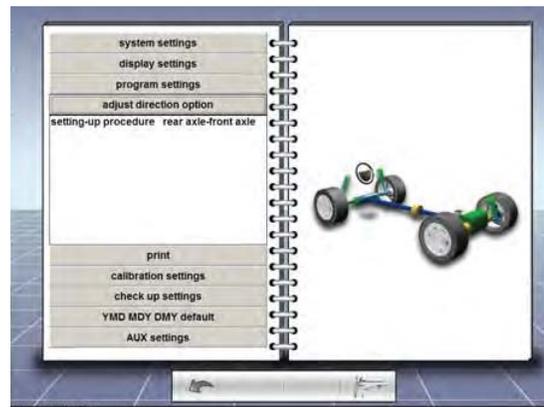


Fig. 42 Adjust Direction Option

4.2.4.1 ADJUSTMENT SEQUENCE

The option includes three sub-options: rear axle—front axle, total, and individual. The option only changes the display method of adjustment interface after finishing the measurement. The three sub-options are switchable through shortcut buttons in the program. The three methods are as follows:



Fig. 43 Vehicle Adjustment Sequence

4.2.5 PRINT SETTINGS

The interface of print settings is shown in Fig. 44. The option contains printout settings of measuring data forms like printing format, language, advertising to clients and some indicating terms. The settings have four options.

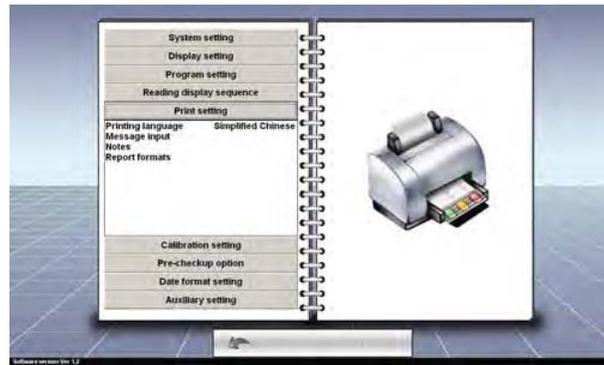


Fig. 44 Printing

4.2.5.1 Print language

Users can choose different print language according to different nations or different needs.

4.2.5.2 Insert information

By clicking the option, the system will pop up a text input box on the right side. Users can input telephone number, company address and some advertising, etc.

4.2.5.3 Tooltip

By clicking the option, the system will pop up a text input box on the right side, in which customers can input some prompt information like vehicle maintenance notice etc..

4.2.5.4 Report form

This option is for setup of the printout format of report form. It has two sub-options: With or without grid and with or without company logo. While choosing with grid, the output will be in form. While choosing without company logo, the output will be without company logo.

4.2.6 CALIBRATION SETTINGS

4.2.6.1 Calibration frame option

The interface of calibration setup is shown in Fig. 45. Due to sensor replacement or deformation from collision which causes inaccuracy, sensor calibration is necessary. The option includes settings to calibrator selection, calibration form and calibration angle.

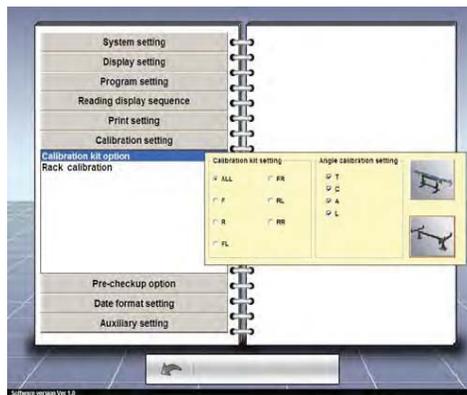


Fig. 45 Calibration Frame Option

Users should select calibration frame according to the calibration frame purchased. The calibration method is different with different calibration frame.

The system provides seven different calibration forms:

- ALL Four sensors
- F Two front sensors
- R Two rear sensors
- FL Front left sensor
- FR Front right sensor
- RL Rear left sensor
- RR Rear right sensor

The system provides four options:

- T Toe-in calibration
- C Camber calibration
- A Axis calibration
- L Level calibration

4.2.6.2 Running Platform Calibration

Running platform calibration is shown in the right figure. When the platform of the shears type lift is not level or there is a height difference between the left and the right side, the accuracy of measurement will be influenced. In this case, the lift needs calibrating. Users can do the calibration according to animation.



Fig. 46 Running Platform Calibration

4.2.7 CHECK-UP SETTINGS

The interface of check-up settings is as shown in Fig. 47. Before wheel alignment, some basic inspection to vehicle is essential. With these inspections in combination with the alignment measurement, users can judge the vehicle failure causes accurately. Therefore, users can make correct adjustment to vehicles so that the vehicle can drive in the best situation.

4.2.7.1 Check-up options

Click the check-up options button, the system will pop up a inspection items list on the right side. Users can tick the required items or click the “all” button on the up right corner to select all items.



Fig. 47 Check-up Options

4.2.8 DATE FORMAT SETTINGS

The date format settings interface is shown in Fig. 48. Users can set up the date display format according to their using habits. The system provides three types of display.

- 1、YYYY—MM—DD
- 2、DD—MM—YYYY

3、MM—DD—YYYY

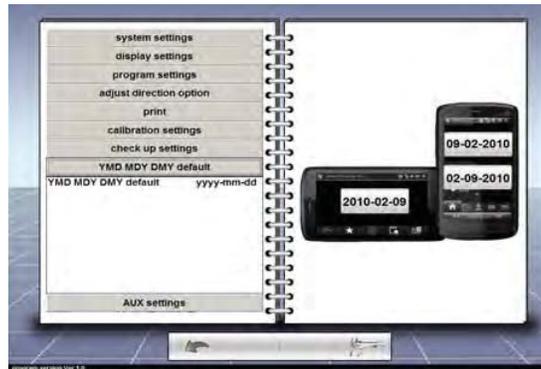


Fig. 48 Date Format Settings

4.2.9 AUXILIARY SETTINGS

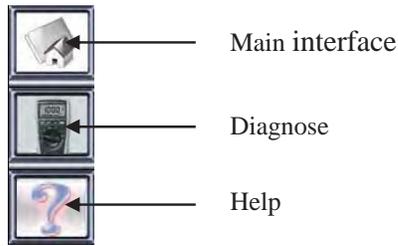
The interface of auxiliary settings is shown in Fig. 49. This option is for enable and disable some auxiliary devices and functions like simulator, PDA (optional) and working records (like the function of black box which records the whole working process of the machine).



Fig. 49 Auxiliary Options Settings

4.2.10 SENSOR DIAGNOSE

Move the cursor to any position on the left, up or right side of the system service program setup interface, the system will pop up one shortcut button bar.



Click diagnose button, the system enters into sensor diagnose interface (Fig. 50).

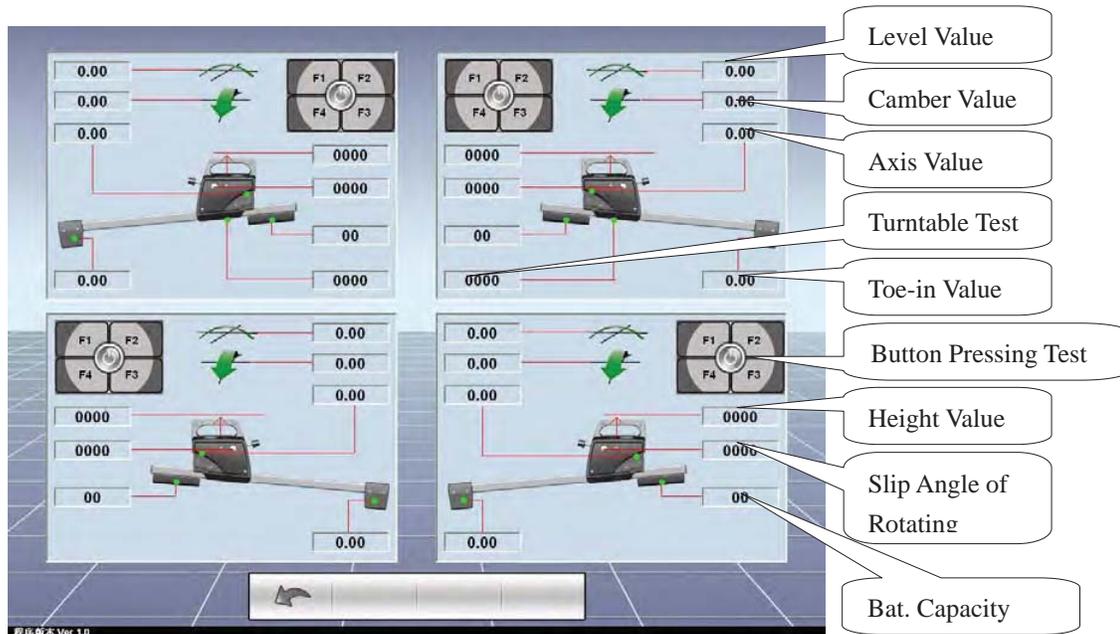


Fig. 50 Sensor Diagnose

4.3 SAVE AND EXIT

After completing the system service settings, click the button  on the left side of the screen bottom. The system will pop up a prompt window (Fig. 51). Press “Yes” to save the settings and exit to the main interface of the program.

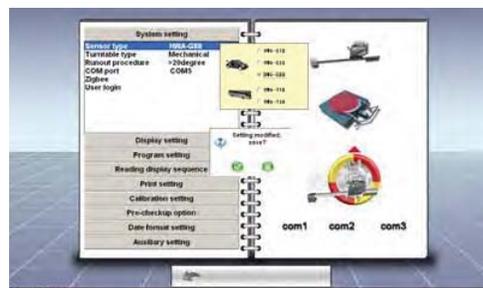


Fig. 51 Store and Exit

4.4 AUTO MODEL DATA INPUT

Press the start button  on the bottom of the main program interface to enter car selection interface. Move the cursor to any position of the left side of the screen where a shortcut button bar will pop up (Fig. 52). Click the third button  to enter the next interface (Fig. 53). The interface displays saved vehicle manufacturers' names and countries in the software. The text input box below is for adding vehicle manufacturer's name and country not listed in the software. Click the button  on the bottom of the screen to add. The box marked with  is compulsory. After completion, click  to enter the next interface (Fig. 54).



Fig. 52 Car Model Selection Interface

If the car model data already exists in the software, click the searched manufacturer, the column will display in reverse blue color. Then press the button  to enter the next interface (Fig. 53). Click  to delete any error input.



Fig. 53 Car Model Data Input

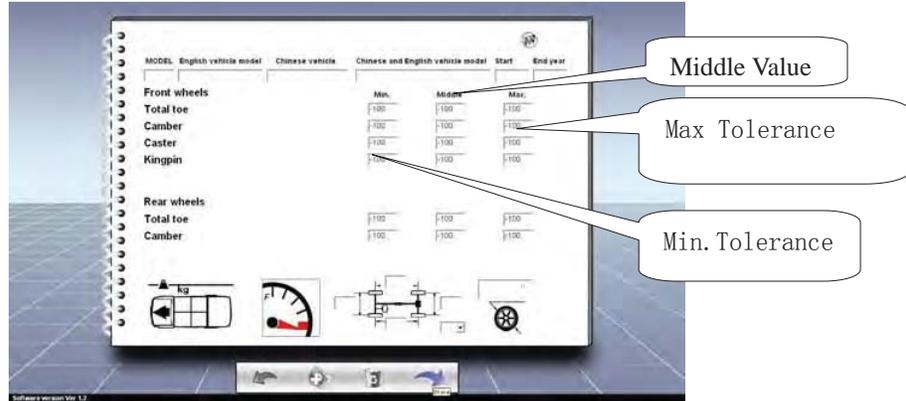


Fig.54 Data Input

The above is the specific car model data input interface. Input the following data one by one in the text box on the up right side of the interface: English car model, Chinese car model, and English and Chinese Car model, Starting Year of the car, Finishing Year of the car. Fill in the blank below with car model data. Fill in min. tolerance, middle value and max. tolerance from left to right separately. The relations of the three values are as below: Middle value = (max. value + min. value) × 0.5, Max. tolerance = max. value - middle value, Min. tolerance = middle value - min. value. The unit is “degree”. Among them, the middle value can be minus or plus. The min. and the max. to be input are not allowed with minus or plus. For the icons on the left side, they represent the car logo, vehicle weight (click to add), display scale of oil leveler (click to add), vehicle wheel base, tread and rim diameter. After confirmation, click next step  to store and return to the next operation. The new car model data input is finished.

CHAPTER 5 OPERATION PROCEDURE

5.1 UNDERSTANDING THE CONDITION

Before wheel alignment, consult with the vehicle owner on any particular problem such as driving condition, problem phenomenon, and recent wheel alignment history or if there has been 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 for any wearing, deformation and looseness on tie rod end, boot, control arm, bearing, tripod ball joint, shock absorber, steering transmission mechanism, etc. Check to assure the tire pressure, tire specification, wheel lugs are

consistent and the tire wear condition, etc. If any abnormality is detected, communicate with vehicle owner in time and take corresponding measure to solve the problems.

5.2 ALIGNMENT INSPECTION

Carry out alignment inspection to measure every alignment angle precisely.

5.3 VEHICLE ADJUSTMENT

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

5.4 TEST DRIVING

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

CHAPTER 6 OPERATION GUIDANCE

6.1 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 tire pressure, tread and wear of the tire.
- 4.** Fixture installation. Fix the clamps on the inner or outer side of the rim according to different vehicle conditions. Try to avoid areas with weights and deformations. 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.** Installation of sensors. Insert the mounting post of sensor in the housing of clamp until the sensor touches the mounting post shoulder. Fasten the clamp locking knob to lock the sensor post. Press the button

 to start up the sensor. Then adjust the sensor to level using the electronic level bulb in the center of the LCD display window. Fasten the locking knob to lock the sensor. Apply the same operation to the other three sensors.

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.

6.2 START MEASUREMENT

For existing clients, operators can retrieve the saved data to start measurement directly. Move the cursor to any position of the up, left or right side of the main alignment program interface. The system will pop up one shortcut menu bar. (Fig. 55) Click the clients' data button  to enter into the clients' data interface as in Fig. 56. Select the client  and click to the next interface of pre-test check. (Fig. 57) .Operators may check the selected items on system service checkup options. Tick the item if qualified and cross it if not.

Enter the next option after all the problems in the previous option are solved.

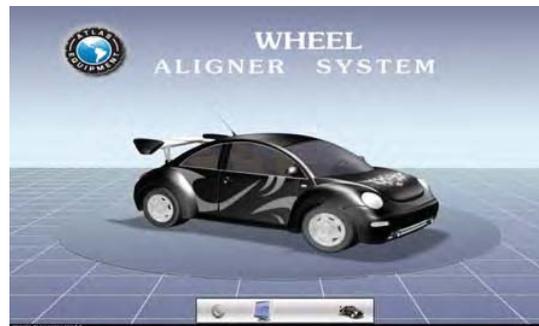


Fig. 55 Main Interface



Fig. 56 Client Information



Fig. 57 Check before Test

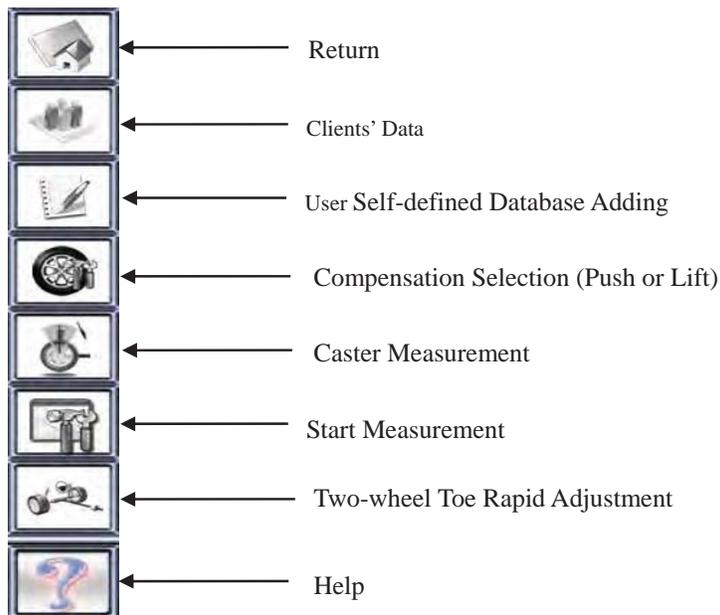
6.2.1 AUTO MODEL DATA SELECTION

For new clients, click the start button  on the bottom of the main screen directly to enter auto model selection interface. (Fig. 59)



Fig. 59 Auto Model Data Selection

Move the cursor to the left, up or right side of the interface freely, the system will pop up one shortcut buttons menu as below:



Auto data base is divided into factory data base and user self-defined data base. Factory data base is standard data base. User can input and establish its defined data base.

In Fig. 59 interface, search auto model by scrolling the mouse according to different options or, by inputting the first letter or, abbreviation of auto name.

Schematic searching: Input English full name or abbreviation of auto model No. in the text box;

First letter searching: Input the first letter of auto name or model No. in the text box;

See Fig. 59A, 59B and 59C.



Fig. 59A Schematic Searching

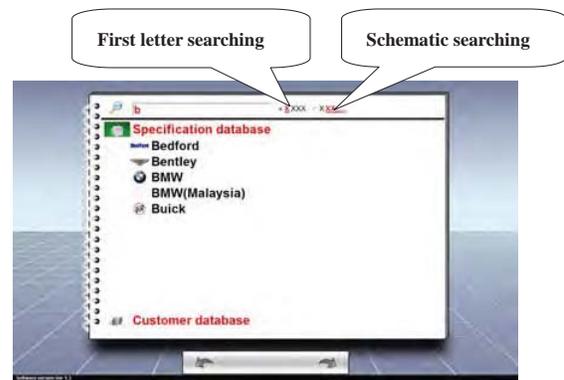


Fig. 59B First Letter Searching

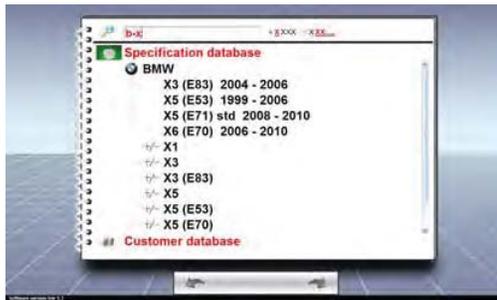


Fig. 59C First Letter Searching

6.2.2 AUTO MODEL DATA DISPLAY

Click directly when finding the auto wanted. Enter data display interface of Fig. 60, and the value displayed is the standard value, according to which auto is adjusted. Users can also modify the rim size according to the auto condition.

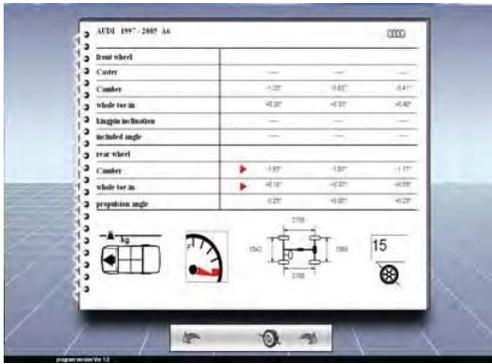


Fig. 60 Auto Model Display



Fig. 61 Auto Model Display

Sometimes the interface of Fig.61 may appear. Some orientation angles have no values but have  mark in front of them. This means that the values can be obtained by measuring the height of car chassis, the length of the shock absorber, the tilt angle of the trailing arm and axle. Following is the operation:

click  to enter the interface of Fig.62. Input the height H1 or H2 in the middle box and the program will automatically choose the closest standard value from the right list. Press Enter key or click with mouse any position in the big box to return to the interface of Fig.63. The standard values of the corresponding orientation angles can be seen in the list.

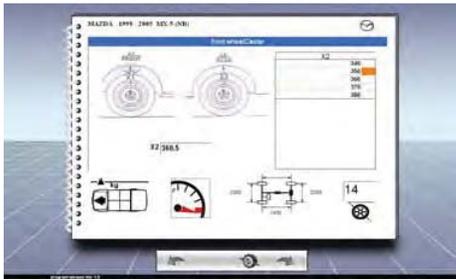


Fig. 62

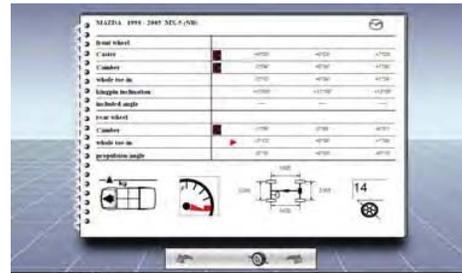
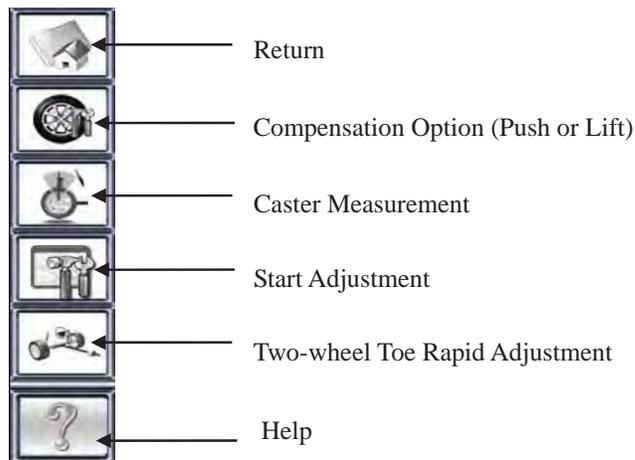


Fig.63

The data shown is the standard data of the vehicle which is the benchmark of wheel alignment. Move the cursor to the left, up or right side of the screen, the system will pop up the following shortcut buttons menu:



6.2.3 CLIENT'S DATA INPUT

Click button  on the data display interface to enter client's data input interface (Fig. 64). Here operators can input some basic information like client's name, license number, address, telephone number, testing date and some simple testing records, etc. This information may help user to establish maintenance file for client, which will be helpful for re-check and next maintenance in the future.



Fig. 64 Clients' Data Input

Click  to enter pre-testing check. (Fig. 57)

6.2.4 RIM COMPENSATION

After vehicle check, click  to enter the next step. The screen pops up 3D animation as Fig. 65. The animation guides operators to such proceedings as driving vehicle onto the lift, fixture installation and sensor installation, etc. Operators may click anywhere outside of the film to exit the animation

demonstration. The system enters into rim compensation procedure. The procedure has two methods of compensation:

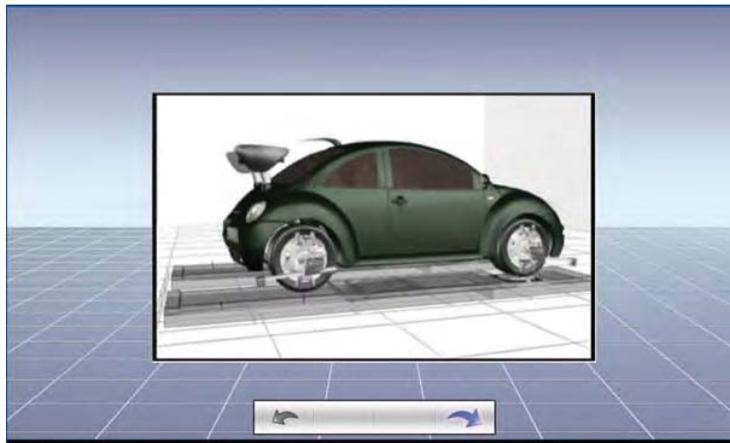


Fig. 65 3D animation

Due to rim deformation, installation error of rim clamps or other operations, the sensors 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 wide difference. Therefore, before alignment, rim run-out compensation to installed measuring system is the guarantee to accurate measuring results. The rim compensation program calculates the installation plane of the wheel measuring system by the changing of wheel camber while rotating the wheel for 360 degrees. The measured installation run-out is used to compensate the alignment measurement.

6.2.4.1 LIFT COMPENSATION

If the service program is set up with lift-up compensation, click  after animation demonstration, the program enters the following rim compensation interface (Fig. 66).

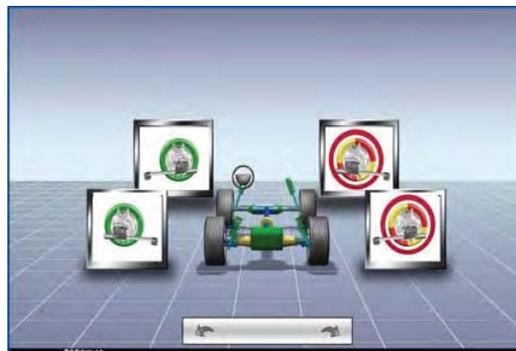


Fig.66 Lift Compensation

To carry out lift compensation, second lifting jacking beam is used. Loosen brake to set the wheel free. Loosen the lock knob of the sensor to set the sensor free. Keep the clamps in vertical position.

Lift rim compensation steps:

When the program enters compensation interface, the power buttons of four sensors twinkle blue, see the sensor display interface in the figure. The operator chooses one wheel and presses the power button on the

sensor. The program tells to rotate the wheel clockwise 180 degrees (if choosing 3 points to compensate, rotate the wheel 120 degrees) evenly and slowly not to shake the wheel. When the wheel turns 180 degrees and is stable and the sensor is horizontal, read the compensation value. When hearing the sensor's "di di" sound, clockwise rotate the wheel 180 degrees again evenly and slowly. When the wheel turns 180 degrees and is stable and the sensor is horizontal, read the compensation value. The sensor makes two "di di" sounds and enters the interface of displaying compensation values. At the same time the corresponding tire displayed in green on the main program interface shows that the rim begins compensating (see fig.66). After compensation of this rim, do the other wheels compensation in the same way.



For lift-up compensation, it should be done one wheel by one wheel without strict compensation sequence.

6.2.4.2 PUSH COMPENSATION

If the service program is set up with push compensation, click  after animation demonstration, the program enters the following rim compensation interface (Fig. 67).

To carry out push compensation, clear obstacles around vehicle. Loosen brake to set the wheel free. Loose the lock knob of the sensor to set the sensor free. Keep the clamps in vertical position.

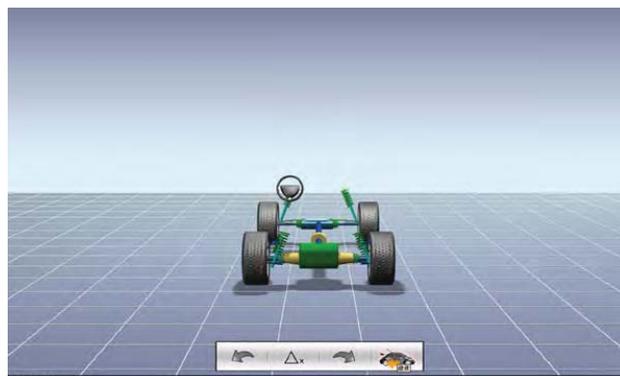


Fig. 67 Push Compensation

Steps of push compensation:

90/180 degrees push compensation

In Fig. 67 interface, press  or power button "F" of sensor to enter push compensation. Computer mainframe sends out compensation instruction to sensors. Power button "F" of sensor flashes in blue. User can push auto backwards evenly and slowly according to computer monitor prompting interface to rotate wheels. When rotated angle is 90/180 degrees, the monitor will show a flashing "F" icon, prompting to stop pushing. After sensors are stable and in level, press power button "F" of sensor, the interface will show

“STOP”. Waiting for several seconds, computer mainframe will collect data from sensors. Then, push auto forwards by the same angle, the monitor will show a flashing power button “F” icon, prompting to stop pushing. After sensors are stable and in level, press power button “F” of sensor, the interface will show “STOP”. Waiting for several seconds, computer mainframe will collect data from sensors. After interface shows “END” and 4 wheel icons become green, push compensation ends. See Fig. 68A, 68B, 68C and 68D.

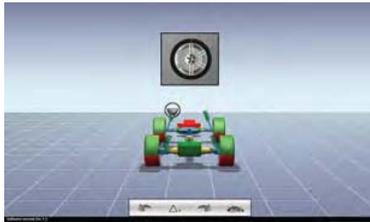


Fig. 68A

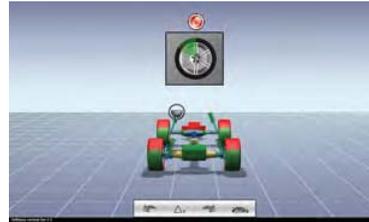


Fig. 68B

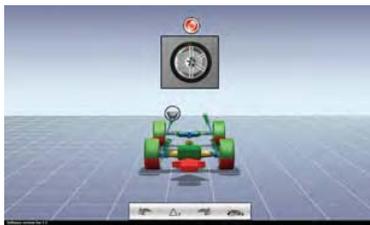


Fig. 68C

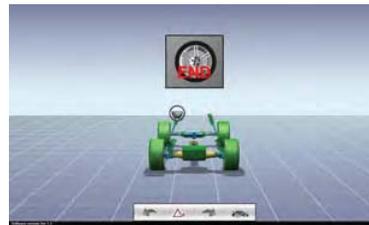


Fig. 68D

6.2.5 VEHICLE MEASUREMENT

After performing rim compensation, click  to enter vehicle measurement. Lower the vehicle and engage the hand brake. Fix the pedal brake with brake depressor. Draw out the locking pins of turntables and sliding plates. Press the vehicle front and rear three times each to eliminate the stress of chassis components. (Fig. 69 and 70)



Fig. 69 Animation of Pedal Brake Depressor

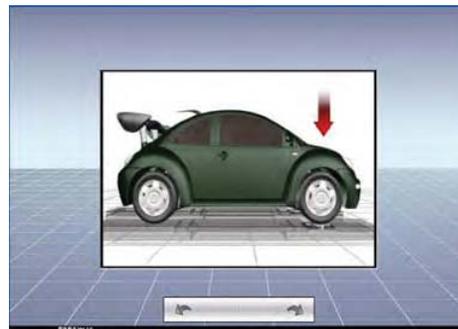


Fig. 70 Animation of Pressing Vehicle Body

6.2.5.1 STRAIGHTEN STEERING WHEEL

Click  to enter the next operation: Put the steering wheel straight. (Fig. 71) Turn the steering wheel left or right side until the red triangle on the screen points to zero. When any of the sensors is detected not

in the horizontal level, the program will pop up one bubble icon for the corresponding sensor. Adjust the



Fig. 71

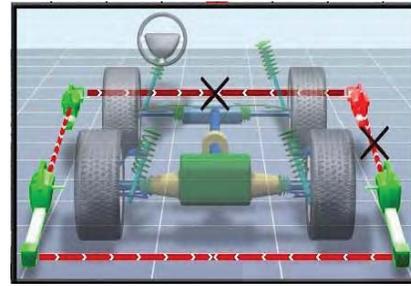


Fig. 71A

level of the sensor until the icon turns into green. When all the four sensors are in levels and the red triangle is in the zero position, the program will display “OK” in the center of the screen. After several seconds, the program enters into the next operation: 12 degree measurement.

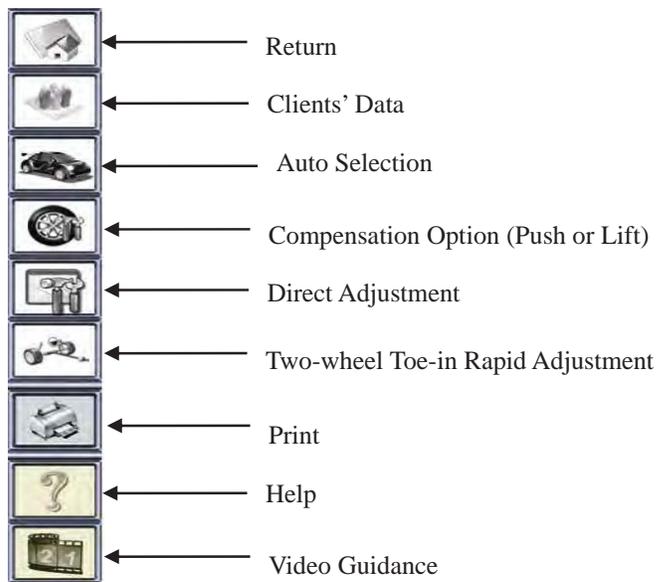
For no communication between sensor and computer mainframe or blocked measurement light ways, corresponding sensor icon will become red; For normal communication or not blocked measurement light ways, corresponding sensor icons in green (Fig. 71A).

6.2.5.2 12 DEGREE MEASUREMENT

12 degree measurement is the necessary step for the measurement of caster. The principle of the measurement is to calculate the vehicle caster from the changing of the level value during the wheel turning process by steering the wheel for 12 degrees to the left and to the right. If the caster measurement is not necessary, operators may cross the measurement in the procedure pre-setting option in the alignment program setup option of the service program settings. Then operators may click “Next” to the next operation.

Operation steps of 12 degree measurement:

Put the steering wheel straight and enter the 12 degree measurement interface. Steer left slowly and evenly to 12 degrees until the screen shows “STOP”. Stop steering for several seconds until the “STOP” disappears. Then, steer right slowly and evenly to 12 degrees until the screen shows “STOP”. Stop steering for several seconds until the “STOP” disappears. Steer left to the center position. The screen will show “STOP,” after several seconds. The program enters to the next operation automatically. The 12 degree measurement is finished.



6.2.6 VEHICLE ADJUSTMENT

After finishing initial measurement, click  to the vehicle adjustment process. Before adjustment, the program will pop up one animation (Fig. 74) to prompt operators to lock the steering wheel. Put straight the steering wheel by visual check. Then lock the steering by steering holder according to the animation prompt. The purpose of locking the steering is to prevent the turning of steering during adjustment which may affect the measurement and adjustment. In addition, it can also guarantee the straight-ahead on direct driving after adjustment.

6.2.6.1 REAR WHEEL ADJUSTMENT

After locking the steering wheel, click “Next” to the interface of rear wheel adjustment. (Fig. 75)

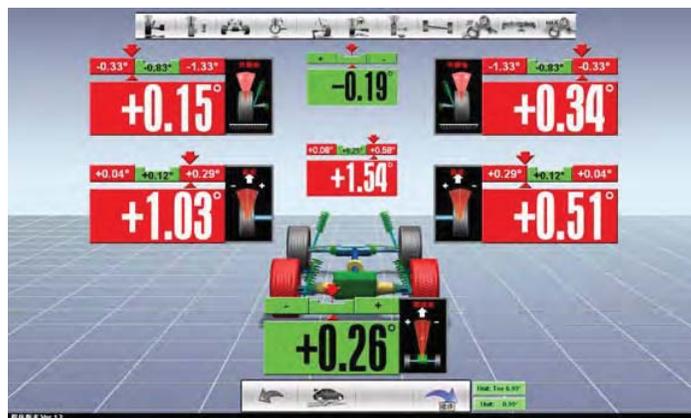


Fig. 75 Rear Wheel Adjustment

According to the different setup of adjustment sequence in the adjustment options, the initial interface of the vehicle adjustment can be one of the following three options: full vehicle adjustment, rear axle-front axle adjustment and individual adjustment. Take rear axle-rear axle adjustment as an example.

In the interface, the two rear wheels of the car model shows in red which represents rear wheel adjustment. There are three columns of data. The first column is camber display area with rear left wheel camber on left, total value of left and right cambers in the middle and rear right camber on the right. The second column is toe-in display area with rear left wheel individual toe-in on the left, rear wheel total toe in the middle and rear right individual toe on the right. The second column is thrust angle display area.

On top of each green data display area, there is a narrow red-green bar, in which is the vehicle standard data. It represents min. value, middle value and max. value from left to the right. If the measured data is beyond the standard data range, the data display area will turn red. In the interface, move the cursor to any of the data display area, the system will pop up a corresponding indicating icon for user's identification. On the top of the interface of rear wheel adjustment, there is a shortcut buttons bar as in Fig. 76.

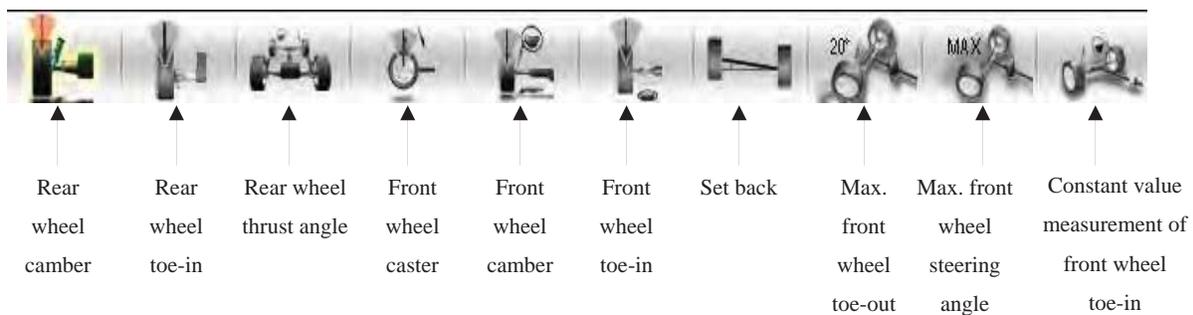


Fig. 76 Shortcut Buttons

To avoid the visual mistake and for the simplicity of using, user may click the relative button to enter the individual adjustment interface. User may also click the blank area of any display area or the data display area to enter the individual adjustment image. (Fig. 77 and Fig. 78)

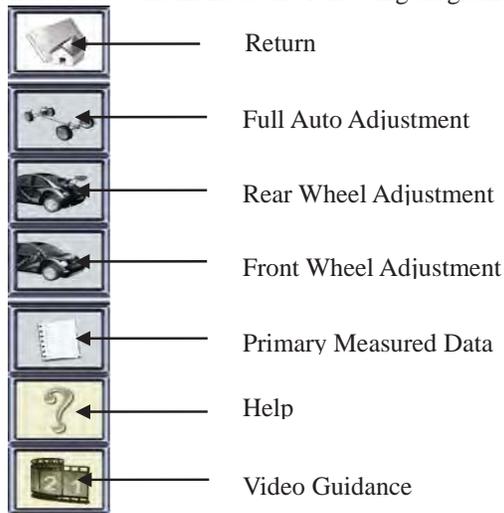


Fig. 77 Individual Adjustment



Fig. 78 Single Wheel Adjustment

Move the cursor to the left or right side of the rear wheel adjustment interface, the system will pop up a shortcut buttons menu as the following diagram shows:



6.2.6.2 FRONT WHEEL ADJUSTMENT

After completing rear wheel adjustment, click  to the front wheel adjustment interface. (Fig. 79)



Fig. 79 Front Wheel Adjustment

In the interface of front wheel adjustment, the two front wheels of the car model is displayed in red representing the wheels to be adjusted. There are three lines of data display area. The first line is the caster display area with left wheel caster on the left and right wheel caster on the right. The second line is camber display area with left camber on the left, total camber in the middle and right camber on the right. The last line is toe-in display area with left wheel individual toe-in on the left, total toe-in in the middle and right wheel individual toe-in on the right.

The data in the red-green bar on top of the green data display area is the vehicle standard data which represents the min. value, the middle value and the max. value from left to right. If the measured data is beyond the standard data range, the data display area will turn into red. Move the cursor to any point of the data display area, the system will pop up relevant indicating icon for better identification. Like the rear

wheel adjustment, user may 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.

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.

After completing the adjustment, click  to the next measurement. The general data after adjustment is shown in Fig. 80.



CITROEN 1997 - 1999 AX 4*2 AX-AX 10-AX 11		
primary data measured	front wheel	data after adjustment
	Caster	
	Camber	
	whole toe-in	
	division toe-in	
	kingpin inclination	
	included angle	
	setback angle	
rear wheel		
	Camber	
	whole toe-in	
	division toe-in	
	propulsion angle	
	setback angle	

Fig. 80 Data after Adjustment

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.

-  Back to the previous page
-  Finish measurement and back to the main interface
-  Continue, next page

6.2.7 CLIENTS DATA INPUT

In the data display interface after adjustment, click the button  to store the measurement results. And click the button  to exit to the main interface.

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. 81. 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.



The screenshot shows a software window titled "clients data input" with a red asterisk icon in the top right corner. The window contains several input fields and a text area:

- customers' name: [empty field]
- car number: 12345
- telephone: 12345678
- address: [empty field]
- test time: 2018-02-09 11:26:42
- test record: [empty text area]
- car: CITROEN
- car model: AX 4*2 AX-AX 10-AX 11
- start year: 1997
- end year: 1999

At the bottom of the window, there is a toolbar with four icons: a blue arrow pointing left, a printer icon, a red circle with a diagonal line through it, and a floppy disk icon. The text "program version Ver 1.0" is visible in the bottom left corner of the window.

Fig. 81 Client Data Input



Back to the previous page



Printout



Exit, back to the main interface



Save

CHAPTER 7 OPERATION GUIDE OF SENSOR

7.1 SENSOR ON-OFF

7.1.1 POWER-ON

Press the power button  on the sensor to power-on. After several seconds, system enters the testing interface. (Fig. 83)



Fig. 82 Sensor Startup Interface

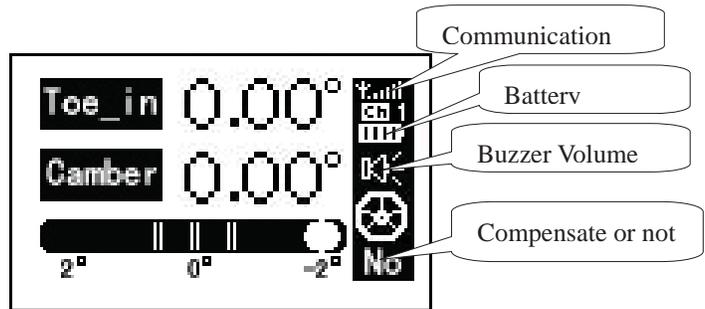
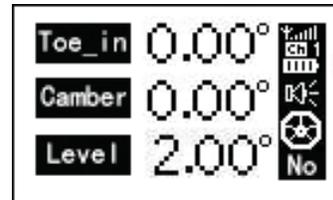
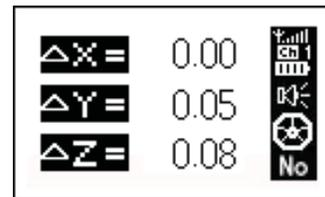


Fig. 83 Sensor Testing Interface

Press power button F and F3+F1 at the same time in the interface of fig.83, you can see the right picture, level is displayed in values.



Press power button F and F3 at the same time to show rim compensation data in the right picture.



Press power button F and F3, F4 at the same time, the tire diameter is displayed as shown in the right picture.



7.1.2 POWER-OFF

Press down the power button  and “F1” at the same time. The sensor prompts “Please press  to confirm shutdown”. Press the power button again to shutoff the sensor.

7.2 SENSOR SETTINGS

Press power button and “F2” to enter into the sensor settings interface. (Fig. 84)

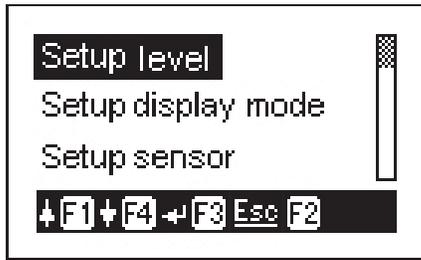


Fig. 84 Sensor Setup

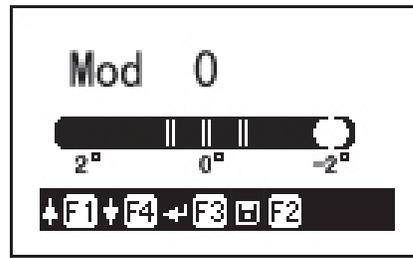


Fig. 85 Level Setup

7.2.1 LEVEL SETUP

The first option of sensor settings is level setting. Press “F3” to enter. (Fig. 85)

The sensor is equipped with 13 kinds of level adjustment modes: Mode 0, 1-6 and -1 to -6. Mode 0 is normal mode. Mode 1-6 represents lowering the sensor by 1 degree to 6 degrees. Mode -1 to -6 represents lifting the sensor by -1 to -6 degrees. The level setup is suitable for super low chassis measurement. Because of the low chassis, the infrared toe measuring beam from the sensor will be blocked. At this time, the sensor needs to be lowered for the measurement. The setup is also for small rim measurement. When the sensor is installed on small rims, the toe end of the sensor will get in touch with the ground. At this time, the sensor needs to be lifted to precede the measurement. Press “F1” and “F4” to change the adjustment mode. Press “F3” to confirm. Press “F2” to store and exit.

Note: To change the level mode, front and rear, and left and right sensors must be under the same mode (lift or lower meantime), otherwise, the measured result maybe be influenced.

7.2.2 DISPLAY MODE SETTINGS

In the menu of sensor settings, press “F4” to move to the next option: Display mode setup. Press “F3” to enter. (Fig. 86, 87)

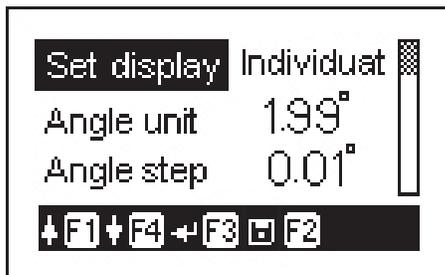


Fig. 86 Display Mode Setting 1

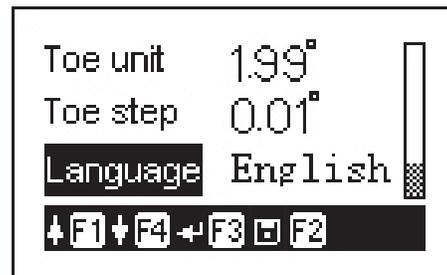


Fig. 87 Display Mode Setting 2

The settings including 6 sub-options:

Display setting: it includes synchronization and non-synchronization. Synchronization refers to the synchronization between sensor and computer. The display setup options like angle unit, angle resolution, toe-in unit, toe-in resolution and language, etc. will be synchronized with computer automatically. Non-synchronization means that sensor and computer are not synchronized. The settings for sensors can be set up individually.

Angle unit: Degree, degree and minutes

Angle resolution: 0.01、0.02、0.05、0.10. Each option represents the carry bit and measurement accuracy of the measurement results.

Toe-in unit: degree, degree and minutes, mm and inch which can be selected according to personal using habits.

Toe-in Resolution: the resolution is different as per the selection of toe-in unit.

Degree: 0.01°、0.02°、0.05°、0.10°

Degree and minutes: 0°01'、0°02'、0°05'、0°10'

mm: 0.05、0.10、0.20、0.50

Inch: 0.002"、0.005"、0.010"、0.020"

Language: the system provides several kinds of languages for user to choose. The present sensor provides three languages: Chinese, English and Traditional Chinese.

Press “F1” “F4” to select different options and change the contents of options. Press “F3” to confirm. And Press “F2” to store and exit.

7.2.3 SENSOR SETTINGS

In the sensor settings menu, press F4 to move to the next setup item. Press F3 to enter. Fig. 88 & 89.

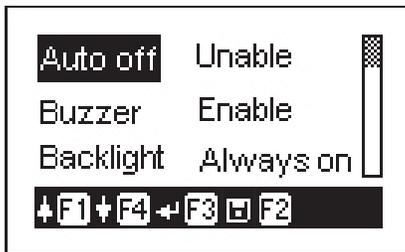


Fig. 88 Sensor Setting

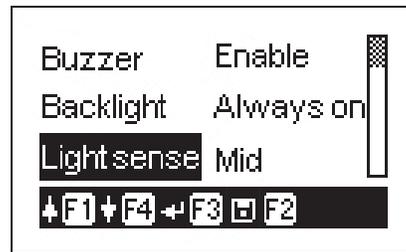


Fig. 89 Sensor Setting

The setting has 4 sub-options:

Automatic power-off: this option is designed for energy saving while there is no communication between sensor and main cabinet or the power is cut off. It includes two options: invalid or time-delay shutdown. If select invalid, the automatic power-off is deactivated. If select time-delay shutdown, the delay time can be adjusted from 10-60 seconds with an interval of 5 seconds.

Buzzer: unable and enable. When choosing enable, the buzzer will give out sound while pressing the buttons. If the buzzer is disabled, it will be silenced while pressing the buttons.

Backlight control: it has three options: constant light, key time-delay and invalid. If, constant light, is selected the sensor keeps lighted. If selecting time-delay, the backlight is lighted while pressing the key board. The backlight will turn off after a short time. If selecting invalid, the backlight is invalid.

Photosensitive intensity: it includes four options: high, middle, low, invalid. High, middle, low is the intensity of photosensitive components to the natural light. The three options are valid when the backlight control is set up with key board time-delay. If select invalid, the photosensitive components are deactivated.

Press “F1” “F4” to selection different options and change the contents of option. Press “F3” to confirm.
And press “F2” to store and exit.

7.2.4 PRODUCT INFO

The production info displays the model, serial no., inspector and trade mark, etc. (Fig. 90)

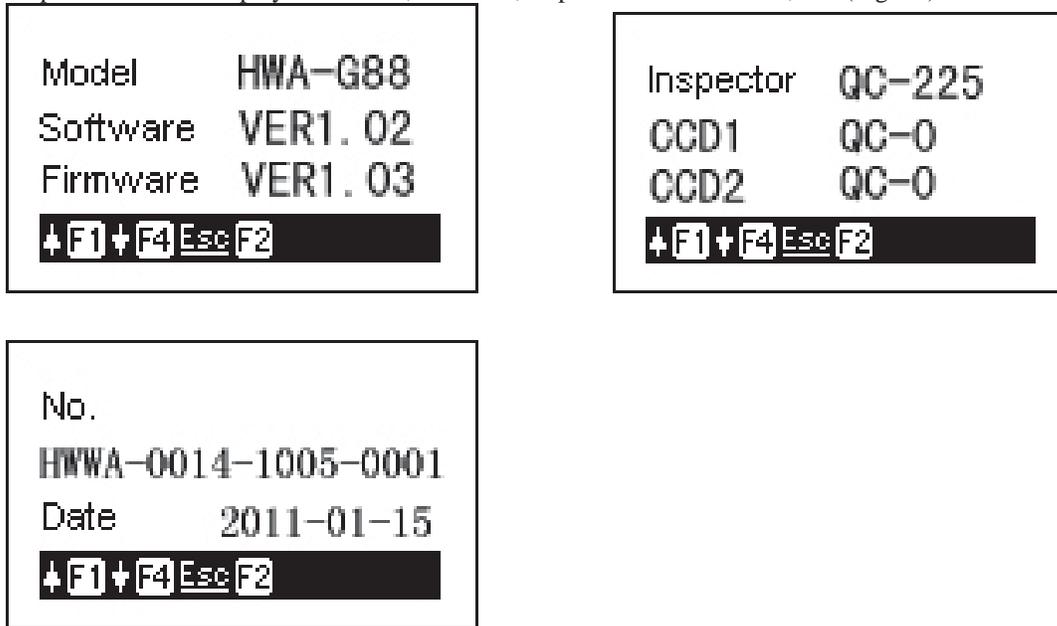


Fig. 90 Production Info

7.2.5 RESTORE FACTORY SETTINGS

Due to sensor setup error by miss-operation or abnormal working of sensor by the changing of a parameter, this setup can restore the sensor to the factory settings. Select the option, the screen will pop up the prompting window in Fig. 94. Press F3 to confirm restoration.



Fig. 91 Restore Factory Settings

CHAPTER 8 MAINTENANCE

8.1 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. Exposure to heat, sun, cold and humidity 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 off 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 not contact computer.
- Unauthorized takedown of computer, amendment of internal connection and board are forbidden, to prevent internal device damage.

8.2 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.

8.3 MAINTENANCE OF CLAMPS AND SENSORS

- 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.
- The housing of sensor is made of aluminum alloy and plastic which may accumulate dust or oil. Therefore, sensors should be cleaned with detergent or absolute alcohol periodically. Water, oil or corrosive materials are strictly prohibited.
- The internals of sensor are configured with high-precision, sensitive components. The sensor should be handled attentively. Otherwise, the deformation of housing or, internal component damage will affect normal using.

- Clamps should be fixed securely before sensor installation to prevent the sensor falling off.
- Unauthorized persons are not allowed to take apart sensors.
- Calibration is necessary if the measurement value is erratic after some period of application.

8.4 MAINTENANCE OF TURNABLES

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

CHAPTER 9 PROBLEMS AND SOLUTIONS

9.1 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 damaged.
- 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.

9.2 THE COMPUTER CAN NOT ENTER WINDOWS XP INTERFACE.

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

9.3 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 virus, please run antivirus software.

9.4 MOUSE OR KEYBOARD DOES NOT REACT.

- Wrong connection of mouse or keyboard.
- Mouse or keyboard does not match the computer.

- Mouse or keyboard is damaged.

9.5 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.

9.6 SENSOR FAILS TO START.

- Check the sensor battery and make sure that it is fully charged before use.
- Check whether the battery contacts are oxidized and the spring contact is good
- The sensor power button contact is oxidized or damaged.
- The sensor power board or main board is damaged.
- The sensor automatically shut down after a period of time. It has no communication with the mainframe.

9.7 THE SENSOR COMMUNICATION IS ABNORMAL.

- Check the battery. If the battery is less than 20% the sensor will be unstable or stop. Charge the battery before use.
- There is electromagnetic interference around it. Change the IP address and communication channel of the communication module or use wired communication.
- Mainframe or sensor is in a closed metal space, shielding the wireless communication.
- Antenna falls off or bad contact.
- Wrong settings of the computer communication port.
- Wrong settings of IP address and communication channel of the master-slave communication module.
- Communication module is damaged.
- Bad contact of the mainframe and USB port.

9.8 TOE-IN OR AXLE HAS NO VALUE.

- Toe-in or axle measuring port is blocked
- The opposite side toe-in or axle infrared tube is damaged.
- Toe-in or axle CCD is damaged.

- Ambient light direct or reflecting to the toe-in or axle measuring port.
- Main board is damaged.

9.9 THE MEASURED VALUES ARE DISPLAYED UNSTABLY.

- Ambient light interference
- Electromagnetic interference
- Angle sensor damage