
Maintenance & Operations Manual

Computer Alignment Equipment



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Maintenance & Operations Manual

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CCD.COM®

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Table of Contents

Table of contents	3
Introduction	7
User Precautions	8
General	8
Operators Precautions	8
Ventilation	8
Wheel Units	8
Installation of Wheel's Units Clamps	9
Installation of Wheels Units	9
Raising a vehicle (Jack & Hold)	10
Accessories for the CCD.COM®	10
Brake pedal depressor	10
Steering Wheel holder	10
Front & Rear Alignment Plates	10
General Information	11
Definitions & Terminology	11
Keyboard's Functions	11
Mouse operation (Touch Pad Type)	12
Entering the Bear® CCD.COM® Program	12
Powering up the equipment	12
Entering to the alignment program	12
Exit from the alignment program	13
Shutting down the equipment	13
General Configuration of the Bear® CCD.COM®	14
Preliminary Selections	14
Time & Date	14
Printer & Printed Diagnostics Messages	15
Selection of Measurements Units & Alignment Procedures	17
Selection of the Owners information & Promotional message	19
Programmed alignment Selections	19
Options Selections	20
Screen language Selection	21
Printed Report language Selection	21
Wheel Runout Selection	21
Decimal Point for the Units of the alignment angles	21
Alignment Mode Selection	22
TOE measurements Units Selection	22
Camber & Caster measurements Units Selection	23
Vehicle's Ride High Units Selection	23
Calibration Verification	24
Confidence Check	24
Alignments specifications up dates	27

Connection to the Internet	27
Up dating Technical Vehicle specifications data base	31
Alignment Theory	33
Front & Rear TOE	34
Front TOE	34
Rear TOE	36
Measurement of Rear TOE with the Centerline	36
Measurement of Rear TOE with Total TOE	36
Domestic TOE	37
European TOE	37
Japan, Korea & others TOE	38
Front & Rear Camber Angle (Inclination)	39
Caster Angle	40
Steering Axis Inclination (SAI)	41
Included Angle (AI)	41
Turning Ratios (TOE out on wheel Turns)	42
Geometrical Centerline	43
Thrust Line	43
Alignment Modes	44
4 Wheel Alignment with thrust line	44
2 Wheel Alignment with Centerline	45
2 Wheel Alignment Only	45
8 sensor	45
Wheel Runout	46
Normal wheel Runout	46
Normal Wheel Runout procedure	46
4 point Wheel Runout	49
4 point Wheel Runout procedure	50
All Wheel Runout	53
All wheel Runout Procedure	54
Special Runout	56
Programmed Alignment	57
Customer's Information	57
Vehicle's Information	58
Vehicle's technical information	61
Visual Inspection (fast)	63
Runout Procedure	64
Caster swing	64
Data Display (Actual state before correction)	66
Data Display for Alignment Angles correction	68
Rear axle Correction Display screen	69
Front axle Correction Display screen	72
Screen Displays & Functions for Alignment adjustments	74
Screen Display for Right Rear Camber adjustments	74

Screen Display for Left Rear Camber adjustments	75
Screen Display for Rear Toe & Thrust Line adjustments	75
Screen Display for Right Front Camber & Caster adjustments	75
Screen Display for Left Front Camber & Caster adjustments	76
Screen Display for Front TOE adjustments	76
Alignment Changes Selections	76
Printing Data & Technical specifications	78
Storing & Viewing Initial vehicle alignment data	78
Displaying Technical vehicle alignment data	79
Printing data with the technical specifications of the vehicle	79
Detailed Visual Inspection	81
All test Selection	81
One test Selection	82
Drive test report	82
Steering test report	83
Brake Inspection test report	83
Fluids tests reports	84
Belts tests reports	84
Filters tests reports	85
Hoses tests reports	85
Exhaust System tests reports	86
Fluid Leaks tests reports	86
Tires tests reports	87
Brake System test report	87
Steering test report	88
Short & Long Arm tests reports	88
Mac Pherson Strut suspension tests reports	89
Maintenance Functions	89
Maintenance reminder	90
Personalized specifications	91
Creating a new vehicle specifications	91
Dealer Contacts	93
Warranty	94

NOTES

75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94

Screen Display for Left Rear Camber & Thrust Angle Adjustments
Screen Display for Right Front Camber & Caster Adjustments
Screen Display for Left Front Camber & Caster Adjustments
Screen Display for Front Toe Adjustments
Alignment Chassis Selection
Printing Data & Technical Specifications
Storing & Viewing Initial Vehicle Alignment Data
Displaying Technical Vehicle Alignment Data
Printing Data with the Technical Specifications of the Vehicle
Detailed Visual Inspection
All Test Selection
One Test Selection
Drive Test Report
Steering Test Report
Brake Inspection Test Report
Fluids Test Reports
Balls Test Reports
Filters Test Reports
Hoses Test Reports
Exhaust System Test Reports
Fluid Leaks Test Reports
Tires Test Reports
Brake System Test Report
Steering Test Report
Shock & Long Arm Test Reports
Mac Pherson Strut Suspension Test Reports
Maintenance Functions
Maintenance Reminder
Personalized Specifications
Creating a New Vehicle Specifications
Dealer Contacts
Warranty

Introduction

The Bear®CCD.COM® is a Wheel Alignment Computer agile and effective. It has a multiple analysis & reports tests, for 2 & 4 wheels alignment procedures.

Based completely on a PC (Personal Computer), it has an immense capabilities for future expansions.

The Bear®CCD.COM® would bring to your shop the alignment capability on the most sophisticated vehicles in the world market, including vehicles with 4 wheel alignment.

Manufactured with the best electronic components in the automotive market, the Bear®CCD.COM® will be the indispensable tool for the repair & service shop.

We would like to thank you for choosing our product Bear®CCD.COM®, and we would like to welcome you to the High Tech era.

Best Regards:

Bear Engineering
A division of Cartek Group
Portage, Michigan
USA.

User precautions

General

- Avoid the use of this equipment on a wet or humid floor.
- Read carefully this manual before any operation of the equipment.
- Be sure to connect the power cable to a polarized power source to avoid any electrical discharges to the equipment.
- Don't move the equipment abruptly when is working.

Operators precautions

- If you don't follow the instructions in this manual you might provoke serious damage to the operator or the equipment. Do not allow non qualified personnel to work with this equipment.

Ventilation

- Use this equipment on a well ventilated area to avoid toxic inhalations from the exhaust fumes of the vehicle your working with.
- Do not expose this equipment to direct sun rays for a long period or time.

Wheel Units

The Wheel Units contains sensors that measure the wheels positions.

During wheel alignment procedures the wheel unit's clamps are attached to the wheel units.

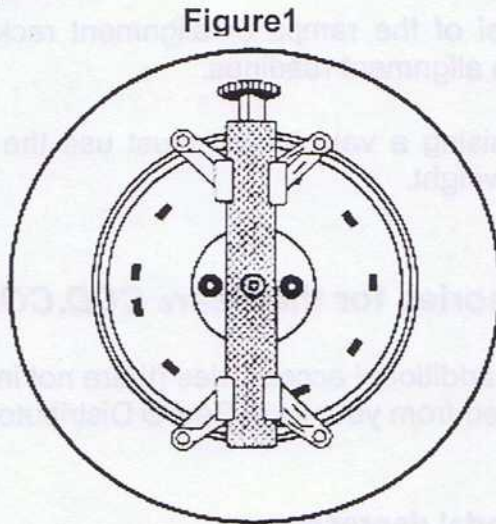
Be sure that the wheel's units clamps are firmly attached to the rim to avoid them to become loose and to fall to the ground.

The Wheel Units are a very susceptible electronic devices such as hard impacts or improper handling , be careful when placing & replacing the wheel units from the clamps.

Always check the cables on each wheel unit and be careful not to tangle them and be sure that there are free from any object that could damage them.

Installation of Wheel's Units Clamps

1. First install the wheel's unit clamp the rim with the knob upwards .(figure 1). The clamp has on its ends 2 types of claws, which help to hold them to the rim of the vehicle. Choose the most adequate claws to the upper part of the rim and firmly tap the lower claws onto the the opposite side of the rim. Use the Knob to firmly attach the clamp to the rim.



NOTES:

In some cases the Vehicle's body could interfere with the clamps 12'O'clock position. In those cases you can install the clamps on the 3 & 6 O'clock position for the Runout procedure.

Installation of the Wheel Units

Each wheel unit is designed for a specific position for each wheel of the vehicle. The Wheel position of each sensor or wheel unit are not interchangeable.

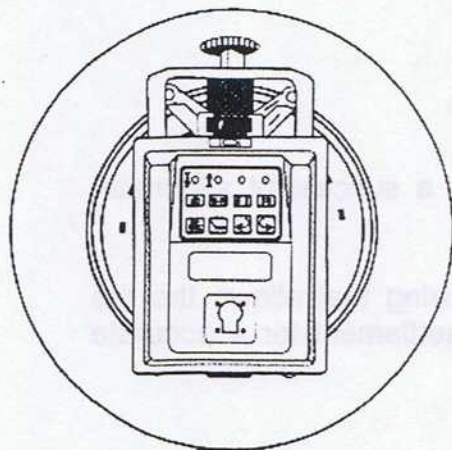


Figure 2

1. Place the Wheel unit on the wheel so it exist a projected view between the front & rear sensors for each side.
2. Slide de Wheel Unit onto the shaft of the clamp.(figure2).
3. Use the level vial on top of the wheel unit and adjust the level for each one of them.
4. Turn the Wheel's unit knob to firmly hold that leveled position.

Raising a vehicle (Jack & Hold)

The level of the ramps or alignment rack must be perfectly leveled to obtain accurate alignment readings.

When raising a vehicle you must use the correct jacking beam for the correct vehicle weight.

Accessories for the Bear® CCD.COM®

This are additional accessories (there not included with your equipment) and can be ordered from your local Bear® Distributor.

Brake pedal depressor

This tool is necessary to hold the brake pedal when you do the Caster Swing, and does not allow the vehicle to move when you make any alignment adjustments.

Steering Wheel Holder

This Tools is necessary to hold the steering wheel of the vehicle and does not allow the steering to move and /or be perfectly centered when you do alignment corrections or adjustments.

Front & Rear Alignment Plates

This alignment plates are the perfect complement for a successful alignment procedure.

The alignments plates are equipped with a rolling bearing that allows the the Carter Swings, also, it allows the vehicle to perfectly settlement for a accurate reading of the Camber & Caster measurements.

GENERAL INFORMATION

Definitions & Terminology

The terminology and/or selections used in this manual are as follows:

- a) "Double *click*" is the procedure of pressing the left button twice of the equipment's mouse over any object on the screen.
- b) "*ICON*" symbol which identifies a directory or file on a Windows Screen, and by pressing it you would Perform its function or selection.
- c) "Opening the *ICON*" is the same as to position the cursor over an Icon y Perform a double click over it.
- d) "Drag" is the action which obtained from to position the cursor over an object or Icon and by means of holding the left button of the mouse you would move it (dragging) to any other position on the screen.
- e) "Closing" Is the action obtained by means of executing a double click over the symbol marked with the X which is located on the far right of each Window or screen.
- f) Single click" is the action obtained by means of executing a single click over any object with the left button of the mouse.

Keyboard's Functions and Mouse Functions (figure3)

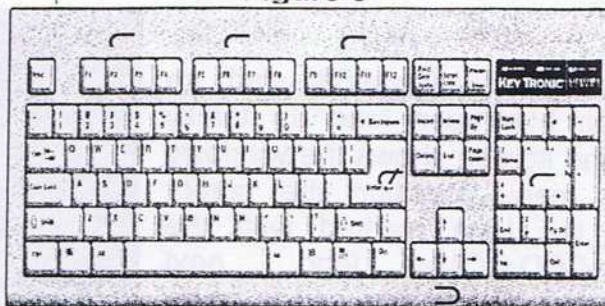
⇒ Arrows: are the keys with the symbols $\uparrow \downarrow \leftarrow \rightarrow$, and are located to the right of the keyboard.

↷ ENTER Key: is located to the right side of the keyboard.

⊂ Function keys: Are marked with F1, F2..etc. And are located on top of the keyboard. Those keys are used to access special functions, such as; customer menu, to continue a test or procedure, etc., etc.

⊆ Numbers: You can type numeral values by means of using those keys. They are located to on two sides of your keyboard layout. Remember that when you are using the number keys on the far right of the keyboard, the light "Numeral lock" over it must be turned on.

Figure 3

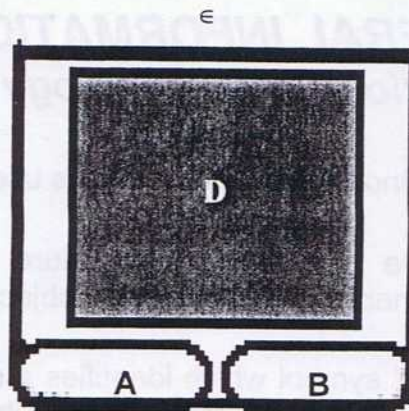


€ The Mouse or touch pad is the tool used to navigate under Windows 98® environments as well under the CCD.COM® program. Your equipment uses a touch pad mouse.

The left & right button are located at the bottom of the device (A & B).

The dark side at the center of the device (D) is the section used to move the cursor on the screen.

Just put your finger tip over the dark track and slide it over it to obtain the movement of the cursor through the screen or display of your **Bear® CCD.COM®**.



Entering the Bear® CCD.COM® program

If you don't follow the proper procedure indicated in this manual for turning on and shutting down this equipment, you will cause damage to the software which is not covered in the warranty period of the equipment.

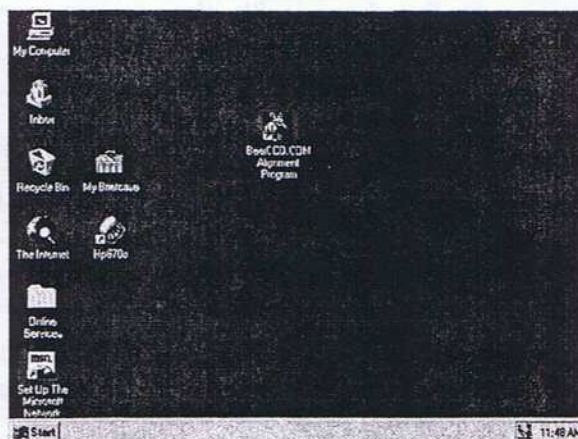
Powering up the equipment

1. Be sure that all wheel units are connected to the equipment by their communication cables (The units at this moment may not be mounted on the vehicle wheels)
2. Turn on the equipment by pressing the Power on/off button located at the rear of the equipment.

Entering to the alignment program

1. Once the Windows98® start up screen has been load up totally and the screen shows the windows main menu, position the cursor over the Icon marked with the Bear®CCD.COM® logo, next Perform a double click over it.(figure 5)

Figure 5





2. Once the alignment data & verification of the program software is loaded, the Main screen of the Alignment program would be displayed. (figure 6)

Figure 7

Exit from the Alignment program

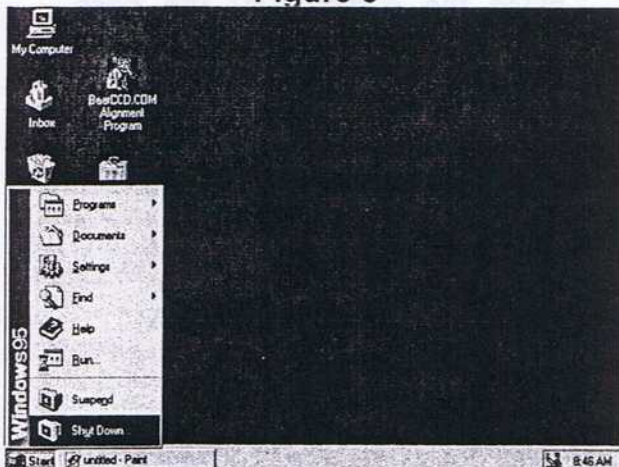
1. To exit & shutting down the equipment, position the cursor over the Icon marked on the figure 6, and Perform a single click over it.
2. Following the confirmation screen will appear. (figure 7) Place the cursor over the case with the word "YES" and Perform a single click over it.



3. The program will close and you will return to the Windows 98® main page.

Shutting down the equipment

Figure 8



1. From the main menu of Windows 98® (figure 5) place the cursor over the case which is marked with the word START and Perform a single click over it.
2. The window options will open (figure 8) and slide the cursor over the case marked with the word Shut Down, Perform a single click over it.

Figure 9

1. Immediately the shut down confirmation will appear (figure 9). Place the cursor over the case with the word "YES" (be sure that the case 'SHUT DOWN THE COMPUTER' is selected.) and Perform a single click over it.
2. Once the message "now is safe to shut down your computer" is displayed in the screen, press the on/off button at the back of the equipment.



General configuration of the Bear® CCD.COM®

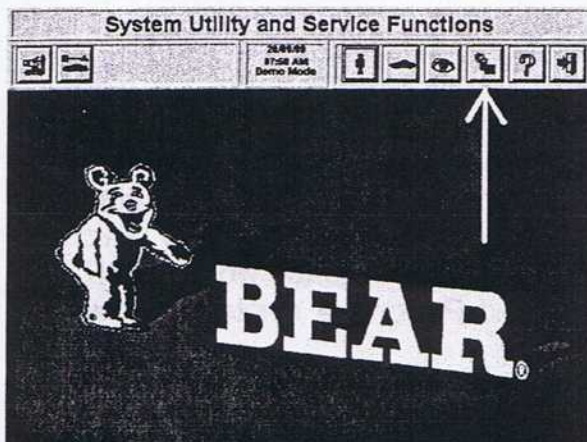
When you place the cursor over any Icon under the alignment software, you will see the on the upper case of your screen an explanation of the function that particular Icon.

Preliminary Selections

The next selections will only be necessary to be performed once in the lifetime of the equipment, but they can be modified or selected at any time or period at the operators wishes.

Time & Date

Figure 10



1. From the screen of the figure 5, place the cursor over the case marked on figure 10 that indicates System Utility & Service .
2. Perform a single click over it.

Figure11

3. Immediately the selection screen will open (figure 11).
4. Select the first Icon marked on figure 11. (Clock & Calendar) by placing the cursor over this case.
5. Perform a single click over it.



Figure 12



6. In this screen (figure 12) you can choose the respective Time & date that matches your local area.
7. The available functions on this screen are:
 - ⊇ Advance or recede on the month.
 - ⌘ Accept the changes and exit.
 - ⊂ Date's Digital or LCD display.
8. To choose the date just place the cursor over the day of the month desired and perform a single click over it.

Printer & Printed Diagnostics messages

Figure 13

1. Select the Icon marked in the figure 13 by placing the cursor over the case with the printer draw.
2. Next, perform a single click over it to open the printer selection menu.

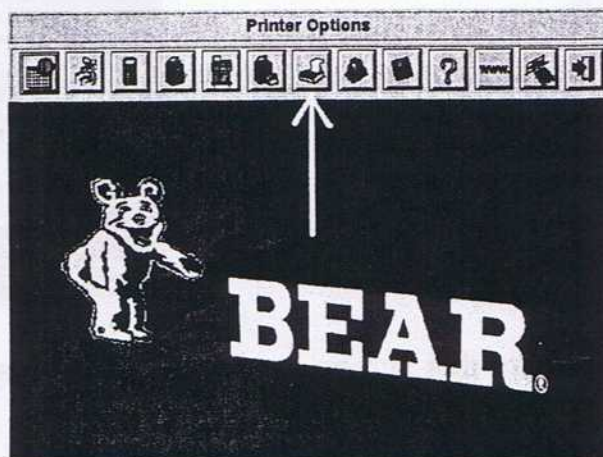
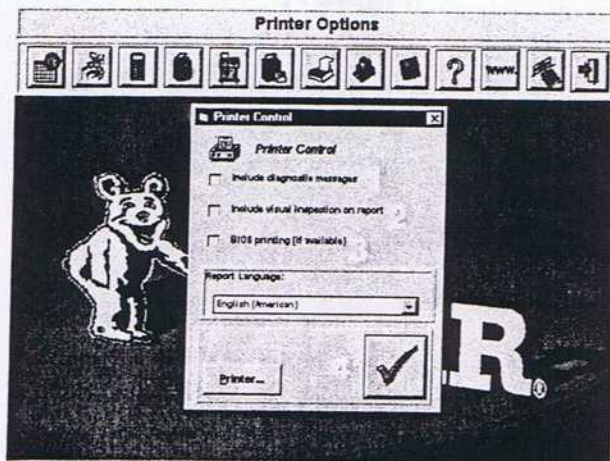


Figure 14



1. On the screen (figure 14) we have the next options:

⊇ Include diagnostic messages: On the printed report you will have the diagnostics messages regarding on the Camber, Caster, TOE...so the customer will know what is the problem with vehicle.

⊘ Include Visual Inspection on Report: On the printed report the visual Inspection routine will be

3. The options screen opens, you will see the options menu for Printed reports y printer types.. (figure 14)

4. To make a selection just perform a click over any of the choices given on the screen .

included as the technician entered the data.

⊘ BIOS Printing (if available): Prints the BIOS technical data of the machine.

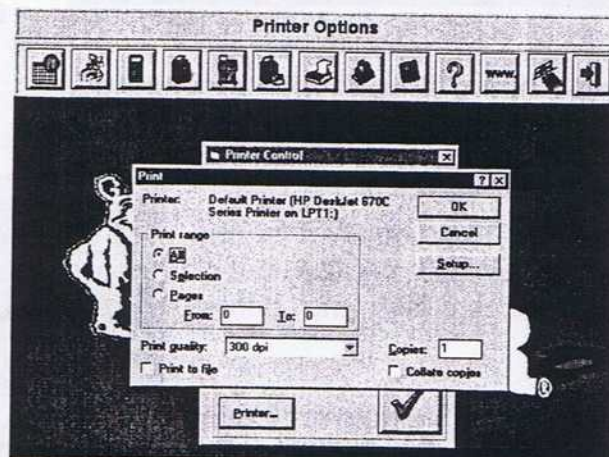
⊘ Exit key: To accept the changes and exit.

6. To choose the printer type and its parameters, place the cursor over the case that indicates Printer and perform a single click over it.

7. The parameter options screen will appear as there where selected previously by service department. We recommend not to change these parameter as it will affect the printer results. (figure 15).

8. To exit form this screen place the cursor over the cases OK and perform a single click over it.

Figure 15

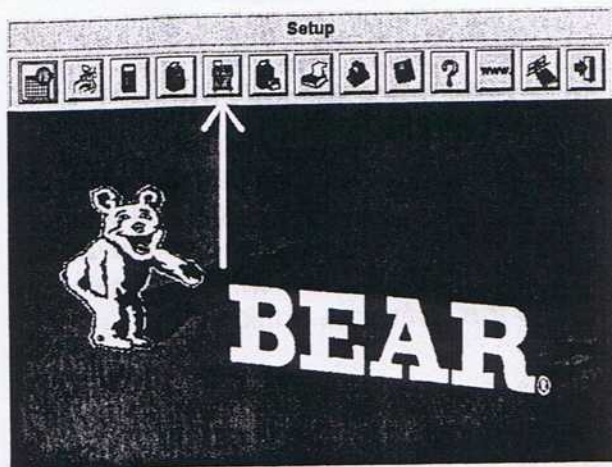


Selection of Measurements Units & Alignment Procedures

On the next screen you will have the chance to select or modify the Alignment Procedures and the Measuring Units for the alignment angles.

You could do the modifications at the beginning of the alignment procedure or during the alignment sequence, so at any time you can change those options.

Figure 16



1. In the screen of the figure 16 select the Icon Setup (marked) and perform a single click over it.

2. The next screen will show the selected data en your **CCD.COM®** equipment (figure 17).

Figure 17

1		2			
Facility		Programmed Alignment		Options	
Screen Language:		English (American)		3	
Report Language:		English (American)		4	
Runout Mode:		Normal Runout		5	
Measurements		<input type="radio"/> Tenths 6 <input checked="" type="radio"/> Hundredths			
Alignment Mode:		4-Wheel Thrust Line		7	
Toe Units:		Millimeters		8	
Camber/Caster Units		Decimal Degrees		9	
Ride Height Units:		Millimeters		10	
<input type="button" value="No"/>				<input checked="" type="button" value="Yes"/>	

3. The functions and explanations for these options are discussed forward on in this manual. If you make any selections on this screen you must perform a single click over the check mark case (3) to accept the changes.

4. In the screen of figure 17 we have the next functions:

: Facility: Option to select or change the name of the shop and promotional message.

⊇ Programmed alignment: Option to select the routine of the alignment procedure.

⊘ Options: Option to select the Toe at rim or tire, Wheel Units communication port, activation of remote control and its communication port, demo mode, etc., etc.

⊂ Screen Language: Option to select the screen language. By default the English language would be selected. Ask the local distributor to install.

⊆ Report Language: Selection of the printed report language . By default the English language would be selected. Ask the local distributor to install.

∈ Runout Mode : Selection of the type of wheel Runout Mode, which are : Normal, 4 Point, All Wheels and Special. We suggest the Normal Runout Mode. Forward on in this manual is the explanation, procedures and differences between those modes. (Chapter Wheel Runout)

∉ Measurements: decimal point selection. You can choose Tenths or Hundredths for the decimal floating point.

∠ Alignment Mode: Selection of the type of alignment, which are: 4 Wheel Alignment with Thrust line, 2 Wheel Alignment with Centerline, 2 Wheel alignment Only and 8 Sensors. Forward on in this manual is the explanation, procedures and differences between those modes.(Chapter Alignment modes).

∇ Toe Units: Selection of the measuring units for the TOE, which are; decimal inches, fractional Inches, millimeters, decimal degrees, degrees and minutes and fractional degrees. (No standard is defined as a rule of thumb , which is normally left to the operators choice.)

® Camber and Caster Units: Selection of the measuring units for the Camber & Carter angles, which are : Decimal Degrees, Degrees and minutes and Fractional degrees. (No standard is defined as a rule of thumb , which is normally left to the operators choice)

© Ride High Units: Selection for the measuring units for the vehicle's ride High, also referred as axle to suspension clearance. No standard is defined as a rule of thumb , which is normally left to the operators choice.

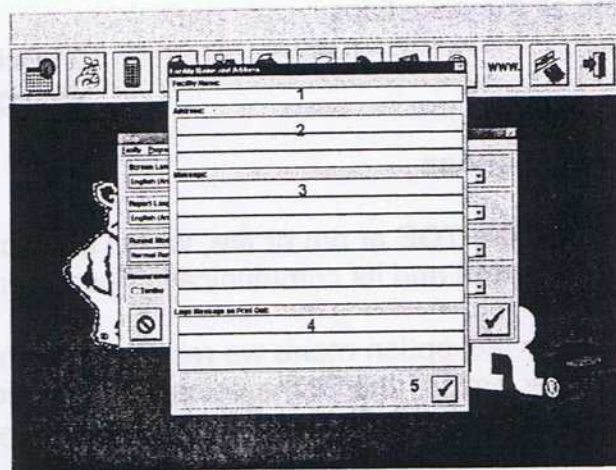
Selection of the Owners information & Promotional message

Facility

1. Place the cursor over the case with the word Facility and perform a single click over it.

Figure 18

1. Immediately the configuration screen opens. (figure 18), to edit the desired text in each blank cases, place the cursor over the blank cases and perform a single click over it.
2. On this screen we have the next options:
 - ≡ facility names.
 - ⌘ Shop's address .
 - ⌘ Promotional Message
 - ⌘ Logo message on printed report.
 - ⌘ Accept the changes and Exit.

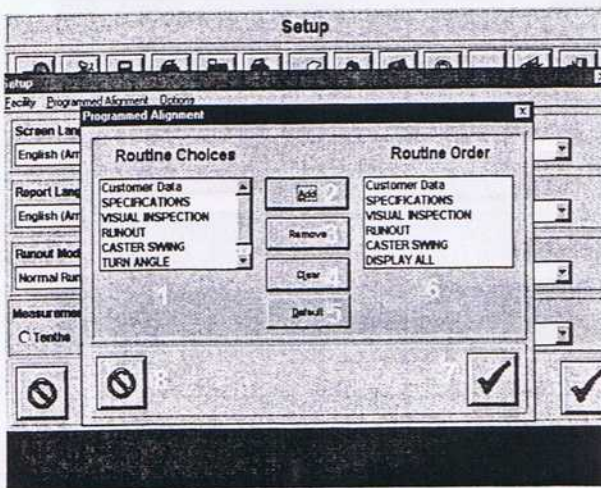


Programmed Alignment Selections

Selections for the Programmed alignment routine .

1. To enter this function place the cursor over the line Programmed Alignment and perform a single click over it.

Figure 19



1. The next screen is the main menu for the Alignment routine (figure 19).
2. On the left column you will see the alignment routine already selected ≡. To change or modified another the routine place the cursor over the desired option and perform a single click over it. If you want to add the routine place the cursor over the case ⌘ and perform a single click. If you want to delete the routine, place

the cursor over the cases ⌘ and perform a single click over it.

3. We have the next options or commands :

⊇ Routine Choices

⊄ Add a new selection to the routine

⊂ Delete a selection to the routine

⊆ Delete all the selections.

∈ Automatic or default routine sequence.

∉ Order of the chosen routines.

∠ Accept the changes and exit.

∇ Exit without saving or storing the changes.

Options Selections

Selections of the TOE at rim or tire, wheel unit communication port, activation of the remote control and its communication port, demo mode.

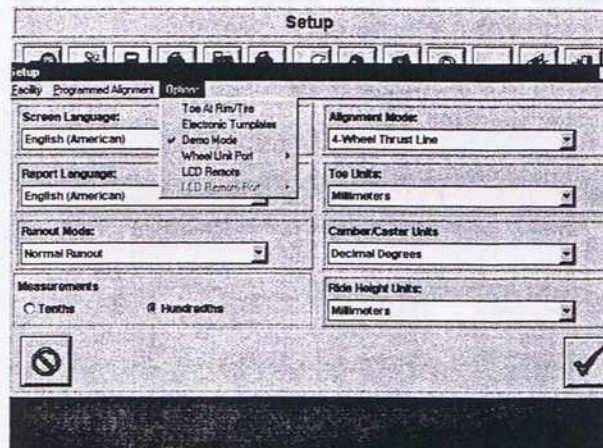
NOTE: Under this option menu we recommend only to change or modify the Toe at rim or tire option, the communications port for the wheel units and/or the remote has to be performed by service personnel only.

The option TOE at Rim or Tire is explained further ahead under the chapter European and Domestic TOE.

1. To choose this option place the cursor over the line OPTIONS and perform a single click over it.

Figure 20

2. The next screen (figure 20) will show the options already chosen marked with the check (3) mark. To choose or remove the option place the cursor at the left side of each line and perform a single click, verify that the check mark is no longer at the left side of your choice.



Screen language selection

If you modify this option the entire on screen language will be changed.

If you choose to modify the on screen language please contact the service personnel to install the language needed .

Printed Report Language Selection

Selection of the Language of the diagnostics printed reports.

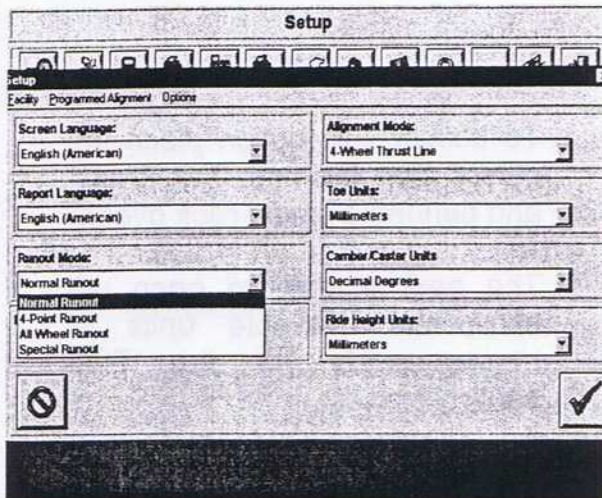
This option will modify the language of the diagnostics messages of the printed diagnostic report.

If you choose to modify the language for the printed reports, please contact the service personnel to install the language needed.

Runout Mode :

Wheel Runout mode selection.

Figure 21



1. To choose the Runout mode, place the cursor over the case "Runout Mode" and perform a single click over it.

2. The options windows opens (figure 21).

3. To choose any selections on this windows or screen place the cursor over the desired option and perform a single click over it.

Decimal Point for the Units of the alignment angles

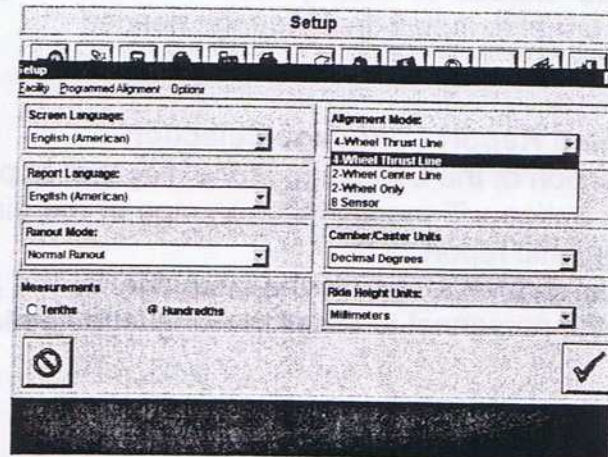
This option lets you configure the decimal floating point to tenths or hundredths for each alignment angle.

To select the desire option place the cursor over the blank circular space beside the tenths or hundredths options and perform a single click over it. A black dot should noticed at the side of your choice.

Alignment Modes Selection

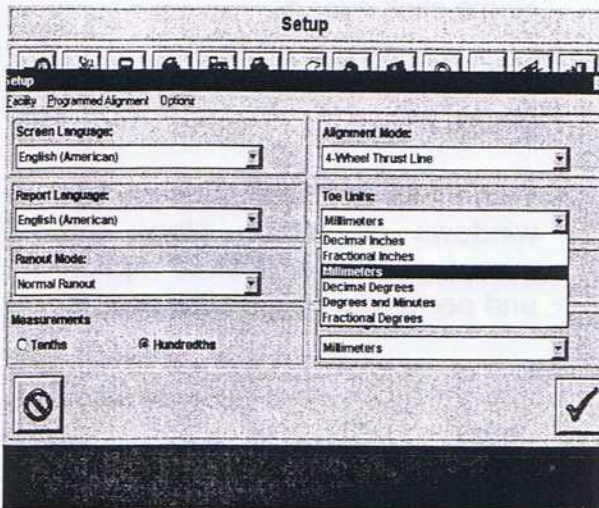
1. To select this option place the cursor over the line "Alignment Modes" and perform a single click over it.
2. The next window (figure 22) to open will show the alignment modes options.
3. To choose or change an option place the cursor over your desired option and perform a single click over it.

Figure 22



TOE measurement units selection

Figure 23



1. To choose this option place the cursor over the line "Toe Units" and perform a single click over it.
2. The next window to open will show the available units of measurements for the TOE angle.
3. To make a selection place the cursor over the option desired and perform a single click over it.

Camber & Caster measurements Units Selection

1. To select this option place the cursor over the line "Camber /Caster Units" and perform a single click over it.
2. The next windows will be displayed (figure 24) and will show the available options or units.
3. To make a selection place the cursor over the desired option and perform a single click over it.

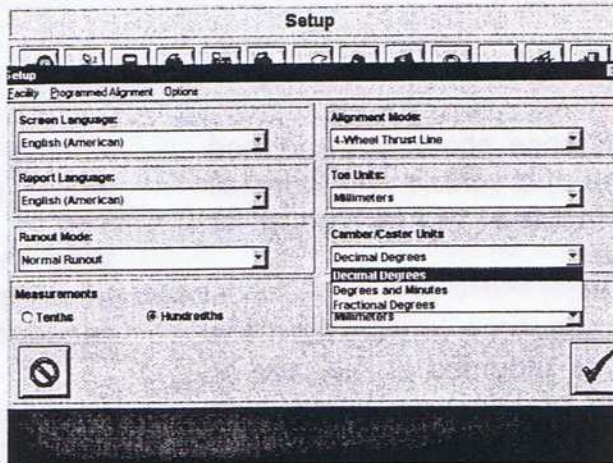
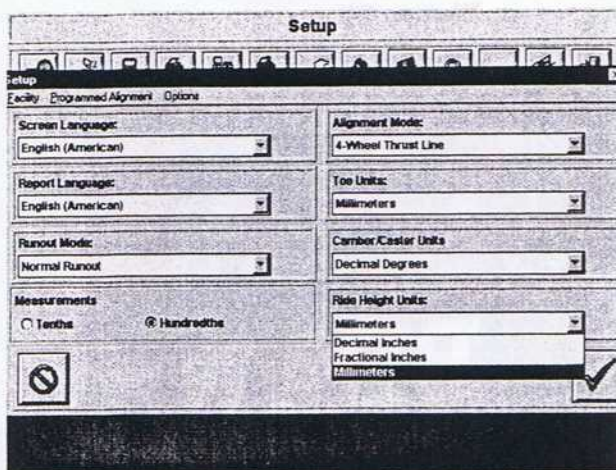


Figure 24

Vehicle's Ride High Units Selection (Axle to suspension clearance)

Figure 25



1. To select this option place the cursor over the text "Ride High Units" and perform a single click over it.
2. The next window to opens will show the options available. (figure 25)
3. To choose any of those options place the cursor over the desired selection and perform a single click over it.

Calibration Verification

The Confidence check is most effective way to ensure that your equipment is performing or calibrated the right way, and the Wheel units are also sending the right information.

Confidence Check

The confidence check is performed by the use of a vehicle and to install the wheel units in two sequences or procedures.

The first sequence is with the front wheel Units mounted at the rear of the vehicle, and the rear Wheel Units mounted at the front wheels of the vehicle.

The second sequence is to mount the Front Wheel Units at front wheels of the vehicle and the rear

This Confidence check can be run periodically to verify the equipment's accuracy.

Wheels Units mounted in the rear wheels of the vehicle.

What the Confidence Check does is to compare the data from the first sequence to the second sequence.

To begin the test all wheel units must be connected to the equipment.

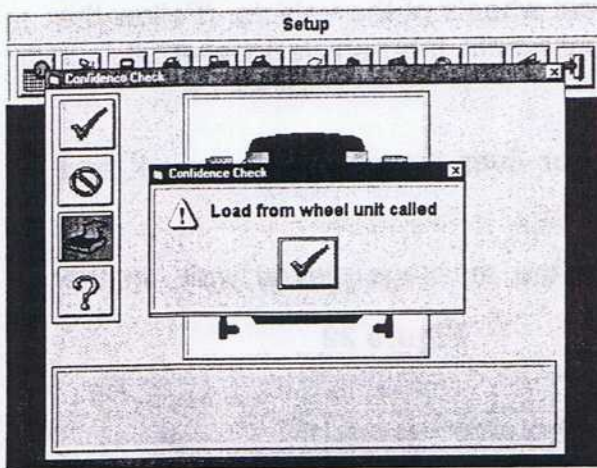
You will need a vehicle to do this test, but is not necessary that the car is in perfect alignment condition.

Figure 26

1. To enter this test place the cursor over the marked Icon in the figure 26 and perform a single click over it.



Figure 27

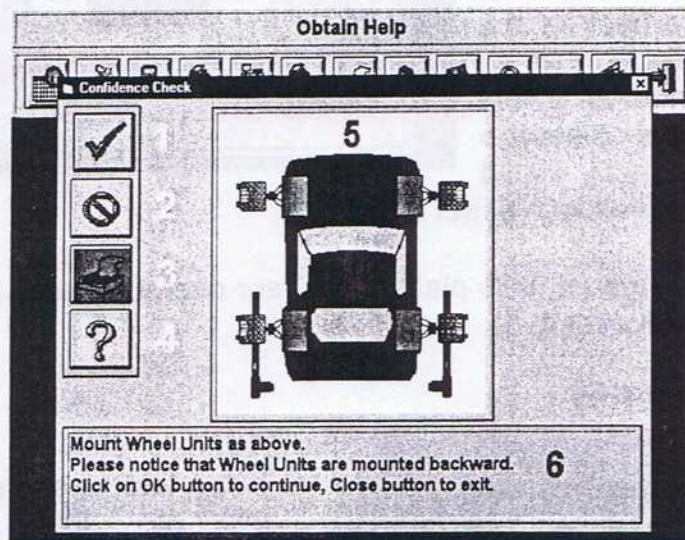


2. Next a confirmation screen will appear (figure 27) "Load From Wheel Units Called" All units must be connected to the equipment at this time.

3. Next place the cursor over the check (3) and perform a single click over it to accept.

4. The first sequence and the main screen of the Confidence Test will opens.

Figure 28



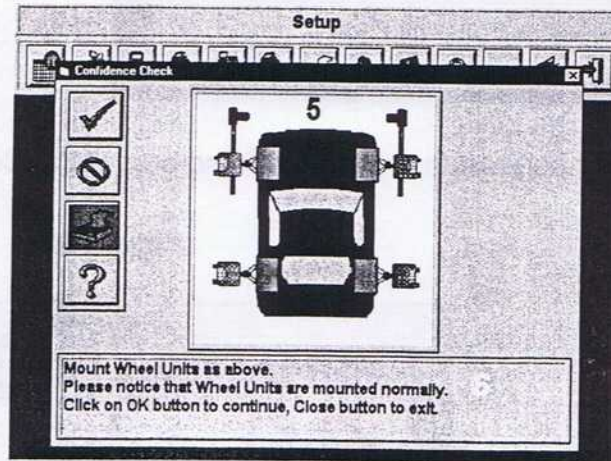
5. You will have the next options:

- ☑ Accept the procedure and continue to the next step
- ☒ Cancel or exit the procedure
- 🖨 Print the information
- 🔍 Help menu
- 🖼 Draw or picture to where to install the wheel units
- 💬 Messages window for the action to follow

6. To begin the procedure install the front Wheel Units at the rear of the vehicle, and install the rear Wheel Units at the front wheels of the vehicle. (Follow the text and the draw to install the wheel units onto the vehicle.) Level all four wheel units!!!
7. To accept the procedure place the cursor over the check (3) mark and perform a single click over it. (figure 28)
8. Once the procedure begins you will see the message please wait in the message window. (€)

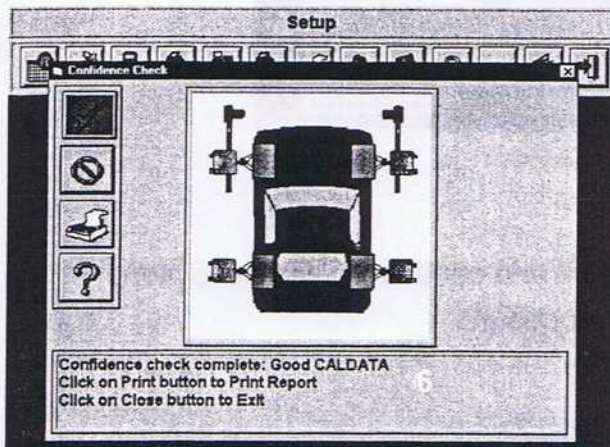
Figure 29

1. After a few seconds the picture or draw (€) in the screen will change for the picture on the figure 29.
2. Next step is to mount the front wheels units at the front wheels of the vehicle and the rear wheel units at the back of the wheels of the vehicle, just as you perform a normal wheel alignment. (see the message and picture to correctly install de wheel units. Level all four wheel units!!!



3. Once you install the wheel units place the cursor over the check (3) mark and perform a single click over it.

Figure 30



1. If the test was successful you will see the confirmation message at the bottom of the picture (€). (figure 30). It is then when you can print the information to maintain a record of verifications.

If the window message tells you that the calibration was not successful try again if the problem persist your equipment needs to be calibrated by the service department.

Alignment Specifications Up Dates

Before you begin with the download of the technical vehicle specifications Up Date you must be familiarized with the basics functions of the Internet and navigation under the Web.

Also you must have a telephone line connected to your equipment.

And last you must have a valid Internet account international or local.

Your equipment has the capability to connect to the Internet when you desire, so you can "download" the latest technical automotive information of the alignment angles for newer vehicles.

Connection to the Internet

1. From the main menu of the alignment program, select the icon marked on figure 31. (System Utility and Service Functions). Next perform a single click over this icon.

Figure 31

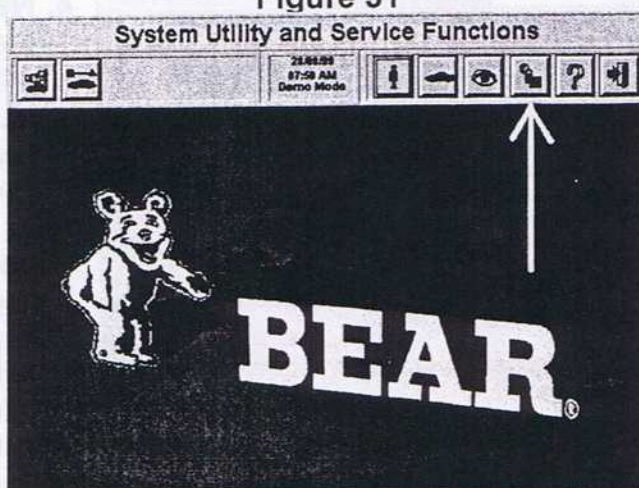
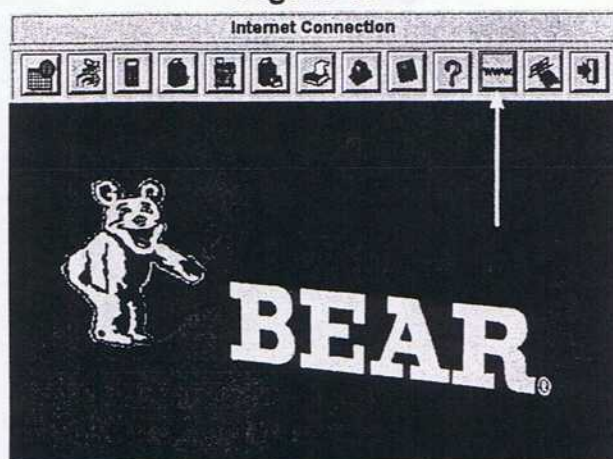


Figure 32



1. The next screen will show the Utilities menu to the special functions. (figure 32).
2. The place the cursor over Icon marked WWW (figure 32) and perform a single click over it.

Figure 33

4. To download the new specifications you must choose the third option (figure 33) by placing the cursor at the blank circle and performing a single click over it, next place the cursor over the check (3) mark and perform a single click over it.

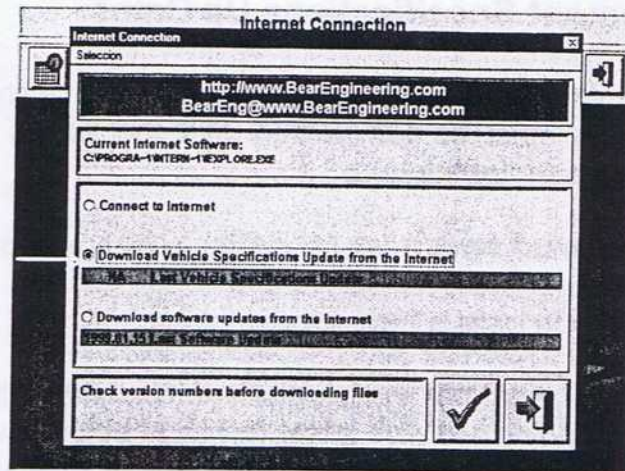
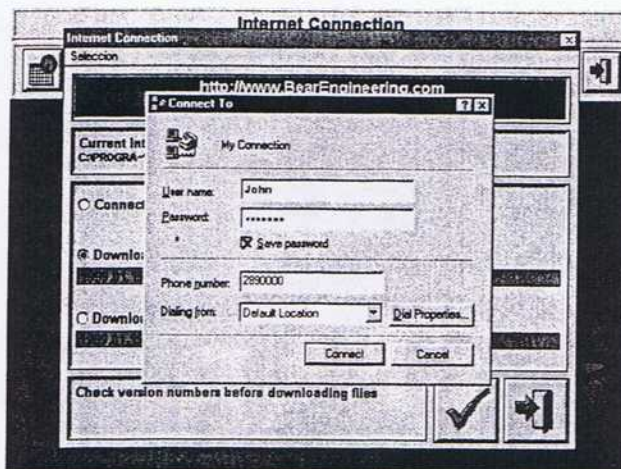


Figure 34



4. Next the connection dialog for the Internet will appear. (figure 34). Select "Connect" by placing the cursor over the case and perform a single click over it.
5. The connection routine will began. NOTE: This procedure could be a little bit different depending on the type of Internet connection you may have.

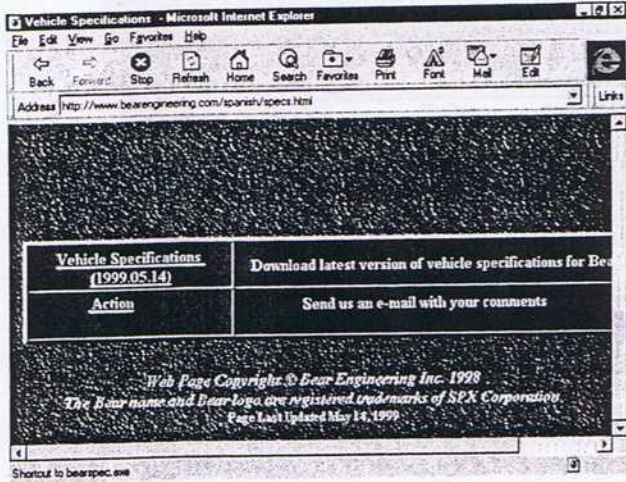
Figure 35

7. Once the Internet protocol is established you will able to see the Bear Engineering main download page. (figure 35). (figure 35). Move down on the page to locate the language menu and locate the English cases.

Select the English language by placing the cursor over the line "English" and performing a single click over it.



Figure 36



9. The next screen is used to choose the most recent technical specifications available at the moment. (figure 36)

10. Place the cursor move down in he screen and locate the vehicle specifications option.

11. Perform a single click over the line Vehicle specifications.

12. Immediately the search for the file will begin . (figure 37).

Figure 37

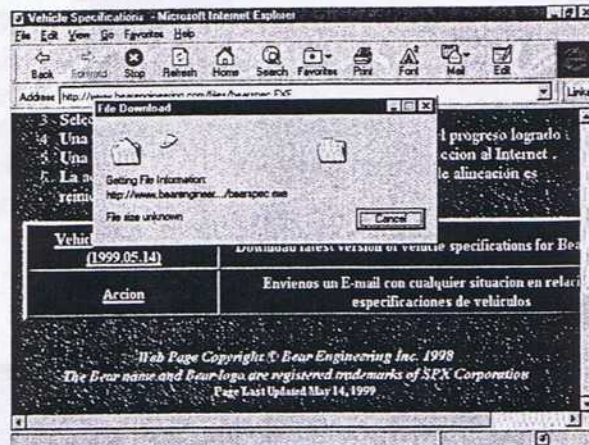
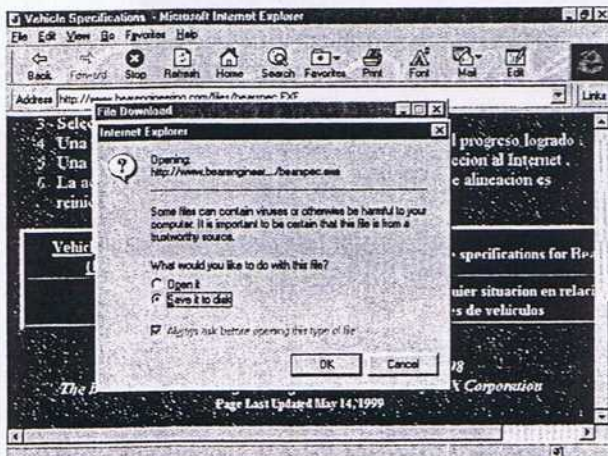


Figure 38



13. To save the information in your equipment's hard drive place the cursor over the blank circle beside the line "save it to the disk" and perform a single click over it.

14. Then place the cursor over the OK case and perform a single click over it.

Figure 39

15. On the next screen (figure 39) place the cursor over the case "SAVE" and perform a single click over it.

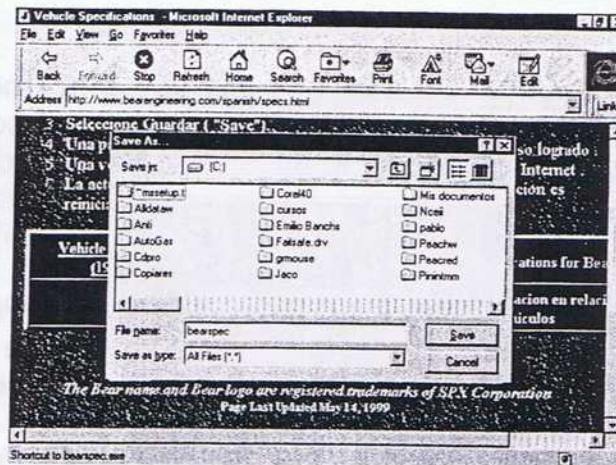
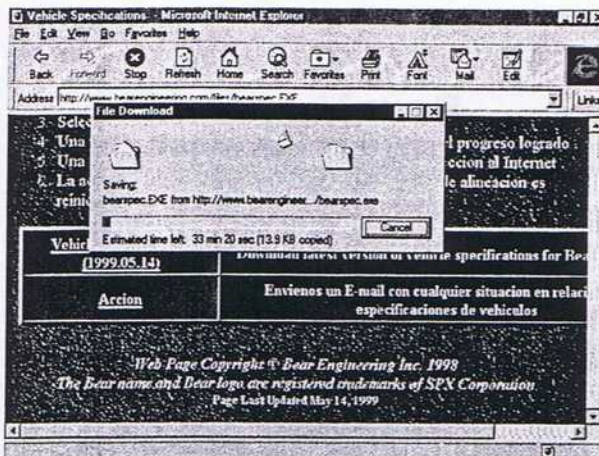


Figure 40



16. The next screen will show you the copy and download process to a determinate place in your equipment's hard drive.

Note: The CCD.COM software will download the file to a default position.

Figure 41

1. Once the process is finished, the screen will return to the download main page. (figure 41)
2. To close the Internet connection place the cursor over the "x" mark at the corner of the screen and perform a single click over it.

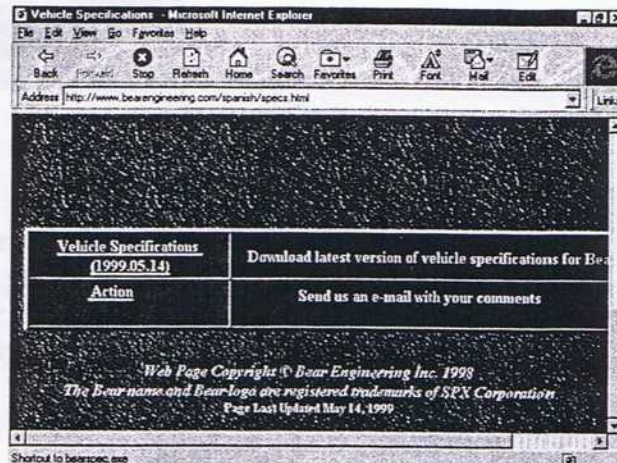
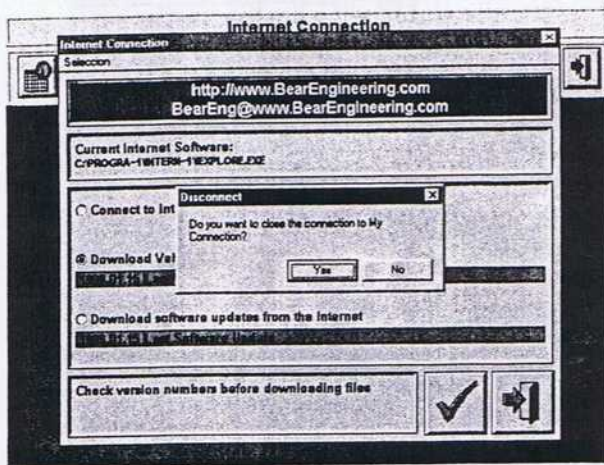


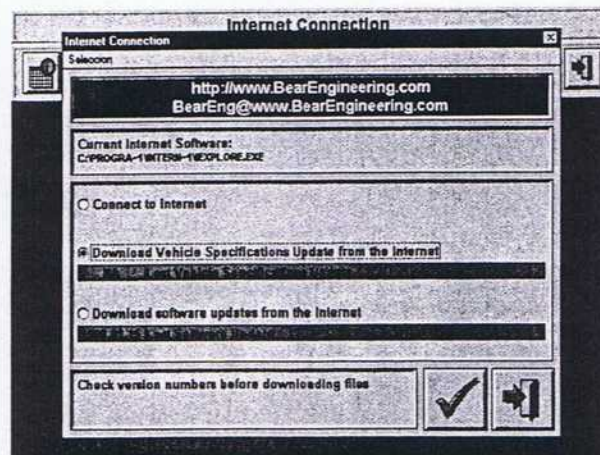
Figure 42



19. Next you will see the screen that prompts you to finish the Internet connection. (figure 42)

20. To close the connection place the cursor over the case "OK" and perform a single click over it.

Figure 43



21. To close the next window place the cursor over the exit door Icon and perform a single click over it. (figure 43)

The new specifications File is ready to be installed in your data bas, please refer to the chapter Up dating Technical Vehicle data base to finish this set up.

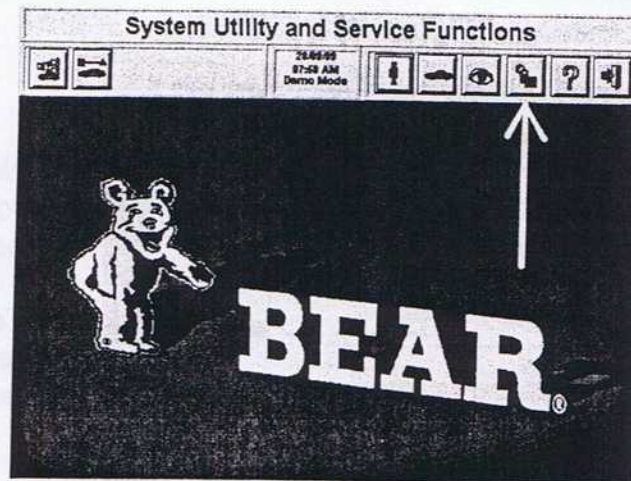
Updating Technical Vehicle Specifications Data Base.

This process would be possible if you already downloaded the File containing the new Vehicle Specifications and store it into you hard drive. (Chapter Connection to Internet)

NOTE: Some times compressed files downloaded through the Internet comes with defects and glitches, many of them caused by a poor communication or defects of the telephone lines.

If the a downloading problem persists please check your communication cable to your modem and repeat the process until you have a clean download of the file.

Figure 44



1. To begin the updating process place the cursor over the Icon System Utility and service functions and perform a single click over it. (figure 44).

Figure 45



2. Next place the cursor over the case marked on figure 45 "Software update" and perform a single click over it.

3. The program automatically will star to look into your hard drive or floppy drive for the new specifications file. (figure 46). This will take just a few seconds.

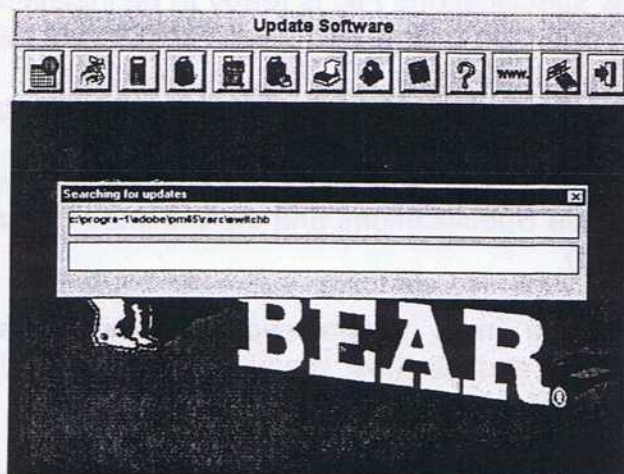
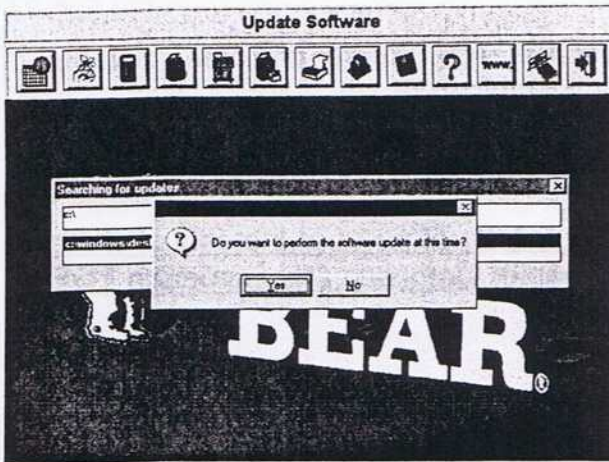


Figure 47



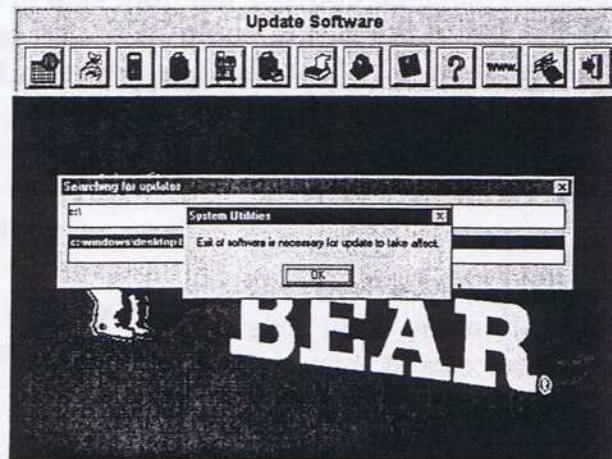
4. Once the file is located you will see the message screen "Do you want to perform the software update at this time?" (figure 47).

5. To begin the installation place the cursor over the "OK" case and perform a single click over it.

6. Once the process is finished you will see the screen that prompts you to exit the software and reinitiate the software so the changes will take effect. (figure 48)

7. Place the cursor over the case OK and perform a single click over it to exit.

8. Next exit the alignment software and re-enter to the program so the changes takes effect.



NOTE:

Place take notes of any problem message that appears in you screen so the service personnel would have a better view to help you to solve any problem.

Once the new specifications has been loaded it NOT necessary to re-calibrate the equipment.

Alignment Theory

For a better comprehension of the alignment process, we have included in this manual Basic Alignment Theory, so the operator would have the most recent knowledge of the alignment angles on modern cars.

It is imperative that the operator is familiarized with this theory and that is used through the entire wheel alignment process.

Front & Rear TOE

There are vehicles with only front adjustable TOE (more common) but the automotive trend is to have Front & Rear adjustable TOE.

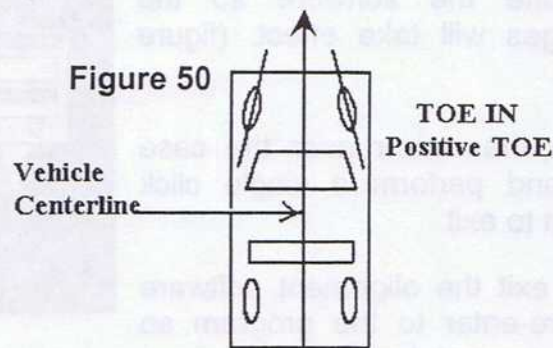
In all cases the Front TOE is completely adjustable.

NOTE: TOE can be measured at the rim (Domestic TOE) or at the center of the tire (European TOE) . Please refer to the chapter Domestic and European TOE for a better explanation of these measurements.

Front TOE

There are two ways to measure front TOE, the first definition is :Front toe is the difference of distance between the front side of the tire in reference with the back side of the same tire of the same axle also referred as TOTAL TOE, and the second definition is : the difference between the Center line of the vehicle to each tire also referred as INDEPENDENT TOE.

A "TOE IN" (positive TOE) situation is detected when the front side of the tires are more closed than at the back side of the same tires. (figure 50)



A "TOE OUT" (negative TOE) situation is detected when the front side of the tires are more open than at the back side of the same tires. (figure 51)

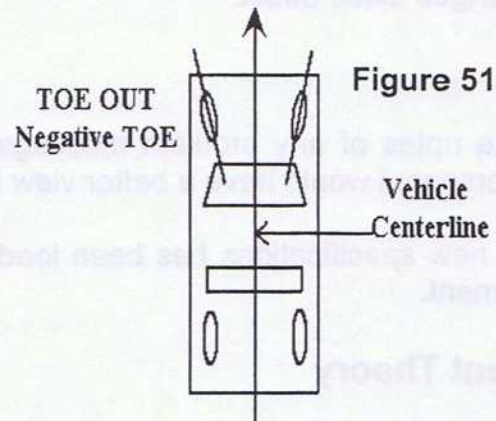
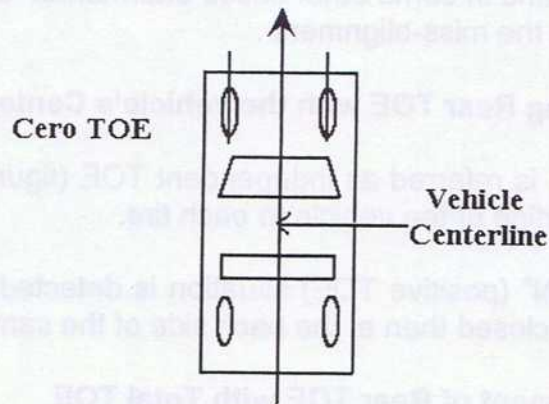


Figure 52



A CERO FRONT TOE is when the front and back sides of the front tires are parallel with the vehicles centerline. (figure 52) and there is no differences between the distances at each tire.

Normally vehicles with rear wheel drive have a Positive TOE, this is because the traction tends to close the front wheels as the vehicle starts to move.

On the other side, vehicles with front wheel drive have a Negative TOE because the front wheel traction tends to open the front wheels as the vehicle moves.

Always consult the technical alignment specifications in your equipment for the exact measures of the alignment angles.

The reason to have vehicles with either Positive or negative TOE is to normalize the Wheel geometry as the vehicle is put in motion, normally when the vehicle is at cruise speed the TOE is equal to CERO.

Front or Rear TOE can be expressed in millimeters, degrees, fractional degrees etc.

TOE is the most critical alignment angle that causes tire wear.

A TOE defect can be caused by:

- ⊇ Wheel miss-alignment
- ⊄ Bad or defective Tie rods
- ⊂ Worn wheel or hub bearings
- ⊆ Defective steering arm
- ⊈ Excessive clearance at the steering box or steering gear

Rear TOE

Some vehicles have Rear adjustable TOE, and some cases they can be adjusted and in some other cases aftermarket adjustment parts have to be used to correct the miss-alignment .

Measuring Rear TOE with the vehicle's Centerline

This TOE is referred as independent TOE (figure 53), is the difference between the centerline of the vehicle to each tire.

A "TOE IN" (positive TOE) situation is detected when the front side of the tires are more closed than at the back side of the same tires (figure 53)

Measurement of Rear TOE with Total TOE

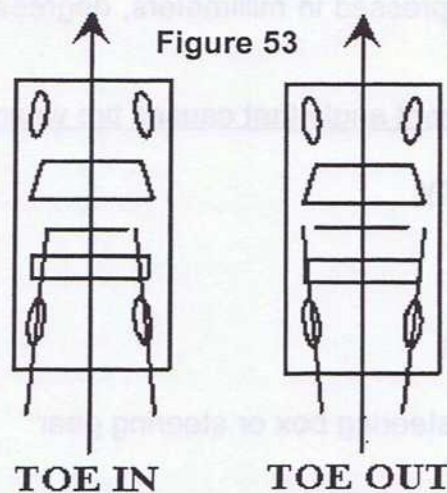
Front TOTAL TOE is the difference of distance between the front side of the tire in reference with the back side of the same tire of the same axle also referred as TOTAL TOE.

Independently of the Independent TOE or Total TOE measurements , the rear TOE can be either positive (TOE IN) or negative (TOE OUT). (figure 53)

Front or Rear TOE can be expressed in millimeters, degrees, fractional degrees etc.

TOE is the most critical alignment angle that causes tire wear.

Also Rear TOE miss alignments will cause a miss alignment on the Thrust line, and with this condition the vehicle will tend to "PUSH" on either direction depending on the rear wheel alignment.



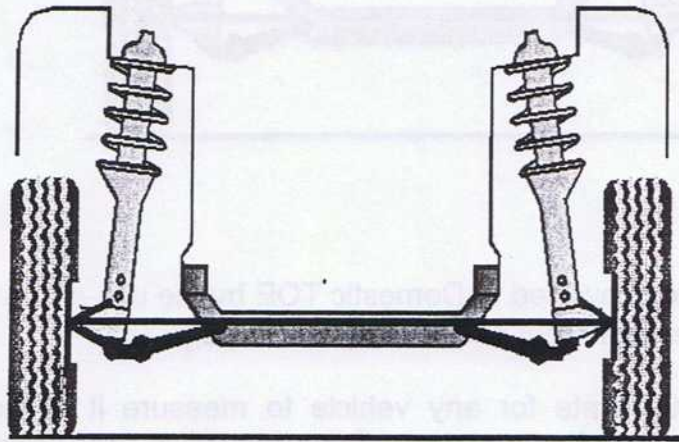
Domestic TOE

The Domestic TOE is the United States standard for the Front & Rear TOE measurements.

The Domestic TOE is just only a method of measurement of Front & Rear TOE angles that is used on the Domestic market (Vehicles manufactured for the USA market.)

This method refers to where to measure the TOE in a vehicle, **which is from the edge of the rim at the center or mid section diameter.** (figure 54)

Figure 54



The Domestic TOE can be converted to European TOE by the use of the Selections menu at any time of the alignment sequence (point α page 18).

Your equipment has the data for any vehicle to measure it in Domestic or European TOE, and can be changed at any time of the alignment procedure.

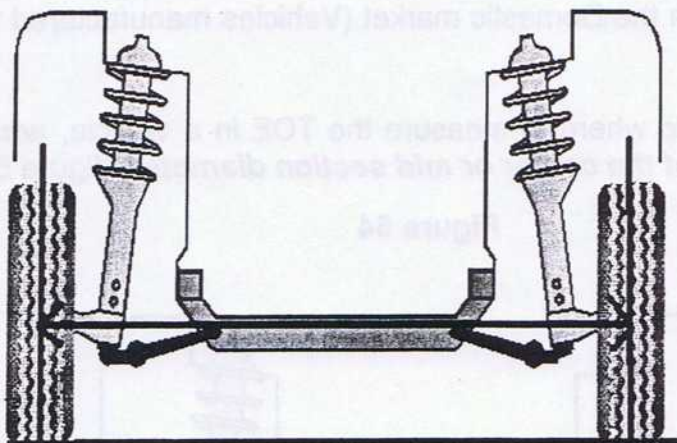
European TOE

The European TOE is the Europe standard for the Front & Rear TOE measurements.

The European TOE is just only a method of measurement of Front & Rear TOE angles that is used on the European market (Vehicles manufactured for the Europe market.).

This method refers to where to measure the TOE in a vehicle, **which is from the center of the tire at the center or mid section** . (figure 55)

Figure 55



The European TOE can be converted to Domestic TOE by the use of the Selections menu at any time of the alignment sequence (point α page 18).

Your equipment has the data for any vehicle to measure it in Domestic or European TOE, and can be changed at any time of the alignment procedure

Japan, Korea & Others TOE

There is no defined method used by those countries to measure the TOE angle.

Many of them have opted for the Domestic & European TOE method, depending where the market is the vehicle manufactured for.

Independently from this situation, you CCD.COM equipment has both methods and both measuring angles for any car manufactured as today and in the future. And you always can see that TOE angle at either Domestic or European method as you wish.

Front & Rear Camber Angle (Inclination)

Although this Camber angle is present in all types of vehicles, not all of them have adjustable Front & Rear Camber angle. In some cases you must use aftermarket parts to correct this angle.

Your CCD.COM will tell you if the vehicle you are about to align has the adjustable Front & Rear Camber.

Vehicles with solid rear axle do not have adjustable rear Camber.

Generally speaking you must measure and adjust Front Camber.

Camber is the inclination in or out of the upper part of the tire. Sometimes this angles is completely adjustable and in some other cases aftermarket

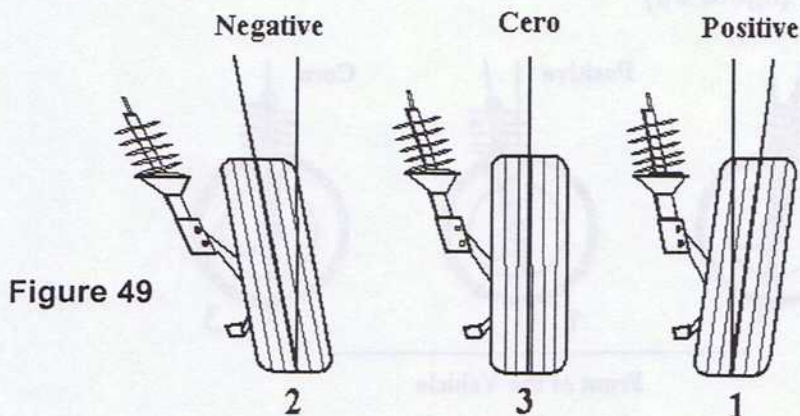
parts must be used to correct this angle.

This angle is measured from the projected perpendicular line to the floor.

A wheel with it's upper side outwards is considered as a Positive Camber (figure 49, \supset .)

A wheel with it's upper side inwards is considered as a negative Camber (figure 49 \subset .)

When the wheel is totally vertical or perpendicular to the floor is considered as a Zero Camber. (figure 49 \subset).



An incorrect Camber angle could be caused by:

- \supset Normal adjustment needed
- \subset Deformed strut's structures (McPherson)
- \subset Defective or worn suspension Ball Joint
- \subset Defective upper & lower suspension control arms
- \subset Defective suspension bushings or body structural defects

This defect contributes to abnormal wear to the inner or outer side of the tires and a condition of "PUSH" to either side when driven the car.

Caster Angle

The Caster angle is not a tire wear factor but it is related to improve the driving performance and steering stability.

Only the front wheels have Caster angle, because only the steering will benefit because the steering control.

The Caster angle can be defined as the backward or forward tilt of the steering knuckle at the top viewed from the side of the vehicle.

It is measured from a true plumb line, straight up and down.

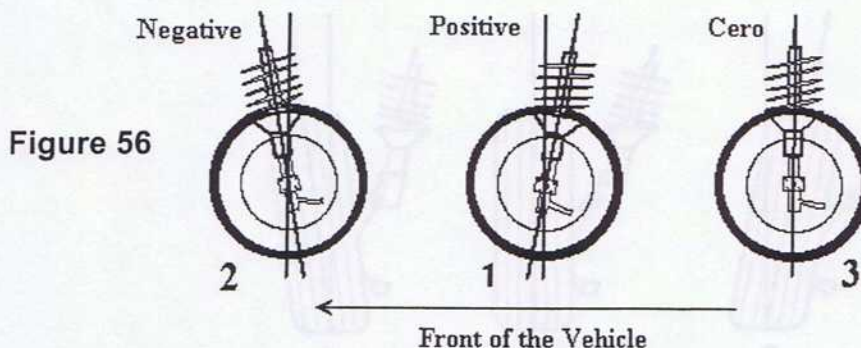
Caster angle is always viewed at the side of the vehicle.

Positive caster is the backward tilt of the steering knuckle from the top of the true plumb line. \supset (figure 56)

Negative caster is the forward tilt of the steering knuckle at the top from of the plumb line. \angle (figure 56)

When Both lines are in the same vertical position the Caster angle equals zero. \subset Figure 56.

Caster is used to offset road crown because caster does not introduce tire wear. Generally allow 3/8 degrees difference for each inch of road crown. The higher the road crown the greater the difference between the Left and right steering knuckles.



Unequal Caster Effect

Unequal caster causes the vehicle to pull towards the side of the leading steering knuckle. To offset road crown the steering knuckles towards the center of the road leads the other knuckle

Steering Axis Inclination (SAI)

This angle is formed by the inward tilt of the ball joint, king pin, or Mac Pherson strut tube at the top. Steering axis inclination:

- Is non-adjustable
- Is the angle you should measure any time the camber angle exceeds specifications

Is determined by a true plumb line and a projected line through either the upper ball joint, center of the king pin, or Mac Pherson strut tube at 0 degrees camber. (figure 57)

The maximum variation from side to side is about ± 1.0 . It also can tell you about a body or structure problem of the vehicle.

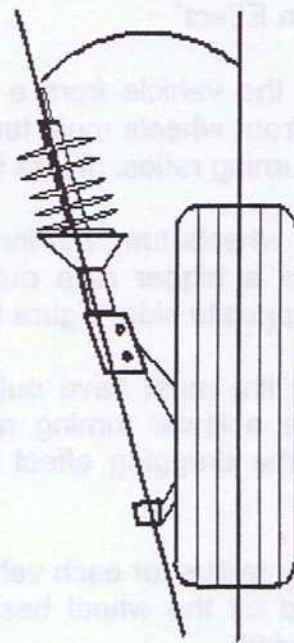
The SAI" forces the front wheels to return to the straight forward position after a turn.

To tilt the steering knuckle inwards during turns or steering rotation, tends or provokes a lifting at front side of the tire then dropping down as the wheels goes back to their original forward position.

Because the wheel can not force it self to the ground as it turns or rotates, the weight of the vehicle and the suspension forces the tire to look for its low gravity position when its allowed by the steering control.

Figure 57

Measure in Degrees



Included Angle (IA)

The SAI angle plus the camber angle is called the "included angle." (figure 58), If you have a positive Camber the $IA = SAI + \text{Camber}$, if you have a negative Camber $IA = SAI - \text{Camber}$.

The SAI and IA must be checked after you correct the Camber & Caster Angles, and adjust it to closest range to the manufacturer specs.

Steering Axis Inclination (SAI)
+ Camber = Included Angle (AI)

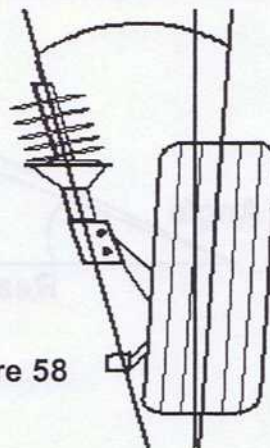


Figure 58

Turning Ratios (TOE out on wheel Turns)

This angle is also known as the "Ackerman Effect"

Watching the vehicle from a above view the front wheels must turn at a different turning ratios. (figure 59)

When the wheels turn, the inner tire must have a bigger ratio outwards than the opposite side. (figure 59)

The Inner tire must have outer tire must have a lower turning ratio to minimize the dragging effect to the pavement.

The turning radius for each vehicle is determined by the wheel base and tire tread width.

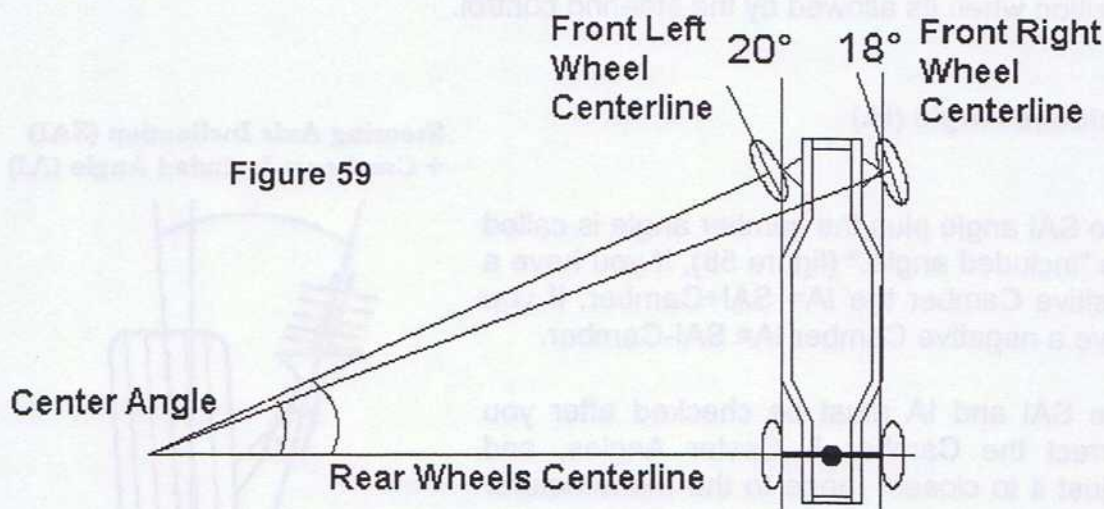
Turning radius is controlled by the angle of the steering arms to the center line of the wheel.

Each steering arm follows its own arc of travel as the front wheels turn.

Before checking this angle be sure that the alignment angles are under specifications.

If you use Marked Turn Tables, be sure that they rotate freely and they are perfectly centered.

To check the turning ratios, center the vehicle onto the alignment plates and center the vial degree for each wheel at ZERO once that you're sure that the wheels are completely straight forward. Turn the steering wheel to the left until the inner vial marks 20 degrees of rotation. The outer wheel must read less than 20 degrees (optimum 18 degrees). If reading are not within specifications you have bent steering parts such as: Steering arms (usually)

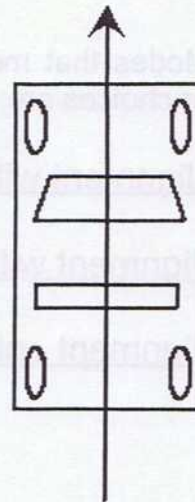


Geometrical Center line

The Geometrical Centerline is obtained by connecting a line between the center of the front and rear axle. (Figure 60)

Once the geometric Centerline is defined is used as a reference point to calculate TOE, Thrust Line, etc.

Figure 60



Thrust Line

Thrust line is associated with rear wheel alignment. (figure 61).

It's a line that divides the total rear toe into two equal parts.

When the thrust line is in a straight ahead position in reference to the vehicle's tire tread width centerline, the vehicle tends to steer straight ahead.

When the thrust line is not in a straight-ahead direction, the vehicle

tends to steer toward the thrust line. An incorrect thrust line can result in:

- Rear wheel steer (left or right)
- Change in steering wheel position
- Rear tire wear.

Your equipment will tell you when you have a problem with the Thrust Line.

Also you can View the data on the screen as you correct it.

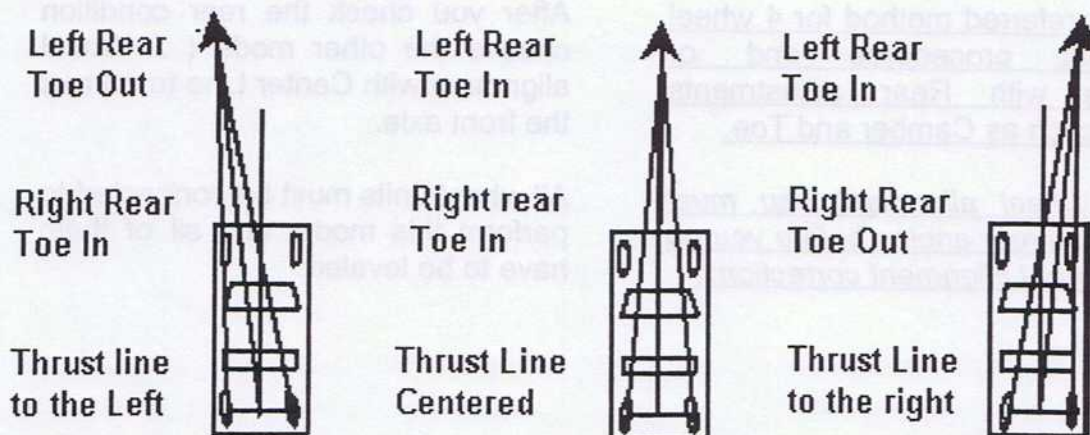


Figure 61

Alignment Modes

There are 4 Modes that modify the way that you do an alignment sequence, those modes or choices are:

- 4 Wheel Alignment with Thrust Line
- 2 Wheel alignment with Centerline
- 2 Wheel alignment only
- 8 Sensors

4 Wheel Alignment with Thrust Line

If you select this mode (page 18, item \angle), your equipment will take all the alignment angles based in all four units with a full wheel by wheel Runout.

The alignment data will include Caster, Toe and Thrust Line for rear and front axles.

This is preferred method for 4 wheel alignment procedures and or vehicles with Rear adjustments angles such as Camber and Toe.

On 4 Wheel alignment you must correct the rear angles before you go into the front alignment corrections.

NOTE:

You can use this mode on solid rear axle vehicles to determine bent or miss aligned rear axles by looking the rear Toe and Camber angles.

On this mode do not try to adjust the front angles even that are shown in your screen, for this type of vehicles this mode will only be useful to look for miss alignment or bent rear axles. After you check the rear condition choose the other mode (2 Wheel alignment with Center Line to correct the front axle.

All wheel units must be connected to perform this mode, and all of them have to be leveled.

2 Wheel alignment with Center Line

If this mode is selected (page 18 item \angle), your equipment will calculate the angles based on the Center Line of the vehicle (rear wheel units reference)

In this mode only alignment angles for the front axle will be shown, and the thrush line will be also displayed.

This is the preferred method or procedure for alignment on solid rear axle vehicles. That do not have real wheel alignment or rear wheel adjustable angles.

2 Wheel Alignment Only

If this mode is selected (page 18 item \angle), your equipment will calculate the alignment angles only with the for Wheel Units.

In this mode only alignment angles for the front axle will be shown, and the thrush line will not be available.

NOTE:

The steering wheel center process will not be to accurate, we advise you to use this mode only for a quick reference on front wheel angles.

Your will need only the front wheel units to perform this procedure or alignment method.

8 Sensors

NOTE:

To choose this method your equipment must be equipped with the 8 sensor configuration (4 front wheel Units) Please consult you local distributor to obtain more information or to update your currently equipment to this new setup.

If this mode is selected (page 18 item \angle), Your equipment will calculate the alignment angles in a perfect square line.

This is the optimum setup for Unibody type of vehicle chassis and also for any vehicle that requires 4 wheel alignment.

The Rear TOE and Camber data will be live data based on the Center line of the vehicle.

In this mode all four TOE, Camber, Caster (only front axle), thrust line will be shown in your screen.

Wheel Runout

The wheel Runout is also known as "Compensation Turn".

Runout is a procedure to detect and compensate for:

- Any offset in the position of the wheel clamp spindles
- Bent rims.

NOTE: Runout must be performed when wheel clamps are installed on the vehicle to get accurate wheel alignment results.

You have four Runout options available. Normal Runout is the default setting. You may select

Normal Runout

This is the most accurate Runout procedure. Under this mode the wheel Runout is calculated by the "Track" beams. All wheel units must be leveled so the reading are the most accurate.

Normal Runout procedure

Preliminary preparation:

- a) Turn on your equipment.
- b) The vehicle must be placed into the alignment rack or ramp.
- c) The front wheels must rest over the front alignment plates and be centered.
- d) The locking devices for the front plates must be removed.
- e) All front wheel Clamps are to be secured firmly at each wheel.
- f) Mount each wheel unit onto the clamps shaft.
- g) You must use a center type elevator to raise the entire front or rear axle, so it will not touch the ground.

another option from the Setup screen:

- Normal Runout
- 4-Point Runout
- All Wheel Runout
- Special Runout

The Runout screen is divided into two sections. The left side of the screen displays a wheel clamp pointing in the correct position of the rim clamp. The right side of the screen displays a top-view of the vehicle with all four wheel units attached.

The normal Runout is choose as the default procedure.

The normal Runout is taken in to steps or wheel turns of 180° degrees each one.

All wheel units must have the Runout procedure.

- h) The Runout process will tell you to raise the front or rear axle at a time to perform the Runout sequence. You must raise the entire axle to perform the Normal Runout, do not by any means let one of the axles' wheel to rest in the floor .
- i) Your alignment equipment in this mode will calculate the Runout based on the Track Beams, and because of this all Wheel Units

must be leveled to perform the sequence or procedure.

- j) All wheel units must be leveled during the entire process.
- k) On some four-wheel drive vehicles, both the left and right side wheels rotate simultaneously. To perform Runout on these vehicles follow the steps below or see Optional Runout Modes.

NOTE:

All the wheel units must be compensated only if you chose the next Alignment Modes:

- a) 4 Wheel with Thrust Line
- b) 8 Sensors

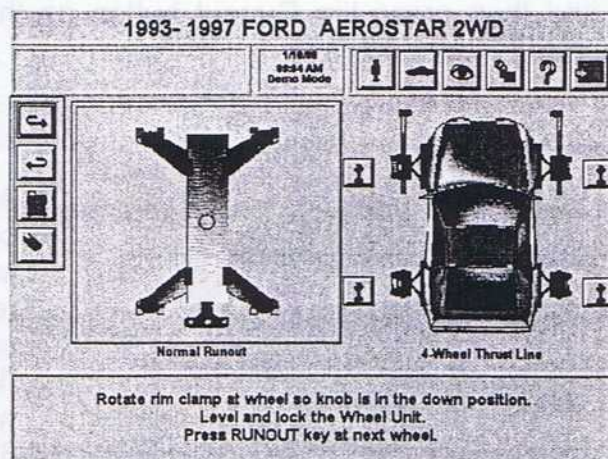
The rest of the modes will only require front axle Runout.

This procedure will begin after you enter the customer data and the vehicle's technical data. The example below is bases on the 3 Wheel with Thrust Line Alignment Mode.

Figure 62

1. Watch the square on figure 62 just beside to each wheel unit, you will see that there not completely green. This indicates that those wheel Units needs to be compensated by the Runout process.

Once that a particular wheel is compensated by the Runout process this square will turn completely green , a yellow color will indicate that the Runout was minimum and the White color will indicate that no Runout was detected. Either ways the Runout must be repeated for each wheel.

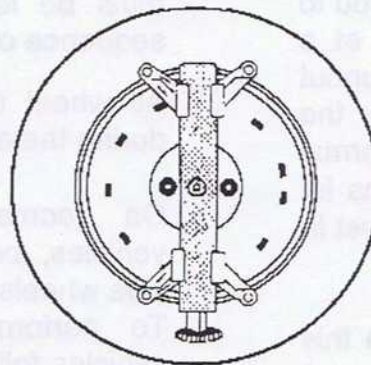


The starting position will be as the figure 63 and the second position will be as the figure 64.

The colors of the cases indicates the state of the Runout process for each wheel:

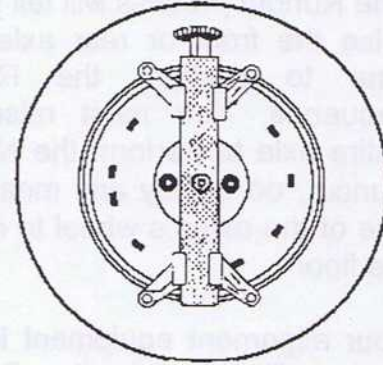
- a) Half green: half of the Runout process is completed.
- b) All green: Complete Runout for that particular wheel as been achieved.
- c) Half or full yellow: Excessive Runout detected. Repeat the Runout for that particular wheel.
- d) Half full white: Runout not accepted. Repeat the Runout on that particular wheel.

Figure 63



6 o'clock Position

Figure 64



12 o'clock Position

2. Using a jacking beam (or other lifting device supplied with the alignment rack), lift one end of the vehicle so both wheels on the same axle are off the rack. Spin the Runout wheel so the wheel clamp knob is pointing in the direction indicated in the on-screen illustration. (figure 62) and then press the Runout button on the wheel Unit (figure 65)

Figure 65

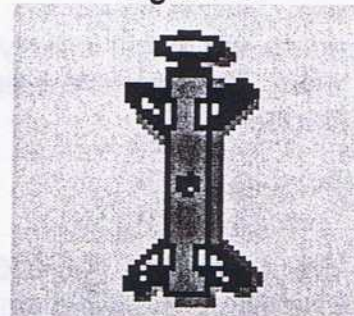
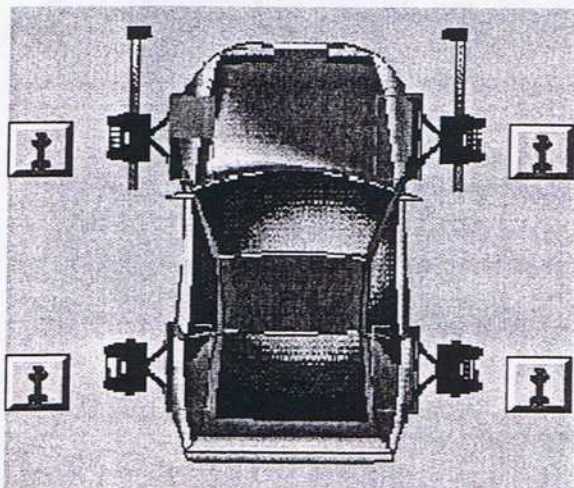


Figure 66

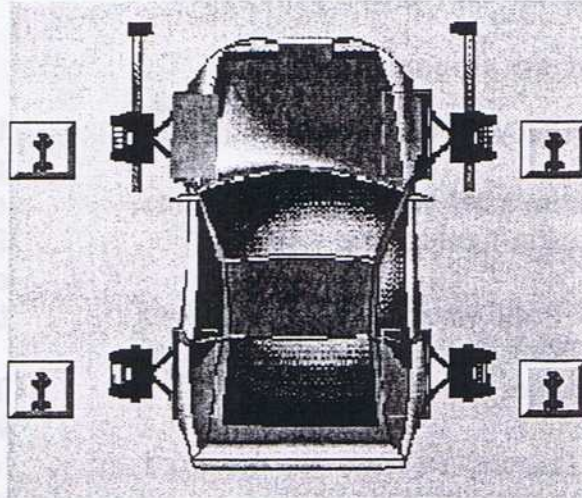


3. A An arrow appears at the corresponding wheel unit on screen. Wait while Runout readings are taken. A tone sounds at the console and the "knob down" indicators on the wheels not done go out. (figure 66)

NOTE: Do NOT move the wheel or wheel unit while Runout readings are being taken.

Figure 67

4. After initial readings are taken, the on-screen wheel clamp flips over and the wheel clamp knob points up. Note that the "knob up" indicator on the wheel unit will be lit and half of the on-screen wheel turns green to show that Runout on that wheel is half complete.(figure 66) . Turn the clamp back 180° as the picture shows, and press the Runout button on the same wheel unit. A second beep will be heard and the case will turn completely green.



5. Repeat steps 1 to 5 for each wheel, and be aware that you must raise the entire axle that you are performing the wheel Runout.

All wheel units must be leveled to perform the Runout!!!!

6. Once the Runout process is complete for wheel units the screen will change for the Caster Swing procedure.

4 Point Wheel Runout

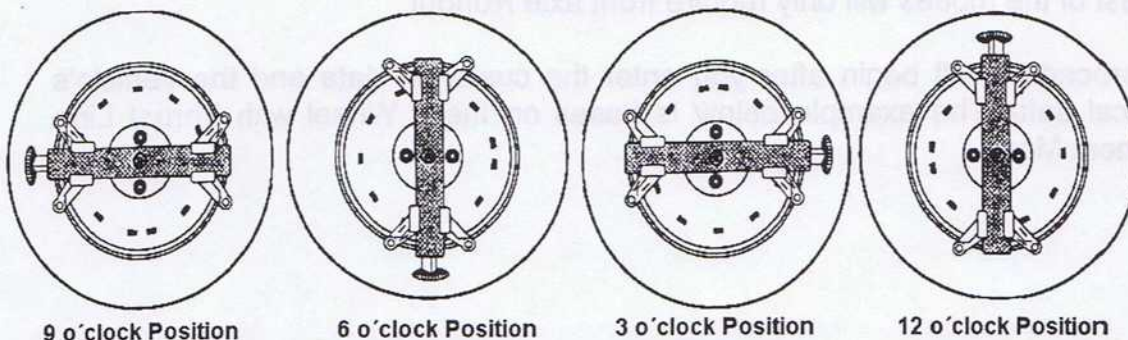
Some racks cause problems by blocking the beam, making standard Runout procedures impossible. 4-Point Runout solves this problem by using the camber vials inside the wheel units to measure Runout.

The major difference in the Runout procedure is that the readings are taken at four positions on each wheel. (figure 68).

NOTE: Always turn the wheel being tested COUNTERCLOCKWISE.

The Runout sequence and wheel clamps position are shown in figure 68

Figure 68



4 Point Wheel Runout procedure

Preliminary preparation:

- a) Turn on your equipment.
- b) The vehicle must be placed into the alignment rack or ramp.
- c) The front wheels must rest over the front alignment plates and be centered.
- d) The locking devices for the front plates must be removed.
- e) All front wheel Clamps are to be secured firmly at each wheel.
- f) Mount each wheel unit onto the clamps shaft.
- g) You must use a center type elevator to raise the entire front or rear axle, so it will not touch the ground.
- h) The Runout process will tell you to raise the front or rear axle at a time to perform the Runout sequence. You must raise the entire axle to perform the Normal Runout, do not by any means let one of the axles' wheel to rest in the floor.
- i) The 4 point Runout calculates the wheel compensation from the vial levers, because of this is very important that the wheel unit you are performing the Runout must be leveled at all times during this process.
- j) All wheel units must be leveled during the entire process.
- k) On some four-wheel drive vehicles, both the left and right side wheels rotate simultaneously. To perform Runout on these vehicles follow the steps below or see Optional Runout Modes

NOTE:

All the wheel units must be compensated only if you chose the next Alignment Modes:

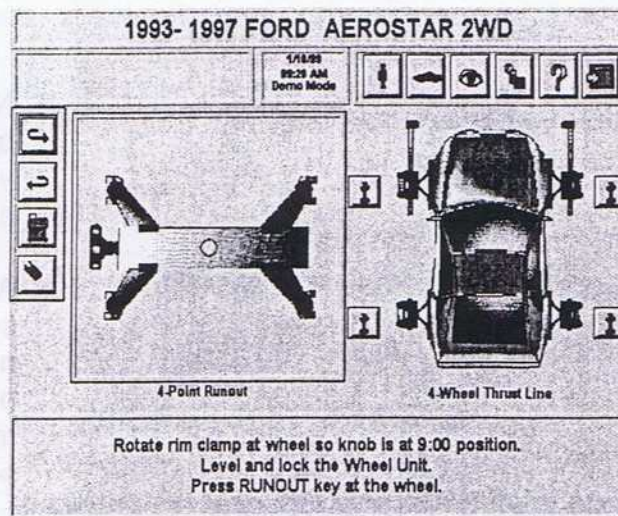
- a) 4 Wheel with Thrust Line
- b) 8 Sensors

The rest of the modes will only require front axle Runout.

This procedure will begin after you enter the customer data and the vehicle's technical data. The example below is bases on the 3 Wheel with Thrust Line Alignment Mode.

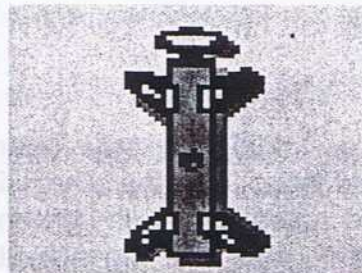
Figure 69

1. Watch the square on figure 69 just beside to each wheel unit, you will see that there not completely green. This indicates that those wheel Units needs to be compensated by the Runout process. **Notice that the initial wheel clamp position is at 9 o'clock..**



2. Using a jacking beam (or other lifting device supplied with the alignment rack), lift one end of the vehicle so the wheels on the same axle are off the rack . Spin the Runout wheel so the wheel clamp knob is pointing in the direction indicated in the on-screen illustration. (figure 69) and then press the Runout button on the wheel Unit (figure 70)

Figure 70

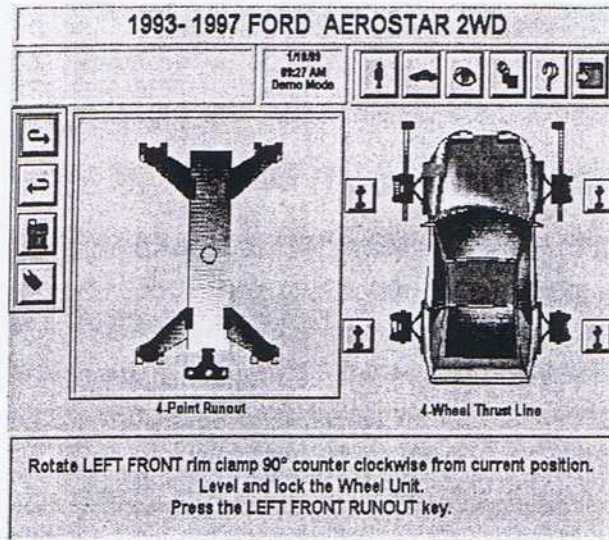


3. Place the clamp as shown at the figure 69 and level the wheel unit. Next press the Runout button on the wheel unit you are working (figure 70).
4. You will also notice that the case beside the wheel unit picture will turn green one $\frac{1}{4}$ at a time. That is an indication that the wheel is being compensated on the first step of four Runout sequence.

The colors of the cases indicates the state of the Runout process for each wheel:

- | | |
|---|---|
| a) Half green: half of the Runout process is completed. | c) Half or full yellow: Excessive Runout detected. Repeat the Runout for that particular wheel. |
| b) All green: Complete Runout for that particular wheel as been achieved. | Half full white: Runout not accepted. Repeat the Runout on that particular wheel |

Figure 71



5. Next you will hear a second beep and the picture will show you that $\frac{1}{4}$ of the case is green accepting the spin . (figure 71)

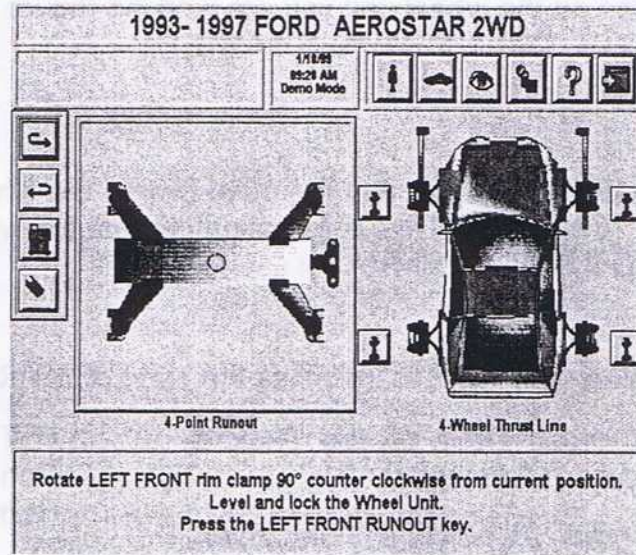
6. After a few seconds the on screen figure will change to the next wheel clamp position (6 o'clock) and also read the message at the bottom of the screen. (figure 71)

7. Next place the wheel clamp as shown in the on screen picture, level the wheel unit and next press the Runout button on the same wheel unit.

Figure 72

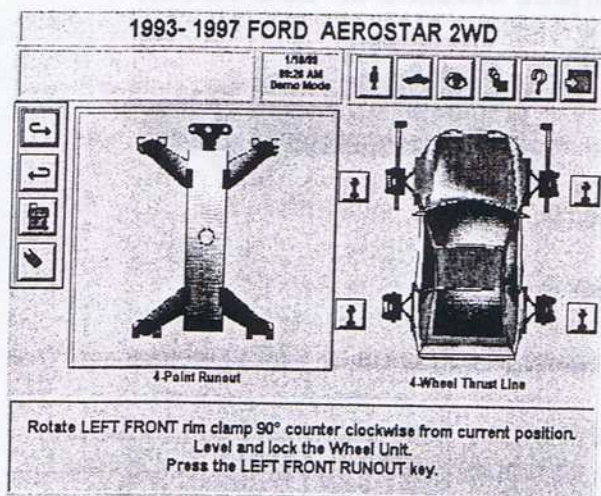
8. After a while you will hear another beep, and the other $\frac{1}{4}$ of the case will turn green indicating that your movement was accepted. (figure 72)

9. After a few seconds the on screen figure will change to the next wheel clamp position (3 o'clock) and also read the message at the bottom of the screen. (figure 72)



10. Place the wheel clamp as in figure 72 and next press the Runout button on the same wheel unit.

Figure 73



6. Next you will hear a beep and the other $\frac{1}{4}$ of the green case will be lit, indicating that the process is accepted (figure 73)
7. Observe that the picture screen shows the next wheel clamp position (12 o'clock) also the bottom screen message will tell you to position the wheels clamp at that position.
8. Place the wheel clamp as the picture indicates (figure 73) and press the Runout button on the same wheel unit.
14. You will hear a beep indicating that the wheel Runout process is finished and the green case will be completely lit.
15. Repeat the same procedure for all the wheel units taking note that each wheel unit to be compensated must be leveled at all times during this process.

All Wheel Runout

This procedure is useful when :

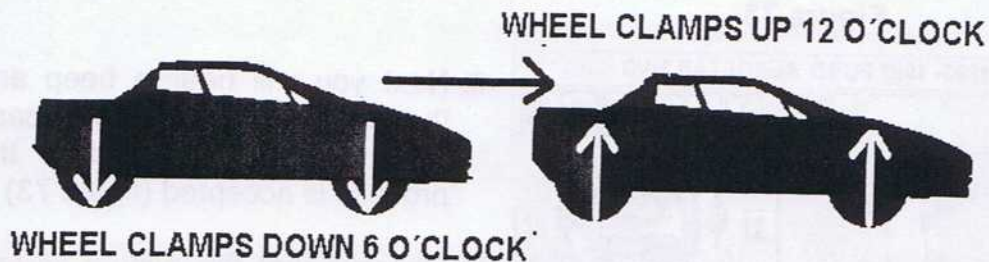
- a) You do not have a lifting equipment
- b) Or you don not have a center lifting device for your alignment rack
- c) Or if you have a all around lifting device for your alignment rack (to speed up the alignment process.

NOTE:

This procedure involves the rotation of all wheel units at the same time in sequences. (6 o'clock and 12 o'clock). You can also make the entire rotation with the vehicle on the ground. Be careful with the wheel units cables if you chose the ground rotation.

If you chose the ground rotation the procedure will be performed in two rotation sequences of 180 degrees each. (figure 74) always make the rotation counter clockwise.

Figure 74



You can make those rotations in two ways:

- a) With the car on the ground moving it forward in rotations of 180 degrees
- b) Or if you have an all wheel central elevator on your alignment rack you can raise the entire vehicle and perform the all wheel rotation once the car is lifted.

You can use either ways to perform this process but you must turn all the clamps and level all wheel units at the same time before you proceed with the all wheel Runout.

All Wheel Runout procedure

Preliminary preparation:

- a) Turn on your equipment.
- b) The vehicle must be placed into the alignment rack or into the floor.
- c) All front wheel Clamps are to be secured firmly at each wheel.
- f) Mount each wheel unit onto the clamps shaft.
- g) If you have an all wheel type elevator or lifting device you must position the vehicle over it.
- h) If you chose to make the all wheel Runout procedure on the ground you must have enough space in front of the vehicle to perform the 180 degrees rotation forward motion.
- i) The all wheel Runout calculates the wheel compensation from the track beams, because of this is very important that the wheel unit you are performing the Runout must be leveled and the track beams are not blocked at all times during this process.
- j) All wheel units must be leveled during the entire process.
- k) On some four-wheel drive vehicles, both the left and right

side wheels rotate simultaneously.
To perform Runout on these

vehicles follow the steps below or
see Optional Runout Modes.

NOTE:

All the wheel units must be compensated only if you chose the next Alignment Modes:

a) 4 Wheel with Thrust Line

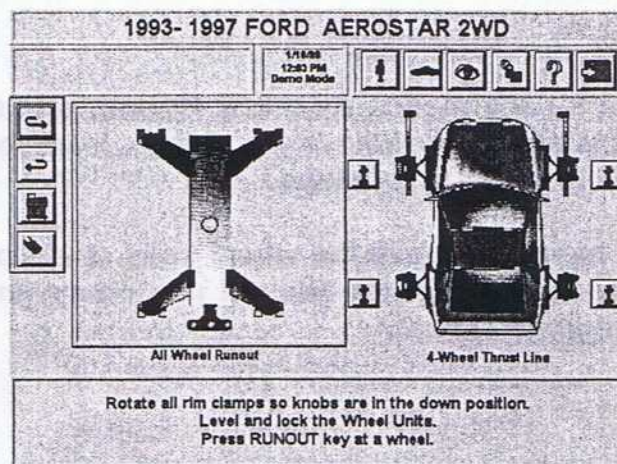
b) 8 Sensors

The rest of the modes will only require front axle Runout.

This procedure will begin after you enter the customer data and the vehicle's technical data. The example below is based on the 3 Wheel with Thrust Line Alignment Mode.

1. Using a jacking beam (or other lifting device supplied with the alignment rack), lift the entire vehicle. The Runout wheels must be off the rack so they can spin freely. Place the vehicle in neutral after it has been raised. Remember if you use the on ground rotation to have enough space at the front of the vehicle to perform the 180 degree clamp rotation, so at the end of the rotation the front vehicle's wheels rest onto the front alignment plates.

Figure 75

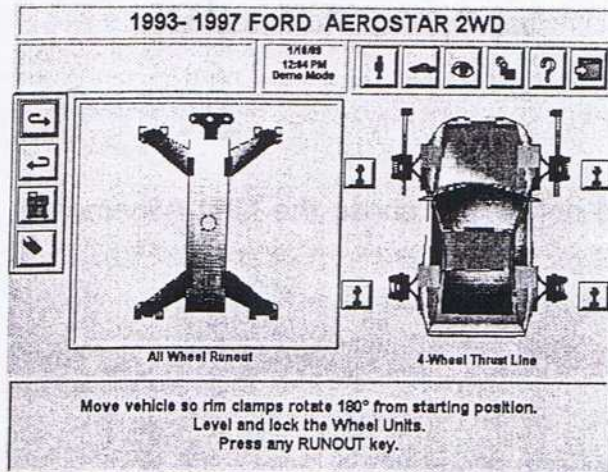


2. You began the procedure with all the wheel units clamps positioned at 6 o'clock. (figure 75)

3. Level and Install all wheel units.

4. Press any Runout Button at any wheel unit.

Figure 76



1. You will hear a beep indicating that the wheel units are being compensated. Immediately you will see the on screen picture showing to perform the 180 degree all wheel units rotation. (figure 76) You will also see the message at the bottom of the screen.
2. Position all the wheel units clamps at 12 o'clock position and level all four wheel units.

3. Following, press the Runout button at any wheel unit. You will hear second beep and after that you will see the Caster Swing procedure process.

Special Runout

Choose this option only if you can not perform a normal Runout . But we do not recommend to use this procedure as the default setup.

Remember the Wheel Runout is essential to guarantee the exactness of the alignment data and angles.

NOTA:

Do not by any means or in any Runout procedure remove the wheel units from the shafts or remove the clamps from the vehicle's rim to perform the wheel clamp units rotations.

If you have to remove the wheel units or clamps from the vehicle you must then perform again the Runout procedure and the Caster Swing to obtain valid alignment data.

Programmed Alignment

On this chapter we would go through the process of a normal programmed alignment sequence.

Please read carefully this chapters to get familiarized with the routines and your CCD.COM alignment equipment.

Figure 77

1. To begin a programmed alignment place the cursor over the marked Icon on figure 77 and perform a single click over it.



Customer Information

1. On the next screen (figure 78) we will have the data information for the customer and his vehicle, this is a very important screen because, it will store in your hard drive the customers information data so they can be accessed in the future.

Figure 78

Enter Additional Information			
Customer Data		Vehicle Data	
Last Name E	First Name F	License I	VIN J
Smith	John	VF4567	1FRTY567URJSYTY577
Address G		Manufacturer P	Make P
Portage Michigan		Ford	Ford
1234 nw. 78 ave		Model	Aerostar ZWD
		Year	93-97
		Options	
		Vehicle Database	NORTH AMERICA
Work Order Data			
Work Order K	Work Order Date L	Notes O	
001	01/10/99	NEW CUSTOMER	
Technician M	Odometer N		
CARL	34567		

On the screen on figure 78 we have the next features:

- | | |
|--|--|
| A. Continue to the next screen | I. Customer's vehicle plate number |
| B. Back up or recede to the previous screen. | J. Vehicle Identification number VIN |
| C. Erase all information on the screen | K. Work order number |
| D. Help menu | L. Date |
| E. Customer's middle name | M. Technician's name |
| F. Customer's name | N. Vehicle mileage |
| G. Customer's Address | O. Special notes |
| H. Customer's Telephone number | P. Customers Technical vehicle data. (They will be filled up automatically after the next step.) |

2. To choose any of this blank cases just place the cursor over the blank space beside every option and perform a single click over it, next type the desired information by the use of your keyboard keys.

3. Once that you fill up all the information , place the cursor over the Icon (A) to continue to the next screen.

Vehicle's Information

This is a very important step, because, your CCD.COM equipment will be based on the information you choose to display the correct angles and/or print diagnostic messages regarding on the vehicle's alignment condition.

Please take your time an search the entire data base for the correct vehicle especifications.

Your Alignment equipment have many vehicle data bases, which depends according to where the vehicles is manufactured for.

The data bases available are:

- | | |
|-----------------|-------------------------------|
| • North America | • Korea |
| • Australia | • User defined specifications |
| • Brazil | |
| • Japan | |

Figure 79

1993 FORD MUSTANG COBRA

7/28/89 12:29 PM

VEHICLE IDENTIFICATION

Vehicle Database NORTH AMERICA

Manufacturer Ford

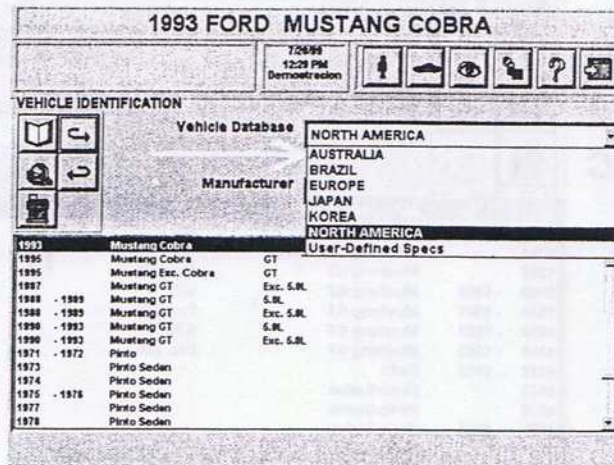
1993	Mustang Cobra	GT
1995	Mustang Exc. Cobra	GT
1987	Mustang GT	Exc. 5.0L
1988 - 1989	Mustang GT	5.0L
1988 - 1989	Mustang GT	Exc. 5.0L
1990 - 1993	Mustang GT	5.0L
1990 - 1993	Mustang GT	Exc. 5.0L
1971 - 1972	Pinto	
1973	Pinto Sedan	
1974	Pinto Sedan	
1975 - 1976	Pinto Sedan	
1977	Pinto Sedan	
1978	Pinto Sedan	

In this screen you will have the next choices:

- A. Fast data option. (you must chose a vehicle first)
- B. Graphics and animation (not available for all models)
- C. CCD.COM selection screen. (this option leads to the Programmed alignment modification screen. You have the options such as: type of Runout, Wheel alignment mode , etc. Please refer to the chapter General configurations of the CCD.COM for more information of this screen.)
- D. Continue to the next screen or step
- E. Recede or go back in the process
- F. Enter new customer information
- G. Go to the vehicle data base
- H. Visual inspection routine (Please refer to the Visual Inspection chapter for more information. on this feature.)
- I. System Utility and service screen
- J. Help menu
- K. Exit the programmed alignment sequence
- L. Vehicle data base
- M. Vehicle model by year, model, technical specifications, etc.
- N. Vehicle model by year of production and chassis types.

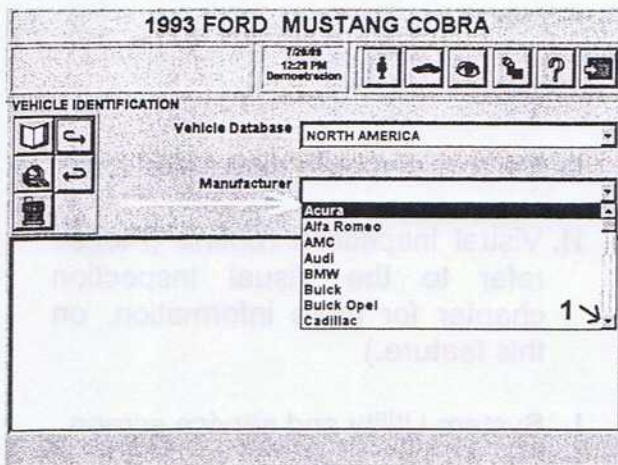
1. To choose the vehicle's country, zone or continent of production , place the cursor over the line vehicles data bases and perform a single click over it. (figure 80)

Figure 80



1. Next the options window opens. (figure 80).
2. Place the cursor over the desired option and perform a single click over it to chose it.

Figure 81



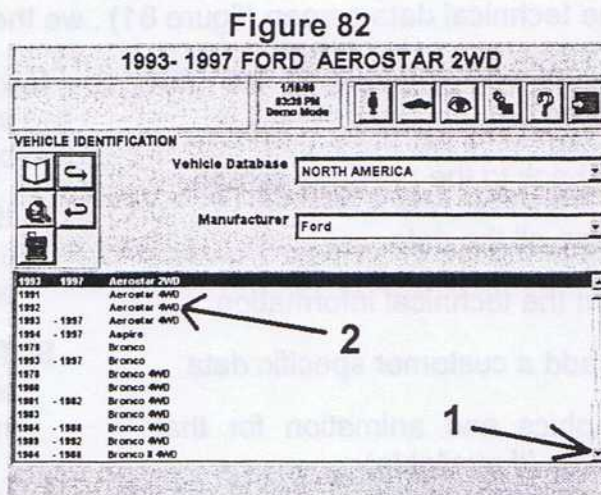
4. To choose the manufacturer of the vehicle place the cursor over the line Manufacturer and perform a single click over it. (figure 81)
5. The manufacturers list opens (figure 81)

6. In this window we have two options:
 - a) To scroll down and look for a specific vehicle using the arrow at the left middle side of the (place the cursor over the arrow (\Rightarrow) and perform a single click over it to scroll down)
 - b) The fast selection (Enter the first initial of the manufacturer you want to find and then perform a single click over it to select it)

Once you find your selection the screen will change to the step #7.

7. The next step is to look for the model and year of the vehicle. (figure 82) To scroll down place the cursor over the arrow (\Rightarrow) and perform single click to view other models in the list.

8. Once you find the right model place the cursor over the desired selection (\Leftarrow) and perform a single click over it.



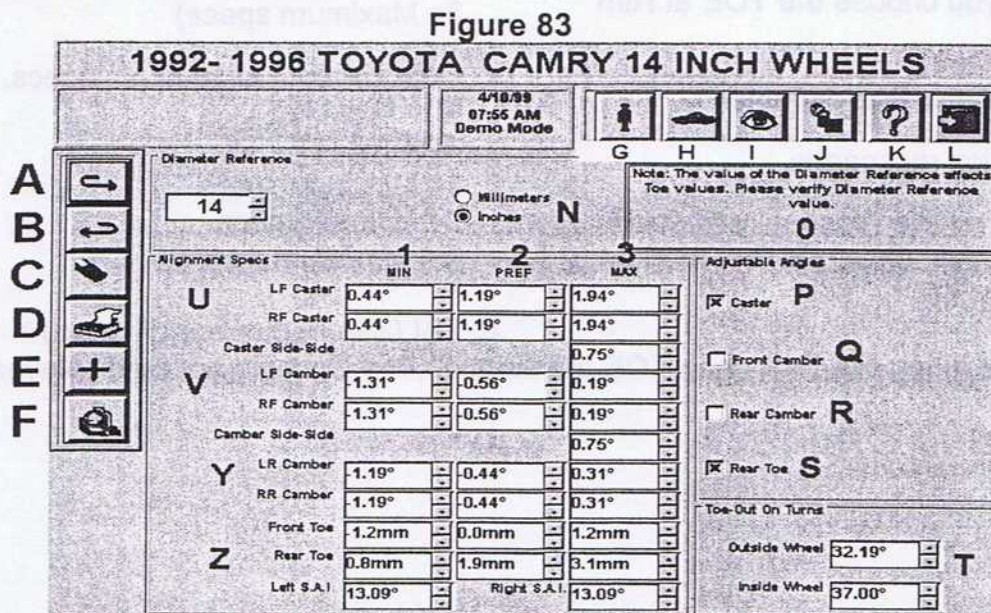
9. Automatically the screen will change to the vehicle data screen and its technical specifications (figure 83)

Vehicle's technical information

The next screen will be able to see the vehicle's technical specification of the alignment angles. (figure 83) Also if necessary you can modify its data to match a specific vehicle set up.

NOTE

If you choose the TOE at rim (see Domestic TOE chapter) you must enter the rim diameter, this input is very important to calculate a correct TOE. On the contrary if you choose the TOE at tire (see European TOE chapter) the rim diameter is not necessary to perform the TOE angle.



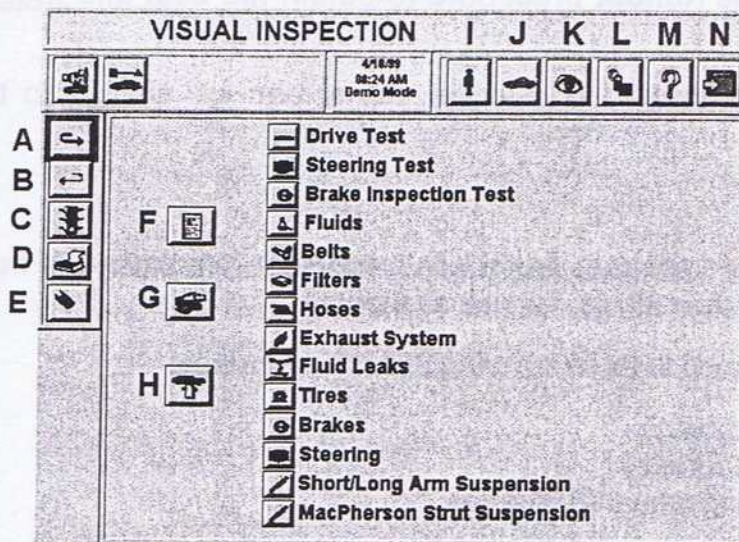
On the technical data screen (figure 81) , we the next data and options:

- A. Accept and continue to the next screen
 - B. Go back to the previous screen
 - C. Erase all the data
 - D. Print the technical information
 - E. To add a customer specific data
 - F. Graphics and animation for that vehicle (if available)
 - G. Edit customer data information
 - H. Look for another technical specifications
 - I. Go the visual inspection routine
 - J. Go the service & utility screen
 - K. Help menu
 - L. Exit the programmed alignment routine
 - M. Rim diameter (enter rim diameter only if you choose the TOE at Rim option)
 - N. Scale of the Rim diameter
 - O. Operation messages
 - P. If the vehicle posses adjustable Caster this case will be marked with the "X"
 - Q. If the vehicle posses front adjustable Camber this case will be marked with "X"
 - R. If the vehicle posses rear adjustable Camber this case will be marked with "X"
 - S. If the vehicle posses rear adjustable Toe this case will be marked with the "X"
 - T. Technical information of the vehicle's Turning ratios.
 - U. Front Caster alignments specs.
FL= Front left
FR= Front Right
1= Minimum specs
2= Normal Specs
3= Maximum specs
 - V. Front Camber alignments specs.
FL= Front left
FR= Front Right
1= Minimum specs
2= Normal Specs
3= Maximum specs)
 - Y. Rear Camber alignments specs.
RL= Front left
RR= Front Right
1= Minimum specs
2= Normal Specs
3= Maximum specs)
 - Z. SAI (Steering axis inclination)
- NOTA :** If you choose European TOE the items M, N y O would not be displayed.

Visual Inspection (fast choice)

For a more detailed visual inspection please refer to the chapter Visual inspection.

Figure 84



On this screen we have the next options:

- | | |
|--|---|
| A. Accept and continue to the next screen | H. Selection of the undercarriage visual inspection |
| B. Exit visual the programmed alignment test. | I. Edit the customer's data |
| C. Perform a detailed visual inspection | J. Edit the technical specs of the vehicle |
| D. Print the visual inspection report | K. Visual inspection routine |
| E. Erase the visual inspection data | L. Service & Utility screen |
| F. Select all visual inspection types. | M. Help menu |
| G. Selection of the over vehicle inspection routine option | N. Exit the alignment process |
| | O. Detailed Visual Inspection |

Runout procedure

Depending on the TOE Runout choose previously, the screen will prompt you, to perform the desired Runout..

NOTA.

Always perform the Runout procedure to obtain the best and most reliable alignment angles.

Once the Runout procedure is selected, the screen will change to the Caste swing procedure.

Caster Swing

Caster swing is very important procedure because it calculates the front caster and Turning ratio of the vehicle, as well as the SAI.

This swing is performed in three steering sweeps or swings:

- One to the left (7 degrees)
- One to the right (7 degrees)
- One centered steering wheel (0 degrees)

The software will tell you how far the steering has to be turned and on which direction.

The arrows on the screen will tell you how close are you to the desired position. (Green = on target Red = our if target)

LEVEL THE WHEEL UNITS AND LOOSEN THE FRONT PLATES BEFORE BEGINNING THIS PROCEDURE

1. On the first swing the arrows and picture will tell you to turn the steering wheel to your left until the arrow reaches the green mark. (figure 85) Be sure not to let the track beams to be blocked at any time.

2. Once the arrow reaches the target green zone it will turn green. And a "STOP" sign will be displayed indicating that you have to hold that position very steady until the software takes the readings. (figure 85)

Figure 85

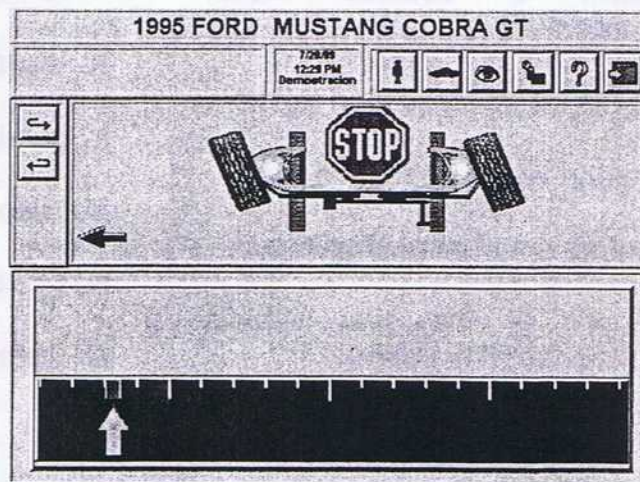
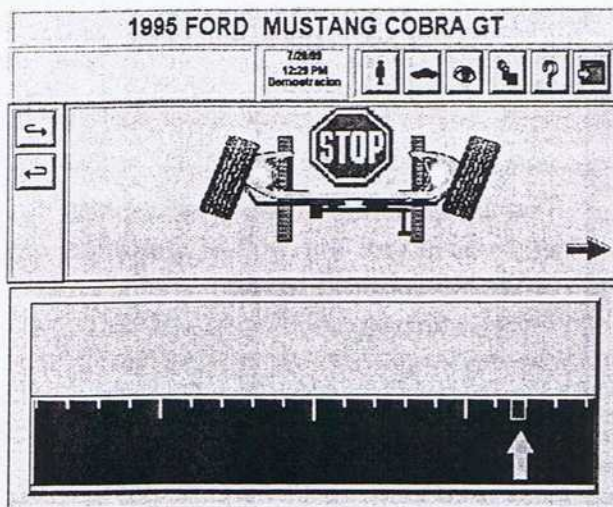


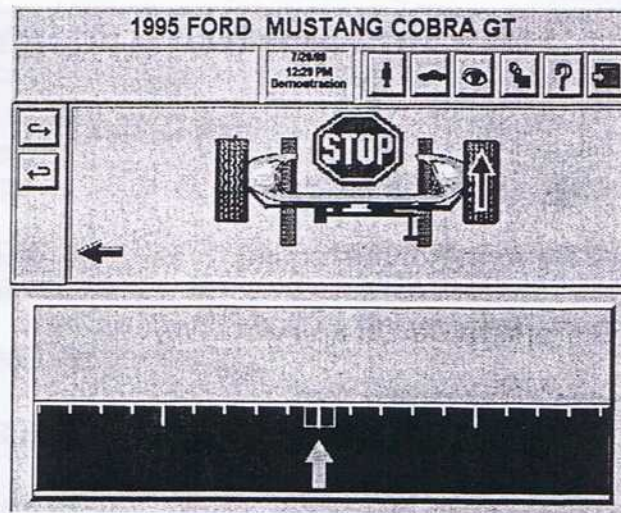
Figure 86



3. After a few seconds you will see the second swing procedure. (figure 86). Turn the steering wheel to the right until the arrow reaches the target zone (green) (figure 86) Be sure not to let the track beams to get blocked at any time of the procedure.
4. Once the arrow reaches the target zone it will green, and a "Stop" sign will indicate you to keep steady until the readings are taken. (figure 86)

Figure 87

5. Last step is to relocate the wheel at the center. The software will prompt you to turn the steering wheel and center the front wheels. (figure 87) until the arrow reaches the target center zone. Be sure not to let the track beams to get blocked at any time.
6. Once the you reach the center target zone, the "STOP" message appears and indicates you to keep the steering wheel steady until the readings are taken. (figure 87)



NOTE

In some cases a message "waiting for stable readings" will appear in the screen. This is a normal operation of the equipment. Your CCD.COM is a very sensitive equipment and any movement or vibration will interrupt the readings or disturb the readings. Always make sure that the vehicle is over a very steady platform.

Data Display (Actual state before the correction)

Figure 88

1987- 1990 TOYOTA CAMRY WAGON 2WD				
15/08/99 11:37 AM Demonstration				
Left		Front	Right	
0.50°		Camber	0.50°	
3.00°		Caster	3.00°	
0.3mm		Toe	0.3mm	
0.6mm				

SAI				

Setback		0.00°		
Left		Rear	Right	
-0.09°		Camber	-0.09°	
1.0mm		Toe	1.0mm	
2.1mm				
Thrust Line		0.00°		

The initial Data screen will opens and will show the actual readings of the vehicle (figure 88)

The figure 89 have the next functions and options:

Upper Bar

Figure 89

1987- 1990 TOYOTA CAMRY WAGON 2WD										
13/08/99 11:37 AM Demostracion										
A	B	C	D	E	F	G	H	I	J	K

A. Perform Runout routine

B. Perform Caster swing routine

C. Perform Turning ratio test

D. Calculations with the vehicle raised at one or two sides. (This option let you raise the vehicle at any side and ,make the necessary corrections on the alignment, without the Camber readings go out of range.

E. Adjustments screens (This option lets you choose the front or rear

alignment angles for the proper alignment corrections.

F. Edit the customer's information

G. Edit the vehicle's information

H. Perform the Visual Inspection routine.

I. Service and selections screens.

J. Help menu

K. Exit the programmed alignment routine

Figure 90 shows the next options:

Lateral Bar

Figure 90



- A** Return to a previous screen
- B** Alignment selections
- C** Graphics and animation (if available)
- D** Store alignment data (This option allows you to keep in memory the alignment angles taken before the alignment corrections, so they can be printed after the repairs)
- E** Show stored (D) readings on screen (you will need to store it before choosing this option)
- F** Show the vehicle's technical alignment angles (This option will show the Technical Alignment angles for the vehicle you are working with so you can compare it when you're performing the alignment corrections.)
- G** Alignment accessories (You will need an additional program to run this option, please consult your local distributor for more information about this option.)
- H** Actual readings (4 Wheel alignment)

In the Figure 91 we have the nest readings:

Figure 91

A & B = Front Left and Right Camber
C & D = Front Left and Right Caster
E & F = Front Left and Right TOE
G = Total Front TOE
H = Steering Axis Inclination (SAI)
I = Setback
J & K = Rear Left and Right Camber
L & M = Rear Left and Right TOE
N = Total Rear TOE
O = Thrust Line
Data display for alignment angles correction

Left		Front	Right	
0.50°	A	Camber	B	0.50°
3.00°	C	Caster	D	3.00°
0.3mm	E	Toe	F	0.3mm
G 0.6mm				
*****	H	SAI	*****	
		I	Setback	0.00°
Left		Rear	Right	
-0.09°	J	Camber	K	-0.09°
1.0mm	L	Toe	M	1.0mm
N 2.1mm				
		O	Thrust Line	0.00°

The next screens will help you to correct the alignment angles. They will show to you different angles views for the Front or Rear axle.

Figure 92

1987-1990 TOYOTA CAMRY WAGON 2WD			
11:06:00 11:07 AM Demonstration			
Left	Front	Right	
0.50°	Camber	0.50°	
3.00°	Caster	3.00°	
0.3mm	Toe	0.3mm	
0.6mm			
*****		*****	
SAI		0.00°	
Setback		0.00°	
Left	Rear	Right	
-0.09°	Camber	-0.09°	
1.0mm	Toe	1.0mm	
2.1mm			
Thrust Line		0.00°	

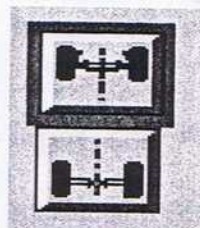
1. You have to options to enter the alignment correction screens: The first option you can place the cursor over the alignment data and perform a single click over it, the second option is to place the cursor over the marked icon on figure 92 and perform a single click over it.2

Figure 93

2. This will take you to the rear axle alignment data (figure 93)
3. The first screen on the 4 wheel adjustment routine is the rear axle. This is setup this way because on 4 wheel alignment you must correct the rear alignment axes before you go into the front axle alignment angles.

1990-1993 FORD MUSTANG 5.0L			
Rear			
0.50°	Camber	0.50°	
0.00°	Difference	0.00°	
Thrust Line			
1.91°			
0.0mm	Toe	0.0mm	
0.0mm Total			

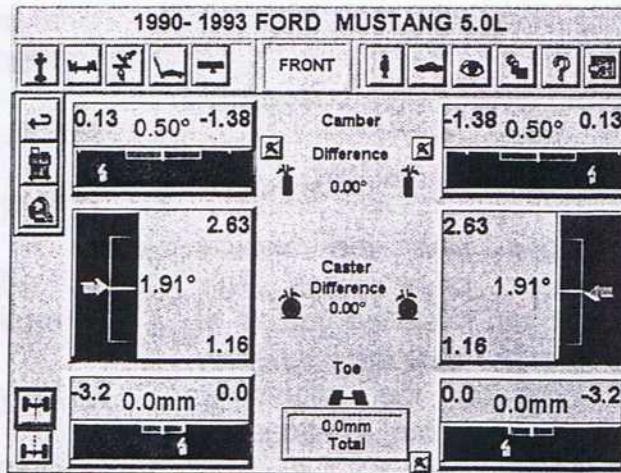
Figure 94



1. To change views form the Front & Rear axle readings you can place the cursor over the icon (figure 94) located at the left bottom of the screen and perform a single click over it to switch between rear & front.

Figure 95

4. The next screen is for the Front alignment specs. (figure 95)
5. This screen shows the Camber, Caster, TOE and the Steering Axis Inclination (SAI).



To return to the Rear axle specs, place the cursor over the Icon 94 which is located at the far left bottom of your screen and perform a single click to switch between both of them.

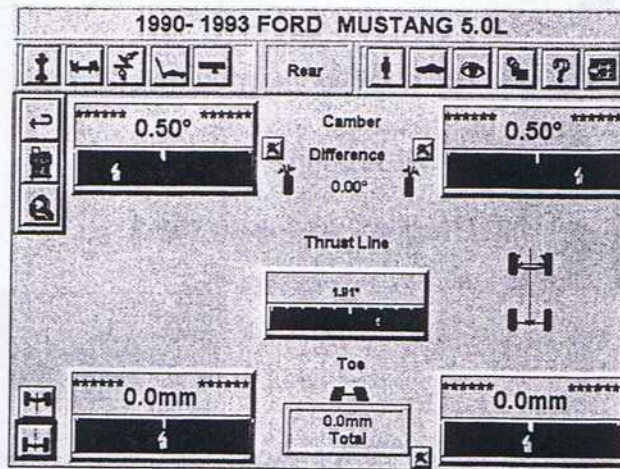
Rear axle Correction Display screen

Figure 96

On the screen of figure 96, we have the Rear axle alignment angles.

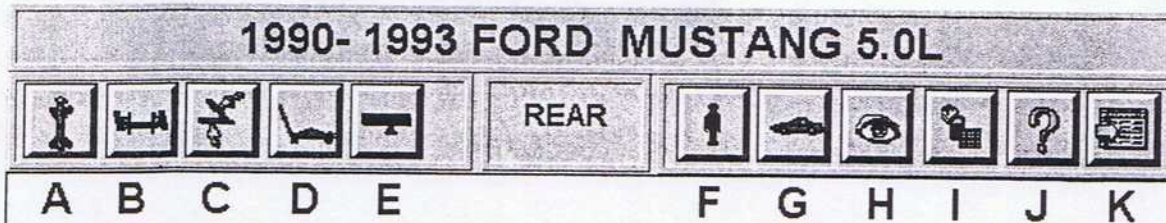
To study this screen we will divide it into 2 sections:

- Icons (Options)
- Alignment data



On figure 97 we have the upper Icons . Which are the same for both Rear and Front alignment data screen.

Figure 97

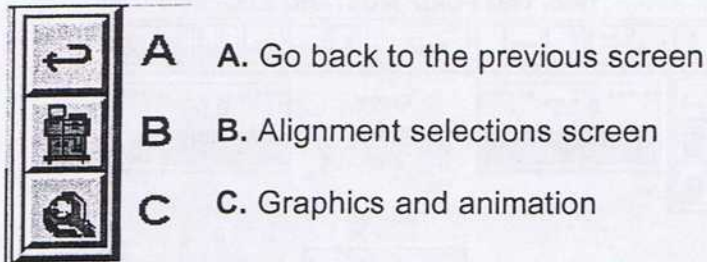


The Icons on figure 97 have the next functions:

- | | |
|---|--|
| A. Perform Runout routine | alignment angles for the proper alignment corrections. |
| B. Perform Caster swing routine | |
| C. Perform Turning ratio test | F. Edit the customer's information |
| D. Calculations with the vehicle raised at one or two sides. (This option let you raise the vehicle at any side and ,make the necessary corrections on the alignment, without the Camber readings go out of range. | G. Edit the vehicle's information |
| E. Adjustments screens (This option lets you choose the front or rear | H. Perform the Visual Inspection routine. |
| | I. Service and selections screens. |
| | J. Help menu |
| | K. Exit the programmed alignment routine. |

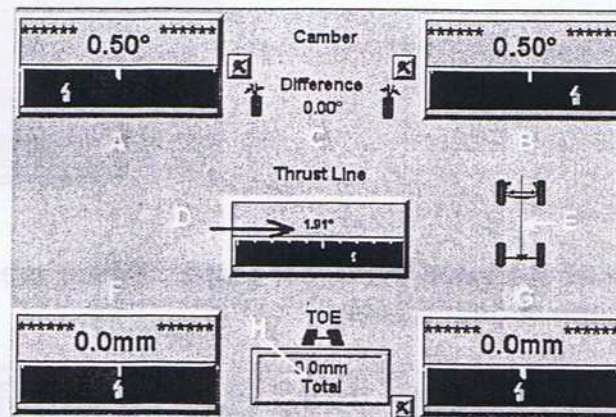
The Icons on figure 98 (both rear & front share the same functions) we have the next functions:

Figure 98



In the screen on figure 99 we next main rear axle alignment display.

Figure 99



On figure 99 we have the next alignment data:

A & B = Rear Camber (Left & Right)

E = Picture of the Thrust line deviation

C = Camber Difference between each wheel

F & G = Rear Toe (Left & Right)

D = Thrust Line

H = Total Rear Toe.

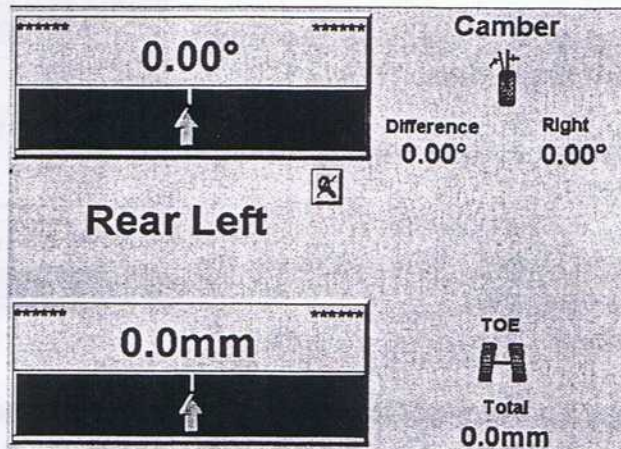
Figure 100



If you watch closely you can see that at the side of each case or angle data an Icon the same as figure 100.

If you place the cursor over this Icon you will obtain amplified images of data of that wheel and the its opposite side.

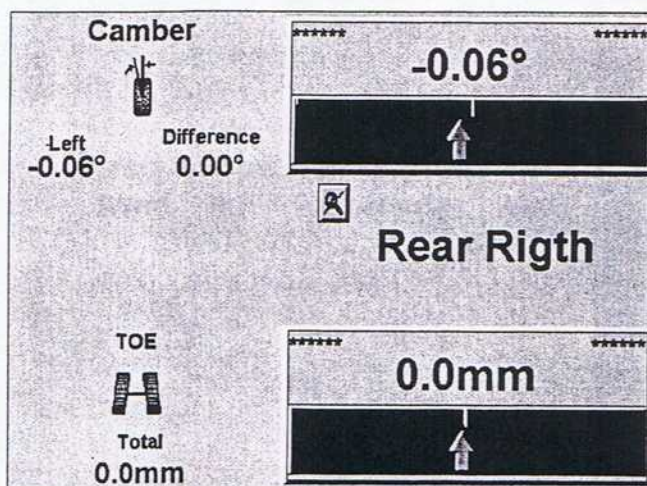
Figure 101



If we single click the Icon at the side of the Rear Left Camber we will obtain the screen of the figure 101.

If we single click the Icon on figure 101 again we will return to the previous screen.

Figure 102

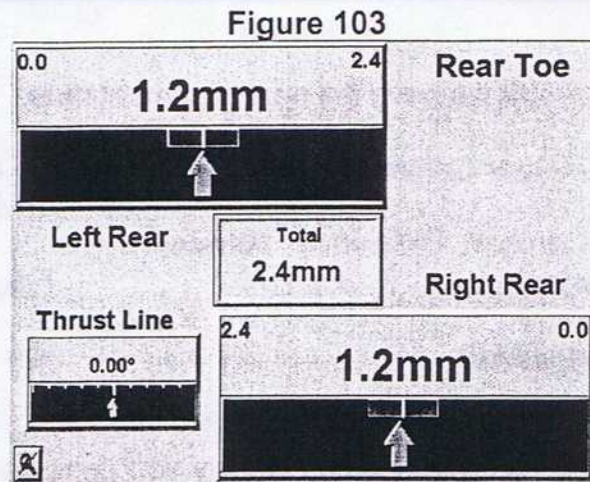


If we single click the Icon at the side of the Rear Right Camber we will obtain the screen of the figure 102.

If we single click the Icon on figure 102 again we will return to the previous screen.

If we single click the Icon at the side of the Rear Toe we will obtain the screen of the figure 103.

If we single click the Icon on figure 103 again we will return to the previous screen.



Front Axle correction Display Screen

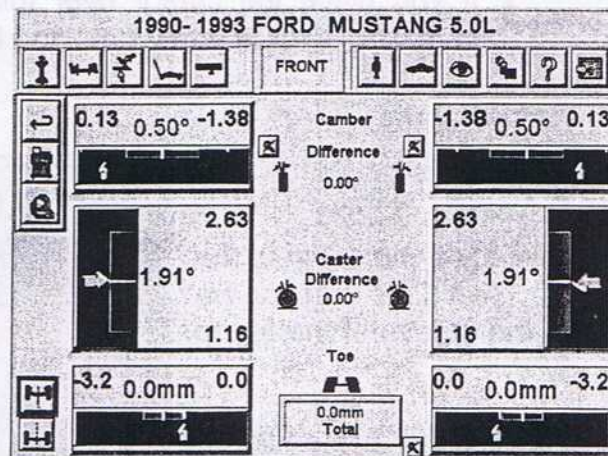
If we choose the Front axle alignment data we will obtain the screen on figure 104.

In the figure 104 we have the Front alignment angle data.

To study this screen we will divide it into 2 sections:

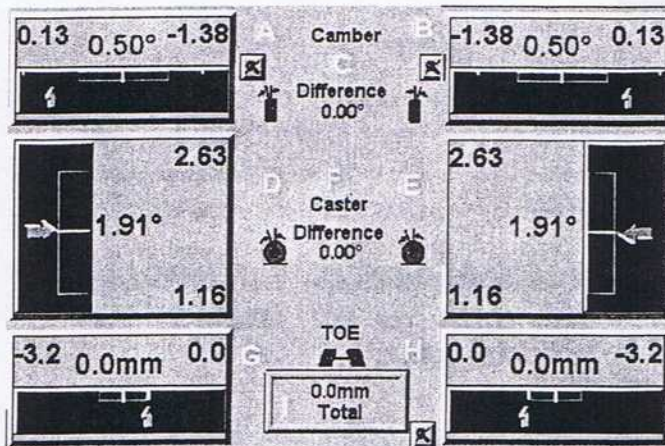
- Icons (Options) (Please look the rear axle Icons)
- Alignment data

Figure 104



The Icons for the Front axle are the same as for the rear axle.

Figure 105



On figure 105 we have the main Data screen for the Front Wheels .

On figure 105 we have the next data:

A & B = Front Camber (Left & Right).

D & E = Front Caster (Left & Right)
F = Difference between front Caster

C = Difference Between Front Camber

G & H = Front Toe

I = Total front Toe

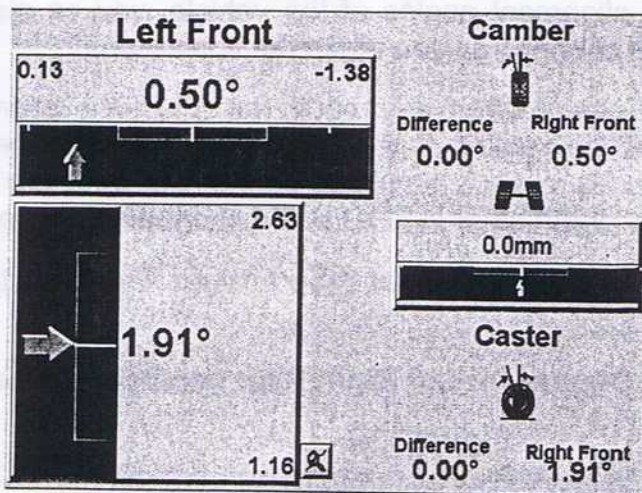
Figure 106



Watch closely at figure 105, you will see that beside all of the alignment data there is an icon as the figure 106.

When placing the cursor over this icon and performing a single click you will see amplified data of that particular angle and its opposite side.

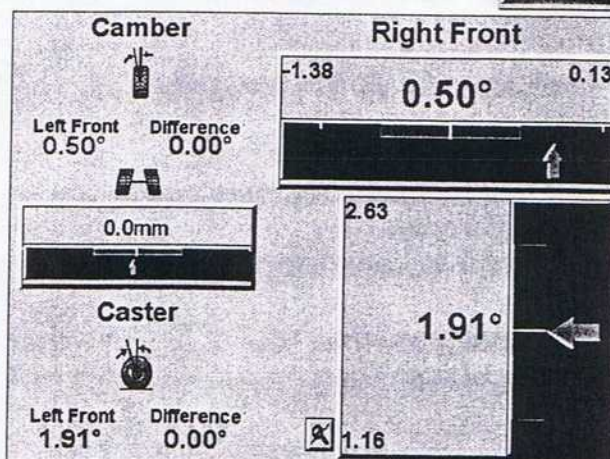
Figure 107



If we click over the icon beside the Left front Camber (letter A on figure 105) we will obtain the screen on figure 107.

Pressing a second time the icon on figure 106 we will return to the previous screen.

Figure 108



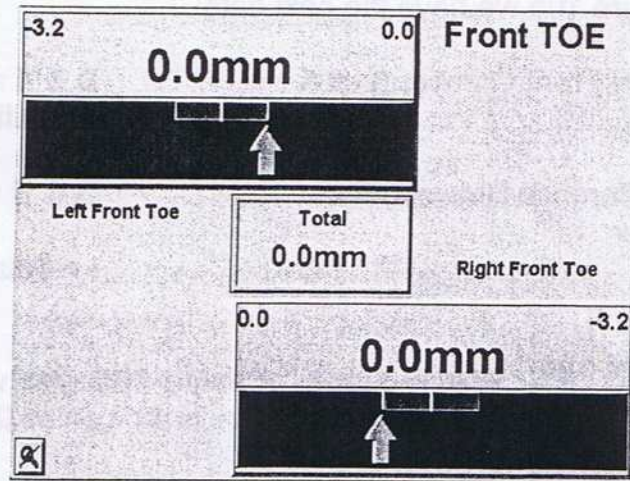
If we click over the icon beside the right front Camber (letter B on figure 105) we will obtain the screen on figure 108.

Pressing a second time the icon on figure 106 we will return to the previous screen.

Figure 109

If we click over the Icon beside the front Toe (letter G on figure 105) we will obtain the screen on figure 109.

Pressing a second time the Icon on figure 106 we will return to the previous screen.



Screen Displays & Functions for Alignment adjustments

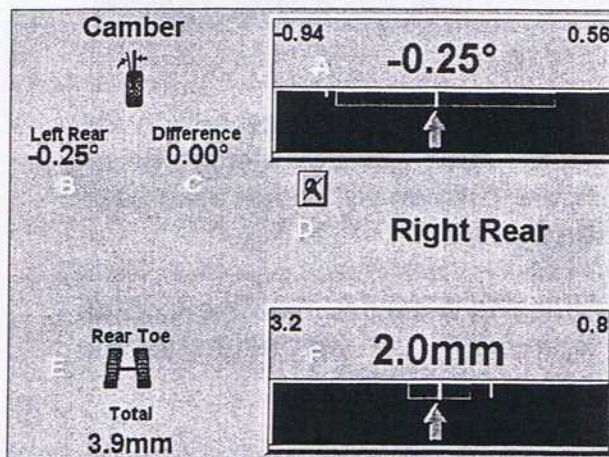
These screens will help you to individually correct and view at the same time the various alignment angles of the vehicle, you can also view the opposite side to view the changes as you make the corrections.

In most cases when you modify or adjust the alignment angles at one side or wheel of the vehicle, this will have an impact to the other side, because of this we includes in each amplified screen the opposite angles, so you can see the changes of the other side as you make the adjustments.

Please refer to the chapter Programmed Alignment to access those screens.

Screen Display for the Right Rear camber adjustments.

Figure 110



On figure 110 we the next data:

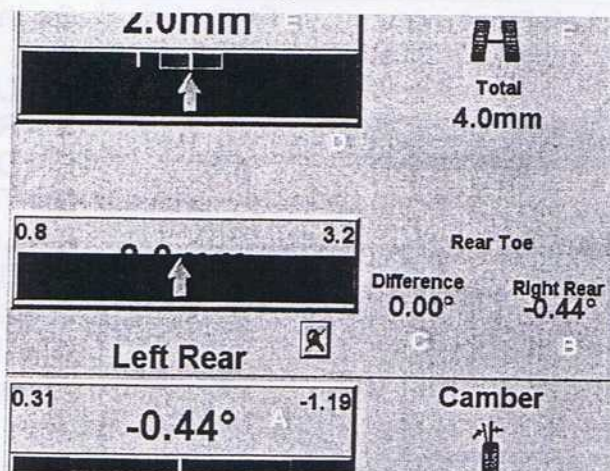
- A = Right rear Camber
- B = Left rear Camber
- C = Difference
- D = Icon to return to the previous screen
- E = Total rear Toe
- F = Right rear Toe.

Screen Display for Left Rear Camber adjustments

Figure 111

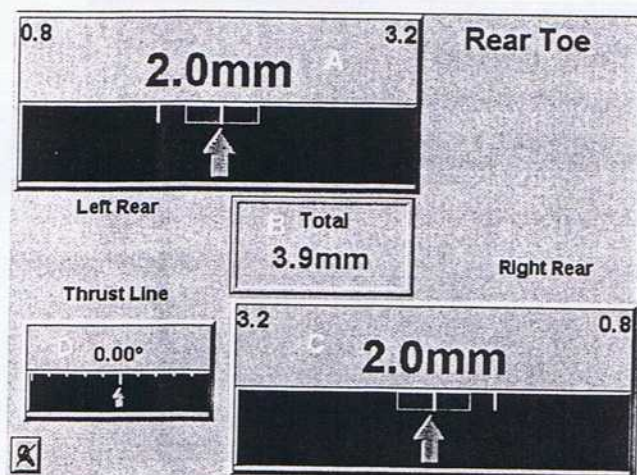
On the figure 111 we the next data:

- A = Left rear Camber
- B = Right rear Camber
- C = Difference
- D = Icon to return to the previous screen
- E = Left rear Toe
- F = Total rear Toe



Screen Display for Rear Toe & Thrust Line adjustments

Figure 112



On the figure 112 we the next data:

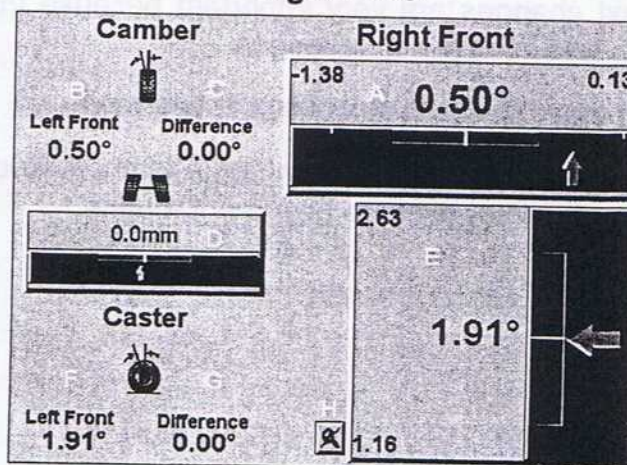
- A = Left Rear Toe
- B = TOTAL Toe
- C = Right rear Toe
- D = Thrust Line

Screen Display for the Right Front Camber & Caster adjustments

Figure 113

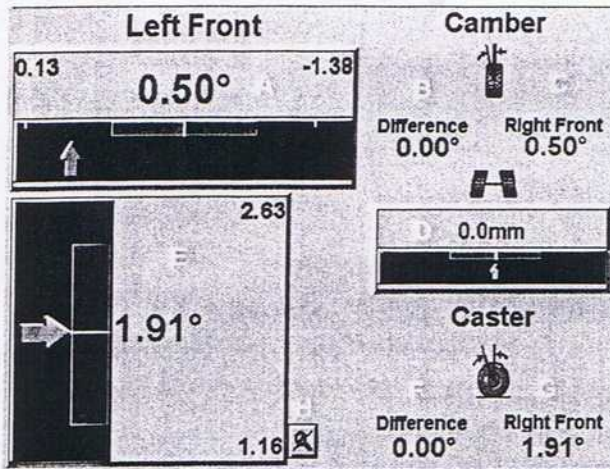
On the figure 113 we the next data:

- A = Right front Camber
- B = Left Front Camber
- C = Difference
- D = Total front Toe
- E = Right Front Caster
- F = Left Front Caster
- G = Difference
- H = Icon to return to the previous screen



Screen Display for Left Front Camber & Caster adjustments

Figure 114



On the figure 114 we have the next data:

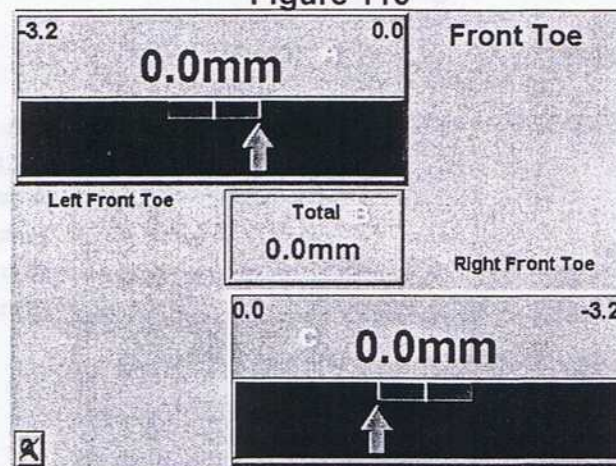
- A = Left front Camber
- B = Right front camber
- C = Difference
- D = Total front Toe
- E = Left Front Caster
- F = Difference
- G = Right Front Caster
- H = Icon to return to the previous screen

Screen Display for Front Toe adjustments

Figure 115

On the figure 115 we have the next data:

- A = Left front Toe
- B = Total front Toe
- C = Right Front Toe



Alignment changes selections

The next changes are very important because they can change the alignment routines and / or their units ranges.

You can change those selections in two ways:

- Before initiating the Programmed Alignment Routine
- During the Programmed alignment routine

Figure 116

Always observe in your screen for the Icon on figure 116. This presence of this Icon on your screen tell you that you can modify or change the alignment selections.

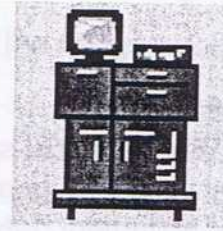
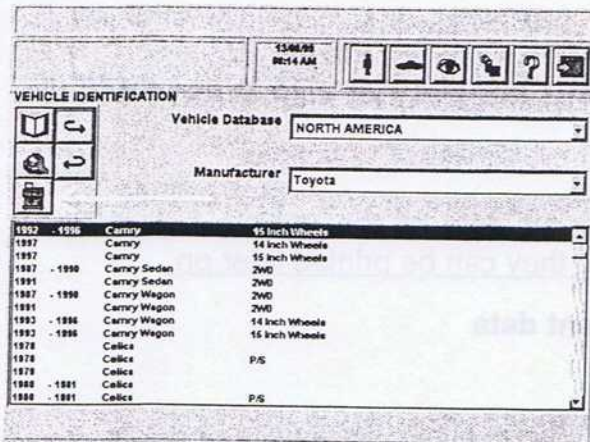


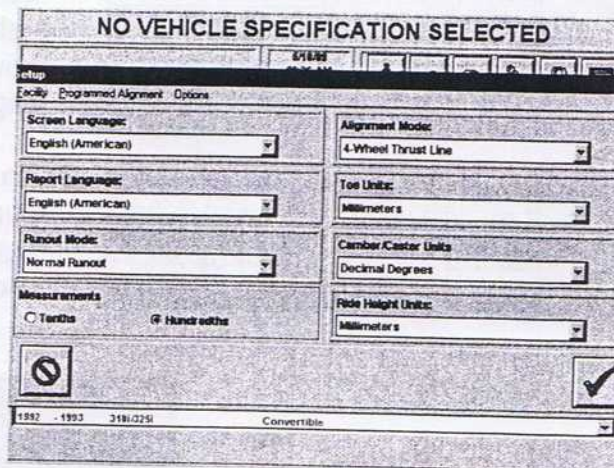
Figure 117



1. Under the Programmed alignment sequence, this Icon will be in the lateral option bar (figure 117). To enter the selection screen place the cursor over this Icon and perform a single click over it.

Figure 118

2. This will led you to the main selection screen. (figure 118) Please refer to the chapter General configuration of the CCD.COM for a more expanded explanation of this screen and its functions.



On Chapter "General Configuration of the CCD.COM" you will find how to modify those items.

Please also read the alignment theory in this manual, so you can modify these options with out any error.

Always make sure that you are taking the readings bases on your previous selections.

Printing Data & Technical specifications

This printer option will let you print:

- Customer Data
- Vehicle Technical specifications (*)
- Initial vehicle alignment data (*)
- Final alignment data after the corrections
- Technical & diagnostics report
- Visual inspection report (*)

All the items above marked with the asterisk (*) can be activated to be printed at the time of the printout.

NOTE

We recommend to save the initial alignment data of the vehicle before you proceed with the alignments corrections, so they can be printed later on.

Storing & Viewing Initial vehicle alignment data

Figure 119

The screenshot shows a software interface titled "Save Readings to Disk." It displays alignment data for a vehicle. The data is organized into two main sections: Front and Rear. Each section has columns for Left and Right sides. The Front section shows Camber (-0.56°), Caster (*****), Toe (0.0mm), SAI (*****), and Setback (0.00°). The Rear section shows Camber (-0.44°), Toe (1.0mm), Thrust Line (1.9mm), and Setback (0.00°). A cursor is visible over the SAI field in the Front section.

Front		Rear	
Left	Right	Left	Right
-0.56°	-0.56°	-0.44°	-0.44°
*****	*****		
0.0mm	0.0mm	1.0mm	1.0mm
*****	*****		
	SAI		
	Setback		
	0.00°		
		Thrust Line	0.00°

1. Once the Runout and the Caster swing is finished, you will see the INITIAL alignment data of the vehicle. (figure 119). This data is how the vehicle enter with its alignment angles.

2. To save the initial data place the cursor over the marked icon in figure 119 and perform a single click over it.

Figure 120

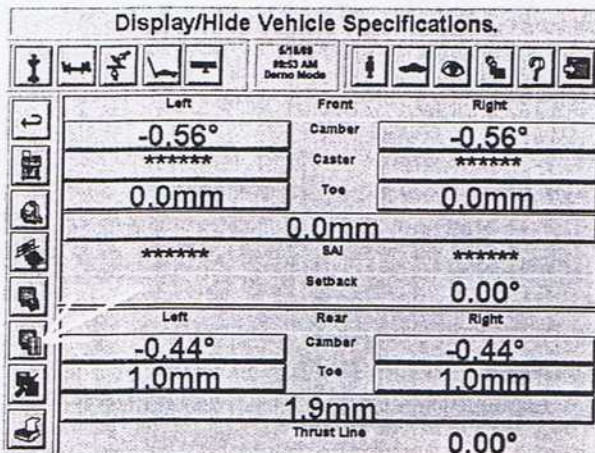
The screenshot shows a software interface titled "Display/Hide Saved Readings." It displays the same alignment data as Figure 119, but with additional "Saved" status indicators on the left and right sides of the data fields. The data values are identical to Figure 119.

Front		Rear	
Left	Right	Left	Right
-0.56°	-0.56°	-0.44°	-0.44°
*****	*****		
0.0mm	0.0mm	1.0mm	1.0mm
*****	*****		
	SAI		
	Setback		
	0.00°		
		Thrust Line	0.00°

3. By placing the cursor over the marked icon on figure 120 you can view and Display the stores data (Initial data), perform a single click over it to show or hide that stored data.

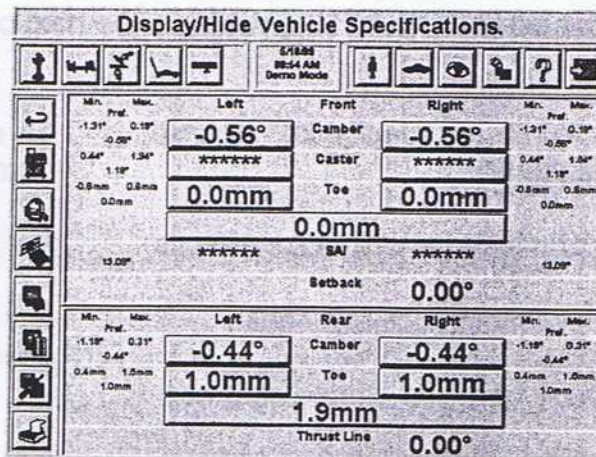
Displaying Technical vehicle alignment data

Figure 121



1. To display the vehicle's alignment technical data, place the cursor over the marked icon on figure 121 and perform a single click over it.

Figure 122



2. The screen on your display will show the vehicle's technical alignment data beside the alignment Initial data (figure 122). You can compare it with you screen data for the proper corrections to be made.

3. You can Hide that information at any time to clear the space on your screen. This particular information is very useful when correcting the alignment angles and comparing them to the vehicle specifications.

Printing data with technical specifications of the vehicle

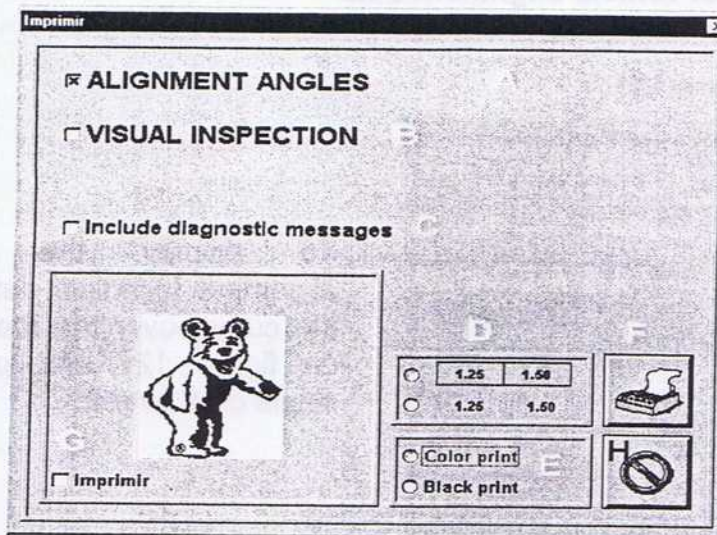
Every time you see on your screen an Icon as the one in figure 123 it means that you can perform a printout.

Figure 123



1. To print place the cursor over the printing icon (figure 123) and perform a single click over it.
2. Immediately you will see the screen of figure 124.

Figure 124



1. In this screen (figure 124) we have the next options:

A = Print the technical vehicle specifications

B = Print the visual inspection results

C = Print Diagnostics messages

D = Space between printed columns

E = Color printout. (White & Black printout the out of range results will

be marked, In color printout the out of range data will be printed in red.)

F = Print all data

G = Print BEAR® logo (only if you choose color printout)

H = Exit printing options

To choose any of the items described above, place the cursor over the blank circle at the side of any option, and perform a single click over it. A black dot indicates the options selected.

NOTE.

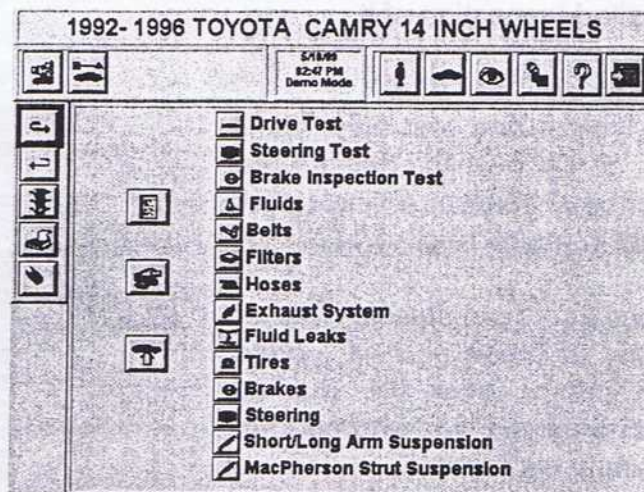
Be sure that the printer is connected and it has paper on its tray before proceeding with the printout.

Detailed Visual Inspection

Figure 125

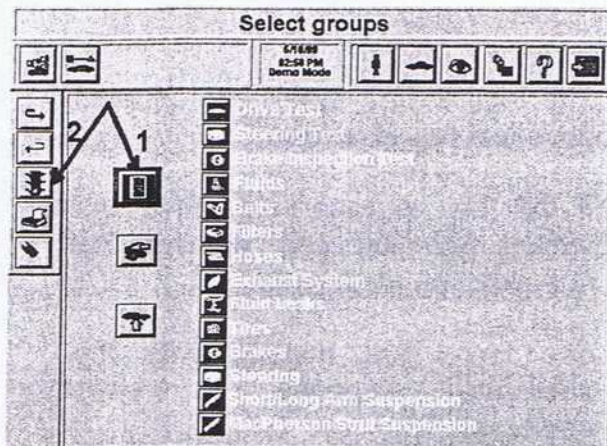
You can choose a detailed visual inspection routine at any time. (figure 125).

This type of inspection will give the customer a more detailed explanation of what problems are found in the vehicle prior the alignment changes.



All tests Selection

Figure 126



1. To run or select all the visual inspection tests, place the cursor over the marked Icon #1 on figure 126 and perform a single click over it.
2. Next place the cursor over the Icon marked Icon #2 on figure 126 and perform a single click over it.

3. All the visual detailed tests will be performed.

The next screens and tests will indicate you what actions and options you can make in those detailed visual inspections tests.

Those visual inspections must be performed by a qualified automotive technician, because it involves the inspection of areas that only an experienced automotive technician will know how to distinguish between good, average, worn, defective or bad.

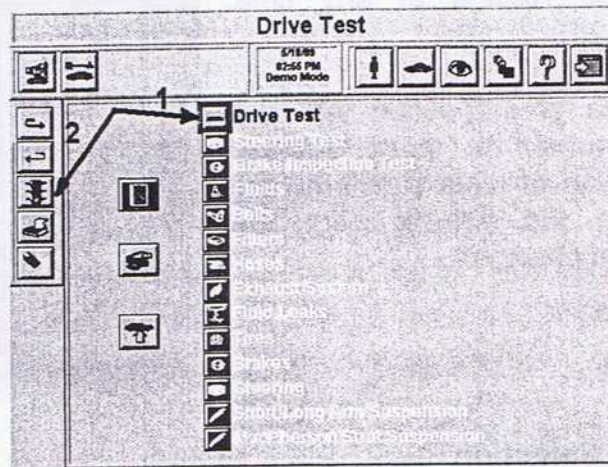
Please take all the necessary precautions to prevent any injuries during the visual inspection.

One test selection

You can also choose only one detailed inspection of a defined item and perform a detailed inspection of it.

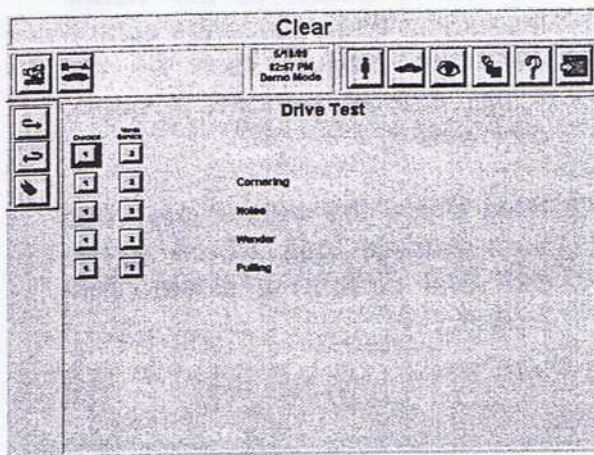
Figure 127

1. To select one test only, place the cursor over the desired test icon and perform a single click over it. (point 1 figure 127)
2. Once you have selected one or many of these options, place the cursor over the marked icon on figure 127 and perform a single click over it.



Drive test report

Figure 128



The Figure 128 shows the detailed drive test report screen.

It will be necessary to drive the vehicle so you can answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue icon and perform a single click over it.

Steering test report

The Figure 129 shows the detailed steering test report screen.

It will be necessary to drive the vehicle so you can answer the questions on each case.

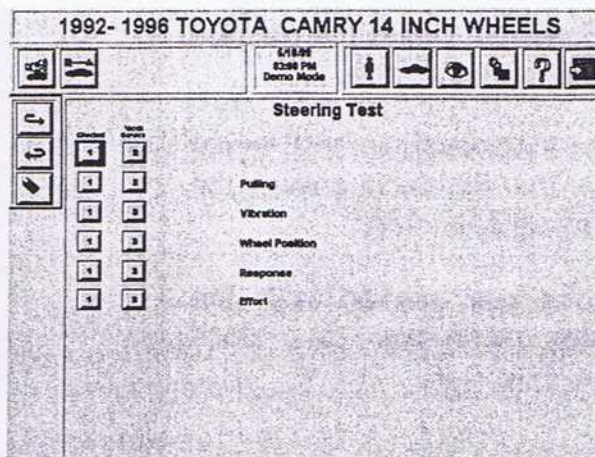
The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

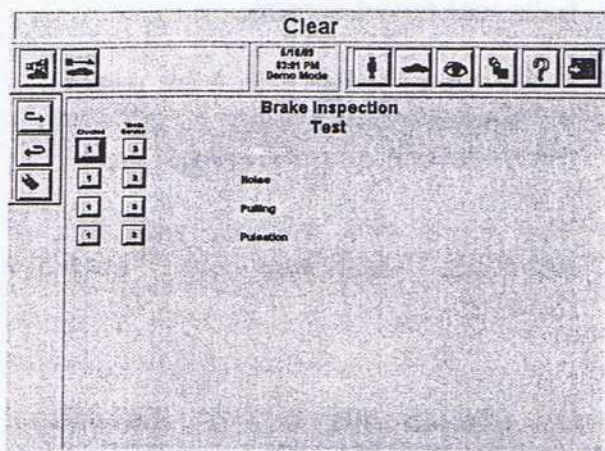
To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Figure 129



Brake Inspection test report

Figure 130



The Figure 130 shows the detailed brake inspections test report screen.

It will be necessary to drive the vehicle so you can answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

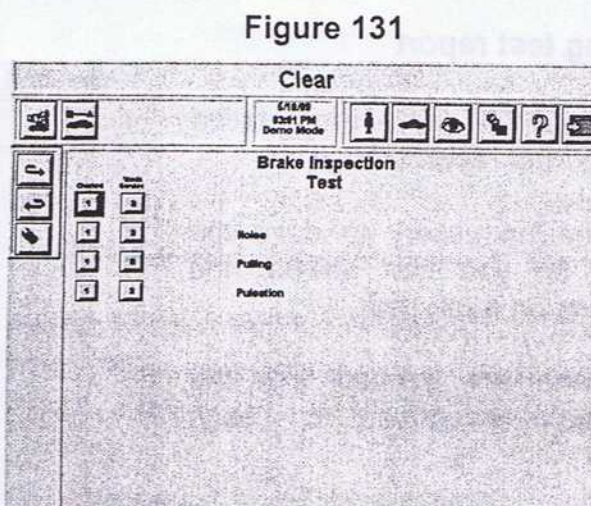
To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Fluids tests report

The Figure 130 shows the detailed Fluids test report screen.

It will be necessary to look under and over the vehicle to answer the questions on each case.

The Icons are marked with the adequate response to each question.



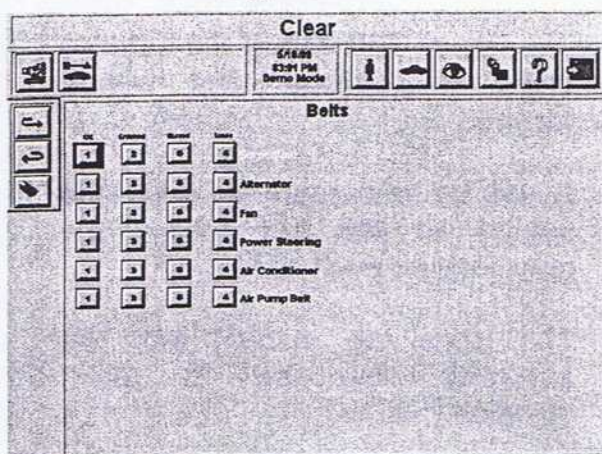
To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Belts tests report

Figure 132



The Figure 132 shows the detailed belts test report screen.

It will be necessary to look under the engine compartment to answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Filters Test reports

The Figure 133 shows the detailed Filters tests reports screen.

It will be necessary to look under the engine compartment to answer the questions on each case.

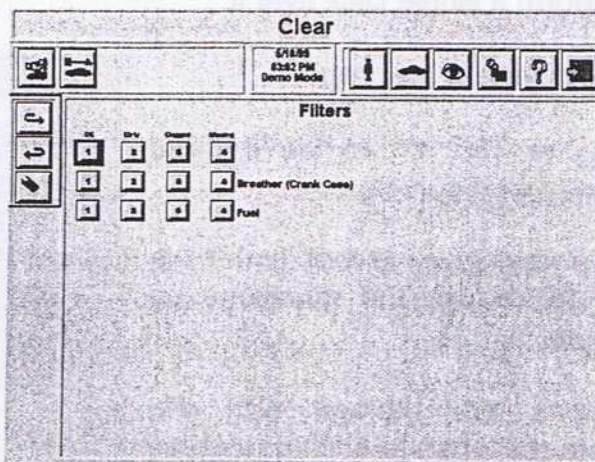
The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

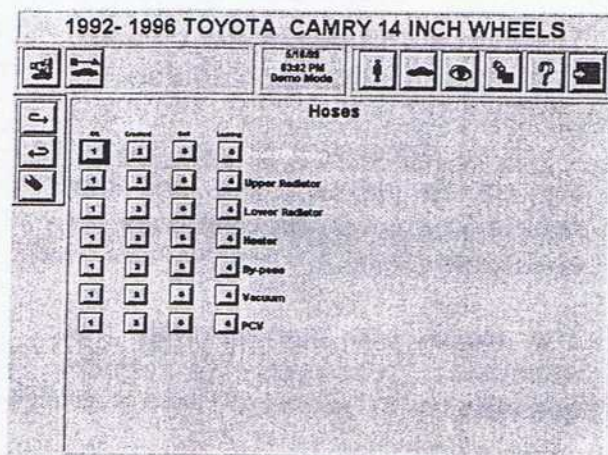
To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Figure 133



Hoses tests reports

Figure 134



The Figure 134 shows the detailed Hoses test report screen.

It will be necessary to look under the engine compartment and the vehicle to answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

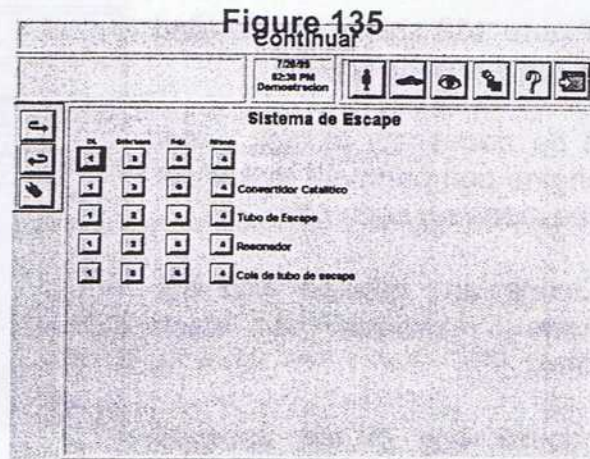
To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Exhaust system test report

The Figure 135 shows the detailed belts test report screen.

It will be necessary to look under the vehicle to answer the questions on each case.

The Icons are marked with the adequate response to each question.



To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Fluids Leaks tests reports

Figure 136



The Figure 136 shows the detailed Fluids Leaks tests report screen.

It will be necessary to look under the engine compartment and the vehicle to answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Tires tests reports

The Figure 137 shows the detailed Tires tests reports screen.

It will be necessary to look at the tires tread and surfaces.

The Icons are marked with the adequate response to each question.

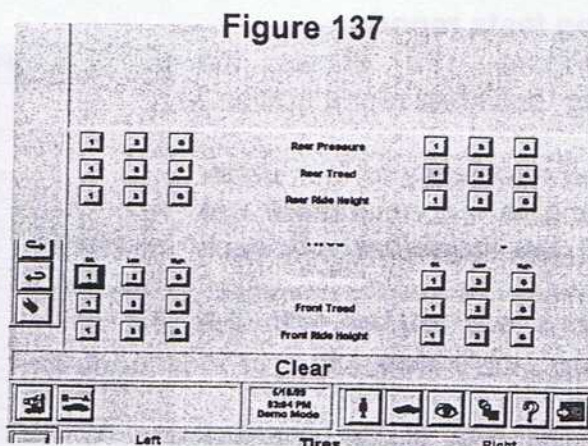


Figure 137

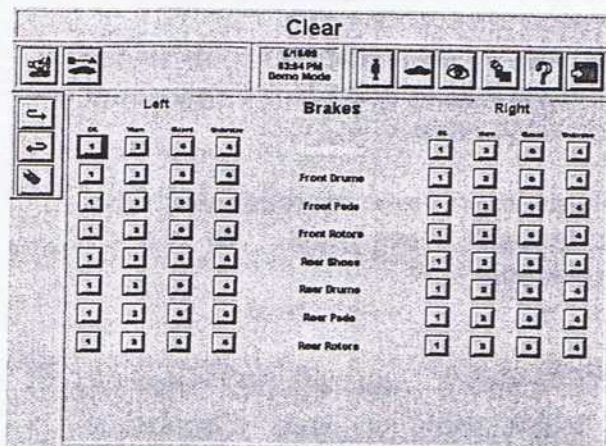
To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Brake system tests reports

Figure 138



The Figure 138 shows the detailed Brake system test report screen.

It will be necessary to look the entire braking system to answer the questions on each case.

The Icons are marked with the adequate response to each question.

To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

Figure 139

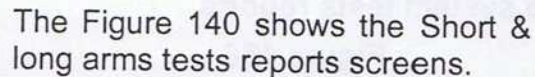
The Figure 139 shows the Steering belts test report screen.

The Icons are marked with the adequate response to each question.

1992-1993 HONDA ACCORD			
		7/24/98 ECM Pin Demonstration	<div style="display: flex; justify-content: space-around;"> </div>
		Direccion	
<div style="display: flex; flex-direction: column; align-items: center;"> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="font-size: 8px; margin-bottom: 5px;">Pin</div> <div style="font-size: 8px; margin-bottom: 5px;">Signal</div> <div style="font-size: 8px; margin-bottom: 5px;">Switch</div> <div style="font-size: 8px; margin-bottom: 5px;">Direction</div> </div>	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="font-size: 8px; margin-bottom: 5px;">1</div> <div style="font-size: 8px; margin-bottom: 5px;">2</div> <div style="font-size: 8px; margin-bottom: 5px;">3</div> <div style="font-size: 8px; margin-bottom: 5px;">4</div> <div style="font-size: 8px; margin-bottom: 5px;">5</div> <div style="font-size: 8px; margin-bottom: 5px;">6</div> <div style="font-size: 8px; margin-bottom: 5px;">7</div> <div style="font-size: 8px; margin-bottom: 5px;">8</div> <div style="font-size: 8px; margin-bottom: 5px;">9</div> <div style="font-size: 8px; 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margin-bottom: 5px;">100</div> </div> <td style="width: 80%; padding: 5px;"> <div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;">Brazo Pitanen</div> <div style="margin-bottom: 10px;">Brazo Asallier</div> <div style="margin-bottom: 10px;">Union Central Direction</div> <div style="margin-bottom: 10px;">Berra de Direccion</div> <div style="margin-bottom: 10px;">Terminal Interior</div> <div style="margin-bottom: 10px;">Terminal Direccion Exterior</div> <div style="margin-bottom: 10px;">Terminalea de Direccion</div> <div style="margin-bottom: 10px;">Rack and Pinion/Mounting Bushings</div> <div style="margin-bottom: 10px;">Guardpolvo de Pilon y cremallera</div> <div style="margin-bottom: 10px;">Brazo de Direccion</div> </div> </td>	<div style="display: flex; flex-direction: column; align-items: flex-start;"> <div style="margin-bottom: 10px;">Brazo Pitanen</div> <div style="margin-bottom: 10px;">Brazo Asallier</div> <div style="margin-bottom: 10px;">Union Central Direction</div> <div style="margin-bottom: 10px;">Berra de Direccion</div> <div style="margin-bottom: 10px;">Terminal Interior</div> <div style="margin-bottom: 10px;">Terminal Direccion Exterior</div> <div style="margin-bottom: 10px;">Terminalea de Direccion</div> <div style="margin-bottom: 10px;">Rack and Pinion/Mounting Bushings</div> <div style="margin-bottom: 10px;">Guardpolvo de Pilon y cremallera</div> <div style="margin-bottom: 10px;">Brazo de Direccion</div> </div>

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Figure 140



The Icons are marked with the adequate response to each question.

To choose any of the answers

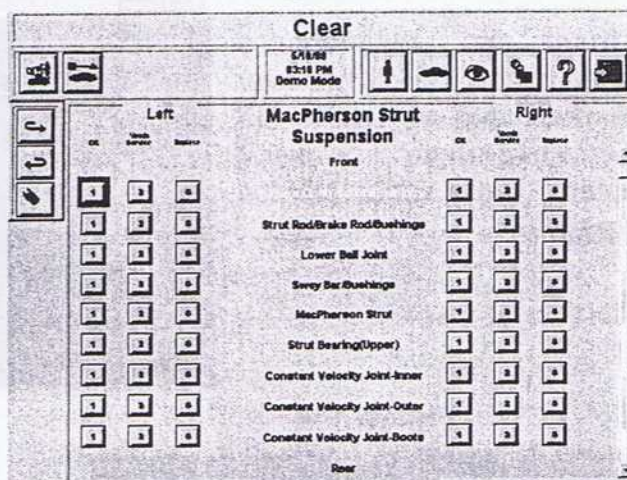
To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

McPherson Strut suspension reports

The Figure 141 shows the McPherson Strut suspension reports screen.

It will be necessary to look under the fenders and drive the vehicle to answer the questions on each case.

The Icons are marked with the adequate response to each question.



To choose any of the answers options, place the cursor over the Icon which matches your diagnostics conclusion to each question.

If you want to erase an answer place the cursor over the erase Icon and perform a single click over it.

To continue to the next screen or tests place the cursor over the Continue Icon and perform a single click over it.

Maintenance Functions

Figure 142



Your equipment is equipped with a special programmed function to remind you to make a maintenance to your lifting equipment and the front and rear alignment plates.

This maintenance involves to clean and lubricate the front plates, also you must level the alignment rack.

This message will be activated after you turn on your equipment, and after certain time interval. (figure 142)

To proceed place the cursor over the OK case and perform a single click over it. (figure 142)

Maintenance reminder

Figure 143

1. To reset the maintenance reminder, place the cursor over the marked icon on figure 143 and perform a single click over it. (system Utility and service functions).

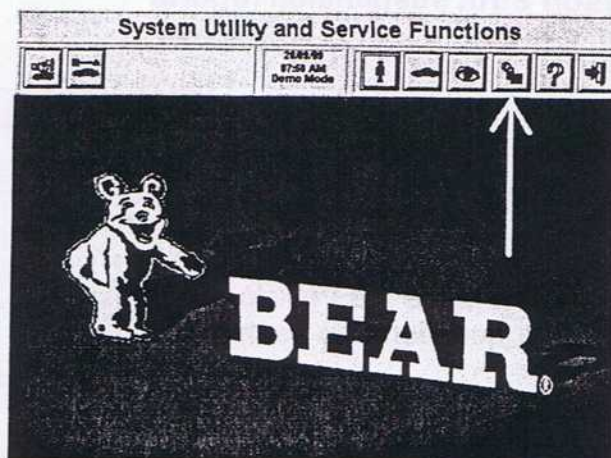


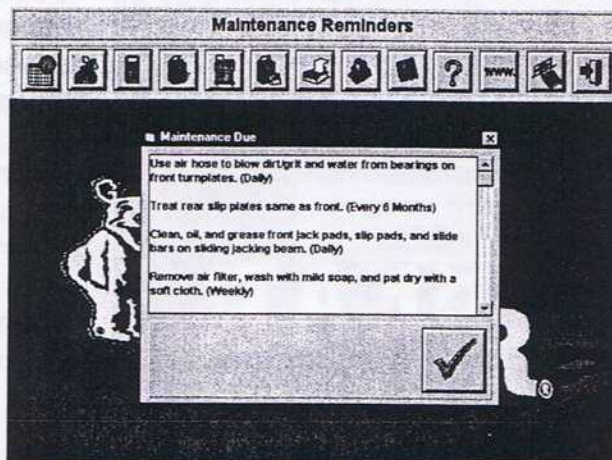
Figure 144



1. Next place the cursor over the marked icon on figure 144 and perform a single click over it. (Maintenance reminder)

Figure 145

1. The next screen (figure 145) will show you the maintenance required to each components. Please follow the text and perform the jobs.
2. Once that you finished with the maintenance place the cursor over the check mark (✓) and perform a single click over it.
3. Your maintenance job is finished and your equipment is ready to work until the next maintenance interval.



Personalized Specifications

Your CCD.COM® equipment has the capability to create or modify new specifications that for any reason are not found in the vehicle data base.

This customer defined specs will allow you to create new alignment data for a specific model, manufacturer, etc. And you can include this data to the vehicle data base for future references.

Creating a new vehicle specifications

1. To create a new vehicle specs or customer defined specs you must use one of the models that are more similar to the one you are creating. This procedure begins after you choose any model of vehicle.

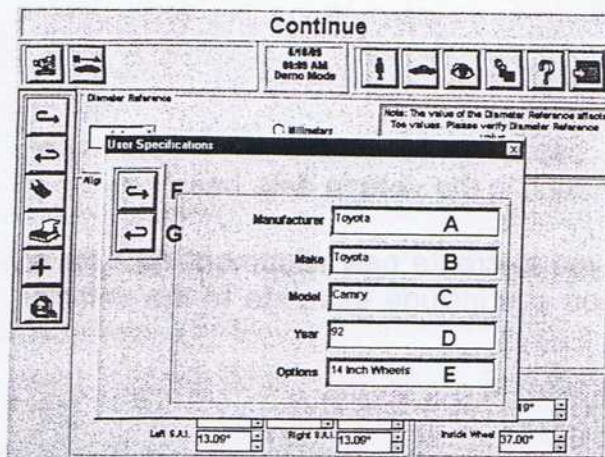
Figure 146

	MIN	PREP	MAX
LF Caster	0.44°	1.19°	1.94°
RF Caster	0.44°	1.19°	1.94°
Caster Side-Side			0.75°
LF Camber	1.31°	-0.56°	0.19°
RF Camber	1.31°	-0.56°	0.19°
Camber Side-Side			0.75°
LR Camber	1.19°	-0.44°	0.31°
RR Camber	1.19°	-0.44°	0.31°
Front Toe	1.2mm	0.0mm	1.2mm
Rear Toe	0.8mm	1.9mm	3.1mm
Left S.A.I.	13.09°		
Right S.A.I.		13.09°	

1. Once you reach the alignment data on the screen (figure 146), you can modify the alignment data by using the arrows up and down beside each alignment data angle. Up arrow increases the angle value, Down arrow decreases the angle value.

Figure 147

1. Once you have selected the desired angles with the manufacturer specs, place the cursor over the marked icon on figure 147 and perform a single click over it.



A = Manufacturer (example :Ford)
 B = Make (example: Mercury)
 C = Model (example: Cougar)
 D = Year of production

1. The next screen will show the manufacturer name, model, year, etc. that you want to create for future reference as it will appear on the customer defined specs data base.

2. The options on this screen are:
 E = Options (example: chassis number, Fwd, 4wd, etc..)
 F = Continue and accept changes
 G = Exit without saving.

Figure 149

6. Once you modify the previous screen, place the cursor over the continue case and you will end up in screen 149. Place the cursor again over the marked Icon on figure 149 and perform a single click over it.

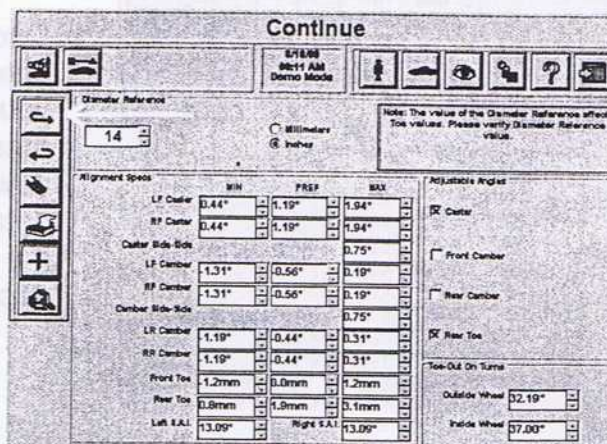
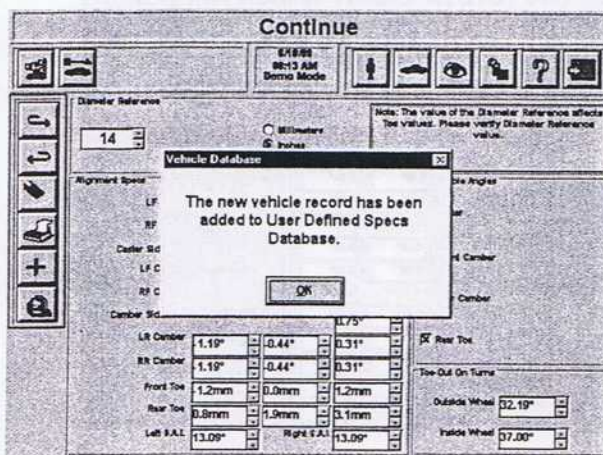


Figure 150



1. The next screen will appear on your display indicating that a new vehicle is already entered in the Customer defined specs data vehicle data base.

To accept place the cursor over the OK case and perform a single click over it.

Figure 151

8. Once the vehicle is created you can look it up in the user defined specs vehicle data base, and choose the model you have created. It will never be erased from your data base, and you can as many models you want.

Continue

09:10 AM
Demo Mode

VEHICLE IDENTIFICATION

Vehicle Database: User-Defined Specs

Manufacturer: Toyota

1997 Camry 1.8 inch Wheels

Dealer Contact

At Bear Engineering we are anxious to hear your comments regarding our products, please contact your local distributor of BEAR® products for any information.

If you wish to obtain information about our world wide distributor please contact us at:

Bear Engineering
A division of Cartek Group
Kalamazoo, Michigan
6950 East Kilgore Road
49001
Phone: 001-616-382-5080
Fax: 001-616-382-5087

Or at our Internet site:

WWW.bearengineering.com

WWW.cartek.com

