

# WinAlign® Alignment Software

## Version 10.x





# Contents

<b>GETTING STARTED</b> .....	<b>1</b>
<b>General Introduction</b> .....	<b>1</b>
References.....	1
<b>System Requirements</b> .....	<b>1</b>
<b>Inside Help Tips</b> .....	<b>1</b>
<b>For Your Safety - Hazard Definitions</b> .....	<b>2</b>
IMPORTANT SAFETY INSTRUCTIONS.....	2
Precautions for Systems Equipped with HFSS, XF and XF2 Cordless Sensors...	3
Specific Precautions/Power Source.....	3
Equipment Specifications.....	4
Safety Summary .....	4
<b>Operating the Console</b> .....	<b>4</b>
Turning Console Power On.....	5
Using the Softkeys .....	5
Alignment Procedure Bar.....	7
Using the VirtualView® Adjustment Feature .....	7
VirtualView® Angle Selector.....	9
SoundGuide® Tone Feedback System .....	10
AlignGuide® Training and Information Guide.....	11
Resetting the Program .....	12
Just-In-Time Training Video Instructions .....	12
VideoTech.....	13
Turning Console Power Off.....	14
<b>Example Alignment Job with the ExpressAlign® Adjustment Feature and Camera Based Sensors</b> .....	<b>15</b>
<b>Example Alignment Job with the ExpressAlign® Adjustment Feature and Conventional Sensors</b> .....	<b>22</b>
<b>OPERATION INFORMATION</b> .....	<b>31</b>
<b>Sensors and Targets</b> .....	<b>31</b>
Mounting Sensors or Targets onto Wheel Adaptors.....	31
Mounting Wheel Adaptor onto Wheels .....	34
Connecting Sensor Cables with Optional Rack Wiring Kit .....	35
Connecting Sensor Cables without Optional Rack Wiring Kit .....	35
Compensating Conventional Sensors - General Compensation .....	35
Compensating Camera Based Targets .....	36
<b>Vehicle Specifications</b> .....	<b>36</b>
Primary and Secondary Specification Groups.....	37
Vehicle Specification Memory.....	37
Vehicle Recall Specifications Selection .....	39
Additional Specification Information.....	40
Selecting from the Vehicle Lists.....	40
Selecting by Vehicle Identification Number (VIN).....	41
Selecting User Specifications .....	41
Entering and Editing Specifications .....	42
Selecting Specification Formats .....	43
Reducing Tolerances .....	44
Storing Specifications .....	44
Specification Notes .....	44
Storing User Specifications.....	45
Factory Amended Specifications .....	47
Selecting Display Units .....	47

<b>Vehicle Measurements and Adjustments</b> .....	<b>49</b>
Vehicle Plan View Status Indicator .....	49
Target Blockage .....	50
Bar Graph Adjustments.....	50
Bar Graph Groups.....	51
Context Sensitive Menu .....	53
Measuring Caster, S.A.I., and Included Angle.....	54
Measuring Caster.....	55
Measuring S.A.I. and Included Angle .....	58
Faster Caster® - Measuring Caster and S.A.I./I.A. Simultaneously.....	59
<b>Advanced Vehicle Handling Values</b> .....	<b>61</b>
Body Center Line Angle .....	61
Body Center Line Offset.....	62
Body Overhang .....	63
Body Roll Angle.....	64
Curb-to-Curb Distance .....	66
Rolling Force Lever.....	67
Turning Circle.....	68
Measuring Ride Height .....	69
ExpressAlign® Alignment Adjustment System.....	77
<b>ALIGNER SET-UP</b> .....	<b>81</b>
Set Up.....	81
Factory Settings for Aligner Set-Up .....	82
<b>EQUIPMENT INFORMATION</b> .....	<b>85</b>
WinAlign® Multi-Disk Backup/Restore .....	85
Backup and Restore Procedures .....	85
Backup Procedure .....	85
Restore Procedure.....	87
Electronic Keys .....	88

# Getting Started

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## General Introduction

This manual provides operation instructions and information required to operate the 811/WA200 aligner with WinAlign® software. WinAlign software version 10.x is a 32-bit program and is compatible only with Windows® 2000 or above.

The owner of the Series 811/WA200 aligner is solely responsible for arranging technical training. Only a qualified trained technician should operate the Series 811/WA200 aligner. Maintaining records of personnel trained on this equipment is solely the responsibility of the owner and management.

## References

This manual assumes the user is already familiar with the basics of wheel alignment. Italics are used to refer to specific parts of this manual that provide additional information or explanation. For example, *refer to "1.4 Operating the Console", on page 9*. These references should be read for additional information to the instructions being presented.

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## System Requirements

WinAlign® software version 10.x is a 32-bit program and therefore is compatible with only Series 811/WA200 Aligners.


Required Software that will be installed by the WinAlign software 10.x Installer:

Microsoft® DirectX® 9.0c

Intel® Display Adapter Driver Version 6.14.10.3762

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## Inside Help Tips

The "HELP" key accesses an on-line, context-sensitive copy of this manual. The "HELP" softkey label is available on all screens, usually located in the **K4** key of the lowest menu level. If the "HELP" softkey is not present, press  until it appears.


When **K4** is pressed, a pop-up screen appears with the question "What kind of help would you like?" The choices are:


- "Cancel" will close the pop-up and return the screen where "HELP" was pressed.
- "Just-In-Time Training" will open a pop-up screen that can be useful to train technicians. "Just-In-Time Training" is optional multimedia video instructions.
- "Table of Contents" will open a pop-up screen with the table of contents of the "Help Manual."
- The softkey label for **K4** will be "About nnnnnn," and will refer to the topic or procedure of the screen from where "HELP" was pressed. Pressing **K4** will open the Help Manual directly to the reference section for that topic.

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## For Your Safety - Hazard Definitions

These symbols identify situations that could be detrimental to your safety and/or cause equipment damage. Watch for these symbols:

 **CAUTION:** Hazards or unsafe practices, which could result in minor personal injury or product or property damage.

 **WARNING:** Hazards or unsafe practices, which could result in severe personal injury or death.

 **DANGER:** Immediate hazards that will result in severe personal injury or death.

### IMPORTANT SAFETY INSTRUCTIONS

Read and follow all caution and warning labels affixed to your equipment and tools. Misuse of this equipment can cause personal injury and shorten the life of the aligner.

Always use wheel chocks in front of and behind the left rear wheel after positioning a vehicle on the rack.

Use caution when jacking the vehicle.

ALWAYS WEAR OSHA APPROVED SAFETY GLASSES. Eyeglasses that only have impact resistant lenses are NOT safety glasses.

Wear non-slip safety footwear when performing an alignment.

Never stand on the aligner.

Do not wear jewelry or loose clothing when performing an alignment.

Wear proper back support when lifting or removing wheels.

Do not operate equipment with a damaged cord, or equipment that has been dropped or damaged, until a Hunter Service Representative has examined it.

Never use the cord to pull the plug from the outlet. Grasp plug and pull to disconnect.

If an extension cord is necessary, a cord with a current rating equal to or more than that of the equipment should be used. Cords rated for less current than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.

Verify that the electrical supply circuit and the receptacle are properly grounded.

To reduce the risk of electrical shock, do not use on wet surfaces or expose to rain.

Verify that the appropriate electrical supply circuit is the same voltage and amperage ratings as marked on the aligner before operating.

To reduce the risk of fire, do not operate equipment in the vicinity of open containers of flammable liquids (gasoline).

Keep all instructions permanently with the unit.

Keep all decals, labels, and notices clean and visible.

To prevent accidents and/or damage to the aligner, use only Hunter recommended accessories.

Use equipment only as described in this manual.

**⚠ WARNING:** NOT FOR USE IN A COMPUTER ROOM AS DEFINED IN THE STANDARD FOR PROTECTION OF ELECTRONIC COMPUTER/DATA PROCESSING EQUIPMENT, ANSI/NFPA 75.

**⚠ WARNING:** This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference with electronic devices. Operation of this equipment in a residential area may cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference.

**⚠ CAUTION:** Do not turn the power off when the disk drive is operating. The disk can be damaged.

**⚠ WARNING:** DO NOT ALTER THE ELECTRICAL PLUG. Plugging the electrical plug into an unsuitable supply circuit will damage the equipment and may result in personal injury.

#### SAVE THESE INSTRUCTIONS

### Precautions for Systems Equipped with HFSS, XF and XF2 Cordless Sensors

The following precautions apply to the HFSS, XF and XF2 transceivers installed in the aligner console and the alignment sensors as part of the HFSS, XF and XF2 cordless sensor option.

**⚠ WARNING:** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**⚠ WARNING:** Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

**⚠ CAUTION:** RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE. DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS.


### Specific Precautions/Power Source

#### North America

The PC aligner is intended to operate from a power source that will apply 120 VAC (nominal) 50/60 Hz between the supply conductors of the power cordset.

## Other Regions

The PC aligner is intended to operate from a power source that will apply 230 VAC (nominal) 50/60 Hz between the supply conductors of the power cordset. The power supply cordset, supplied with this equipment, may need modification to allow connection to the power supply mains. Your Hunter service representative will install the proper plug for your location.

 **CAUTION:** A protective ground connection, through the grounding conductor in the power cord, is essential for safe operation. Use only a power cord that is in good condition.

## FUSING:

To avoid fire hazard, use only the fuse specified for your product.

## EQUIPMENT SERVICE:

This equipment contains no user serviceable parts. All repairs must be referred to a qualified Hunter Service Representative.

## PROVISIONS FOR LIFTING AND CARRYING:

No provision has been made for lifting or carrying this equipment. The unit must be moved by rolling it on its casters.

## Equipment Specifications

### Electrical

VOLTAGE:	120/230 volts (nominal)
AMPERAGE:	6/3 amps
WATTAGE:	720 watts







### Atmospherics

TEMPERATURE:	+32°F to +122°F (0°C to +50°C)
RELATIVE HUMIDITY:	Up to 95% Non-condensing
ALTITUDE:	Up to 6000 ft. (1829 m)

## Safety Summary

### Explanation of Symbols

These symbols appear on the equipment.

	Alternating current.		RISK of electrical shock.
	Earth ground terminal.		Stand-by switch.
	Protective conductor terminal.		Not intended for connection to public telecommunications network.
I	ON (supply) condition.		
○	OFF (supply) condition.		

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## Operating the Console

Individual consoles will vary due to specific model number and production date. Detailed console-specific instructions will be included with the aligner console.



## Turning Console Power On











Turn the unit "ON" by pressing the power switch located on the left side panel, or on the back panel of the aligner cabinet.





The "Logo" screen will appear and indicate that the unit is ready for use. This will take approximately 1.5 minutes.

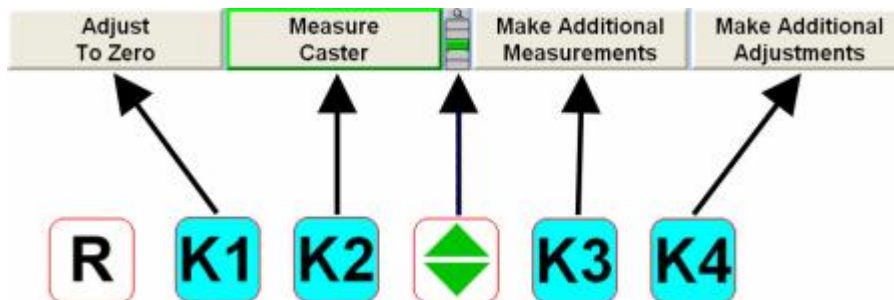


## Using the Softkeys


The softkeys, located on the keyboard, provide operator control of the program. These keys are identified as:


-  K1 key
-  K2 key
-  K3 key
-  K4 key
-  Menu shift key
-  Reset key
-  Forward key
-  Backward key
-  Zoom key (keyboard)
-  Zoom softkey (screen display)




The four labels that appear at the bottom of each screen are referred to as the softkey labels. These labels indicate the action that the program will take when the corresponding , , , or  key is pressed.






The vertically stacked squares between the "K2" and "K3" labels indicate how many levels of softkeys are available. The highlighted box indicates the menu level that is currently displayed.

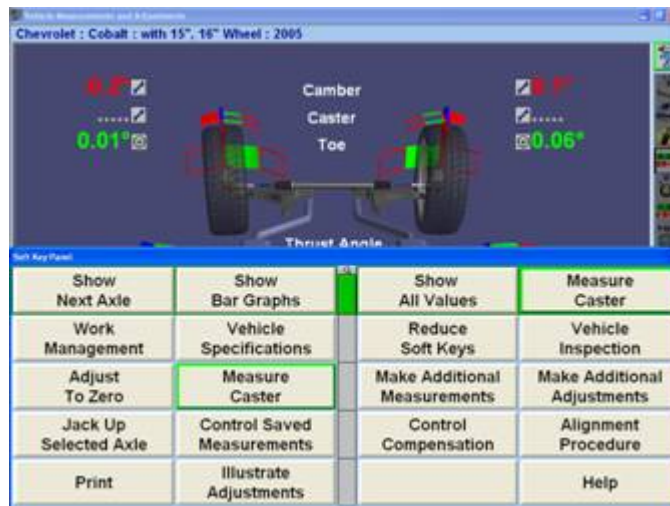
The softkey level is changed by pressing the menu shift softkey, . When this key is pressed, the softkey labels will change to the next level down. If the last menu level is

currently displayed, the softkey level will be the first softkey level. To go to the next softkey level up, press **\_** and .


Pressing  and  will zoom the current softkey level to a full screen version as seen below. The softkeys associated with the softkey label are shown on the left side of the labels and the softkey level is indicated on the right side of the labels. Pressing  again will cause the softkey level to return to the original view.



Pressing , or selecting  above the softkey levels, or pressing and holding with a pointing device on the menu level indicator will cause all of the menus available to appear, as seen below. The green background indicates the active menu level. Pressing  again will cause the menu to return to the original perspective.



The number of softkeys displayed may be reduced to only the number of softkeys needed for a typical alignment by enabling Reduce Number of Softkeys in Aligner Setup. Refer to "Aligner Setup."

Throughout this manual, the statement Press "nnnnnnn" indicates the label of the softkey to press. If the required label is not on the current menu,  must be pressed to change menu levels until the desired label is displayed.

Some softkey labels have a green border highlight around the softkey. Generally, the softkey with the green border (usually K4) is the appropriate key to press to continue with the procedure being performed, as seen below.

# Measure Caster

## Alignment Procedure Bar



Whether ExpressAlign® is enabled or disabled, a vertical procedure bar appears along the right side of the screen. The Alignment Procedure toolbar displays an icon for each alignment or WinAlign® procedure available or performed.

The icons are arranged in order from the first step that you must complete to the last step that you must complete. After each alignment procedure has been completed, a checkmark will appear in the upper right corner of the corresponding icon.

If there are more icons available than space on the screen, the toolbar can be scrolled up or down. If the triangular area at the top or bottom is gray there are more choices available and can be selected to scroll up or down. If the triangle is blue, no more choices are available in that direction.

When the cursor is placed over an icon, a message appears describing the icon's function, such as ExpressAlign.

Selecting an icon from the Alignment Procedure bar will take you to the procedure that the icon represents.

Selecting  Backward key, or the  Forward key, will move the screen backward or forward in the alignment procedure as outlined on the procedure bar.

A Plan View Indicator, located along the right side of the screen, under the procedure bar, shows which axle is being adjusted when a gray background is present.



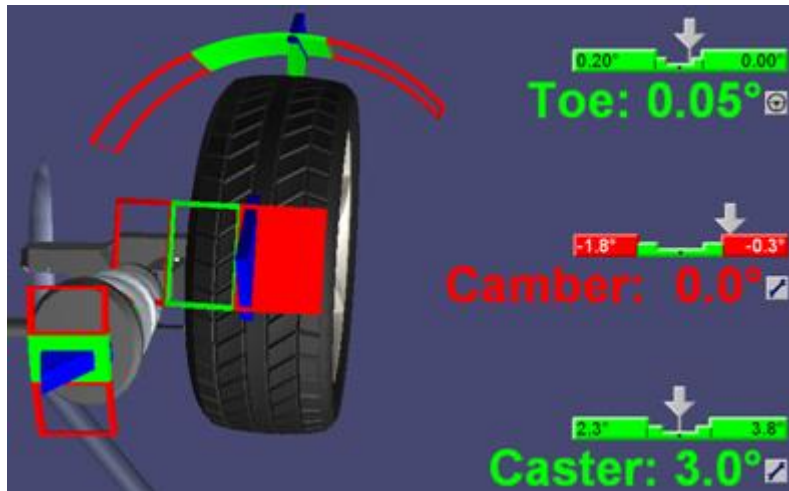
## Using the VirtualView® Adjustment Feature

**NOTE:** VirtualView® is available only on 811/WA200 Aligners.

The VirtualView adjustment feature allows the user to view alignment angles in a 3-D perspective. This feature provides the user with a detailed view of the angles and their status in respect to alignment angle specifications and is reinforced with corresponding bar graphs.

VirtualView is available for most measurements and adjustments screens, plus Rolling Compensation, Caster Steer, and WinToe®.

If the measured angles are within tolerance, the arrows will be in the green. If the measured angles are marginal, the arrows will be shown in yellow (*if half-tolerances are enabled*). If the measured angles are out of specification, the arrows will be shown in red areas. The arrowhead of the alignment angle will protrude through a 3-D specification bar graph showing the current angle status.



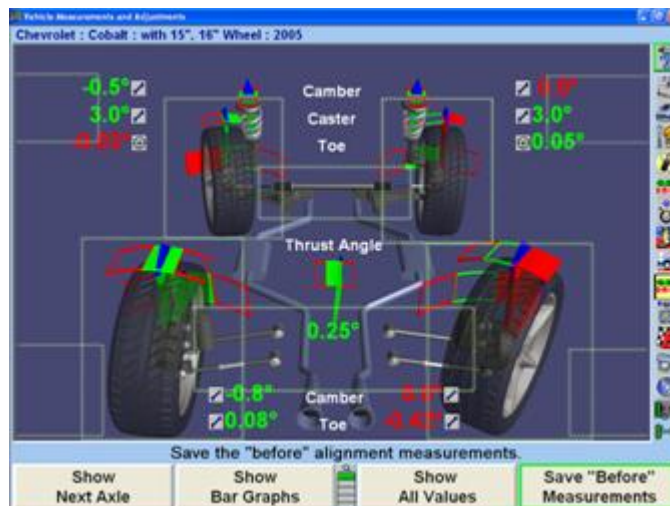
NOTE: If measurements have not been taken or are not available, the 3-D bar graph will not be shown in VirtualView.

From the "Vehicle Measurements and Adjustments" screen, you may toggle between VirtualView with bar graphs, or bar graph-only measurements by pressing "Show Bar Graphs" from the softkeys. VirtualView is the default "Vehicle Measurements and Adjustments" setting, however, may be disabled in "Aligner Setup". *Refer to "Aligner Set-Up."*

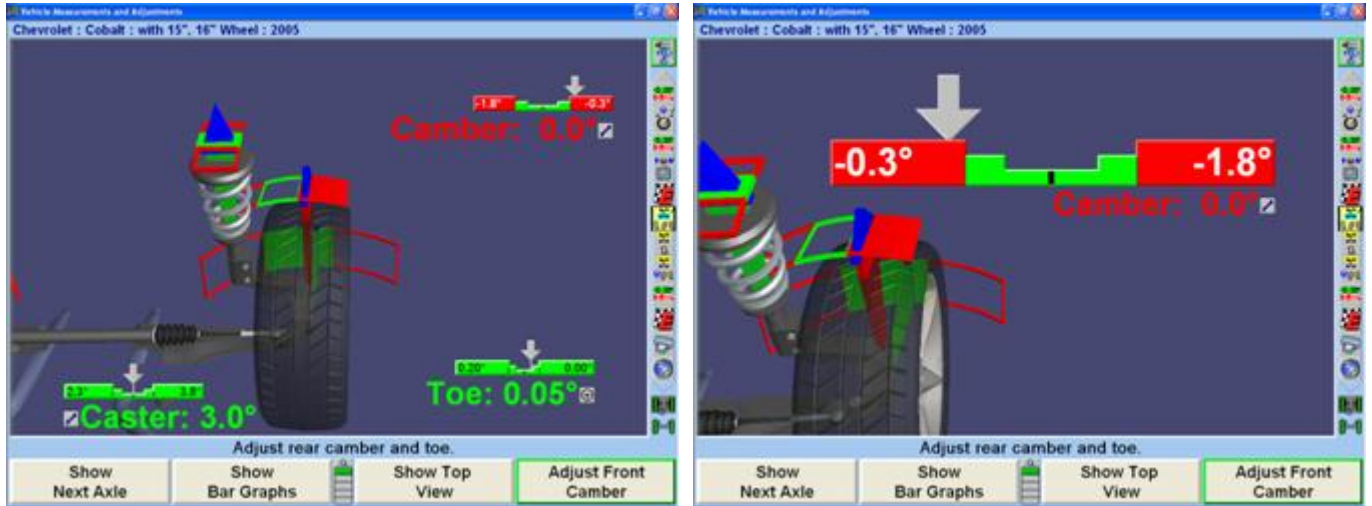
VirtualView displays all measured angles of the vehicle on one screen. It is not necessary to switch screens to view measurements on the front axle or the rear axle. Camber and toe for both axles, caster for the front axle, and thrust angle are all displayed adjacent to the appropriate wheel in VirtualView.

The VirtualView image has strategically placed hotspots for navigation around the vehicle on-screen. The image below exhibits some of the hotspots available. *(Not all of these hotspots are available at once.)*

Guide the mouse across the screen to highlight a hotspot, exhibited by a dotted line around the area. Boxes shown on the extreme out side edges of the screen will display a side-view of the vehicle when selected.



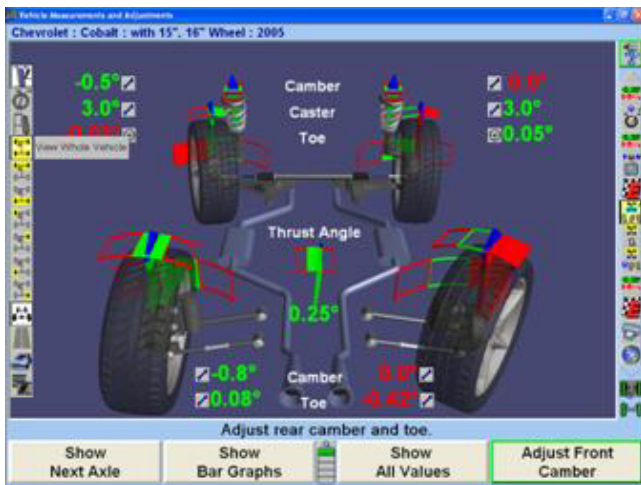
While in any VirtualView displaying bar graphs, click on an individual bar graph to zoom in to that particular view.



Right-click to return to the previous view.

### VirtualView® Angle Selector

When VirtualView® appears, the VirtualView Angle Selector on the left side of the screen will appear when the cursor is moved over the left side of the screen, allowing you to select a variety of wheel and angle views.

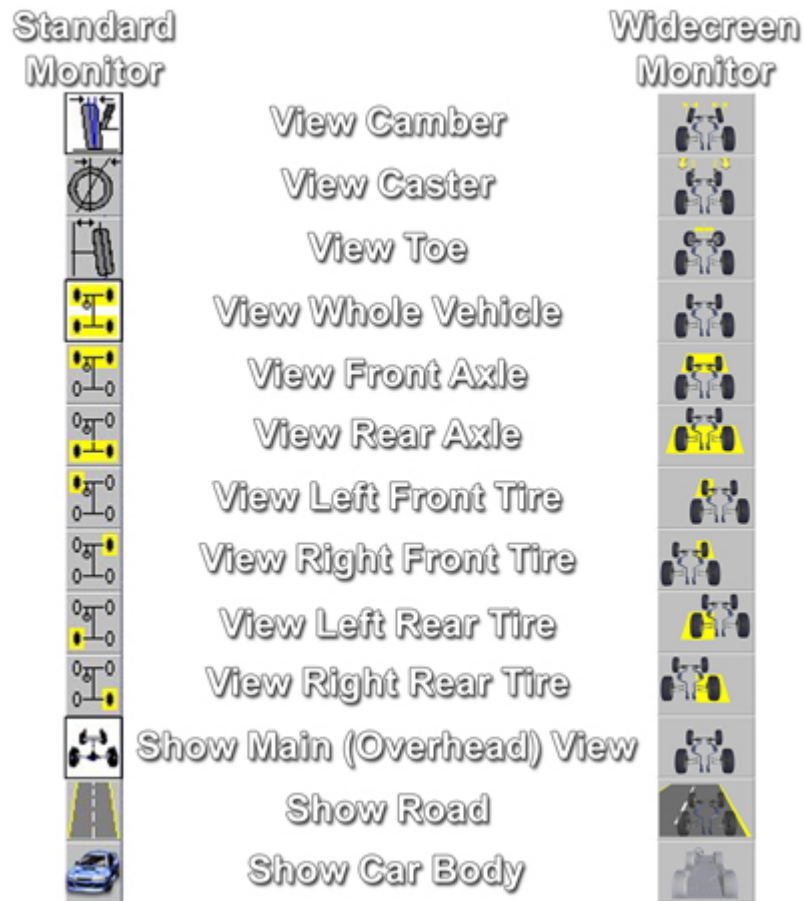


Standard Monitor



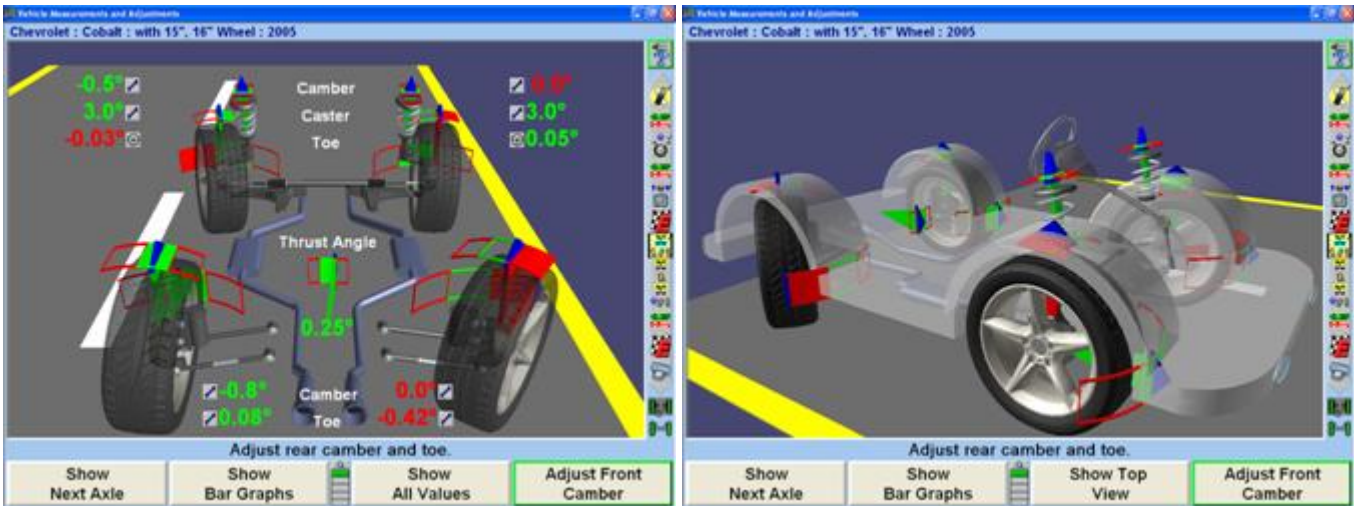
Widescreen Monitor

Refer to the image below for a description of all the possible choices.




The VirtualView can be enhanced by adding the road image in relation to the vehicle and adding a view showing the car body.

The Dual Screen VirtualView requires Kit 20-1450-1.





## SoundGuide® Tone Feedback System

SoundGuide® Tone Feedback System is an audio recognition system that offers audible alignment feedback when performing certain functions within the alignment program.

SoundGuide , is available on many screens including the caster measurement screen and WinToe®, or from drop-down menus on most screens, as shown below.




Turn the SoundGuide on or off by single-clicking on the icon . When SoundGuide is off the icon appears with a red line through it . SoundGuide can be selected from bar graphs or icons next to individual angles to turn on SoundGuide for those individual adjustments.

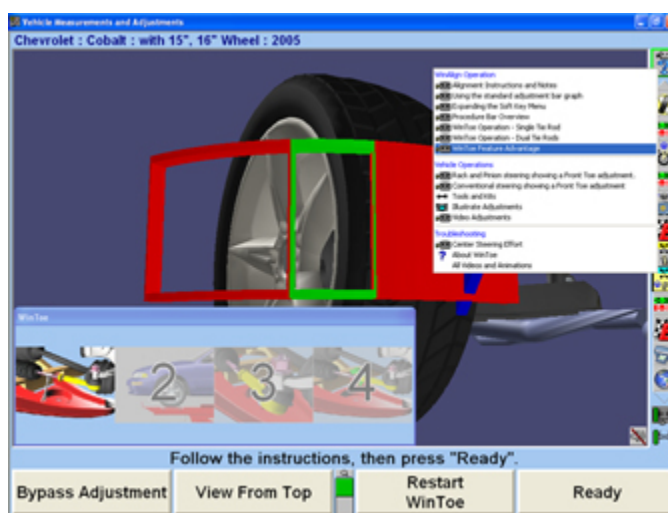
SoundGuide is available from various screens including: WinToe, Rolling Compensation, Caster Steer, VirtualView®, and Bar Graphs.

## AlignGuide® Training and Information Guide

AlignGuide® training and information guide is an information center on WinAlign® software. It contains training videos and information on using WinAlign software, wheel sensor operations, vehicle operations, vehicle troubleshooting, and alignment adjustment methods.

AlignGuide is available only with the Digital Video option.

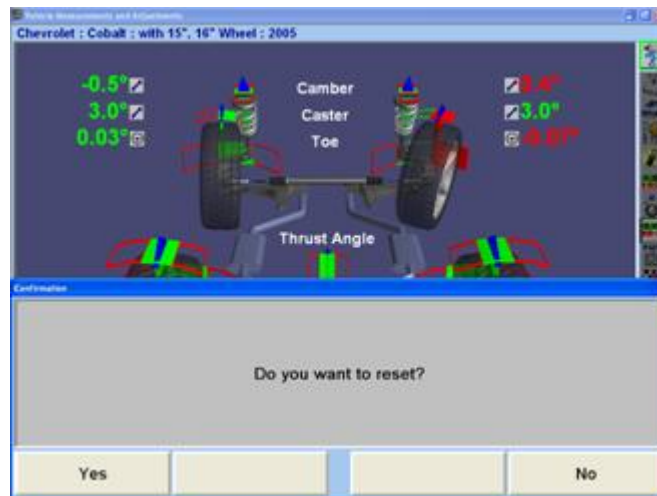
To access the AlignGuide training feature, select the  icon above the Procedure Bar. A drop-down menu will list all the choices available including access to "WinAlign Help", "Tools and Kits", "Illustrate Adjustments", (these choices are context-sensitive based on the current WinAlign screen), and a selection for "All Videos and Animations".



Select the appropriate choice and the video, animation, illustration, or Help item will display.

## Resetting the Program

The alignment program may be reset at anytime during an alignment by pressing the **R** key, located at the upper left-hand corner of the keyboard. A confirmation screen will appear to verify that the **R** button was pressed intentionally.



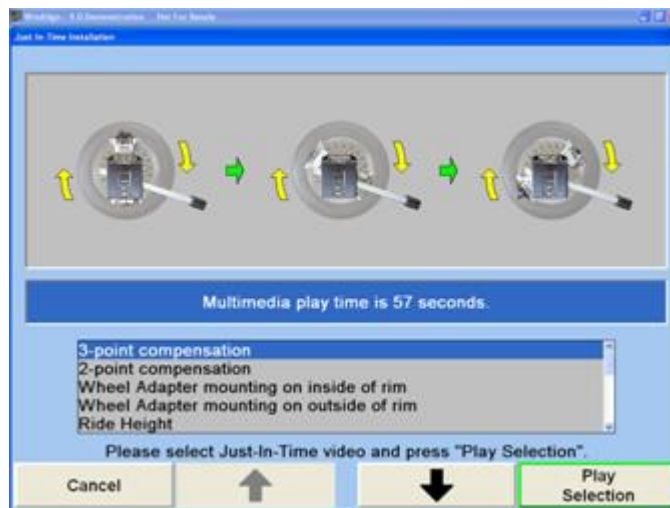
When this screen appears, press "YES" to reset the program or "NO" to continue working.

When the aligner is reset, the information collected for the alignment in progress will be erased and the display will return to the "Logo" screen.

## Just-In-Time Training Video Instructions

Optional multimedia video instructions provide a live audio-visual demonstration of procedures. To view video instructions:

Press "Help", then press "Just-In-Time Training" to view a list of available videos.



Press **↑** or **↓** to highlight the desired video, and then press "Play Selection". The video will start.

Pressing **⏸** will pause the video, and **▶** will restart the video after it has been paused. Pressing **■** will stop the video and return you to the Just-In-Time Training menu screen. After the video ends, you will be returned to the Just-In-Time Training menu screen.



## VideoTech

### VideoTech Overview

VideoTech requires the Digital-VIDEO option. VideoTech requires either the Multimedia CD set or the Multimedia DVD.

VideoTech is designed to help the technician diagnose specific vehicle problems in alignment, tires, and brakes. VideoTech uses video and animation segments that can be viewed prior to vehicle service, or during the alignment procedure.

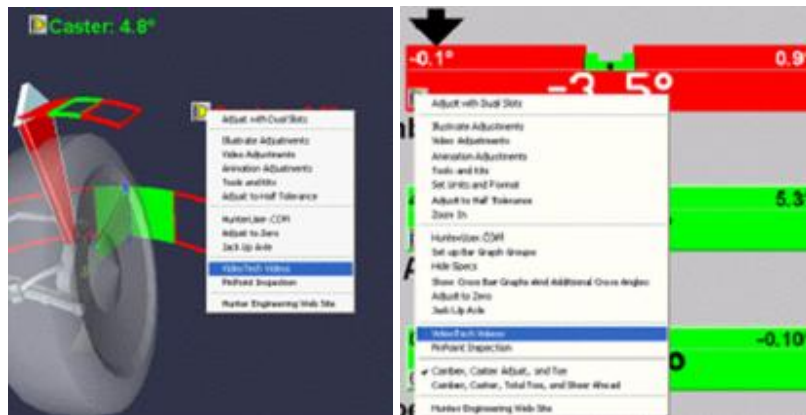
VideoTech is divided into five categories:

- Tire Wear
- Vibration and Noise
- Adjustment Concepts
- Advanced Alignment Concepts
- Handling Conditions

### Accessing VideoTech

To access VideoTech, from the logo screen expand the softkeys to display the "VideoTech" softkey. The VideoTech softkey is also available under the Service Programs tier of softkeys.

VideoTech is also accessed within the alignment procedure. Place the cursor over an alignment bar graph, click and hold, and a drop down menu will display with the VideoTech option available, as shown in the close-up below.



### Playing a VideoTech Video

Install the VideoTech CD or the Multimedia DVD into the CD/DVD player on the aligner.

Select "VideoTech". This will bring up a menu list for all videos available, as shown below.



Scroll through the list and select the appropriate subject by highlighting it. When highlighted, a window will display at the top of the screen with a brief description and screen shots from the video chosen.

Press the "Play Selection" softkey when the appropriate selection is highlighted.

## Turning Console Power Off

To turn off the aligner power, do the following:

Turn off cordless sensors. (Each sensor has a power switch.)

Reset the console.

Press "Exit Aligner". A "Confirmation" pop-up screen will ask if you are sure you want to exit the aligner. Press "Yes".

Wait for the aligner program to end. The aligner will shutdown automatically.

Turn off console power.



**CAUTION:**

Do not turn off the power while information is being written to the disk drive. This occurs during console setup and when specifications are being stored. This can result in corrupt disk drive files.

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## Example Alignment Job with the ExpressAlign® Adjustment Feature and Camera Based Sensors

This example alignment job assumes that the system is configured as follows:

<b>Enabled</b>
• <b>ExpressAlign® Level III</b>

Your system may be configured differently.

<b>NOTE:</b>	This section is an overview of an alignment job using the ExpressAlign feature. For details about any procedure, <i>refer to the appropriate section of the manual or press HELP in the WinAlign® program.</i>
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From aligner setup, a camera based sensor must be selected as the default sensor. *Refer to "Aligner Set-Up."*

Prepare the vehicle for alignment as follows:

Drive the vehicle onto the alignment rack, centering the front wheels on the turnplates.

Apply the vehicle parking brake and place the transmission in park, if applicable. On standard transmission vehicles, the transmission should be placed in neutral.



Position chocks at the front and rear of the left rear tire to keep the vehicle from rolling.

Place the lift at alignment height.

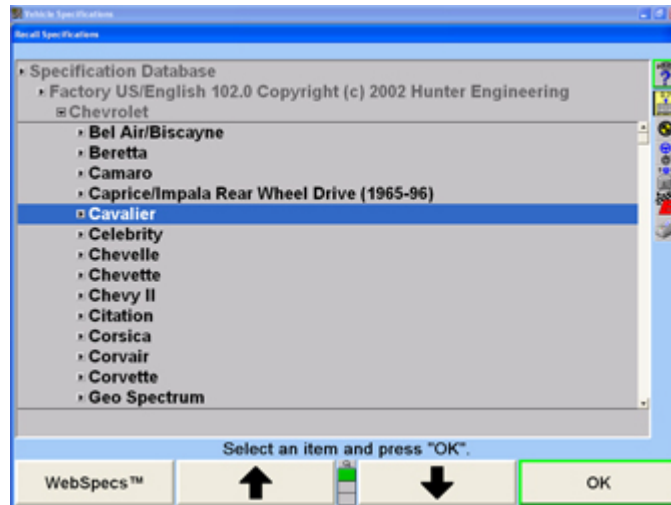
Check and adjust tire pressure to vehicle manufacturer's specification. Inspect for unevenly worn or mismatched tires.



Start the alignment program by pressing "Begin Alignment" on the Logo screen. The "Recall Specifications" pop-up screen will appear.



Press  or  to highlight the manufacturer of the vehicle being aligned.

Press "OK" to select the highlighted manufacturer. The next screen will list the models available from the selected manufacturer.



Press  or  to highlight the model of the vehicle being aligned.

Press "OK" to select that model.

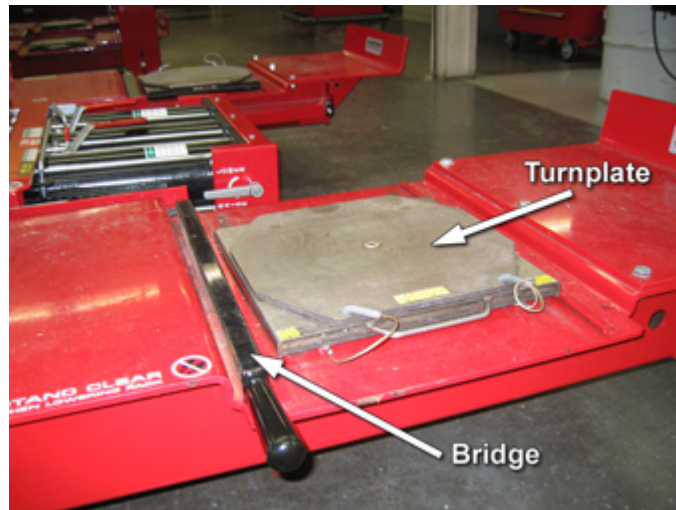
Continue in this manner until the vehicle is identified to the program.

The screen will change to the "Compensation Control" pop-up screen.

There are two methods of compensation, rolling and jacking. The method chosen for this example procedure is rolling compensation. Refer to "Compensating Camera Based Targets - General Compensation," or to "Compensating Camera Based Targets - Rolling Compensation."

Verify that the pins are in the turnplates and slip plates.

Position a turnplate bridge in each pocket behind the turnplate so the runway surface and the bar surface are flush. Rotate the bridges so they are taller than wide.



Place wheel chocks that limit rearward motion approximately 15 inches behind the rear wheel(s).

Steer ahead with transmission in neutral and the parking brake off.

Mount the targets and wheel adaptors on the wheels. Refer to "Mounting Sensors or Targets onto Wheel Adaptors."

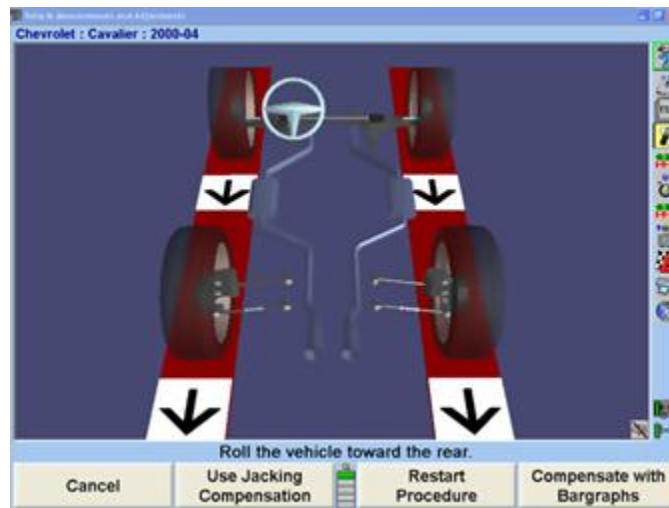
Level and lock the targets.

**NOTE:** The targets should not be re-leveled at any time during the alignment. The only exception being - If the target is removed from the wheel adaptor during the alignment, (shim replacement, steering component replacement, etc.) the affected target must be re-leveled and re-compensated, using jacking compensation.

**NOTE:** Beginning the rolling compensation procedure removes any previous compensation from the targets.

The screen instructs you to roll the vehicle rearward. Release parking brake and put transmission in neutral. Roll the vehicle rearward until the arrows turn green.

**NOTE:** It is recommended to roll the vehicle by rotating the left rear tire. Do not push or pull the vehicle by the front (steering axle) tires or wheels during rolling compensation. Do not push or pull on spoilers, fascia moldings, or other trim accessories.



**NOTE:** A vehicle with 28-inch diameter tires will require approximately 12 - 14 inches of movement. Smaller diameter tires will require less movement, while larger diameter tires will require more.

Stop rearward movement of the vehicle. The arrows will disappear for a moment.

If a new style remote indicator is used, indicators for all four wheels will be flashing, indicating to roll forward.

When the compensation arrows reappear, roll the vehicle forward to the original position.

When all four targets have been compensated, apply the vehicle parking brake and place the transmission in park, if applicable. On standard transmission vehicles, the transmission should be placed in neutral.

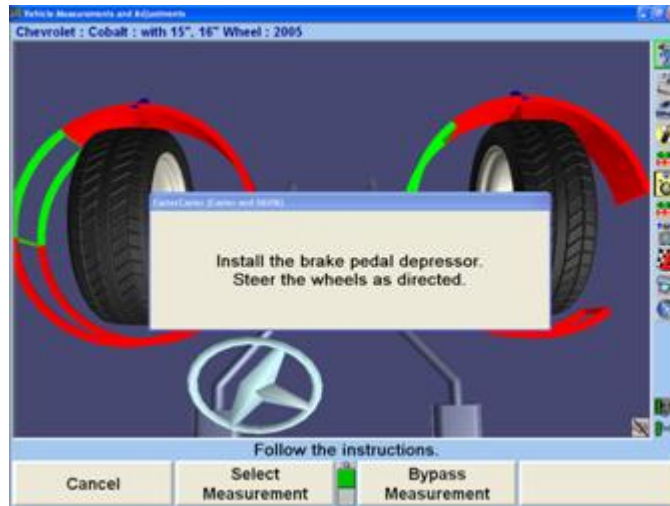
Position chocks at the front and rear of the left rear tire to keep the vehicle from rolling.

**NOTE:** The rolling compensation procedure **MUST** end with the vehicle in the proper position to check and adjust the alignment.

After the targets have been compensated, remove the pins from the turnplates and slip plates.

Turn the turnplate bridges into the stored position.

The screen will change to the "Caster and S.A.I. Measurement" pop-up screen that will direct you to measure caster.



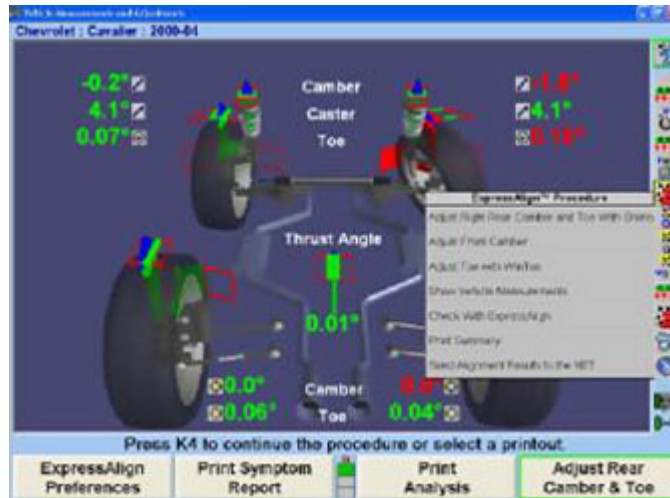
Install the brake pedal depressor. Steer the wheels as directed and follow the on-screen directions.

**NOTE:** Do NOT block the front targets during the Measure Caster Procedure. One of the two rear targets may be blocked during the Measure Caster procedure.

After caster has been measured, the screen prompts you to steer the wheels straight ahead.

The measurements of the vehicle will be saved.

The screen will change to VirtualView® with the "ExpressAlign" menu.



**NOTE:** The actual procedures displayed will vary depending on the vehicle and alignment angles that need to be adjusted.

An icon will be displayed in the "ExpressAlign" pop-up screen for each suggested procedure. Selecting the corresponding icon in the procedure bar will start the procedure that the icon represents.

Procedures that have yellow text in the "ExpressAlign" pop-up screen refer to adjustments that must be made for the specified vehicle.

Selecting the ExpressAlign icon in the procedure bar will prompt you through the recommended sequence for the alignment. In this instance, rear camber and toe will be the first necessary adjustment.



Remove the wheel to install shim. After installing shim and reinstalling wheel with target and wheel adaptor, the target must be re-compensated using jacking compensation.

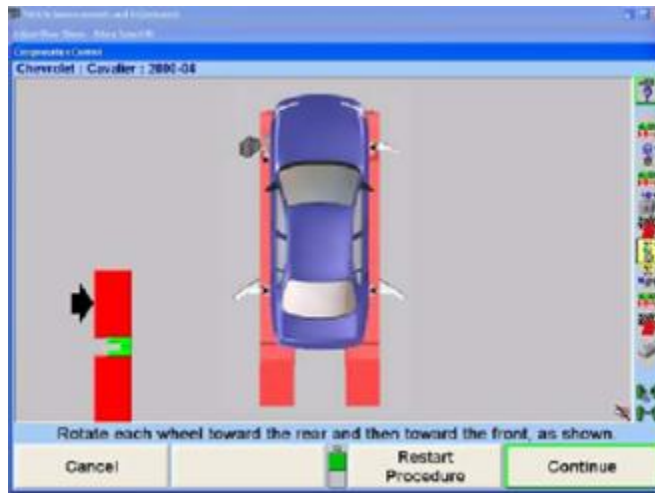


Press "Cancel" if no adjustments were made.

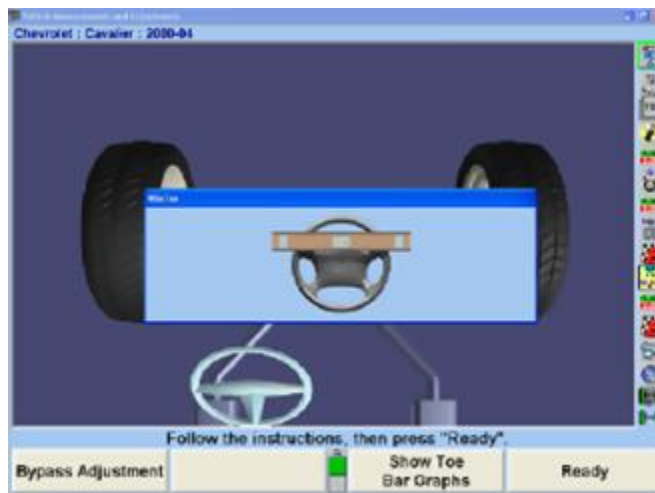
OR

Press "OK" to re-compensate the target.

Follow the on-screen directions to compensate the target. Press "Continue" when finished.



Follow the on-screen directions, then press "Ready".



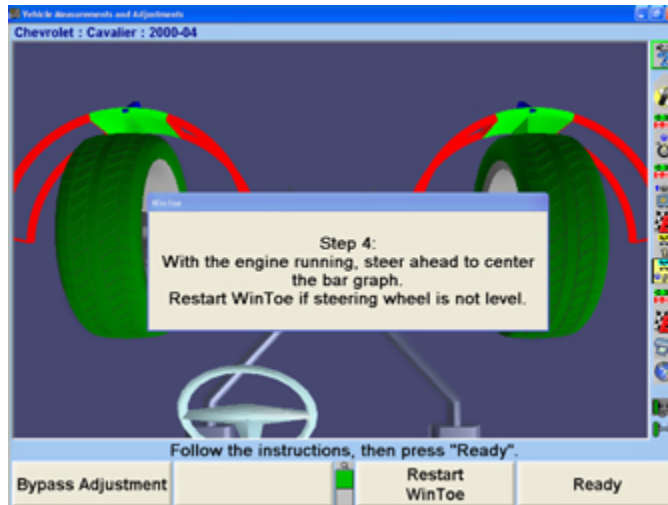
Adjust the right tie rod, follow the on-screen directions, then press "Ready".



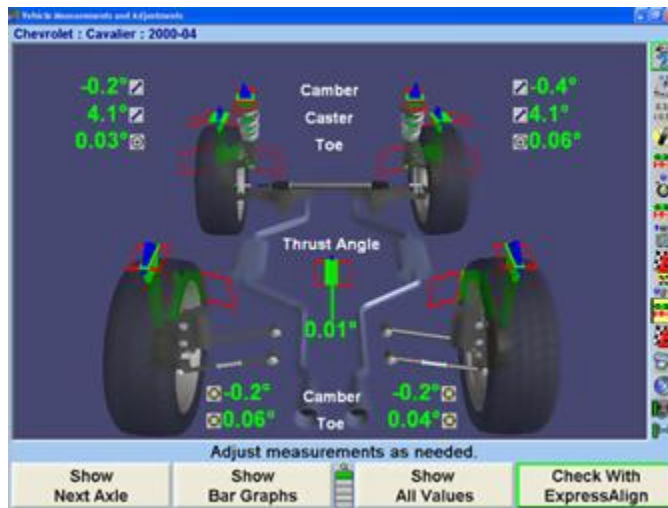
Adjust the left tie rod, follow the on-screen directions, then press Ready.



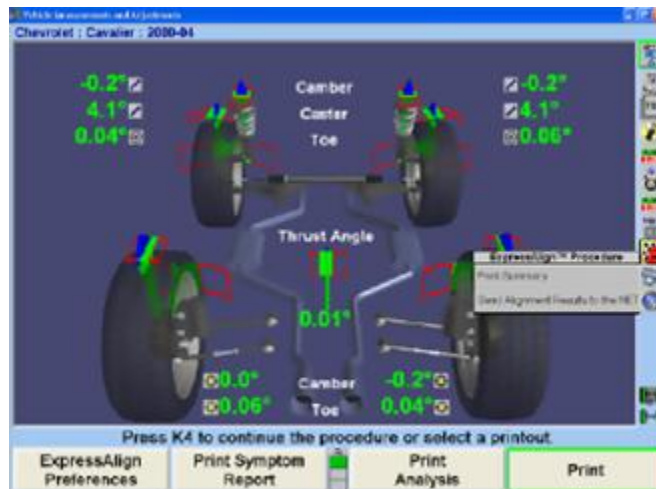
Steer ahead to center the bar graph. The steering wheel should be level. Press "Ready". If the steering wheel is not level, restart WinToe® and correct as necessary.



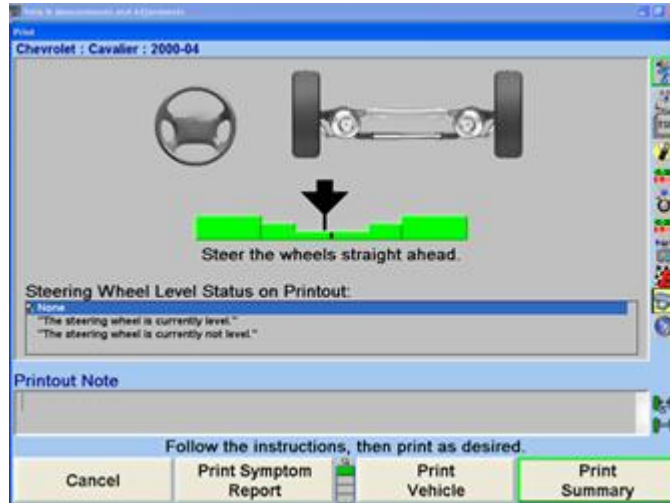
Press the "Check With ExpressAlign" icon.



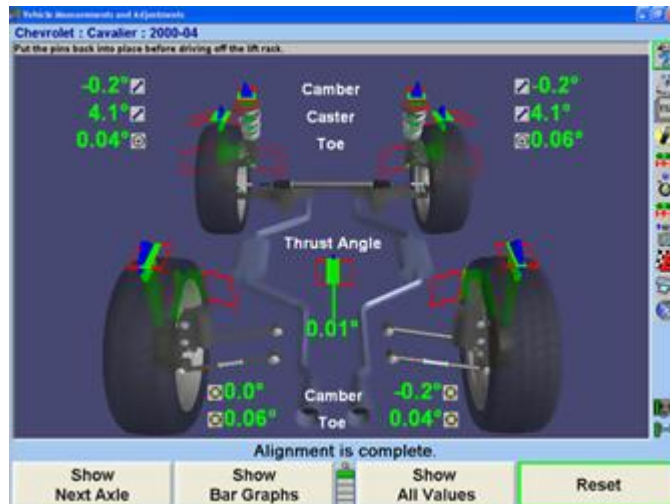
After all adjustments are completed, select the "Print" icon or select "Print Summary" from the ExpressAlign menu to print the alignment results.



Press "Print Summary". Before printing, the Print pop-up screen will allow the technician to input the current steering wheel status and make additional notes as needed. After steering ahead, add the necessary comments for the printout and select "Print Summary".



After printing the results, the Vehicle Measurements and Adjustments primary screen will appear with the current vehicle measurements showing. The alignment is complete.



Verify that the pins are in place in the slip plates and turnplates before driving the vehicle off the rack.

## Example Alignment Job with the ExpressAlign<sup>®</sup> Adjustment Feature and Conventional Sensors

This example alignment job assumes that the system is configured as follows:

ENABLED
<ul style="list-style-type: none"> <li>• Display of Vehicle Specifications</li> <li>• Show Measurements Display After Compensation</li> <li>• Show Measurements Display After Caster</li> <li>• Verify Caster Adjustment</li> <li>• ExpressAlign<sup>®</sup> Level III</li> </ul>

Your system may be configured differently.

**NOTE:** This section is an overview of an alignment job using the ExpressAlign feature. For details about any procedure, refer to the appropriate section of the manual or press **HELP** in the WinAlign® program.

Prepare the vehicle for alignment as follows:

Position vehicle onto alignment rack with the front wheels centered on the turning angle gauges.

Place the vehicle transmission in park and apply the parking brake.

Position chocks at front and rear of the left rear tire.

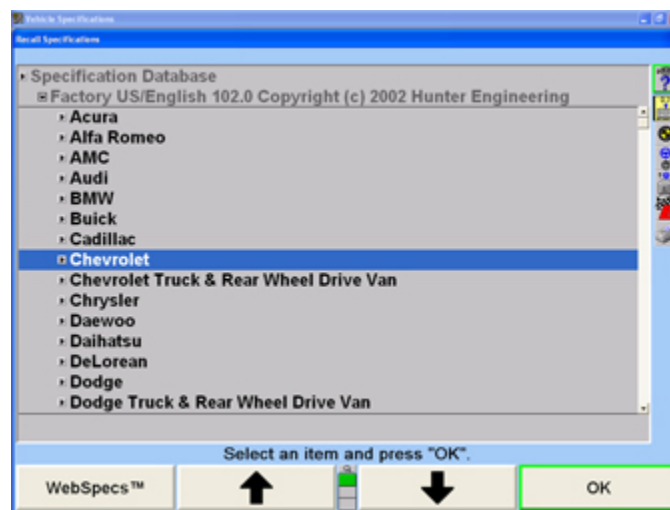
Place the lift at alignment height.



**NOTE:** The alignment rack must be level to properly perform an alignment.

Inspect for unevenly worn or mismatched tires and adjust tire pressure to vehicle manufacturers' specification.

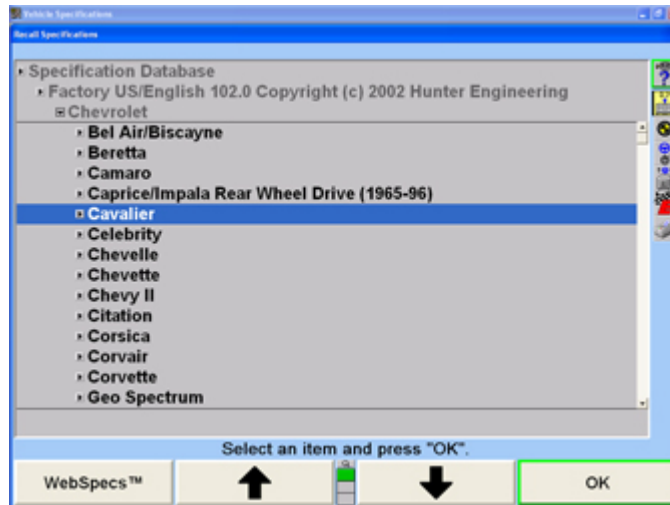
Inspect the suspension and steering linkage components for wear, looseness, or damage.



Start the alignment program by pressing "Begin Alignment" on the Logo screen. The "Recall Specifications" pop-up screen will appear.



Press  or  to highlight the manufacturer of the vehicle being aligned.

Press "OK" to select the highlighted manufacturer. The next screen will list the models available from the selected manufacturer.



Press  or  to highlight the model of the vehicle being aligned.

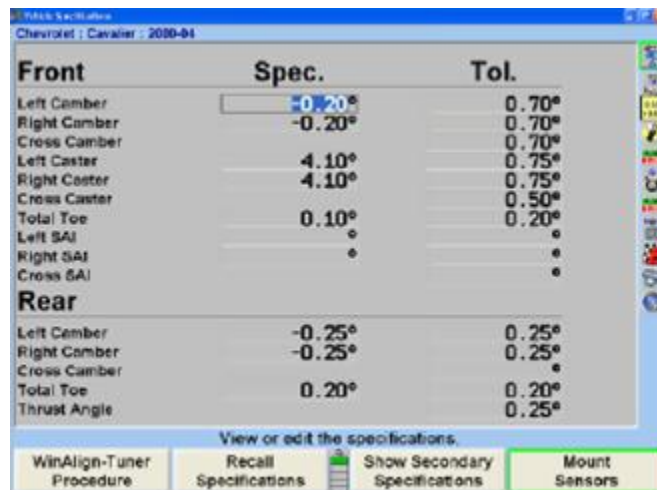
Press "OK" to select that model.

Continue in this manner until the vehicle is identified to the program.

When the vehicle is identified to the program, the screen will change to the "Vehicle Specifications" primary screen.

The "Vehicle Specifications" primary screen displays the identification and alignment specifications for the vehicle chosen.

Confirm that the vehicle identified is the vehicle you have chosen, and then press the "Mount Sensors and Compensate" icon in the procedure bar.



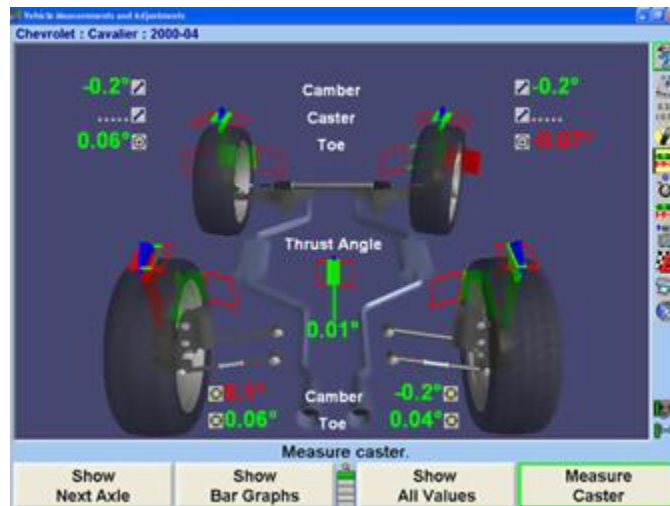
The screen will change to the "Compensation Control" pop-up screen.



Mount sensors on wheels and compensate them for runout. Refer to "Mounting Sensors or Targets onto Wheel Adaptors."

After the sensors have been compensated, remove the pins from the turnplates and slip plates, then lower and jounce the vehicle.

The screen will change to the "Vehicle Measurements and Adjustments" primary screen. The current vehicle alignment measurements are shown on this screen.



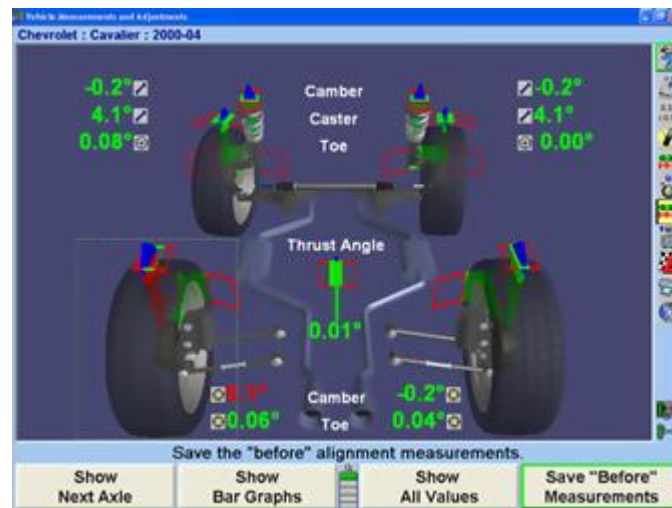
Press the "Measure Caster" icon in the procedure bar. The screen will change to the "Caster and S.A.I. Measurement" pop-up screen that will direct you to measure caster.

Install the brake pedal depressor, level and lock sensors, and lower vehicle if raised.

Steer the wheels as directed and follow the on-screen directions.



These are the initial measurements of the vehicle. Press the "Save Before Measurements" icon in the procedure bar to save them for the printout. The screen will change to the "Save Before Alignment Measurements" pop-up screen.



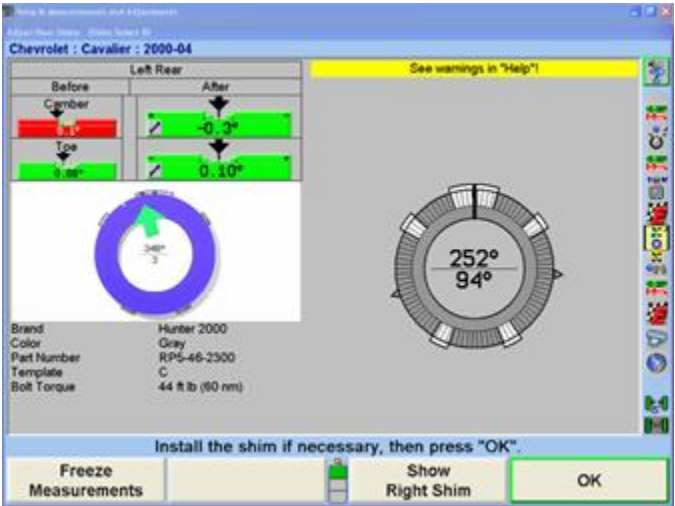
The screen will change to the ExpressAlign menu screen.



NOTE: The actual procedures displayed will vary depending on the vehicle and alignment angles that need to be adjusted.

A suggested procedure will be displayed in the ExpressAlign menu. Selecting the corresponding icon in the procedure bar will start the procedure that the icon represents.

This vehicle uses shims to adjust rear camber and toe. Selecting the "Rear Adjust Camber & Toe" icon in the procedure bar will automatically proceed to Shim Select® II and display the correct shim for the necessary adjustment.

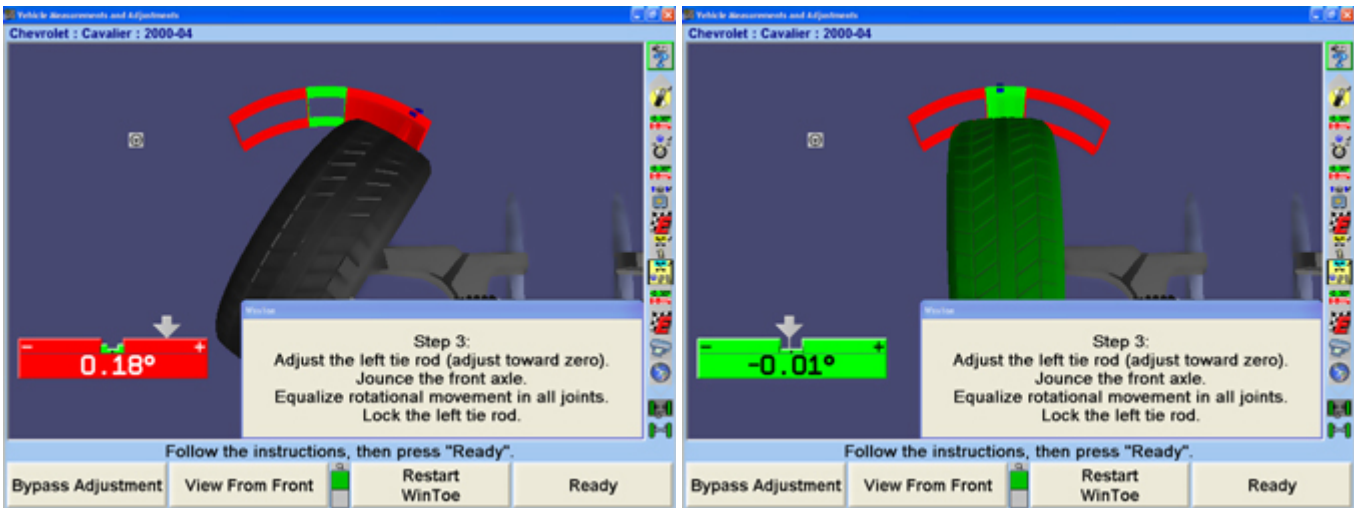


If the vehicle you are aligning does not use shims, ExpressAlign will select and display the appropriate adjustment screen. Press "OK" after making adjustments and re-compensating the sensor.

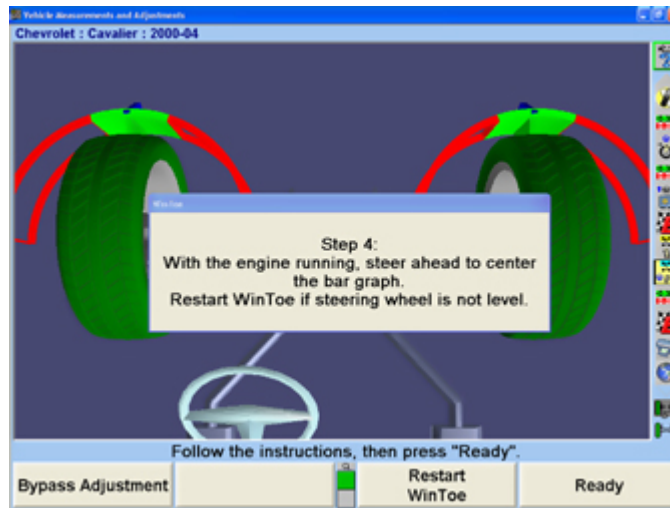
Make the adjustments indicated on the screen. Then press "Ready".



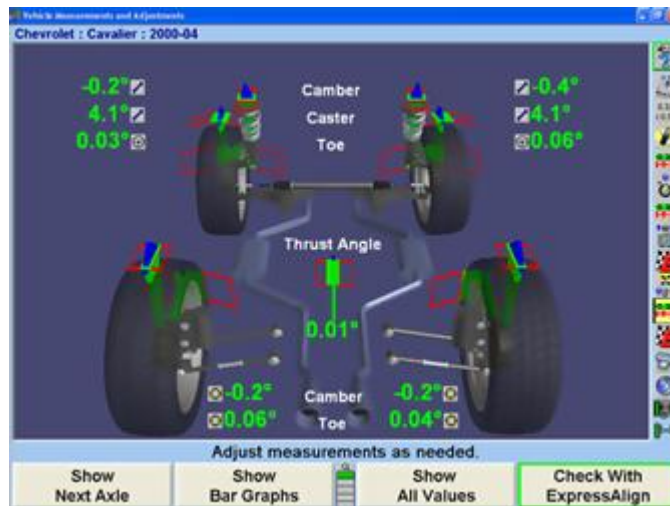
Make the adjustments indicated on the screen. Then press "Ready".



Steer ahead to center the bar graph. The steering wheel should be level. If the steering wheel is not level, restart WinToe® and correct as necessary.

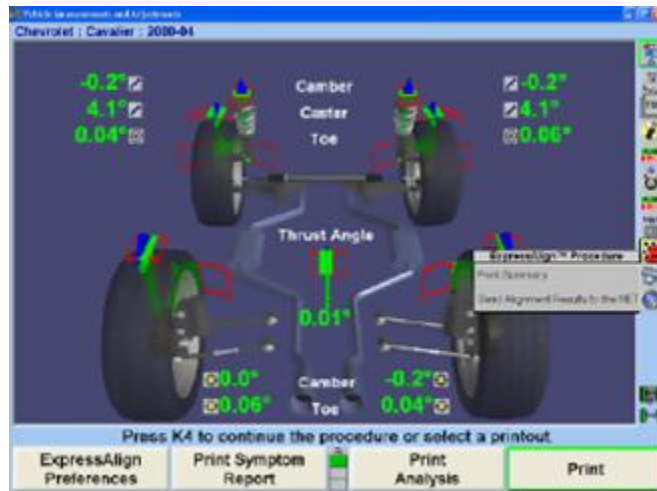


Press the "Vehicle Measurements and Adjustments" icon in the procedure bar and the "Vehicle Measurements and Adjustments" primary screen will appear.



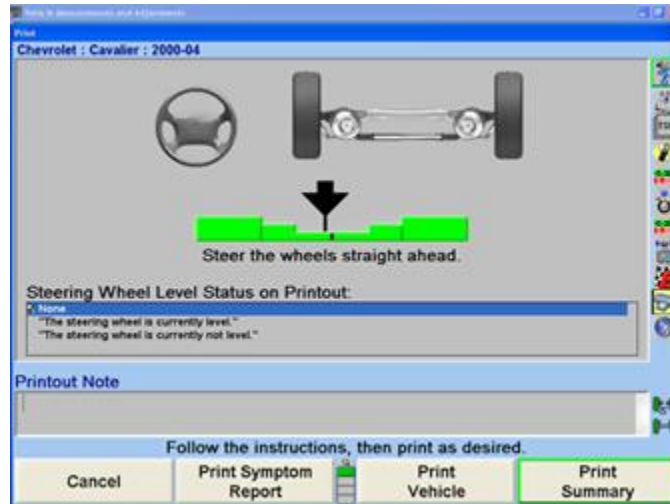


Select the "Check With ExpressAlign" softkey.



After all adjustments are completed, select the "Print" icon in the procedure bar to print the alignment results.

Before printing, the "Print" pop-up screen will allow the technician to input the current steering wheel status and make additional notes as needed. After steering ahead, add the necessary comments for the printout and select "Print Summary".



After printing the results, the "Vehicle Measurements and Adjustments" primary screen will appear with the current vehicle measurements showing. The alignment is complete.

Verify that the pins are in place in the slip plates and turnplates before driving the vehicle off the rack.



# Operation Information

## Sensors and Targets

Sensors or targets may be mounted on the wheel adaptors before mounting the wheel adaptors on the vehicle. In some cases, it may be easier to mount the wheel adaptor first and then mount the sensor or target onto the adaptor (either method may be used).

### Mounting Sensors or Targets onto Wheel Adaptors

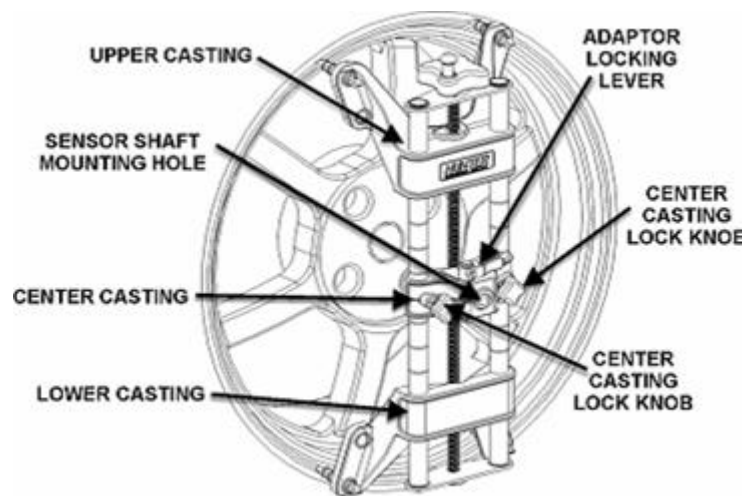
Sensors may be mounted on the wheel adaptors before mounting the wheel adaptors on the vehicle. In some cases, it may be easier to mount the wheel adaptor first and then mount the sensor onto the adaptor. Either method may be used.

Center the wheel adaptor center casting between the upper and lower castings. When the center casting is properly centered, a plunger ball will fall into the detent position on the adaptor rod.

Tighten both center casting lock knobs firmly. This will prevent the center casting from slipping down when the sensor is attached.

**CAUTION:** Hand tighten center casting lock knobs as tight as possible (DO NOT USE TOOLS TO TIGHTEN).

**CAUTION:** If the center casting lock knobs are not firmly tightened, runout compensation and alignment accuracy will be adversely affected.



If detached, attach the sensor to the wheel adaptor by inserting the sensor mounting shaft (at the rear of the sensor) into the sensor mounting hole in the middle of the center casting.

**NOTE:** The sensor shaft must be fully inserted into the sensor shaft mounting hole.

## Wheel Adaptor 175-285-1

Rotate the adaptor locking lever clockwise to the locked position.

**CAUTION:** When mounting sensors to the wheel adaptors, the sensor shaft must be fully seated. Make certain that there is no play or looseness between the sensor shaft and the wheel adaptor. Rotate the wheel while holding the sensor. Listen and feel for movement between the sensor and wheel adaptor. Runout compensation and alignment accuracy will be adversely affected if there is any movement between the sensor and wheel adaptor. Sensors must fit tightly against the surface of the wheel adaptor or the lock may not hold. This could allow the sensor to fall and be damaged.

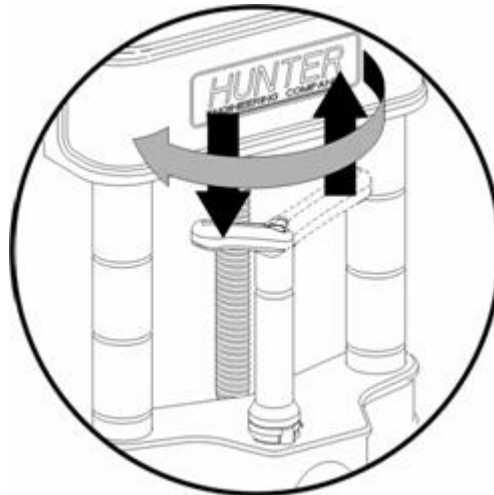
When the sensor is mounted, the sensor locking lever should be rotated using firm hand pressure. Tools should not be used to force the locking lever.

## Wheel Adaptor 175-321-1 with Ratchet Adaptor Locking Lever

Rotate locking lever clockwise to tighten. If upper casting prevents rotation of lever, either expand adaptor to move upper casting or re-position the lever by lifting lever up to disengage, rotating counter-clockwise, and lowering to re-engage.

Proceed until the shaft is locked tight to adaptor.

With shaft fully locked, re-position the lever to the 9 o'clock position by lifting lever up to disengage, rotating to 9 o'clock, and lowering to re-engage.

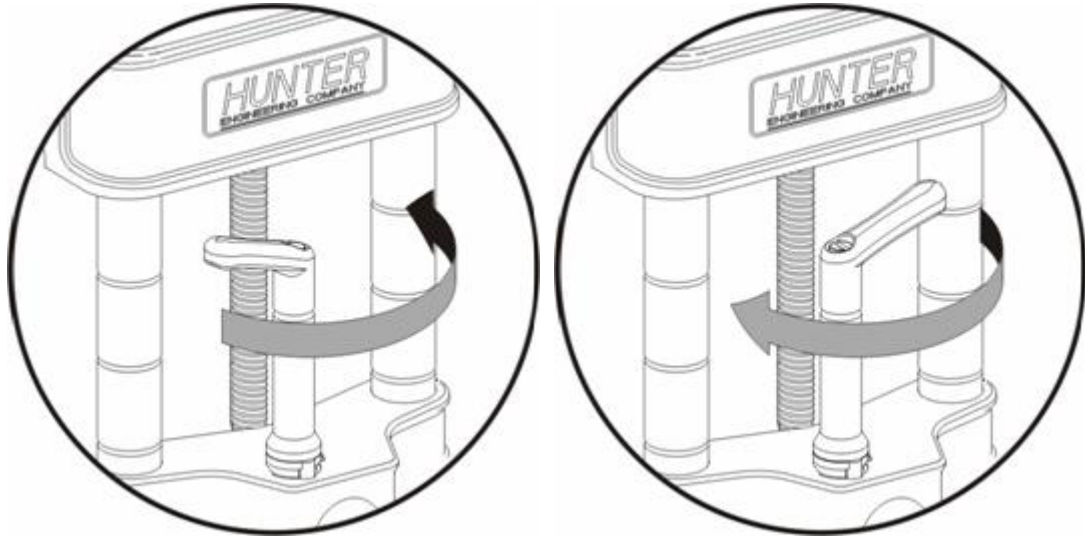


Re-position lever to 9 o'clock

The lever in the 9 o'clock position eliminates possible contact with upper casting or sensor during alignments.

## Operation of Ratchet Adaptor Locking Lever after Initial Setup

To remove the sensor or reposition a target, loosen the lock by turning the lever counter-clockwise to the 3 o'clock position.

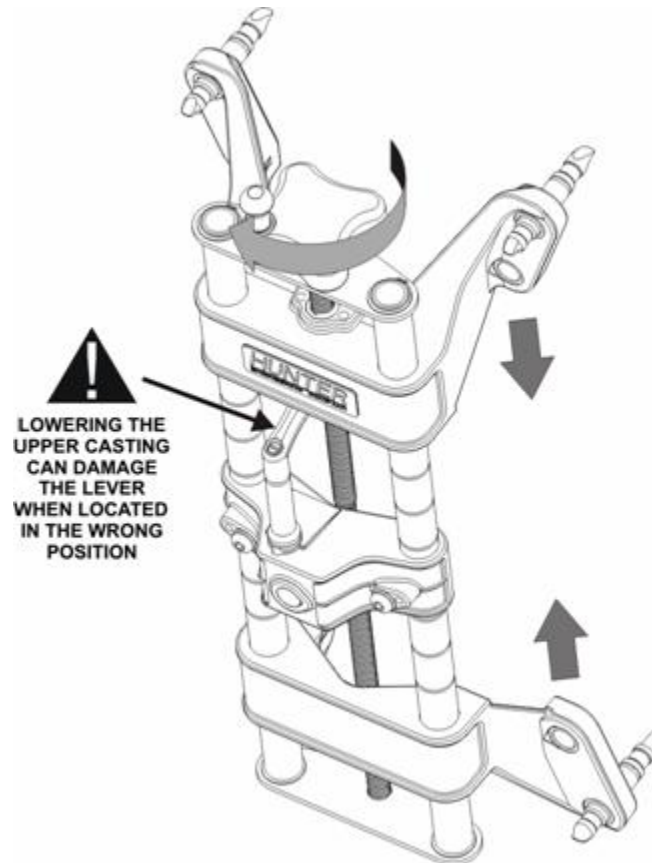


To loosen, turn lever from 9 to 3 o'clock

To lock, turn lever from 3 to 9 o'clock

To lock the sensor or target, tighten the lock by turning the lever clockwise to 9 o'clock position.

**CAUTION:** Failure to follow tightening and loosening procedures may result in damage to lever. Upper casting can damage lever if contact occurs when going for a large to small diameter rim. Refer to figure below.



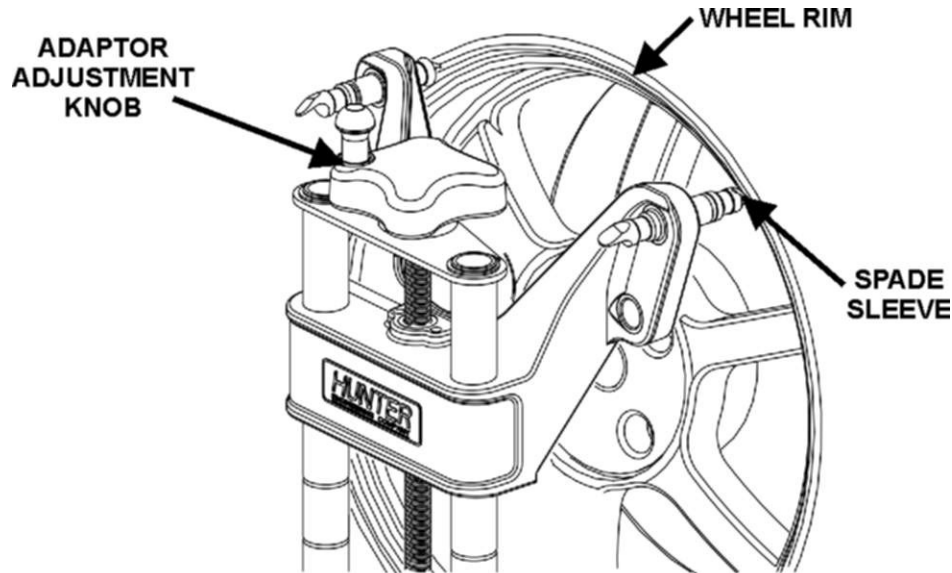
## Mounting Wheel Adaptor onto Wheels

### Wheels without Rim Lip (Attaching to Outer Rim Lip)

Position the wheel adaptor with the two upper external rim studs on the outside of the wheel rim.

Align the two lower external rim studs on the outside of the wheel rim and check that all four rim studs will engage the outside of the wheel rim.

Turn the adaptor adjustment knob to firmly attach the adaptor to the wheel.



Test the security of the installation by lightly tugging on the wheel adaptor.

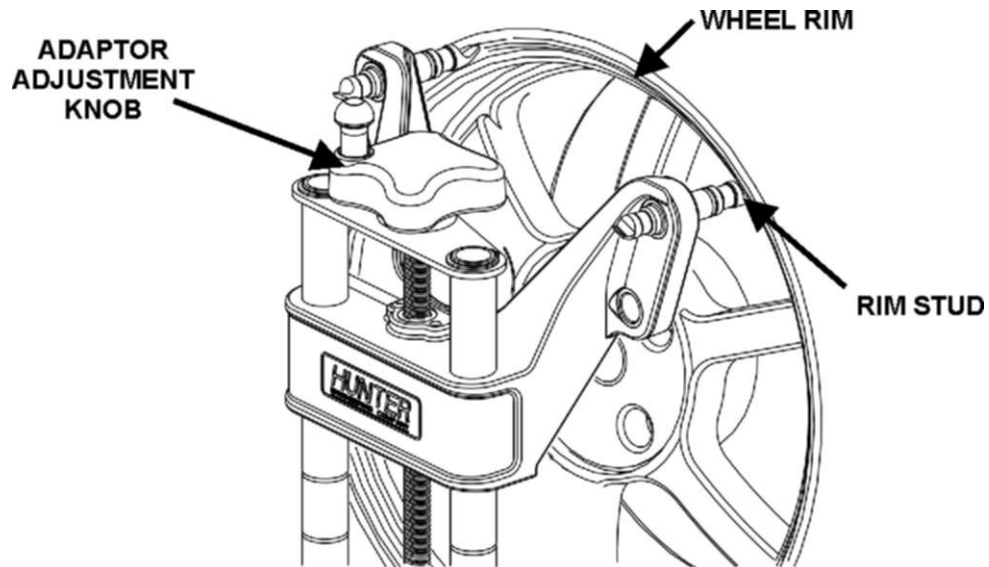
**⚠ CAUTION:** Do not allow the rim studs to slip on the wheel. Runout compensation and alignment accuracy will be adversely affected if the wheel adaptor is allowed to slip on the wheel.

### Wheels with Rim Lip (Attaching To Inner Rim Lip)

Position the wheel adaptor with the two lower rim studs engaging the lower wheel rim lip.

Align the two upper rim studs with the upper wheel rim lip and check that all four studs will engage the inner portion of the rim lip.

Turn the adaptor adjustment knob to firmly attach the adaptor to the wheel.



Test the security of the installation by tugging on the wheel adaptor.

**CAUTION:** Do not use rim studs on alloy or clear coat wheels. Rim studs can damage these wheels.

**CAUTION:** Do not allow the rim studs to slip on the wheel. Runout compensation and alignment accuracy will be adversely affected if the wheel adaptor is allowed to slip on the wheel.

### Connecting Sensor Cables with Optional Rack Wiring Kit

Connect each sensor to a rack wiring box with short sensor cables (either connector may be used).

Connect a front rack wiring box to the console with a long sensor cable (any available connector may be used).

### Connecting Sensor Cables without Optional Rack Wiring Kit

Connect the two rear sensors to the front sensors using sensor cables (either front sensor connector may be used).

Connect the two front sensors to the console using sensor cables (any available console cable socket may be used).

### Compensating Conventional Sensors - General Compensation

The sensors must be compensated to eliminate error in angle measurements caused by runout of the wheel and wheel adaptor.

The default setting for the alignment console is set for 3-point compensation. The default setting can be changed in "Aligner Setup" for either 2-Point compensation or 3-Point compensation (Pro-Comp® compensation).

The operator still has the option to override the default setting by adding 2-point compensation and rolling compensation in "Aligner Setup" under the "Sensors" heading - "Compensation Options".

When these compensation options are added, softkeys will be available during the compensation procedure.

If a sensor that has been compensated should require re-compensation, pressing the compensate button twice within four seconds will begin the new procedure.

When pressing the sensor compensate button, momentarily depress (do not hold the compensate button). Also, do not disturb the sensor until the red LED responds.

Sensors may be compensated in any order; however, these precautions must be followed:

If a sensor is removed from a wheel, that sensor must be re-compensated when reinstalled. The other sensors do not need re-compensation.

During 2-point compensation and normal operation of conventional sensors, be certain no obstructions are blocking the infrared beams between sensors. Should a blockage occur, the affected sensor(s) shown on the illustration on the CRT will flash on and off and the displayed toe measurement of the sensor(s) will go blank until the obstruction is cleared.

When compensating sensors mounted to the vehicle drive wheels, place the transmission in NEUTRAL.

The lift rack should be level on leveling legs.

## Compensating Camera Based Targets

### General Compensation

The camera based sensors must be compensated to eliminate errors in angle measurements caused by runout of the wheel, wheel adaptor, and target shaft.

The default setting for the alignment console can be set for either rolling or jacking compensation.

When using Jacking Compensation, targets may be compensated in any order; however, these precautions must be followed:

If a target is removed from a wheel, that target must be re-compensated when reinstalled. The other targets do not need re-compensation.

When compensating targets that are mounted to the vehicle drive wheels, place the transmission in NEUTRAL.

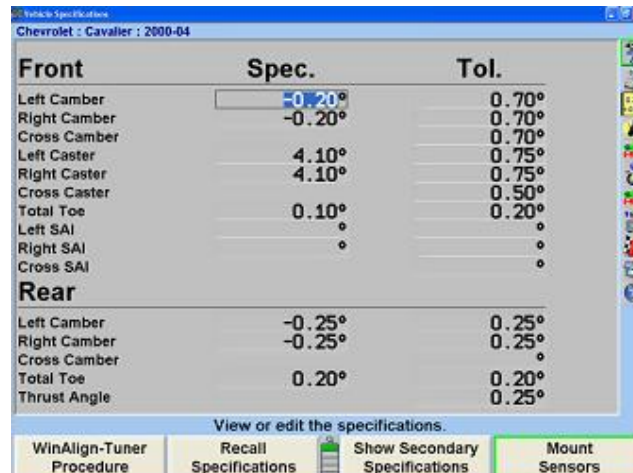
The lift rack should be level on the leveling legs when the legs are present on the lift.

The lock pins must be in place on the turnplates and rear slip plates during rolling target compensation.

---

## Vehicle Specifications

The "Vehicle Specifications" primary screen shows the vehicle identification and its alignment specifications.



	Spec.	Tol.
<b>Front</b>		
Left Camber	-0.20°	0.70°
Right Camber	-0.20°	0.70°
Cross Camber		0.70°
Left Caster	4.10°	0.75°
Right Caster	4.10°	0.75°
Cross Caster		0.50°
Total Toe	0.10°	0.20°
Left SAI	°	°
Right SAI	°	°
Cross SAI		°
<b>Rear</b>		
Left Camber	-0.25°	0.25°
Right Camber	-0.25°	0.25°
Cross Camber		°
Total Toe	0.20°	0.20°
Thrust Angle		0.25°

View or edit the specifications.

WinAlign-Tuner Procedure    Recall Specifications    Show Secondary Specifications    Mount Sensors



This primary screen is displayed by pressing "Vehicle Specifications" on any other primary screen. To change to one of the other primary screens, change to the second row of softkey labels, and press the appropriate softkey.

The "Vehicle Specifications" primary screen is used for the following purposes:

- Viewing the identification of the vehicle.
- Viewing the specifications of the vehicle.
- Manually entering the specifications of the vehicle.

The "Vehicle Specifications" primary screen is also used for:

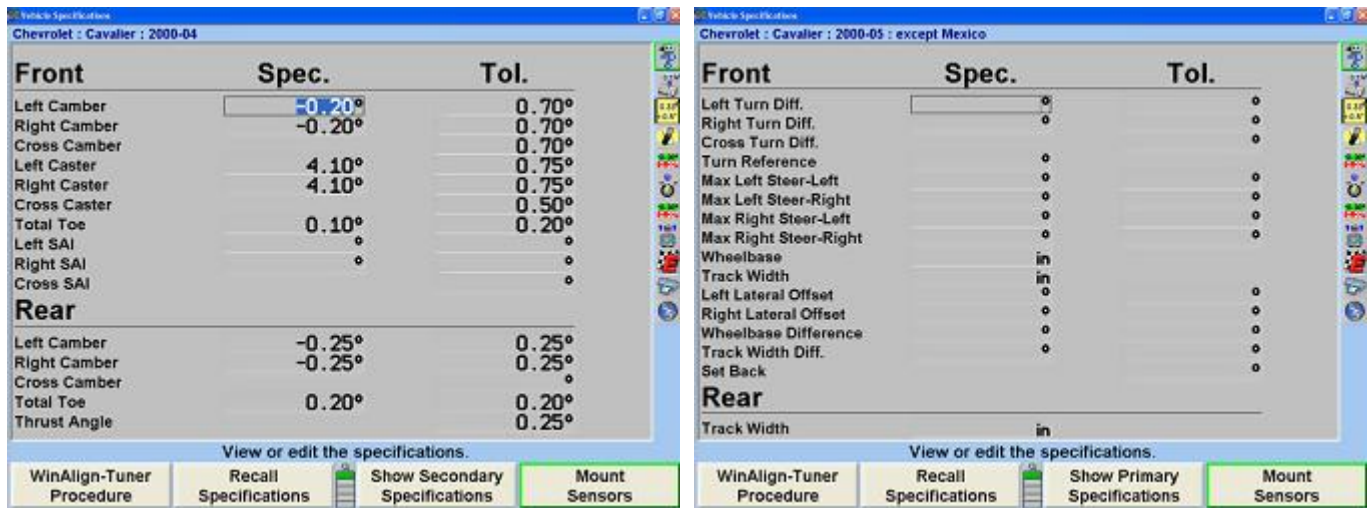
- Recalling vehicle specifications from the specification memory.
- Storing vehicle specifications into the specification memory.
- Reading and writing notes which are attached to the specifications of a vehicle.
- Setting the display units and formats for specifications and measurements.

## Primary and Secondary Specification Groups

The specifications and tolerances are shown in two different groups:

**Primary Specifications** are the usual camber caster total toe and thrust angle specifications and tolerances.

**Secondary Specifications** are S.A.I., toe-out-on-turns and maximum steering angle specifications and tolerances.



You may select "Show Primary Specifications" or "Show Secondary Specifications" from the "Vehicle Specifications" primary screen. "Secondary Specifications" displays both the front and rear axle. "Secondary Specifications" can be accessed from any primary screen where the "Show Vehicle Specifications" softkey is available.

## Vehicle Specification Memory

The "Recall Specifications" pop-up screen allows vehicle specifications to be recalled and stored in the specification memory.

The "Recall Specifications" pop-up screen is displayed by pressing "Recall Specifications" on the "Vehicle Specifications" primary screen.

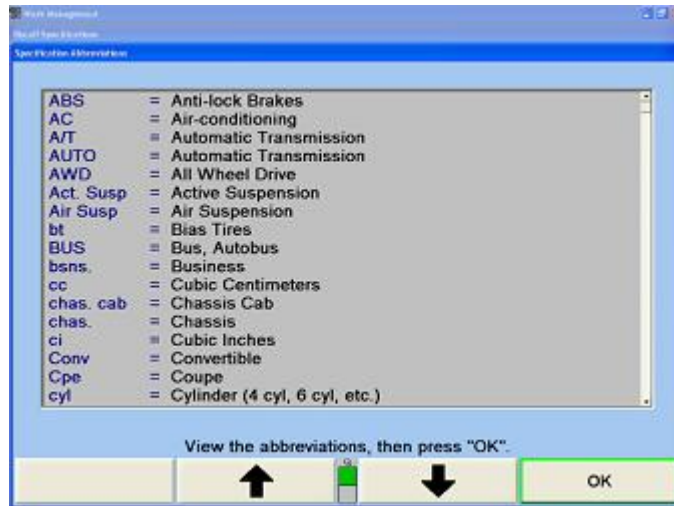


Specifications may be recalled from "Factory Specifications", based on original equipment manufacturer specifications, "Factory Amendments", or "User Specifications". "Factory Amendments", and "User Specifications" are created and stored into the computers memory by the equipment operator.

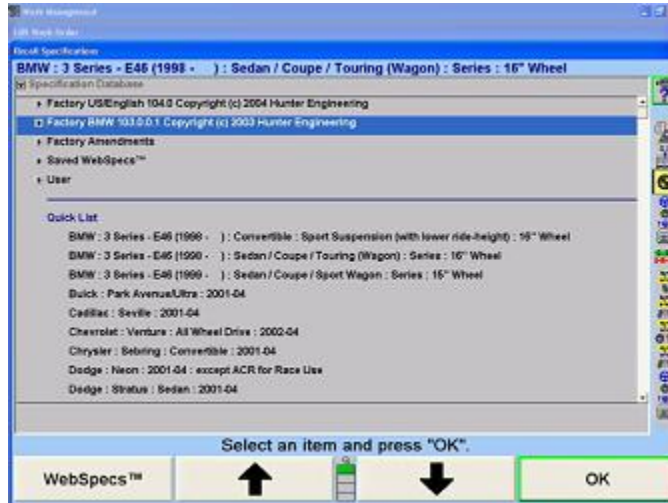
Although the specification database is extensive, some vehicle manufacturers and/or specific models may not be included in the factory specifications memory. Locate the alignment data in the alignment specification book or vehicle manufacturers' service manual and manually enter the specifications on the "Vehicle Specifications" display.

The manually entered specifications may be stored in computer memory to be recalled at a later time. *Refer to "Selecting User Specifications."*

Pressing "List Abbreviations" identifies a list of abbreviations used in "Factory Specifications".





Also displayed in "Recall Specifications" is the "Quick List". The "Quick List" displays all the vehicles most recently worked on, as shown below.





The "Quick List" is not erased, but each new vehicle entry overwrites an older entry.

## Vehicle Recall Specifications Selection

To recall the specifications from the specification database, begin by pressing  or  to highlight the manufacturer of the vehicle being aligned. Press "OK" to select the highlighted manufacturer. The screen will change to show the models available for the selected manufacturer.



Press  or  to highlight the vehicle model. Press "OK". Continue in this manner until the vehicle is completely identified. When the vehicle is identified, the specifications will be recalled and the screen will change to the "Vehicle Specifications" primary screen.

At any point in the selection sequence, you can type in the desired selection using the keyboard. For example, when selecting the vehicle manufacturer, you can select "Chrysler" as follows:

Type "C"; the selection changes to Cadillac.

Type "H"; the selection changes to Chevrolet.

Type "R"; the selection changes to Chrysler.


The more letters typed the more accurate the selection. This is also valid within the vehicle make selection.

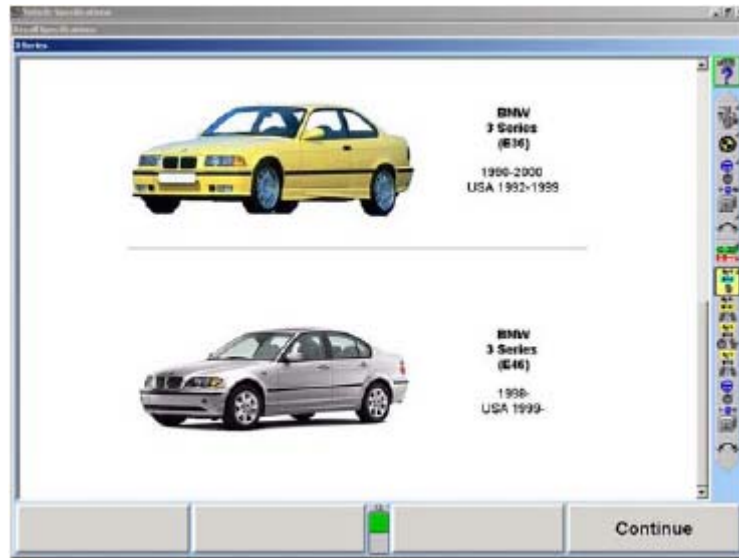
In Set-up, you may select one of four sequences by which the vehicle is identified.


The four choices are:

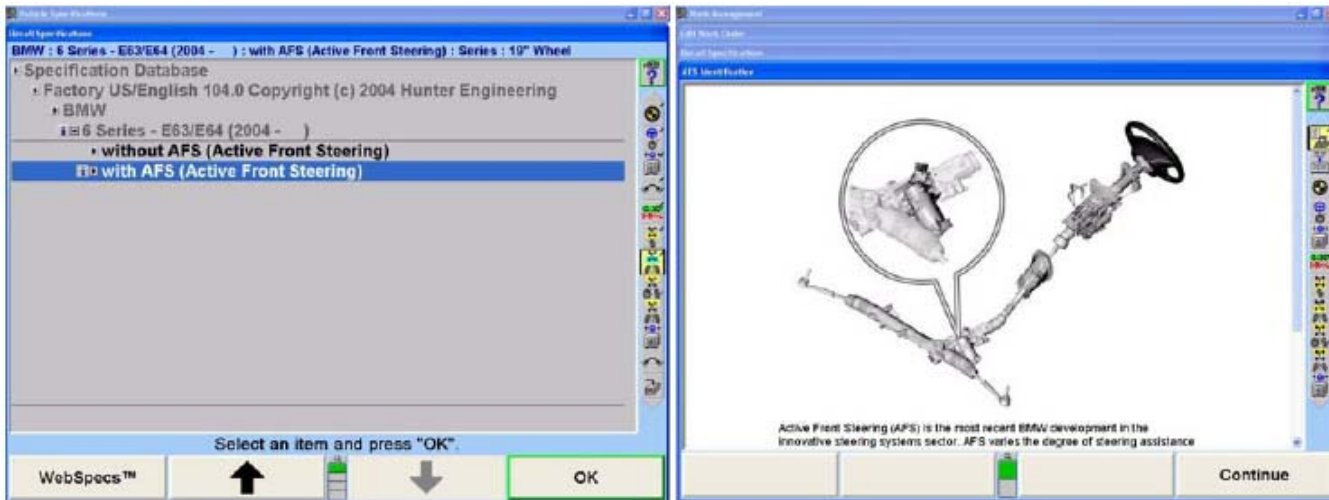
- Optimal
- Year, Manufacturer, Model
- Manufacturer, Year, Model
- Manufacturer, Year and Model

### Additional Specification Information

Certain vehicles will require specific identification. It is crucial to select the exact vehicle with the exact options, such as wheel diameter, sport suspension, etc. For help identifying these vehicles, specific body styles, and codes, this icon  (info) will appear.



This icon will display all vehicles that fall under this type and illustrate the years of manufacture, and the body style differences. In some cases another  will appear, indicating more info is available.



### Selecting from the Vehicle Lists

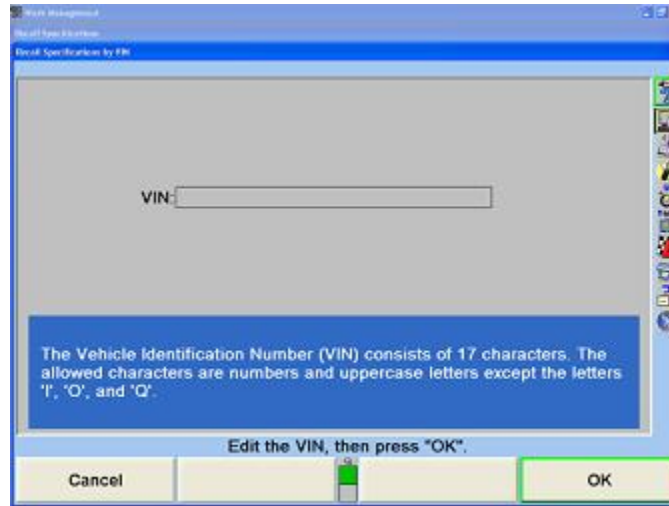
The factory specifications stored in the system are based on industry data available at the time of entry. Because specifications are subject to change, refer to vehicle manufacturer's service manual and service bulletins if a question arises.

## Selecting by Vehicle Identification Number (VIN)

The seventeen-digit Vehicle Identification Number (VIN) contains coded information that the aligner software can use to recall the vehicle specifications.

**NOTE:** Recalling vehicle specifications using VIN can be used for 1981 or newer passenger cars. This method will not work for trucks, pick-ups, vans, mini-vans, or utility vehicles.

To recall vehicle specifications using the VIN, press "Recall by VIN#..." on the first "Vehicle Specifications" pop-up screen. The "Recall Specifications By VIN pop-up" will appear.



Enter the seventeen-digit VIN using the keyboard, and then press **Enter** or "OK".

Some VIN (numbers) may not contain enough information to completely describe a vehicle. If more than one vehicle is found, a list of vehicles will be displayed. The correct vehicle must be selected by highlighting the correct item and pressing "OK".

If the aligner software finds the VIN to be invalid, a screen with an error message will appear. Press **Enter** or "OK" and edit the VIN.

The VIN entered may have been misread when recorded from the vehicle or improperly entered. Verify the VIN and type again if an error was found.

If the message "Vehicle Not Found" appears on the screen, the program is unable to identify the required specifications according to the VIN that has been entered. If this occurs, the aligner will return to the "Recall Specification" display and the user will need to manually select the vehicle identification.

Once a vehicle has been identified, the program will retrieve the selected vehicles specification from the specification memory, as if the vehicle had been identified by the normal selection sequence.



## Selecting User Specifications



The system can store user entered specifications in addition to those contained in the factory specification memory. These specifications may be for older vehicles no longer in the factory specification memory, or a user may modify factory specifications for a specific vehicle. These specifications may be recalled and used during an alignment.

To recall specifications from the "User" specification memory, the "Recall Specifications" pop-up screen must be currently displayed:

Press **Up Arrow** or **Down Arrow** to highlight Specification Database.

Press "OK". The screen will change to a list of possible database selections.

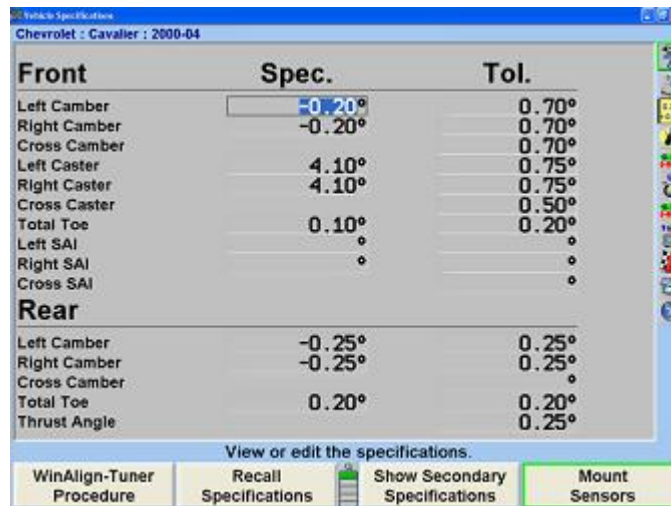
Press  or  to select "User" and press "OK". The screen will change to list user entered specifications.

Press  or  to highlight the desired item and press "OK". The vehicle specifications will be retrieved from the "User" specification memory. When the specifications have been retrieved, the screen will change to display those specifications.

## Entering and Editing Specifications

If specifications for a vehicle are not included in the factory specifications memory, the alignment information must be found in the alignment specification book and entered manually. It may be necessary to change the specification or tolerance of an existing specification.

To change or enter a value on the Vehicle Specifications display, press "Select Next Value" or "Enter" to advance to the desired field. Enter the new specification and press "Select Next Value" or "Enter" to replace the existing specification.



	Spec.	Tol.
<b>Front</b>		
Left Camber	-0.20°	0.70°
Right Camber	-0.20°	0.70°
Cross Camber		0.70°
Left Caster	4.10°	0.75°
Right Caster	4.10°	0.75°
Cross Caster		0.50°
Total Toe	0.10°	0.20°
Left SAI		°
Right SAI		°
Cross SAI		°
<b>Rear</b>		
Left Camber	-0.25°	0.25°
Right Camber	-0.25°	0.25°
Cross Camber		°
Total Toe	0.20°	0.20°
Thrust Angle		0.25°

Tolerances must not be 0.

Specifications may be entered as whole numbers (1), whole numbers and fractions (1 1/2), fractions (1/2), decimals (0.5), degrees (1.01°), or degrees and minutes (1°30). Use the following methods to enter alignment specifications using the current display units.

NOTE: Display units (i.e. degrees to inches, degrees to degrees and minutes, etc.) can be changed from the Vehicle Specifications primary screen. Refer to "Selecting Display Units."

Use the Space key to separate whole numbers and fractions.

For example, 2 1/2° would be entered as,

Press      and "Select Next Value".

Use the Space key to separate degrees and minutes.

For example, 2° 15' would be entered as,

Press     and "Select Next Value".

If the degrees and minutes specification is less than 1°, enter a 0 for degrees.

For example, 6' would be entered as,

Press    and "Select Next Value".

**NOTE:** Specifications are assumed to be positive unless the negative (-) sign is positioned before the specification value.

When "Select Next Value" or "Enter" is pressed, the value is entered and the cursor advances to the next entry field.

**CAUTION:** Values are not entered until "Select Next Value" or "Enter" is pressed.

Specifications and tolerances may be changed at any time during the alignment by pressing Vehicle Specifications and advancing the cursor to the position for the new value to be entered.

### Selecting Specification Formats

Specifications may be displayed in a symmetrical or non-symmetrical manner. Specifications that use an equal tolerance range for an angle such as:

	specification	tolerance
Left camber	0.50°	± 0.25°

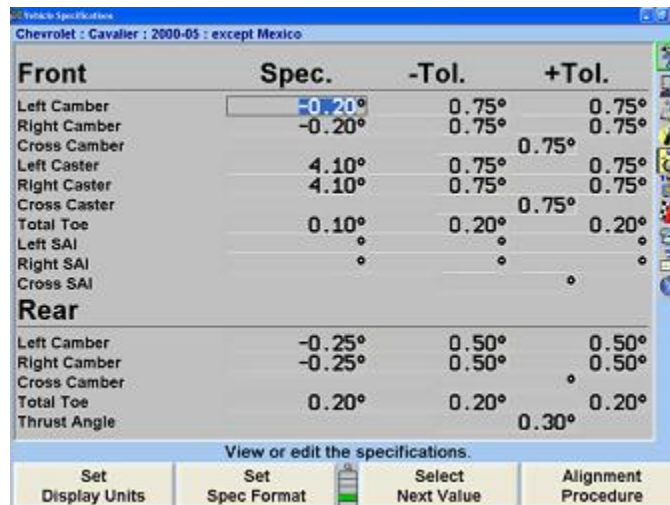
These are called symmetrical specifications because the tolerance range extremes are equal distance from the preferred specification. This permits a ± value to be used as a tolerance and does not require two placeholders for tolerances. Symmetrical specifications are most common.

Non-symmetrical specifications use an unequal ± tolerance such as:

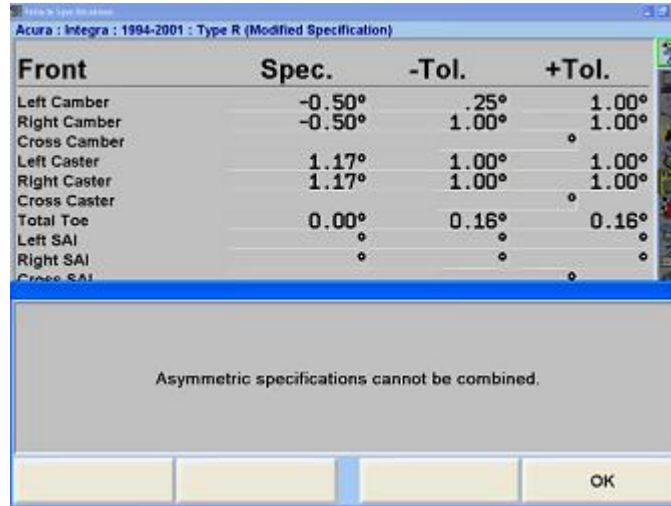
	specification	+ tolerance	- tolerance
Left camber	0.50°	0.50°	0.30°

The tolerance values require two placeholders on the specification screen because the tolerance extremes are unequal distances from the preferred specification.

Press "Set Spec Format", if individual + and - tolerance values are to be entered. The screen will change to display a positive and negative tolerance position for each specified angle.



If the format is asymmetric and the "+ tolerance" is not equal to the "- tolerance" for at least one tolerance pair, then the screen cannot be changed to symmetric format. Attempting to do so will generate an error message.



Press **ESC** or "OK" to clear this error message.

## Reducing Tolerances

Tolerances that are too large may allow a less than desirable alignment while tolerances that are too small may make adjustments difficult.

Pressing "Reduce Tolerances" will reduce the specification tolerances to the following:

- front and rear camber tolerance to  $\pm 0.25^\circ$  (1/4°),
- front caster tolerance to  $\pm 0.50^\circ$  (1/2°),
- front and rear total toe tolerance to  $\pm 0.06''$  (1/16", 0.13° or 1.5 mm depending upon toe units selected).

The actual angle specification will not be altered and only tolerances greater than these will be reduced.

## Storing Specifications

### Specification Notes

A "specification note" is a block of text that may be attached to a vehicle specification and stored with the specifications in the specification memory. The note may be stored with factory specifications, factory amended specifications, or with user specifications.

**NOTE:** Some factory specifications may already have a note attached. This might be a technical service bulletin, or some tip that may aid you in selecting the vehicle or adjusting its alignment.

To enter and store a specification note, do either of the following:

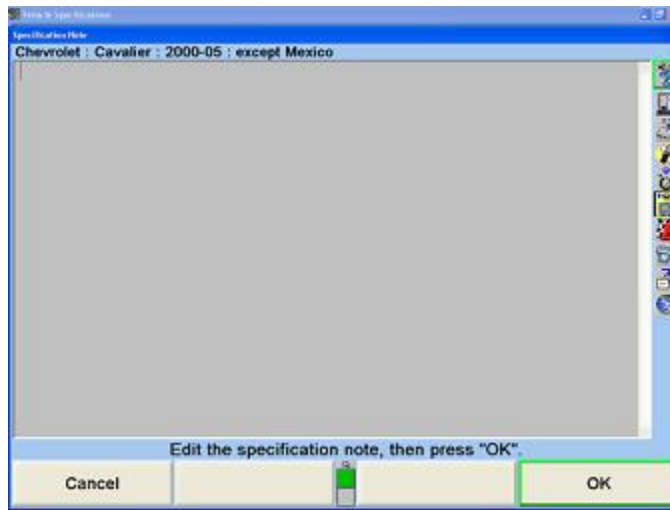
Recall the specifications in the usual manner. On the "Vehicle Measurements and Adjustments" primary screen, press "Show Spec Note".

OR

Open the "Recall Specifications" pop-up screen. Select the vehicle, press "OK" for the final selection. The "Show Spec Note" softkey will be available on the screen at this point. Press "Show Spec Note". This allows you to view the note without recalling the specifications.



The "Specification Note" pop-up screen will appear.



Use the keyboard to type and/or edit the note as desired. Pressing "Cancel" will close the pop-up screen without altering the note. Pressing "OK" will store the note in the specification memory with the vehicle.

If a vehicle in the specification memory has a note attached, it will have a small image of a note with a paper clip next to it in the "Recall Specifications" pop-up screen.



## Storing User Specifications

The program can store vehicle specifications that you enter and identify directly.

These specifications can take two forms:

- They can be manually entered onto a blank specification screen.

- They can be derived from a factory specification by recalling and then editing the specifications for a vehicle.

The specifications can then be stored in two locations:

- If they were manually entered onto a blank specifications screen, they can be stored in "User" specification memory.

- If they were derived from a factory specification, they can be stored in "User" specification memory or they can be stored in the "Factory" specification memory as an "Attachment" to the factory specification.

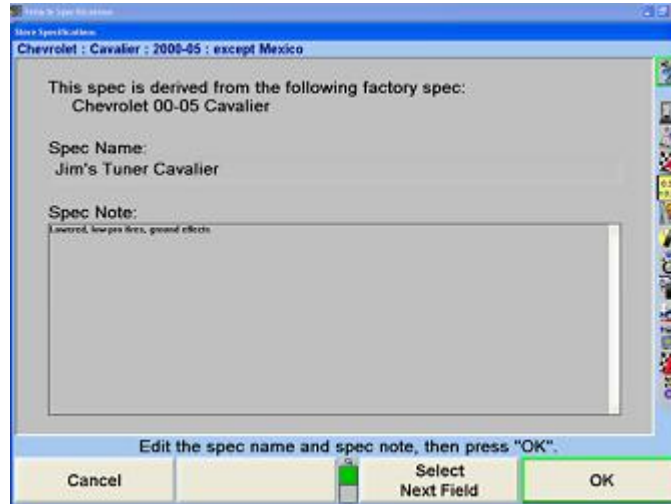
To store a specification:

On the "Vehicle Specifications" primary screen, press "Clear All Specifications". Then manually enter the specifications in the usual manner.

OR

Recall the vehicle specifications from the specification memory. Then manually edit the specifications as needed. This derives the specifications from the factory specifications.

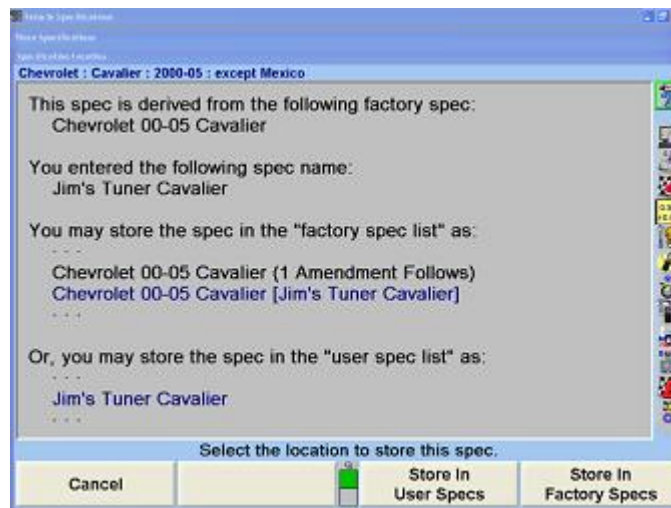
When the specifications are ready to store, press "Store Specifications". The "Store Specification" pop-up screen will appear.



Type in the identification of the vehicle. This is the name of the vehicle that will appear on the "Specification Recall" pop-up screen, and at the top of the "Vehicle Specifications" primary screen.

Press "Next Field" or "Tab", and the cursor will move to the "Spec Note" field. Type in any desired notes concerning the vehicle, such as Technical Service Bulletin information.

Press "OK". If the specifications were not derived from a factory specification, they will be immediately stored in the user specification memory. If they were derived from a factory specification, the "Specification Location" pop-up screen will appear. Now you must decide where to store the specification.



Press "Store In User Specs" or "Store In Factory Specs" to specify the memory where the new specification will be stored.

When saving to User specifications, if the specification ID is already used in the memory, a screen will appear stating "A specification with this ID is already in the database. Do you want to replace it?" Pressing "OK" or "Enter" will replace the specification.

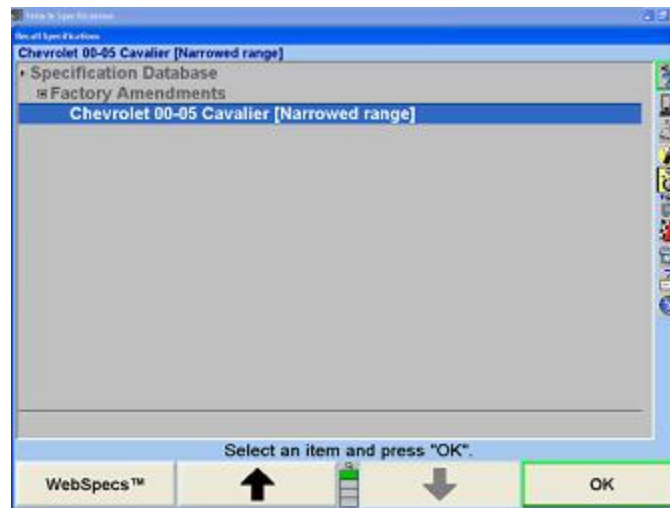
When saving to "Factory" specifications, if the specification ID is already used in the database, the specification will be saved as an AMENDMENT to the factory specification already in memory.

For recalling User Specifications, refer to "Selecting User Specifications."

## Factory Amended Specifications

"Factory Amended Specifications" are specifications that are derived from and stored with a factory specification. The procedure for doing this is discussed in , "Storing User Specifications."

Select "Show Spec Databases". Then select "Factory Amendments". This displays all vehicles that have a Factory Amended Specification.



The most likely use of a factory-amended specification is that the manufacturer has issued a Technical Service Bulletin that does one or more of the following:

- It alters the factory specification.
- It details a special service procedure.
- It warns of alignment problems.
- It warns of warranty procedures.

By having a "Factory Amended Specification" in the specification memory, these items are brought to your attention, as you recall the specifications. This way, you do not have to remember the Technical Service Bulletins.

On the "Recall Specification" pop-up screen, when there is an amended specification that is derived from the factory specification of the vehicle being aligned, highlight that specification and view its "Specification Note". This note is intended to explain the use of this specification instead of the factory specification.

If there is a Technical Service Bulletin, store a "Factory Amended Specification" as detailed in , "Storing User Specifications", on page 12. The "Specification Note" should contain the contents of the Technical Service Bulletin.

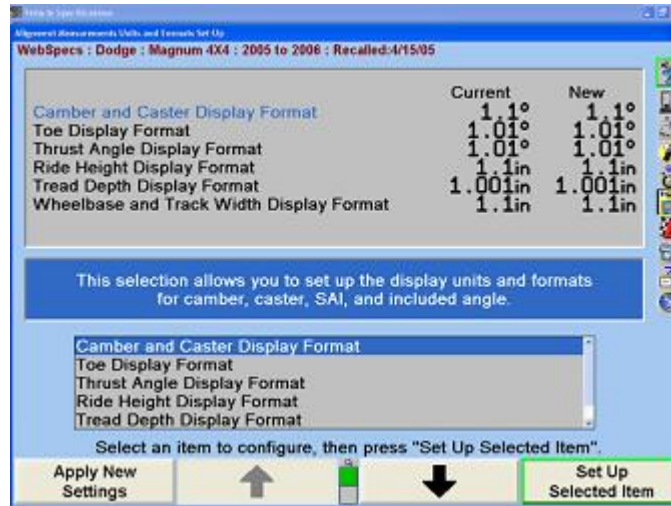
## Selecting Display Units

**Do not underestimate the importance of selecting the display units.** Although the ability to change display units can be beneficial, the factory specifications are displayed in the format designated by the manufacturer.

Press "Set Display Units" in the "Vehicle Specifications" primary screen. The "Alignment Measurement Units and Formats Setup" pop-up screen will appear listing "Current" and "New" settings.

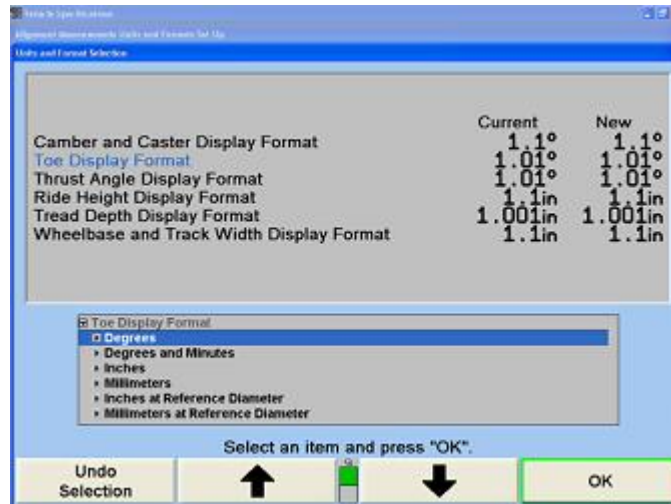
**NOTE:** The "Alignment Measurement Units and Formats Setup" pop-up screen may also be accessed by selecting Alignment Measurement Units and Formats from Aligner Setup. Refer to "Aligner Set-Up."

Select and change the units and formats for the various alignment displays from the following pop-up screen. Both the "Current" and "New" settings are shown as example measurements.





Press or to highlight a display format type. When a parameter type is highlighted, a brief explanation of the measurement type appears.

Press "Set Up Selected Item". The "Units and Format Selection" pop-up screen appears to allow the units and formats to be selected. This pop-up screen continues to show the current and new settings for all the display formats.



Press or to highlight the desired units, then press "OK". The screen changes to show the formats available for the selected units for the display format.

Press or to highlight the desired units, then press "OK". If the selected format is fractional, a third selection must be made, to select whether the fractions should be reduced. When the final choice is made, the pop-up screen closes and the display returns to the "Alignment Measurement Units and Formats Setup" pop-up screen. The new example for the display format shows the selection just made.

Press  or  to highlight another display format and continue to set up the units and formats.

If the change(s) should be applied only to the current vehicle, press "Apply New Settings".

If the change(s) should be applied to the entire factory database each time the system is powered up, press "Set As Default".

Press "Exit" to return to the "Vehicle Specifications" screen.

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## Vehicle Measurements and Adjustments

### Vehicle Plan View Status Indicator

The purpose of the vehicle plan view status indicator is to illustrate:

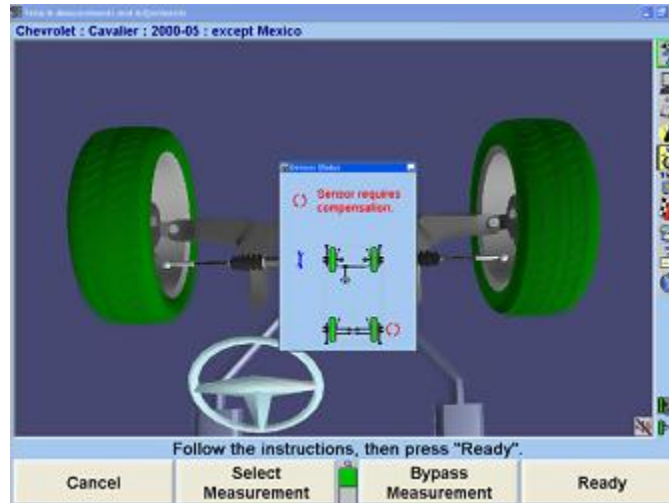
The geometry of the vehicle under alignment.

**NOTE:** This feature is more useful for truck applications because automobiles all show similar alignment geometry.

Where and how the sensors should be mounted.

Which axle of the vehicle is currently displayed.

The current status of the sensors, transducers, and sensor communications.



The indicator appears on the display when:

The primary or pop-up screen actively uses the sensors to measure or adjust the alignment.

An alignment procedure is being selected, where one or more instances of the plan view are used to illustrate the steps of the procedure.

During VirtualView® and ExpressAlign® screens.

The indicator shows:

The vehicle geometry.

The currently required sensor mounting locations and orientations.

Which axle the measurements and adjustments currently apply.

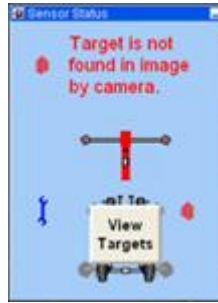
Which axle is currently selected (which applies to jacking up the axle, etc.).


The individual wheels turn red when a sensor problem is present.

To change the displayed axle measurements, click on a wheel of the indicator with a pointing device, or press the softkey for "Show Next Axle".

## Target Blockage

The Plan View Sensor Status Indicator displays a live image of target status. If a target image is blocked the Plan View will display the following image indicating which target image is blocked.



Select "View Targets" to display a live video camera image of all four targets. The thumbtack image  in the upper left hand corner of the pop-up keeps the window visible.



Each target can be selected to zoom the image to identify viewing errors. Simple errors could be caused by a physical interference, or a dirty target, or possibly a target rotated out of viewing range.

## Bar Graph Adjustments

Bar graphs are used to show alignment angle information for each wheel. These bar graphs indicate the difference between the actual measurements of the vehicle and the recalled specifications. The adjustment tolerances determine the size of the center areas of the bar graph.

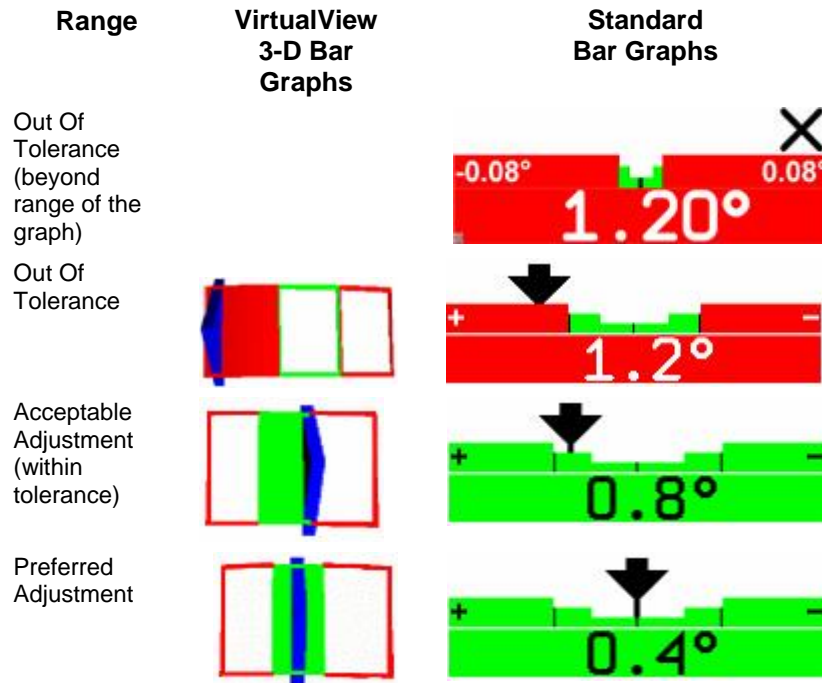
Softkeys labeled "Show Next Axle", "Show Bar Graphs", and "Show Next Bar Graphs" are available to access adjustment displays. The system utilizes both bar graph and digital adjustment displays.

The numerical values below the bar graphs represent the actual measurement. The ideal or preferred adjustment would find the wheel position indicator arrow centered over the white line of the center bar and the numeric value reading the preferred specification for the vehicle.

A red bar graph indicates the measurement is out of tolerance. On standard bar graphs, an "X" indicates the measurement direction on the bar graph is beyond the range of the bar graph. The "X" will change to an arrow when the measurement is adjusted into range of the bar graph.

As the vehicle is adjusted, the wheel position indicator moves in the direction of the adjustment. As the adjustment approaches the acceptable tolerance range, the center area of

the bar graph grows. When the adjustment is within tolerance, the bar graph changes to green.



If no 3-D bar graph is shown in VirtualView or the standard bar graph color is gray:

Either "no specification", a "zero tolerance", or "no tolerance" is entered for that angle.

OR

The sensors are experiencing some problem that prevents measurements, such as: the sensor is unplugged, uncompensated, or the toe beam is blocked.

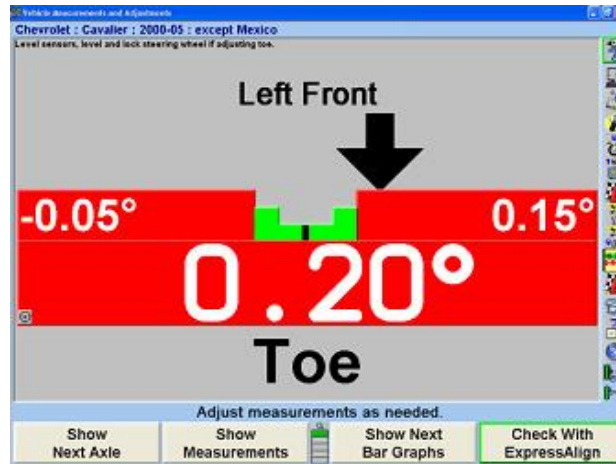
## Bar Graph Groups

The bar graphs can be viewed in various groups. Three examples are shown below.



To view an alternative group or single bar graph, press "Show Next Bar Graphs". Repeat to view the next bar graph group. When all enabled bar graphs have been viewed, the first enabled bar group will appear when "Show Next Bar Graphs" is pressed.

To view a single bar graph select the desired bar graph with a light pen or mouse. The system will zoom in on the selected bar graph and all other bar graphs will be removed from the screen.

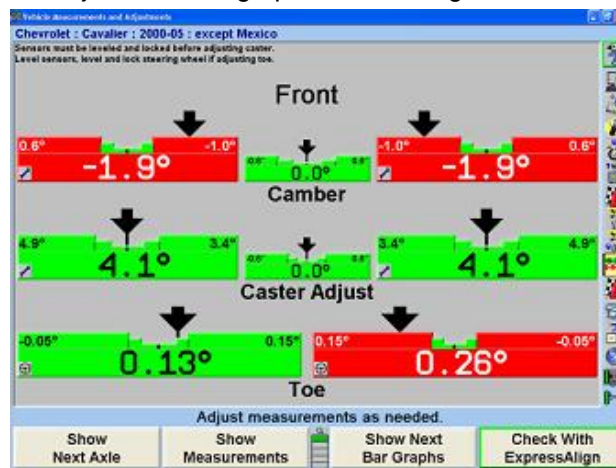


To return to the previous bar graph display, click on the current bar graph.

In VirtualView® select any bar graph with the mouse and it will also zoom in for a larger display.



Like the "Vehicle Measurements and Adjustments" screen, cross camber and caster can now be displayed on the adjustment bar graph screen using the context sensitive menu.



Front Axle Bar Graphs Groups, Rear Axle Bar Graphs Groups, and Cross Bar Graph/Additional Cross Angles may be setup in aligner setup.



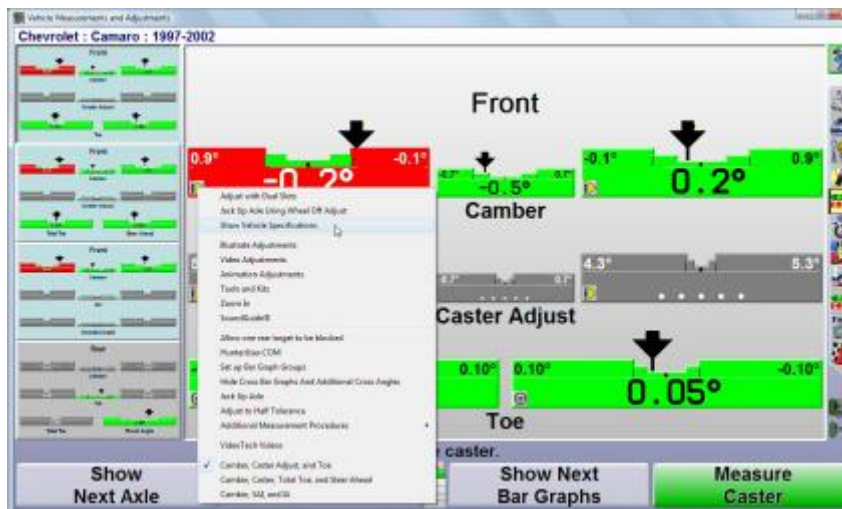
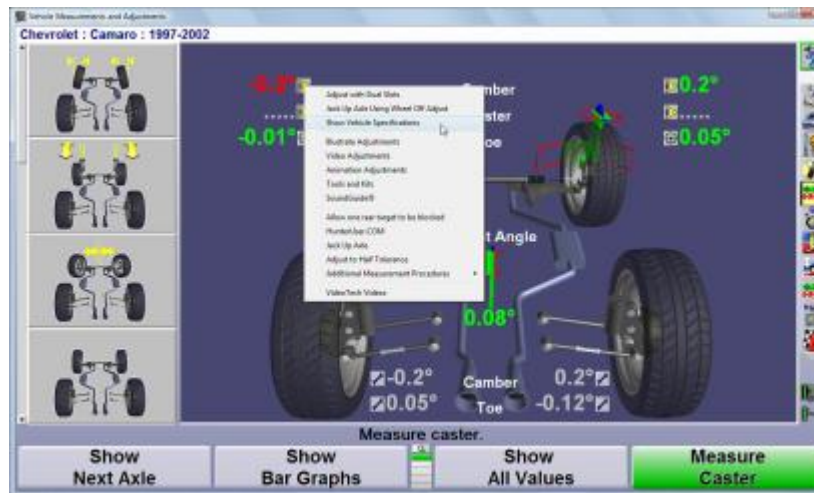
## Context Sensitive Menu

A context sensitive menu is available on the bar graph adjustment screen.

To view the menu, move the arrow cursor to the desired bar graph with a light pen or mouse, then press and hold. Pressing the **Esc** key will also cycle through each context sensitive menu.

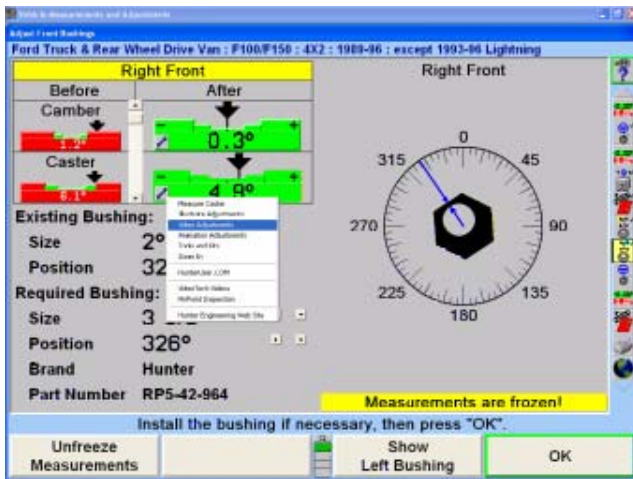
The items listed in the menu will depend upon which bar graph is selected. The menu may contain some of the following items:

- |  |  |
|--|--|
| Zoom In  | Zoom Out                                     |
| Illustrate Adjustments                               | Video Adjustments                            |
| Animation Adjustments                                | Adjust with Eccentric Cams                   |
| Adjust with Shims                                    | Adjust Toe with WinToe®                      |
| Measure Caster                                       | Measure SAI/IA                               |
| Set Units and Formats                                | Select Bar Graph Groups                      |
| Show Vehicle Specifications                          | Adjust With Automatic<br>Bushing Calculator® |
| Show Cross Bar Graphs and Additional<br>Cross Angles |  |

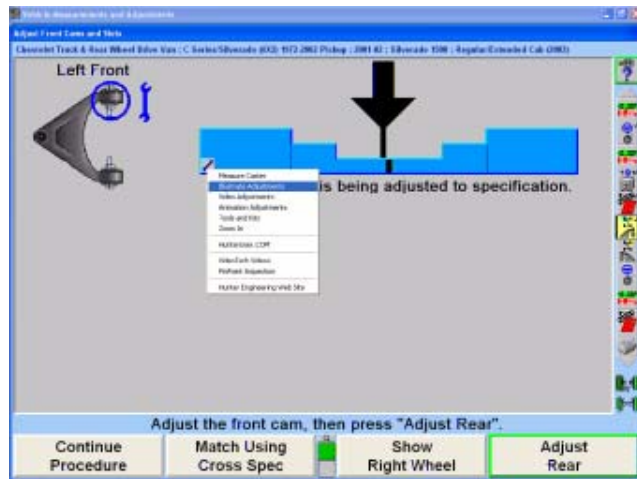


To select the desired item, continue moving the cursor until the desired item is highlighted. Click on the highlighted item and the selected pop-up screen will appear.

Context sensitive menus are also available on power feature adjustment bar graphs.



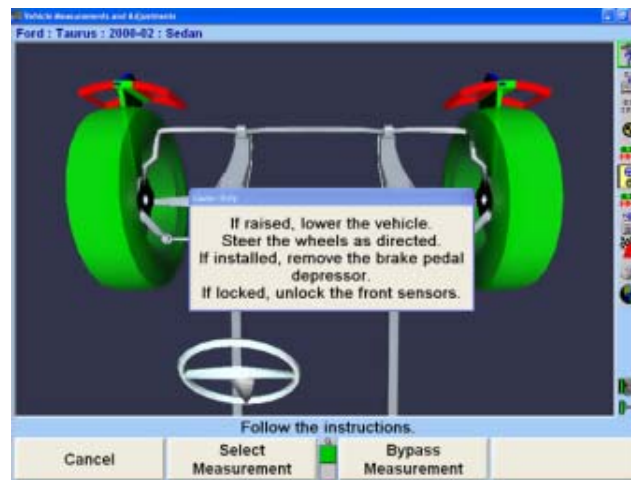
Automatic Bushing Calculator



CAMM-Control Arm Movement Monitor

## Measuring Caster, S.A.I., and Included Angle

The "Measure Caster" display provides guidance through the procedure to measure Caster or Steering Axis Inclination (S.A.I.) and Included Angle (I.A.). At times, measuring S.A.I., I.A. or turning angle may be useful tools to help determine front suspension or steering system problems with a vehicle.



Horizontal bar graphs are used to indicate wheel position or angle position in relation to the preferred position or specification. The center of each bar graph represents the preferred position of the wheel(s) or angle.

The caster measurement display uses graphics and horizontal bar graphs to guide the steering of the wheels through the caster turn.

A wheel position indicator (either an "X" or an arrow) is positioned within the bar graph and shows the position of the wheel(s). The wheel position indicator will be left of center if the front wheels are steered too far to the left, right of center if the front wheels are too far to the right, or in the center valley of the bar graph if the front wheels are steered correctly (null position).

An "X" on a red bar graph indicates the wheels are steered beyond the range of measurement. Steer the wheels in the direction necessary to move the "X" toward the center of the bar graph. The "X" will change to an arrow when the wheel comes into range of the bar graph.

NOTE: Total toe conditions greater than 2 inches or 4 degrees should be corrected prior to steering caster.

As the wheels are steered in the proper direction, the arrow will move toward the center. As the wheel approaches the acceptable tolerance, the center area will get larger. When the wheel is within tolerance, the bar graph will change to green.

Steered out of range (right)



Steered too far (right)



Steered correctly (null position)



When the wheel is in the proper position, the arrow will be over the thinnest section of the bar graph. The aligner will save the measurements and the bar graph will disappear.

**NOTE:** It is not necessary to perfectly center the arrow in the bar graph when steering to measure caster, caster and S.A.I./I.A., or S.A.I./I.A. The wheel position is acceptable when the arrow is positioned within the center valley of the bar graph.

**NOTE:** If WinAlign® determines that the brakes are applied or sensors are unlocked while measuring S.A.I., a prompt will appear asking you to check the sensors and/or brakes.

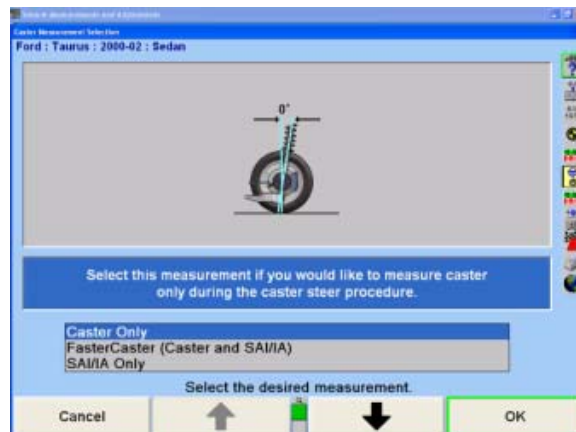
**NOTE:** Camera Based Sensor Only:  
Unlike conventional sensors, Camera Based Targets should not be unlocked and re-leveled if the target has rotated so that it is not level after measuring caster.  
If the Camera Based Sensor targets have rotated so that they are not level after measuring caster but before adjusting caster, "Match Caster Adjust to Measured Caster" may be selected from the caster pull-down bar graph. This will allow WinAlign to electronically compensate for rotation.



## Measuring Caster

Press "Measure Caster" on the "Vehicle Measurements and Adjustments" primary screen. The "Caster and S.A.I. Measurement" pop-up screen will appear.

If "Caster Only" is not the default:

Press "Select Measurement", the "Caster Measurement Selection" pop-up screen will appear.



Press  or  until "Caster Only" is highlighted.

Press "OK" to select the measurement. The "Caster and S.A.I. Measurement" pop-up screen will appear.

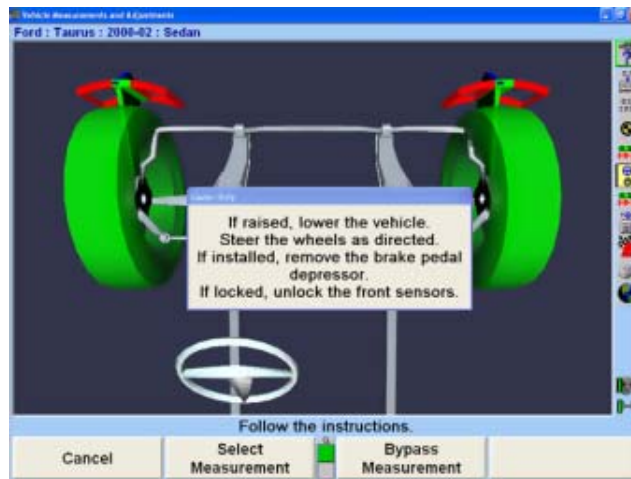
<b>NOTE:</b>	This selection will not change the aligner default setting. When the aligner is reset, the default settings will be applied.
--------------	---

Lower vehicle if raised and remove brake pedal depressor if installed.

Loosen the front sensor lock knobs.

A single bar graph is displayed along with a prompt to steer the wheels to the straight-ahead position.

Steer the wheels until the wheel position indicator is within the center valley of the bar graph and hold steady. The aligner will save the measurements and the display will change to show two bar graphs and prompt to steer left. Depending on conditions, you may be required to press "Ready" to continue.



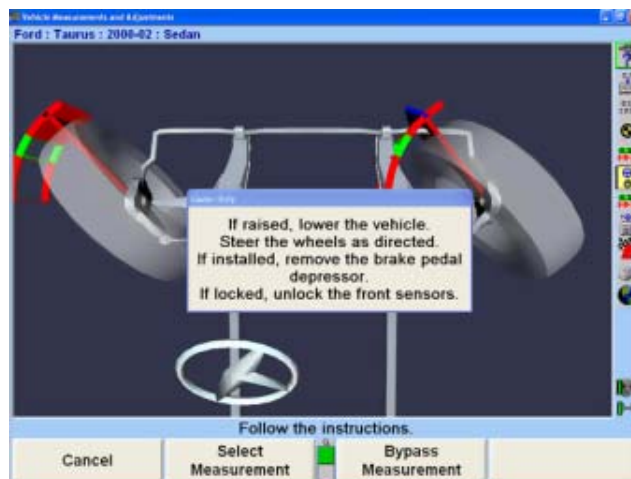
The left bar graph indicator is controlled by the left wheel, the right bar graph indicator by the right wheel.

Observing the bar graph display, steer the wheels to the left until either wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady.

The measurements will be saved and the bar graph will disappear.

Continue to steer the wheels until the remaining wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady until that bar graph disappears.

Two new bar graphs will appear and the steering wheel display will indicate to steer to the right.



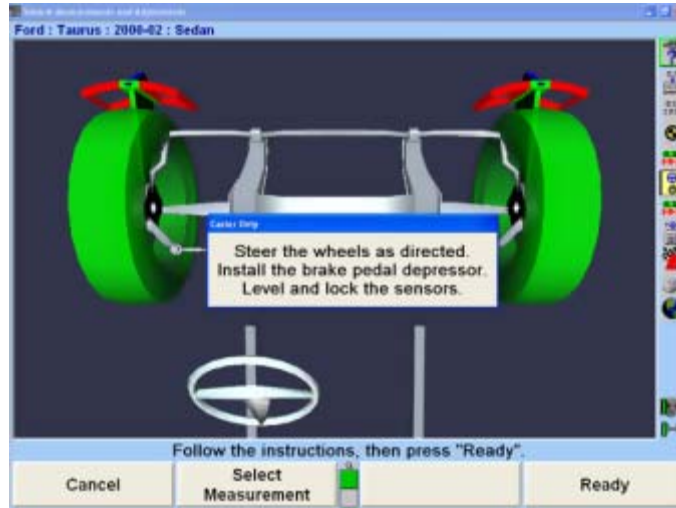
Observing the bar graph or VirtualView display, steer the wheels to the right until either wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady.

The measurements will be saved and that bar graph will disappear.

Continue to steer the wheels as indicated until the remaining wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady until that bar graph disappears.

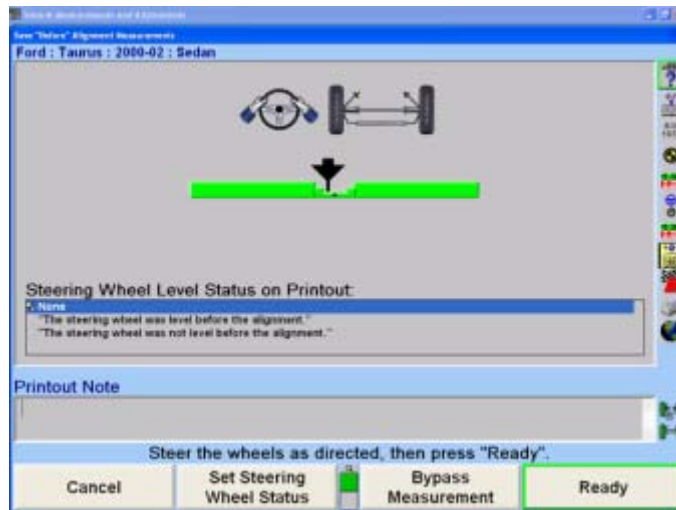
A single bar graph will appear.

Steer the wheels straight ahead until wheel position indicator is within the center valley of the bar graph. Install the brake pedal depressor and level and lock the sensors.



Press "Ready" and the "Vehicle Measurements and Adjustments" primary screen will reappear.

These are the initial measurements of the vehicle. Press "Save Before Measurements" to save them for the printout. If "Set steering wheel status when measurements are saved" is enabled from Aligner Setup, the screen will change to the "Save Before Alignment Measurements" pop-up screen. *Refer to "Aligner Set-Up."*



If "Set steering wheel status when measurements are saved" is disabled from Aligner Setup, and all measurements are stable, and the vehicle is steered straight ahead, then the "Save Before Alignment Measurements" pop-up screen will be continued through. The screen will briefly appear and the settings will be automatically saved if everything is stable.

Make sure the vehicle is in the correct condition to save the before measurements. Jounce the vehicle, then steer the wheels straight ahead until the bar graph indicates a null position.

For printouts, highlight the steering wheel level status. This message will be displayed on printouts. In ExpressAlign® it is necessary to steer ahead prior to saving the current status.

Press "Ready". When the measurements are stable, the program will save them for ExpressAlign, Work Management printout.



The system will save the measurements and the screen will return to the "Vehicle Measurements and Adjustments" primary screen if ExpressAlign is not enabled.

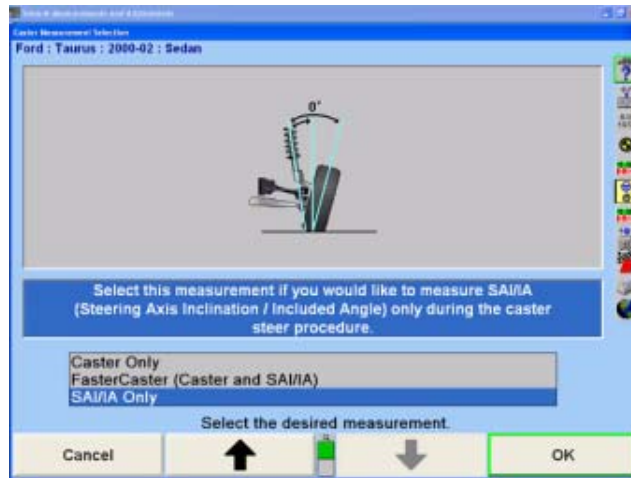
## Measuring S.A.I. and Included Angle

Press "Measure Caster" on the "Vehicle Measurements and Adjustments" primary screen. The "Caster and S.A.I. Measurement" pop-up screen will appear.

If measuring S.A.I./I.A. Only is not the default:

Press "Select Measurement", the "Caster Measurement Selection" pop-up screen will appear.

Press  or  until S.A.I./I.A. Only is highlighted.



Press "OK" to select the measurement. The "Caster and S.A.I. Measurement" pop-up screen will appear.

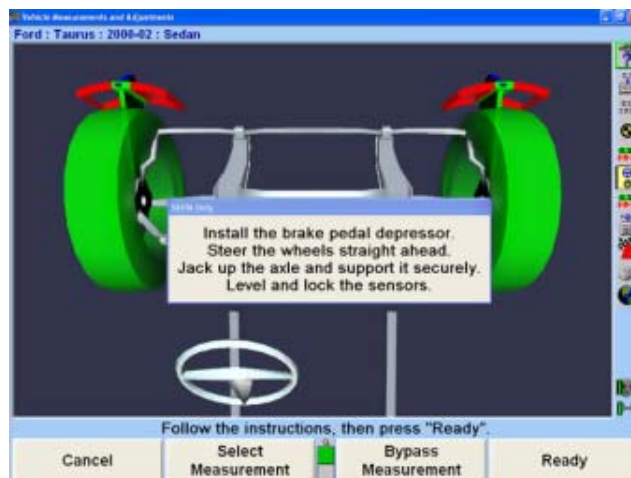
<b>NOTE:</b>	This selection will not change the aligner default setting. When the aligner is reset the default settings will be applied.
--------------	---

Lock the front brakes using a brake pedal depressor.

Steer the wheels straight ahead.

Jack up the front axle until the front wheels clear the turning angle gauges or rack. The jack should securely support the vehicle.

Level and lock the sensors.



Press "Ready".

Perform the S.A.I. turn while observing the bar graphs in the same manner as the caster turn. Refer to "Measuring Caster," below. When S.A.I. measurements are completed, the screen will change to the Vehicle Measurements and Adjustments primary screen with the S.A.I. and I.A. measurements shown.

Lower the vehicle.

**NOTE:** While lowering the vehicle, camber and S.A.I. measurements will change. However, included angle measurements will remain constant.



### Faster Caster® - Measuring Caster and S.A.I./I.A. Simultaneously

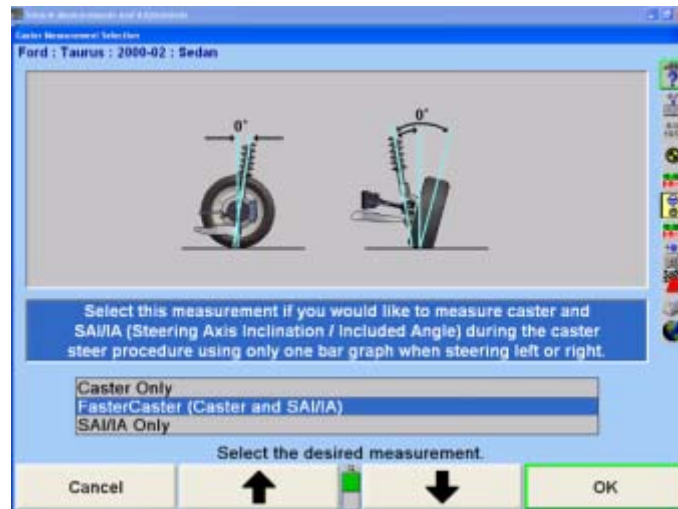
The Faster Caster® measurement feature uses a single bar graph indicator instead of using both a left and right bar graph indicator.

Press "Measure Caster" on the "Vehicle Measurements and Adjustments" primary screen. The "Caster and S.A.I. Measurement" pop-up screen will appear.

If measuring Faster Caster (Caster and S.A.I./I.A.) is not the default:

Press "Select Measurement", the "Caster Measurement Selection" pop-up screen will appear.

Press  or  until FasterCaster (Caster and S.A.I./I.A.) is highlighted.



Press "OK" to select the measurement. The "Caster and S.A.I. Measurement" pop-up screen will appear.

**NOTE:** This selection will not change the aligner default setting. When the aligner is reset, the default settings will be applied.

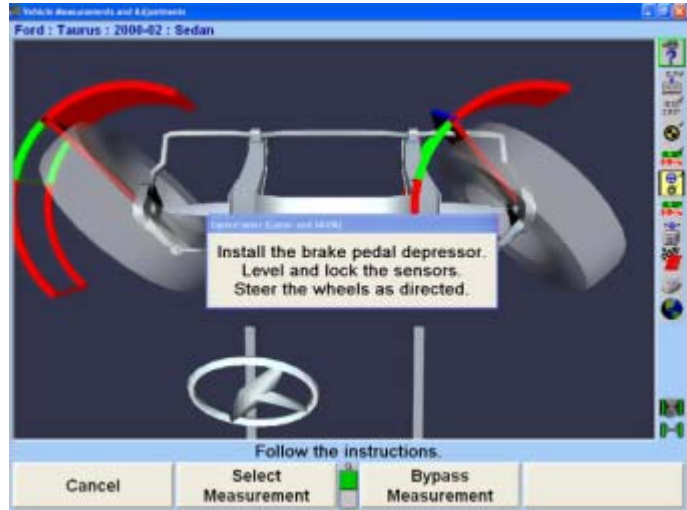
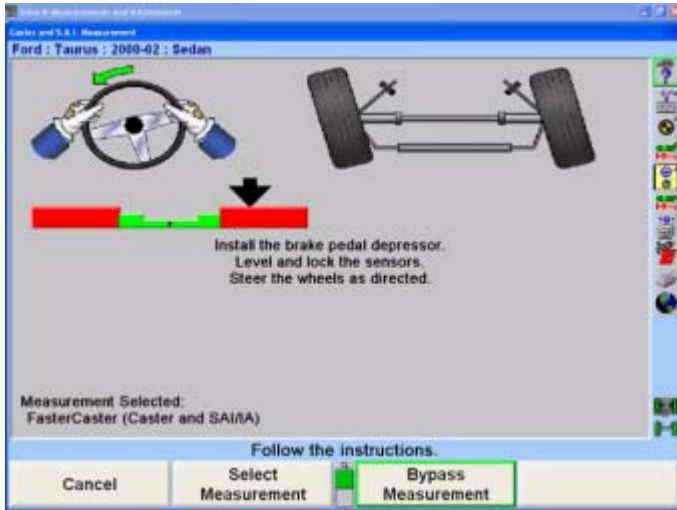
Lock the front brakes using a brake pedal depressor.

Steer wheels straight ahead.

Level and lock the sensors.

Press "Ready".

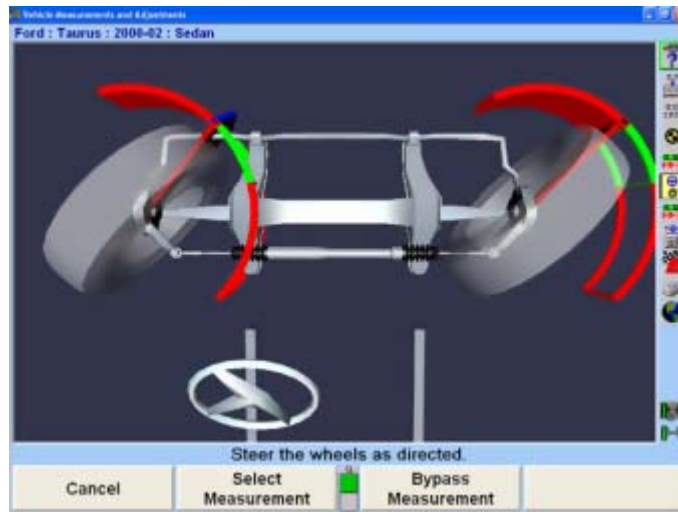
The aligner will save the measurements and the display will change to show a bar graph and prompt to steer left.



The single left bar graph indicator is controlled by the left wheel.

Observing the bar graph display, steer the wheels to the left until the wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady until the bar graph disappears.

A single right bar graph will appear and the steering wheel display will indicate to steer to the right.



Observing the bar graph display, steer the wheels to the right until the wheel position indicator is within the center valley of its bar graph. Hold the steering wheel steady until the bar graph disappears.

A single bar graph will appear.

Steer the wheels straight ahead until wheel position indicator is within the center valley of the bar graph.

When the caster and S.A.I. measurements are completed, the screen will change to the "Vehicle Measurements and Adjustments" primary screen with the caster, S.A.I., and included angle measurements shown.



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## Advanced Vehicle Handling Values

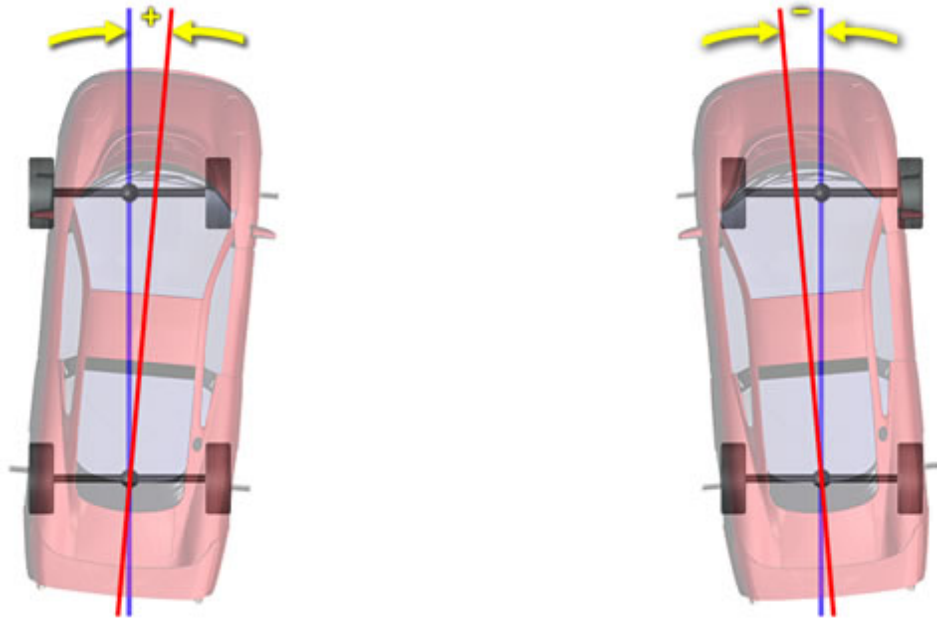
Advanced alignment values represent forces, angles and dimensions which may affect vehicle handling. Modifications to a vehicle's suspension, tires and/or wheels often affect these values, which may result in unwanted changes to vehicle handling or ride quality.

Although most of these values cannot be adjusted directly, knowing the amount and direction of change can be very useful when diagnosing problems. These changes may indicate potential problems or improvements in vehicle ride, handling, stability, steering response, tire wear, and fuel efficiency.

These values should be measured before and after any modifications to record the changes of both adjustable and non-adjustable readings.

There are no specifications for advanced alignment values.

### Body Center Line Angle



Positive Body Center Line Angle

Negative Body Center Line Angle

<b>NOTE:</b> Body Center Line Angle measurements require Live Ride Height Targets.
--

#### Description:

Body Center Line is the center of the vehicle's body and measured using ride height targets affixed to the body of the vehicle. The alignment sensors are also used to find the geometric or chassis centerline of the vehicle.

Ideally, the body center line and the chassis center line are aligned with each other and to the thrust line of the vehicle. A substantial difference between body and chassis center line may be the result of collision or intentional modification.

The difference between body and chassis center line is shown as Body Center Line Angle. A positive number indicates the thrust line is to the right of body center line. Negative numbers indicate the thrust line is to the left of body center line.

Both Body Center Line Angle and Body Center Line Offset may be useful tools when diagnosing the cause of an excessive thrust angle.

### What can change it:

A horizontal shift of the rear axle may be caused by broken leaf spring centering pins, loose or broken U-bolts, bent trailing arms or damaged frame rails.

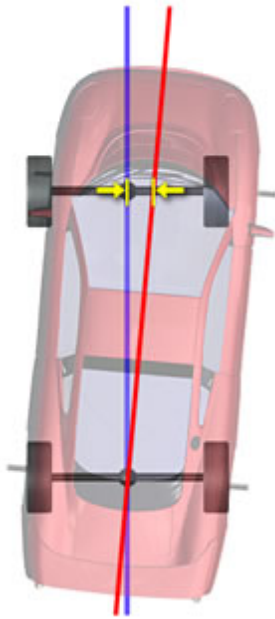
A horizontal shift of the front axle may be caused by cradle position (damaged or shifted), frame rail damage, loose or broken U-bolts or broken leaf spring centering pins.

Collision, body repair, etc, may also cause these lines to be divergent.

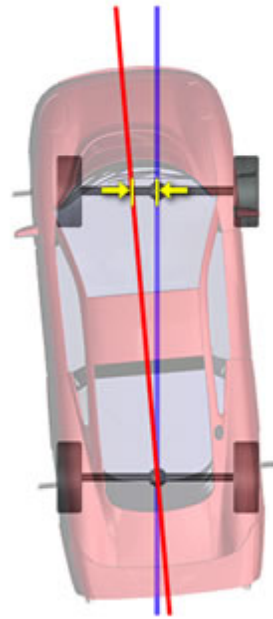
### Vehicle characteristics it effects:

Any Body Center Line Angle measurement other than "0" will cause dog tracking.

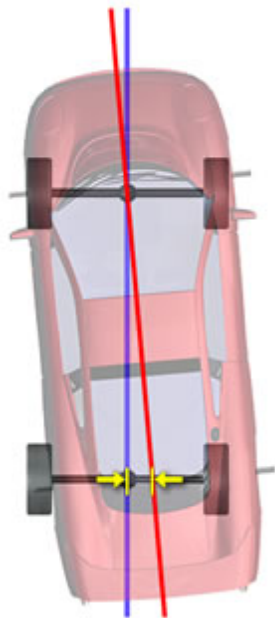
### Body Center Line Offset



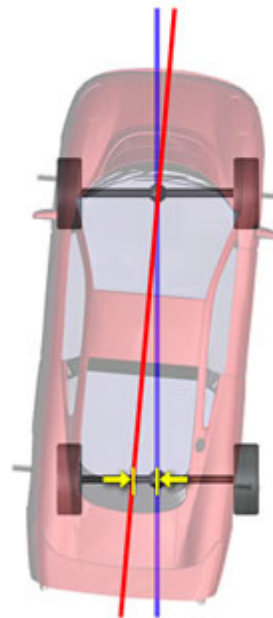
Front Positive Body Center Line Offset



Front Negative Body Center Line Offset



Rear Positive Body Center Line Offset



Rear Negative Body Center Line Offset

**NOTE:** Body Centerline Offset measurements require Live Ride Height Targets.

**Description:**

Body Center Line Offset is the lateral distance between body center line and chassis center line at the front or rear axle. Both Body Center Line Angle and Body Center Line Offset may be useful tools when diagnosing the cause of an excessive thrust angle.

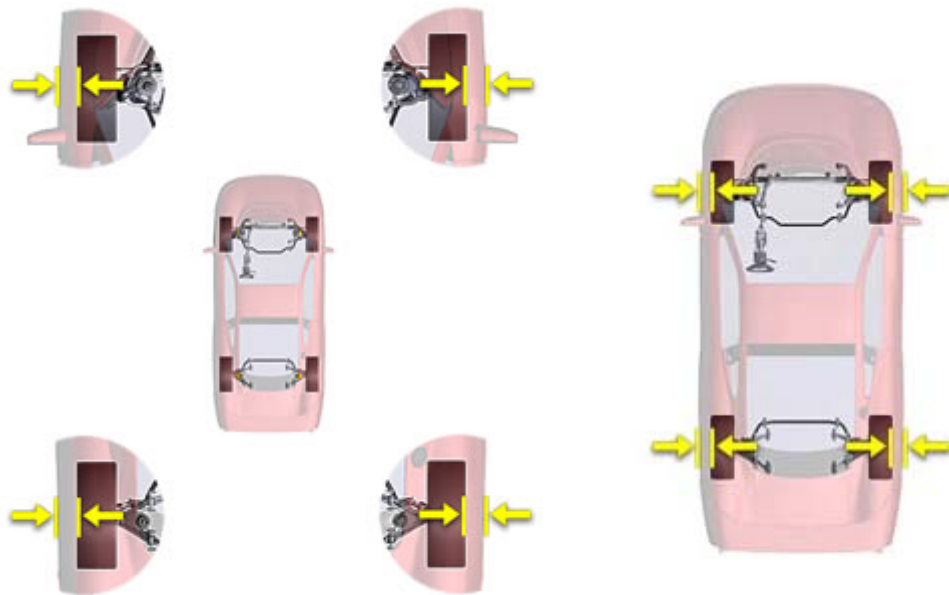
**What can change it:**

Collision, body repair, etc, may cause these lines to be divergent.

**Vehicle characteristics it effects:**

Any front to rear difference in body centerline offset will produce a non-zero Body Center Line Angle measurement, which will cause dog tracking.

**Body Overhang**



**NOTE:** Body Overhang measurements require Live Ride Height Targets.

**Description:**

Body Overhang is the distance, positive or negative, the wheel well overhangs the tire. This measurement should be similar on either side of the same axle.

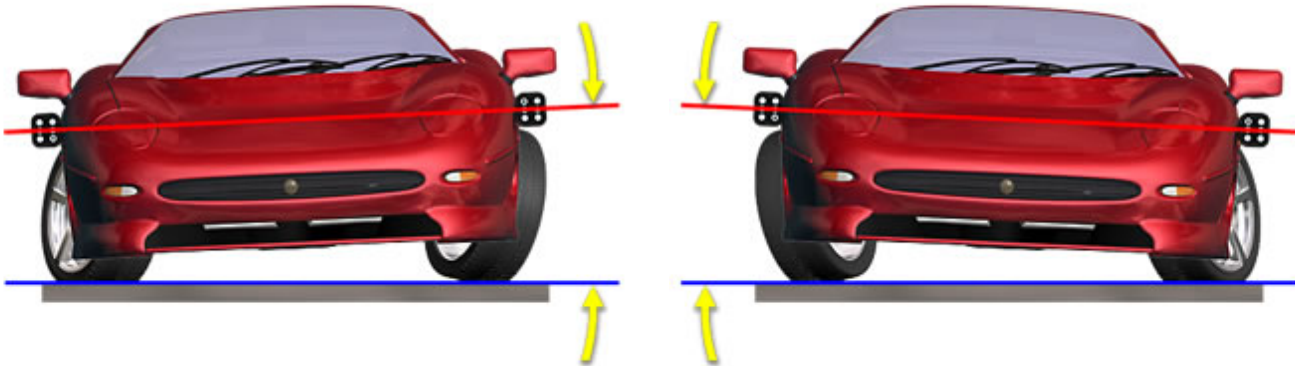
**What can change it:**

Collision, body repair, etc, may cause these lines to be divergent.

**Vehicle characteristics it effects:**

Wheels with greater offset or width can produce a negative Body Overhang, which means that a collision may occur between tire and wheel well when the springs are compressed.

## Body Roll Angle



Positive Body Roll Angle

Negative Body Roll Angle

<b>NOTE:</b> Body Roll Angle measurements require Live Ride Height Targets.
---

### Description:

Body Roll Angle is the vehicle body tilt from side to side that occurs when the wheels are turned from steer ahead to the maximum steering angle in either direction.

When the vehicle is steered from side to side, the body of the vehicle rolls due to a height change induced by the steering axis inclination (SAI) and caster. The side of the vehicle on the inside of the turn is usually lifted higher than the side of the vehicle on the outside of the turn.

Steering system and suspension symmetry can be evaluated by comparing the Body Roll Angles at predetermined steering angles. The Body Roll Angle should be equal and opposite for left hand and right hand turns. If there is a difference then a symmetry problem exists.

### What can change it:

Factors that influence Body Roll Angle are:

- Front caster
- Steering Axis Inclination
- Spring rate
- Anti-sway bar configuration
- Wheel offset, diameter, and width

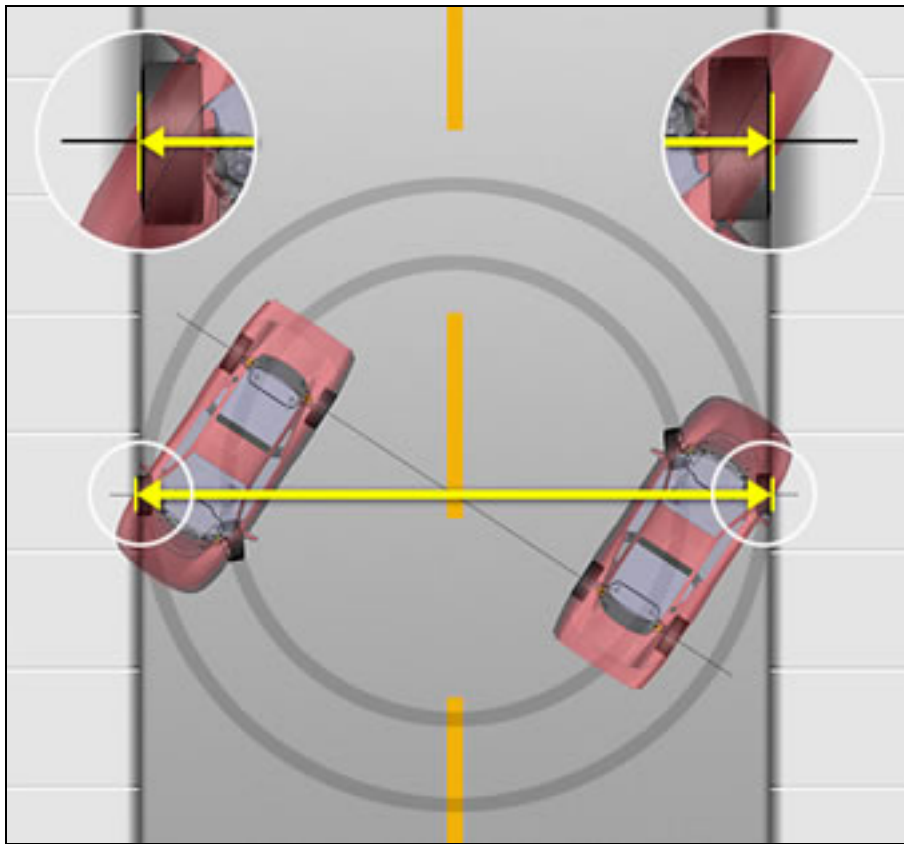
The following conditions may contribute to excessive differences in Body Roll Angles:

- Excessive cross caster and/or S.A.I.
- Sagged or broken springs
- Broken sway bar links

### Vehicle characteristics it effects:

Minimizing Body Roll Angle will help the vehicle maintain better traction in turns.

## Curb-to-Curb Distance



### Description:

Curb-to-Curb Distance is the minimum diameter of a circle, as measured from the outside of the tire, needed to turn a vehicle 360°. This measurement is determined by the wheel base, tire width, and the vehicle's maximum turning angle.

### What can change it:

The following components can effect Turning Radius measurements:

- Loose or missing steering box mounting bolts.
- Bent or damaged steering arm.
- Loose or damaged idler arm.
- Loose or damaged pitman arm.

Incorrect total toe and modifications to the wheel base will also effect Turning Radius.

### Vehicle characteristics it effects:

The larger the Curb-to-Curb Distance, the more room a vehicle needs to turn around.

## Rolling Force Lever



Positive Rolling Force Lever - Left Side

Positive Rolling Force Lever - Right Side

### Description:

Viewed from the front of the vehicle, the Rolling Force Lever can be illustrated by a line drawn perpendicular from the steering axis to where the wheel centerline intersects the spindle centerline.

This measurement should be similar on either side of the same axle.

### What can change it:

Any modification or condition that can alter the position of the steering axis, or where the center of the wheel intersects the spindle, will cause the length of the Rolling Force Lever to change.

Using a wheel with a larger negative offset will cause the value to change towards the positive. Wheels with a smaller negative offset will change the value towards negative.

Changes in camber will effect Rolling Force Lever by tilting the spindle.

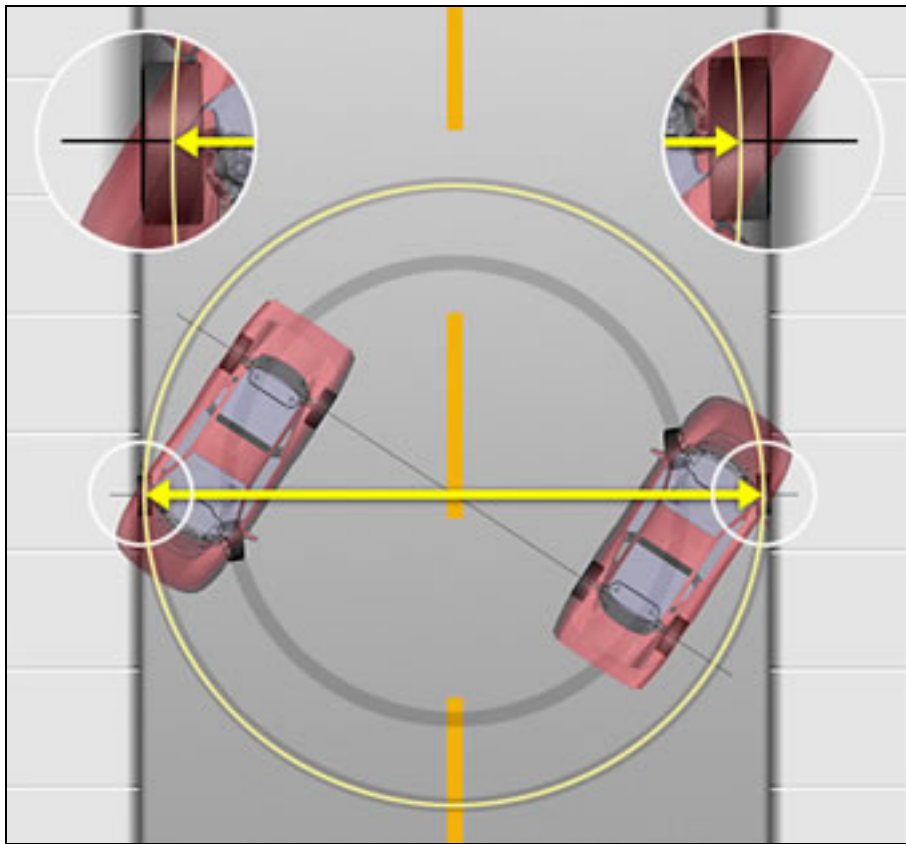
Damaged suspension components will also cause a change in Rolling Force Lever.

### Vehicle characteristics it effects:

As the Rolling Force Lever gets longer, it becomes easier for road forces to disturb and sometimes steer the wheels. Because of this, additional road shock can be transmitted to the steering wheel.

If the Rolling Force Levers are unequal side-to-side, the vehicle may pull. Road force and rolling resistance will act on the longer lever and try to steer the vehicle away from straight ahead. An under inflated tire will cause more steering pull when the Rolling Force Lever is longer.

## Turning Circle



### Description:

Turning Circle is the minimum diameter of a circle, as measured from the center of the tire, needed to turn a vehicle 360°. This measurement is determined by the wheel base and the vehicle's maximum turning angle.

### What can change it:

The following components can effect Turning Radius measurements:

- Loose or missing steering box mounting bolts.
- Bent or damaged steering arm.
- Loose or damaged idler arm.
- Loose or damaged pitman arm.

Incorrect total toe and modifications to the wheel base will also effect Turning Radius.

### Vehicle characteristics it effects:

The larger the Turning Circle, the more room a vehicle needs to turn around.

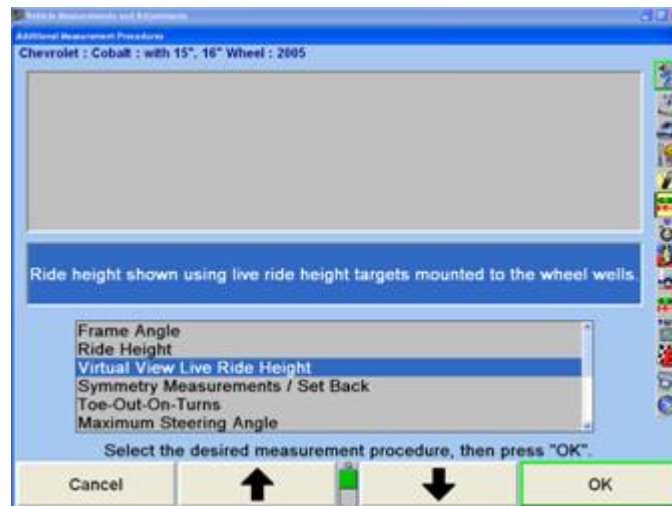
## Measuring Ride Height

**NOTE:** Ride height specifications should be used only as an initial screening test. Measure ride height using the OEM procedure to verify that components meet the OEM requirements.

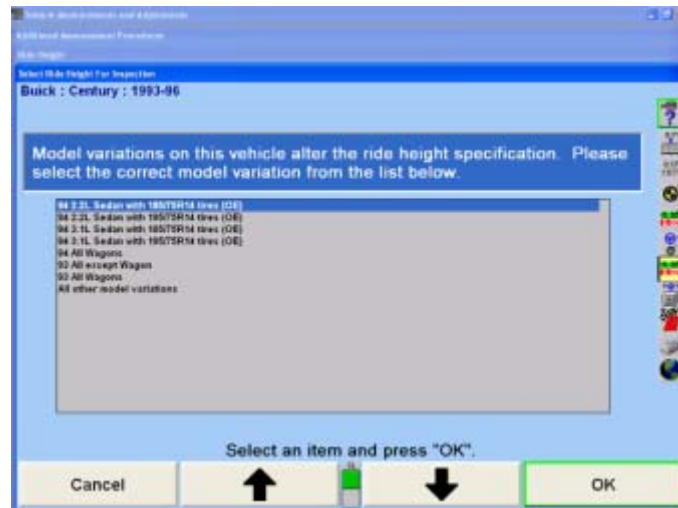
The DSP200/DSP250 and DSP306/308 sensors will take accurate ride height measurements using the Ride Height (RH) tool.



**NOTE:** Ride Height can be entered manually or electronically. The electronic Ride Height is an optional kit that is installed on both the DSP200/250 and DSP306/308 sensors for measuring the vehicles ride height electronically.

To access Ride Height select "Make Additional Measurements" from the "Vehicle Measurements and Adjustments" primary screen and select ride height. Ride Height can also be added in Set up to be included in the Alignment Procedure.



The manufacturer may vary ride height specifications based on suspension and tire options. Those vehicles will have an additional identification screen listing the suspensions or tire options.



Press  or  to highlight the model variation that applies to the vehicle being measured. The "Ride Height" pop-up screen will appear with the specification. If the model variation is tire size, then select the tire size that is the original equipment of the vehicle.





Remove the Ride Height tool and repeat this procedure with the other sensors.

**NOTE:** Do not jerk the Ride Height tool out of the sensor. This could cause the internal gear to spin resulting in an inaccurate reading.

When the ride height of all the wheels has been measured, press "OK" to save the measurements for printout on the alignment summary.

Ride Height can be re-measured at any time while on the ride height screen. Simply re-insert the ride height tool in the desired sensor until the shoulder contacts the sensor, and then raise the Ride Height tool until the horizontal arm touches the underside of the wheel arch.

**NOTE:** Failure to fully seat the shoulder on the sensor will may cause inaccurate Ride Height measurements.

In cases where the Ride Height tool is too long or too short, manually enter the measurements from the keyboard.

### Measuring Ride Height Using the Keyboard

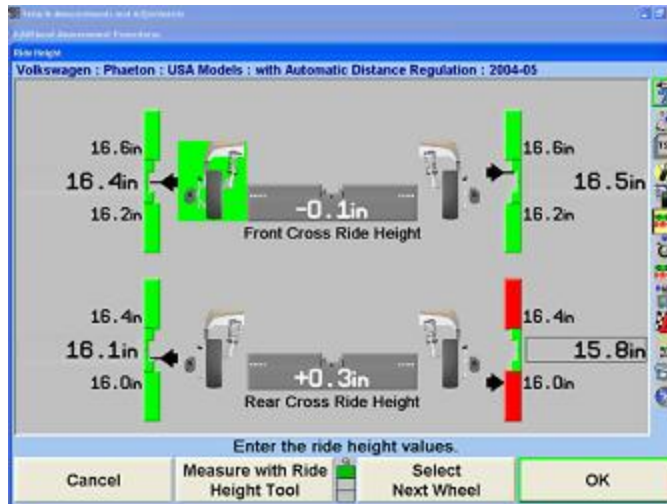
For manual measurement and keyboard entry:

Press "Enter With Keyboard" to enter measurements using the keyboard.

Measure the distance from the mark on the center casting of the wheel adaptor to the wheel well.

**NOTE:** Make sure that the wheel adaptor is vertical.

Enter the measurement from the keyboard.



Press "Select Next Wheel",  $\leftarrow$ , or  $\rightarrow$  to highlight the next wheel or  $\leftarrow$  +  $\rightarrow$  to highlight the previous field. The program will display the measurement next to the wheel. The center of the corresponding tire on the screen will turn green if the measurement is within specifications or red if out of specifications. It will turn blue if the specifications are not available.

Repeat this procedure with the other wheels.

When the ride height of all the wheels has been measured, press "OK" to save the measurements for printout on the alignment summary.

Ride Height can be re-entered at any time while on the ride height screen. Simply press "Select Next Wheel",  $\leftarrow$ , or  $\rightarrow$  to highlight the next wheel or  $\leftarrow$  +  $\rightarrow$  to highlight the previous field. Re-measure the distance from the mark on the center casting of the wheel adaptor to the wheel well, and then enter the measurement using the keyboard.

**NOTE:** Make sure that the wheel adaptor is vertical.

Vertical bar graphs and an illustration of a tire are used to indicate vehicle height in relation to the specification. The center of the bar graph represents the specification.

The large numerical values on the outside of the bar graphs represent the **actual measurement**. The ideal or preferred adjustment would find the indicator arrow next to the white line of the center bar and the numeric value reading the preferred specification for the vehicle.

### Measuring Ride Height Using the Ride Height Remote

**NOTE:** Recalling certain vehicles from the information database, will automatically bring up the "Ride Height" screen, such as Volkswagen Touareg.

Refer to Form 5134T, Operation Instructions for Ride Height Remote Kit 20-1885-1, for detailed operation information.

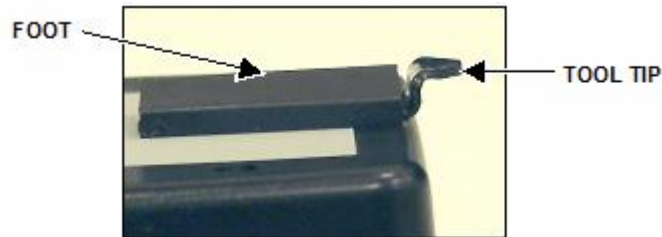
When prompted by WinAlign® program, begin ride height measurement procedure with the wheel indicated.

Reference the manufactures specifications of the vehicle to determine the appropriate reference points for the ride height measurements.

Press the measurement button once for automatic measurement mode or twice for manual measurement mode.

**NOTE:** Locate the cable pointer directly under or above the second reference point. Any excess cable pulled from the ride height remote to reach the second reference point will result in larger than actual measurement value.

Place the ride height remote at one of the reference points, using the foot or tool tip located on the bottom of the ride height remote in one of the following manners:



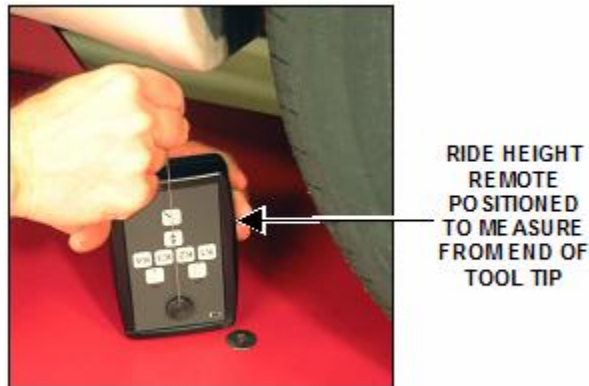
Place the bottom of foot on the reference point. (preferred method)



Hold the top or bottom of the tool tip against the reference point. (alternate method)



With the ride height remote turned with the transmitter down, place the end of tool tip against the reference point (alternate method).



Pull the cable straight from the ride height remote to place the tip of cable pointer to the reference point.

To measure to center of wheel, match the notch in cable pointer to the central pin on the wheel clamp or tire clamp assembly. Refer to Form 5134T, Operation Instructions for Ride Height Remote Kit 20-1885-1.



**NOTE:**

A measurement error is indicated by two short beeps and the status LED turning orange. Possible causes for the error are the cable was pulled too quickly (too fast for encoder to respond), the cable snapped-back (pulley slipping) or the cable was pulled too far beyond the desired length (pulley slipping). Return cable pointer to home position and then try again.

Store the length measurement by holding the pointer steady at a distance (automatic measurement mode) or by pressing the measurement button (manual measurement mode).

A beep and a green status LCD indicate the measurement has been stored within the ride height remote.

Return the cable pointer to home position.

**NOTE:** Pulling the pointer from the ride height remote again or pressing the measurement button will cause the measurement to be reset to zero.

The ride height remote will also reset to zero after 10 seconds of inactivity.

Point the ride height remote's transmitter toward the cabinets receiver and press the transmit button. The transmit LED flashes red to indicate that the ride height remote is transmitting the ride height measurement.

**NOTE:** The transmitter is a line-of-sight device that will not transmit a signal through solid objects.

The distance measured will be displayed within the appropriate field on the WinAlign screen. The cursor will then move to the next ride height entry field.

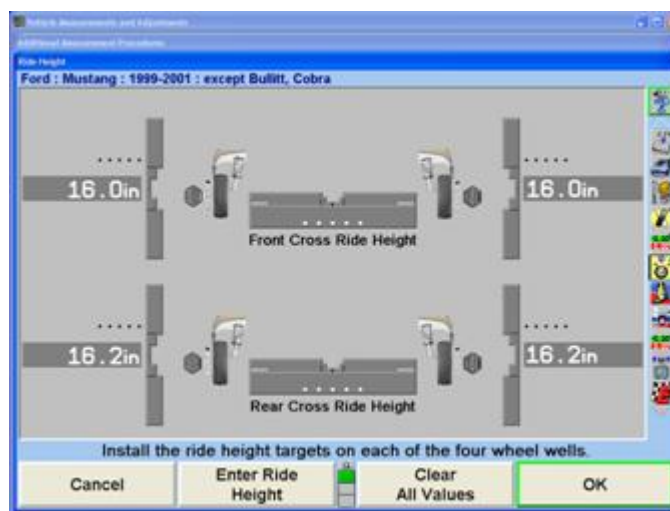
Repeat process to enter all ride height measurements, as prompt by WinAlign program.

**NOTE:** To conserve battery power, the ride height remote enters a sleep mode after 1 minute of inactivity.

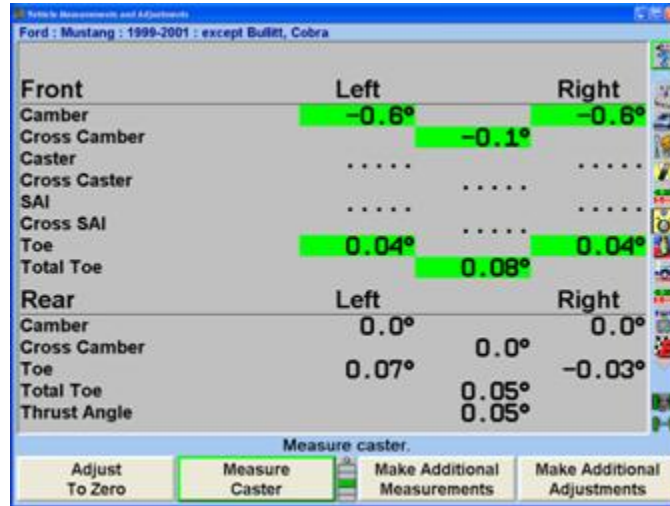
### Live Ride Height

**NOTE:** DSP600 or HawkEye Targets must be installed along with the Ride Height Targets for WinAlign® to show live ride height measurements.

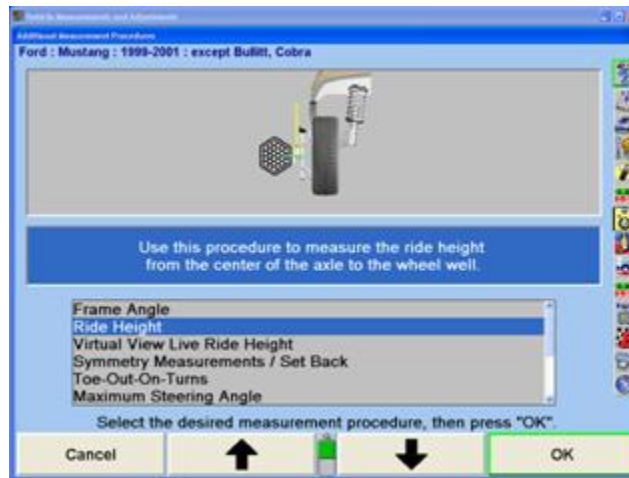
Live Ride Height measurements may be used with VirtualView® or in bar graph form. If not using Virtual View Live Ride Height, use the following instructions to measure ride height with the Live Ride Height bar graph screen as shown below.



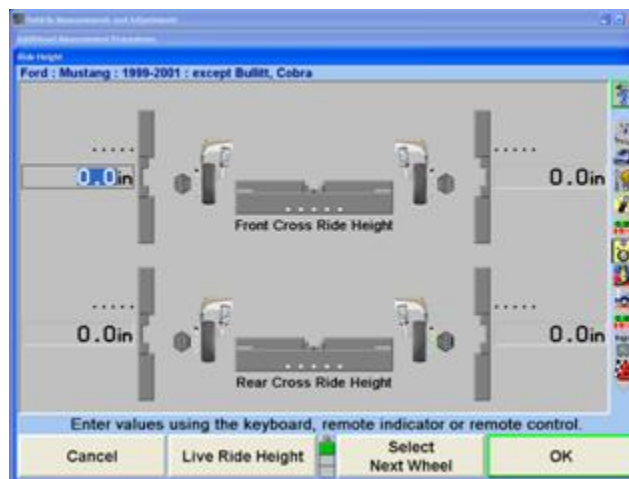
If the "Live Ride Height" screen does not appear automatically as part of the alignment procedure, select "Make Additional Measurements" from the "Vehicle Measurements and Adjustments" screen.



Select "Ride Height" from the menu and press "OK".

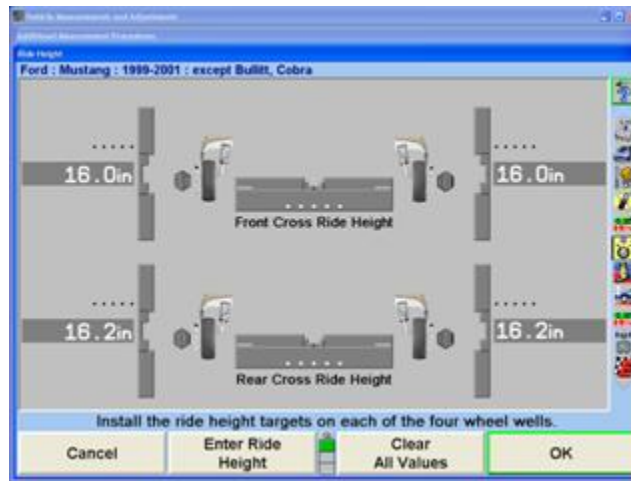


Select "Live Ride Height" to measure ride height using the ride height targets.



**NOTE:** The bar graphs will remain gray unless the selected vehicle has specifications for spindle-to-fender measurements.

WinAlign displays the "Ride Height" screen using live measurements.

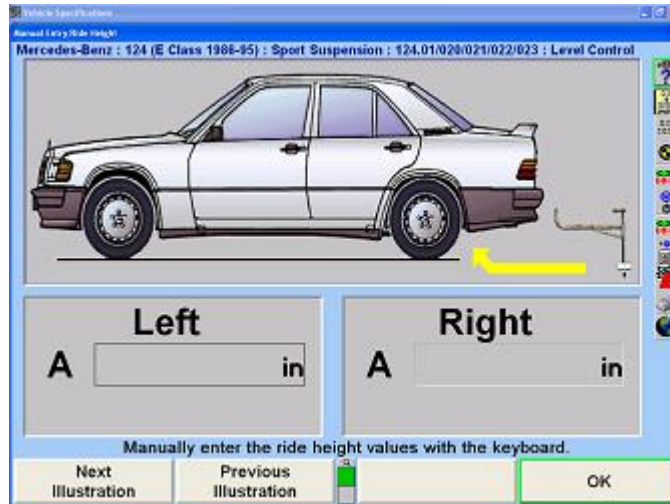


**NOTE:** The bar graphs will remain gray unless the selected vehicle has specifications for spindle-to-fender measurements.

Remove the ride height targets when measurements and adjustments are complete.

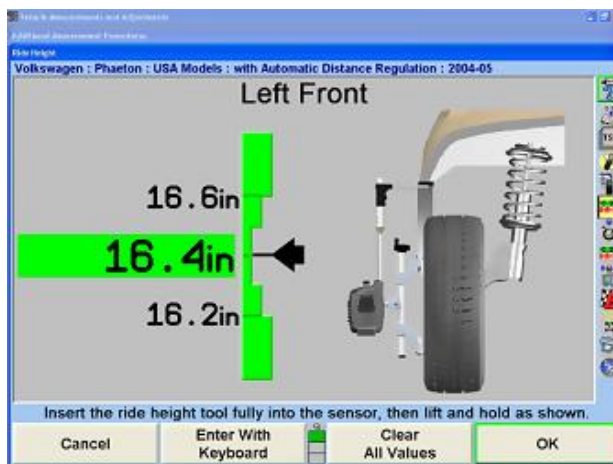
### Ride Height Dependent Specifications

Some manufacturers require ride height to be measured to determine the appropriate alignment specifications. Enter ride height measurement(s) into the left and/or right dialog box of "Manual Entry Ride Height" pop-up screen. WinAlign® will use the ride height data to generate the recommended front and rear camber, caster, and toe specifications.



## Zoom

When measuring Ride Height using the RH tool, the aligner will detect which wheel is being measured, and will zoom to the bar graph and image of that wheel. After the measurement has been taken, the fender will turn green if the measurement is within specifications, or red if it is out of specifications, as shown below.



The screen will remain on the individual wheel for about ten seconds, and then it will display all four wheels.

To disable the zoom, press "Disable Zoom".

**NOTE:** The screen will not zoom if the keyboard is being used to enter the measurements.

## Printing Ride Height

When "Print Ride Height" is selected all the bar graphs shown on the screen and any specifications used will be printed.

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## ExpressAlign® Alignment Adjustment System

ExpressAlign® is a feature that analyzes an alignment job and directs the technician through the alignment and adjustment procedures needed for a specific vehicle. ExpressAlign reduces the alignment procedures to the minimum number of steps required to completely align the vehicle.

ExpressAlign considers the following for each specified vehicle aligned:

- The alignment adjustments that are necessary.
- The alignment sequence and specifications for the adjustment(s).
- The power tools that are applicable, (such as shims, WinToe®, CAMM®).
- The applicable adjustment illustrations and videos.

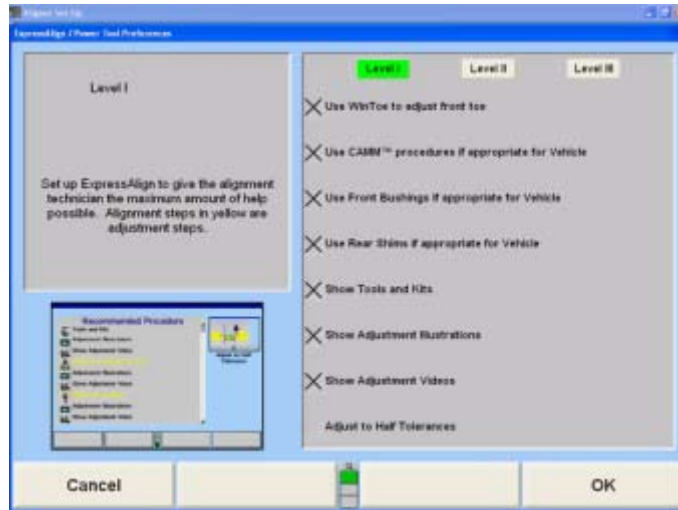
Then ExpressAlign creates a custom alignment procedure that allows the technician to perform only the procedures needed for the selected vehicle.

**CAUTION:** ExpressAlign may display bar graphs and prompt to adjust an angle that is out of specification that is non-adjustable according to the vehicle manufacturer. ExpressAlign displays these bar graphs to indicate a possible problem within the suspension or steering components that needs to be diagnosed and repaired for proper alignment. This is why the manufacturer publishes a specification for that angle, even if it is not adjustable. There may also be an aftermarket kit available to make the necessary adjustment for this angle.

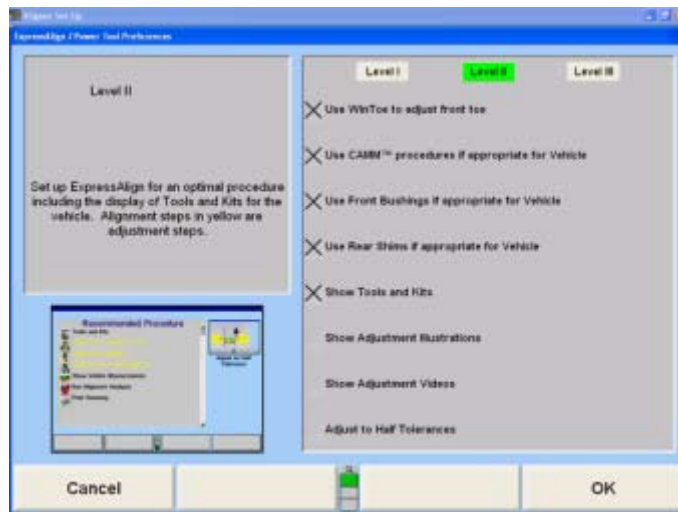


Three levels of ExpressAlign can be selected from the "ExpressAlign Setup," or a custom setup can be chosen.

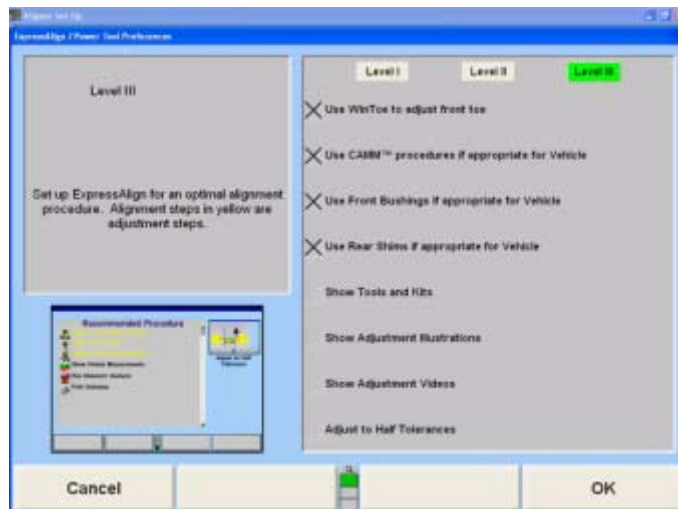
**Level I** is designed to provide the technician with the maximum amount of help and support to complete the alignment.



**Level II** is designed to present the optimal alignment procedure while still showing the user what tools and kits are necessary to complete the job.



**Level III** provides the optimal alignment procedure for the experienced technician.



Items may be selected individually for a custom ExpressAlign setup.

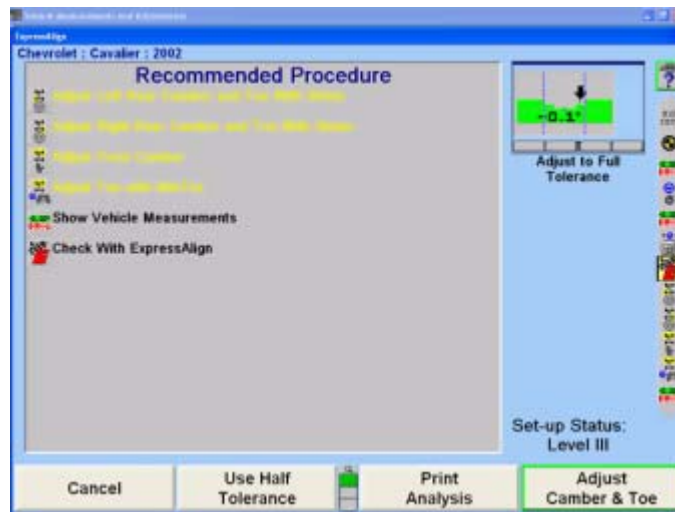
The items available include:

- Use WinToe if appropriate for Vehicle
- Use CAMM procedure if appropriate for Vehicle
- Use Front Bushings if appropriate for Vehicle
- Use Rear Shims if appropriate for Vehicle
- Show Tools and Kits
- Show Adjustment Illustrations
- Show Adjustment Videos
- Adjust to Half Tolerances

ExpressAlign can be setup from "Aligner Setup", or while ExpressAlign is running, it can be setup by selecting "Setup ExpressAlign" softkey.

ExpressAlign cannot be disabled while using ExpressAlign to perform an alignment job. ExpressAlign can only be disabled from "Aligner Setup".

After the vehicle is selected, inspected, sensors mounted and compensated, caster is measured, but before measurements are saved, the ExpressAlign pop-up screen will be displayed as shown below.



**NOTE:** The actual procedures displayed will vary depending on the vehicle and procedures that are enabled or disabled in "ExpressAlign Setup."

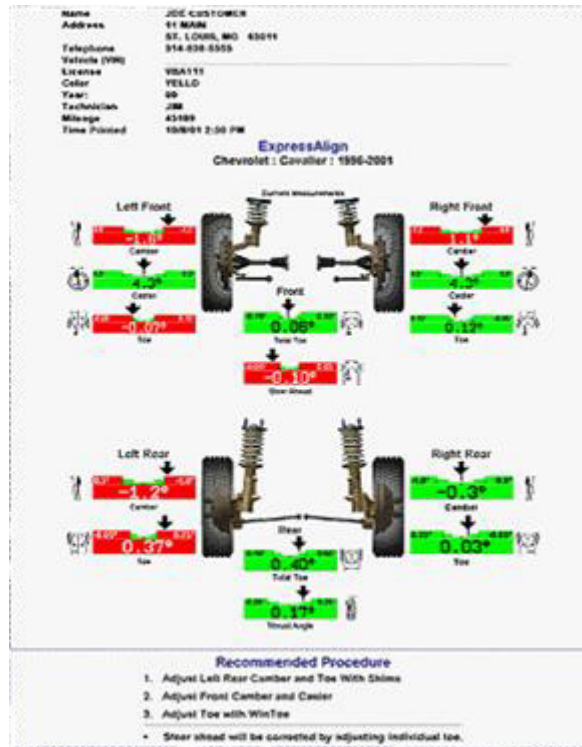
On the ExpressAlign screen, press the icon on the procedure bar that corresponds to the step to be completed. During the procedure, continue to press the next icon on the procedure bar in order to progress through the procedure. As you go through the procedure, the current step will be highlighted on the procedure bar.

An icon will be displayed in the ExpressAlign pop-up screen for each suggested procedure.

The procedure created by ExpressAlign will be displayed in the vertical procedure bar on the right side of the screen.

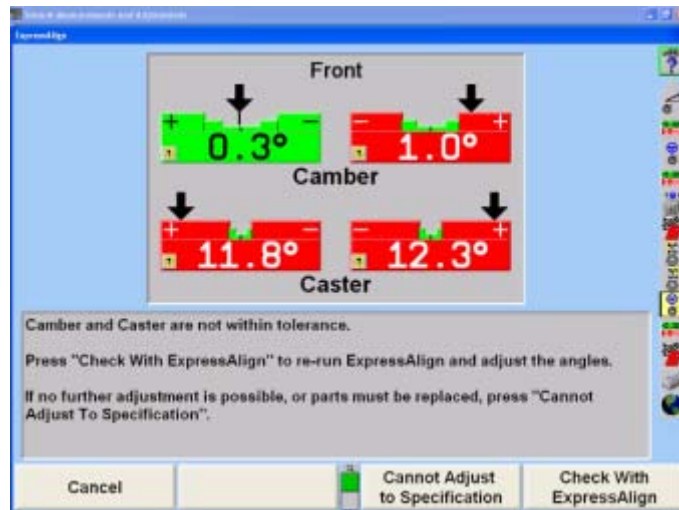
Procedures displayed with yellow text in the ExpressAlign pop-up screen refer to adjustments that **must** be made for the specified vehicle. Procedures displayed with black text are for measurement verification or to provide assistance during the alignment.

Selecting "Print Analysis" from the softkey panel of the ExpressAlign pop-up screen will print all measured angles with the recommended procedures required to adjust the angles.



Selecting "Use Half Tolerance" from the softkey panel of the ExpressAlign pop-up screen will reduce the specification tolerance to half of the original equipment manufacturers recommended tolerance.

If one side of the vehicle is within specification, ExpressAlign will allow the side that is out of specifications to be adjusted with the One-Sided Adjustments procedure. If you complete the alignment and an angle has not been adjusted to within specifications, ExpressAlign will allow you to select "Cancel", "Cannot Adjust to Specifications" or "Check With ExpressAlign".



Selecting "Cancel" will return you to the "Vehicle Measurements and Adjustments" primary screen.

Selecting "Cannot Adjust to Specification" will allow you to proceed with the angle not adjusted in ExpressAlign.

Selecting "Check With ExpressAlign" will create a new ExpressAlign procedure and return you to the "ExpressAlign" pop-up screen.

# Aligner Set-Up

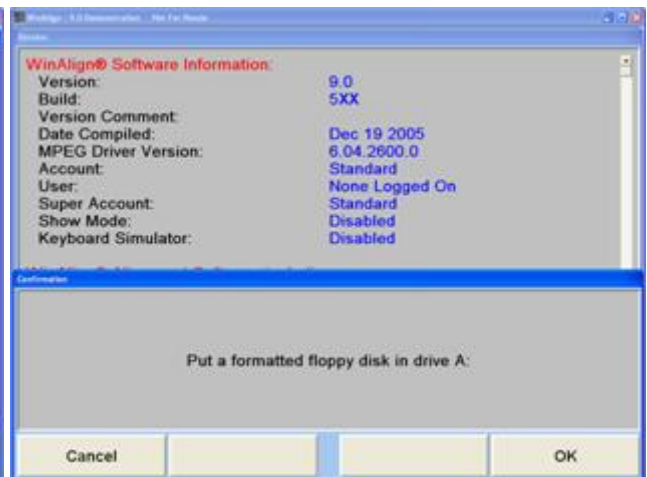
## Set Up

The aligner can be configured to meet many different operating needs. For example, the "Customer Identification" screen can be removed from the prompt sequence so it does not automatically appear at the beginning of the alignment process, but is still accessible through the menu selection. Other selections such as the default alignment procedure can be set. The Set-Up selections are stored on the hard drive and recalled each time the program needs them. Modify Set-Up by pressing "Service Programs" on the logo screen. The menu labels will change.

Press "Set-Up Aligner" and the "Aligner Set-up" primary screen will appear.



The current settings can be saved to disk or printed. To access these settings along with WinAlign® technical information press CNTRL+Shift+K1. The "Version" screen may take several seconds to appear. Select "Print" to print all the settings and WinAlign information, or select "Copy Log files to Floppy Disk".



If "Copy Log files to Floppy Disk" is selected the screen will inform of the destination. Selecting "Set Copy Destination" allows another destination to be set. Select "OK" and the information will be copied.

The information in Set-Up can only be restored manually.

## Factory Settings for Aligner Set-Up

### Program/Account

Account Standard

### Display

Display Language English  
 Logo Screen Advertising Message Blank  
 Animated Logo or Still Logo Animated Logo  
 Animated or Still Procedure Images Animated Images  
 Dynamic window open effect Disabled  
 AlignGuide Enable/Disable Enabled  
 Set background color selection Button - Silver Blue  
 Inset - Light Gray  
 Background - Silver Blue  
 Website Address (Hunter.com or HunterUser.com) HunterUser.com

### Alignment Procedure

Common Alignment Preferences WinAlign-Tuner, Show Measurement Display after Compensation, Show Measurement Display after Caster, Verify Caster Adjustment  
 Vehicle Specific Alignment Preferences Adaptive Cruise Control, Collision Avoidance System, Ride Height Information  
 ShopResults.NET Enabled  
 ExpressAlign Preferences/Power Tool Preferences Level III  
 Alignment Procedure ExpressAlign Total Alignment with Power Tools  
 Alignment Procedure Automatic Selection Automatically switch to Recommended Procedure  
 Alignment Measurement Units and Formats  
 Camber and Caster Display Format Degrees  
 Toe Display Format Degrees  
 Thrust Angle Display Format Degrees  
 Ride Height Display Format Inches  
 Tread Depth Display Format Inches  
 Wheelbase and Track Width Display Format Inches  
 Tire Temperature Display Format Degrees Celsius  
 Tire Pressure Display Format PSI  
 Caster Measurement Selection Faster Caster  
 Reduce Number of Softkeys Enable/Disable Disabled  
 Set Vehicle Selection Options Selection Sequence: Optimal  
 Default Vehicle Specification None (Choose vehicle specification every time)

### Bar Graphs

Front Axle Bar Groups Camber, Caster Adjust and Toe; Camber, Caster, Total Toe and Steer Ahead  
 Rear Axle Bar Groups Camber, Toe, Total Toe and Thrust Angle

Cross Bar Graph/Additional Cross Angles:  
Enable/Disable Enabled

Show Specs on Bar Graphs: Enable/Disable Enabled

### Printer

Printer HP Printer

Print Language English

Printout Advertising Message Blank

Print Warning Message Enable/Disable Enabled

Report Format Standard Format

Default Printout Print Summary

    Custom Print Header Disabled

Print Preview Disabled

### Sensors

Sensor Type HS401

Toe-Out-On-Turns Device Camera Sensors

Update Remote Indicator Software Remote Indicator requires version "2.1"

Alignment Reference Runway Reference Plane

Alignment Bay Configuration Any lift with 1 turnplate position at standard distance.

Compensation Procedure Rolling Compensation

Emitter Flash Mode Constant Flash

Target Type Standard Hexagonal Targets

Lighting Mode Standard Mode

Calibration Check Reminder Never Remind

Cordless Channel Selection Console Channel: 1

Weight Turnplate Calibration Factory Calibration

### Power Tools

Rear Shim Default Brand Hunter

Rear Shim Display Size NA

Front Bushing Default Brand Hunter

VirtualView Enable/Disable Disabled

Live or Manual Ride Height Manual Entry Ride Height

Tools and Kits Order Now Internet ordering Enabled

### Inspection

Select Inspection Mode Point and Click Inspection Mode

### Date and Time

Date and Time Current time and date

12 or 24 Hour Clock Display 12 Hour Clock Display

Date Format MM/DD/YY

### Aligner Equipment

Remote Control Channel Identification Remote Control channel setting: A, O

Select Logging Type Statistical Logging

Shut down Windows on Exit from WinAlign Disabled

## Transmit Measurements

Transmit Measurements Destination	Transmit Measurements to a file.
Transmit Measurements Format	Partial Measurements C111 Audit Format A

## Work Management



Work Order Format	Custom Forms
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## Logon

Logon Enable/Disable	Disabled
Logon Registry	NA
Logon Password	NA
Automatic Backup Options	Keeps backups for two days. Overwrite oldest backup. Backup path C:\Backup.dat

## Tread Depth

Define Tread Depth Specification	The value is not defined.
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The "Aligner Set-Up" primary screen provides a list box of Set-Up items. Press  or  to highlight the desired selection. When an item is highlighted, the current setting appears on the screen, along with an explanation of the item. Press "Set-Up Selected Item" to open the pop-up screen to Set-Up the highlighted item.

To move from a major heading to another major heading, press  or  from the second tier of softkeys. The following is a list containing all the Set-Up options including options using Digital Video.

Press "End Set-Up" after all the desired changes have been made to exit Set-Up and save changes.

# Equipment Information

## WinAlign® Multi-Disk Backup/Restore

The WinAlign® Multi-disk Backup/Restore procedure saves files modified by WinAlign to floppy disk(s). The saved files can be restored later by using the restore procedure.

**NOTE:** The restore procedure does not install the WinAlign software.

WinAlign modifies files when any of the following occur: setup is changed, a vehicle specification is stored, a vehicle specification note is stored, the logon registry is changed, a work order is stored, a form letter is stored or a filter is stored.

Backup should be performed on a regular basis. How often backup is performed depends on what features of WinAlign are used. The following backup schedules are suggested:

If you do not use Work Management then back up weekly.

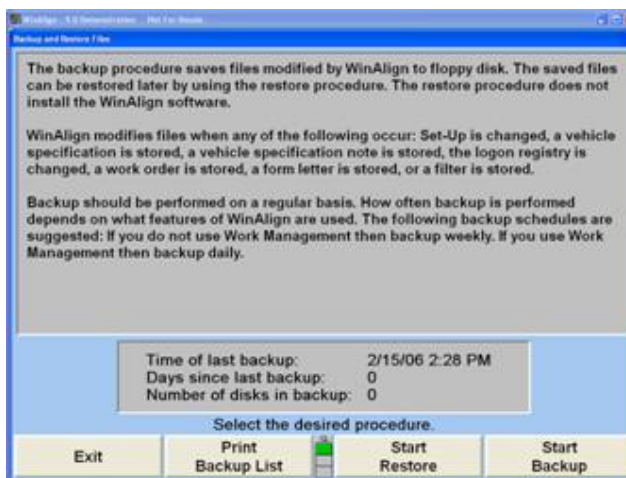
If you use Work Management, then back up daily.

### Backup and Restore Procedures

To access the Backup/Restore utility, press "Service Programs" on the logo screen. The menu labels will change.

Press "Backup and Restore" from the "Service Programs" softkey menu.

The "Backup and Restore" screen presents initial information about WinAlign® backup. It also displays the time of the last backup, the number of days since the previous backup, and the number of disk(s) in the most recent backup set.

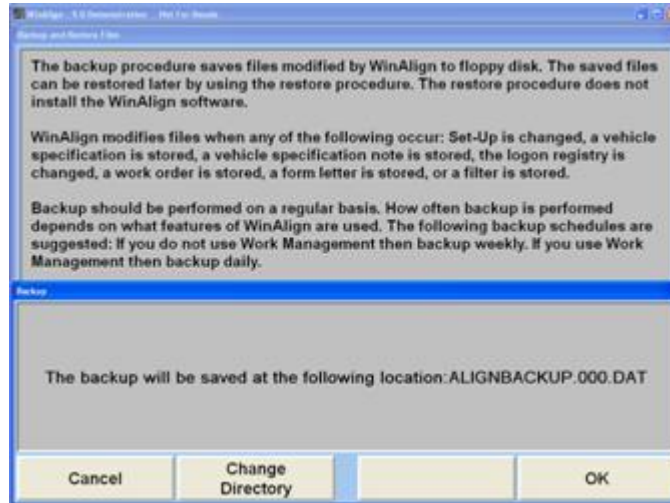


### Backup Procedure

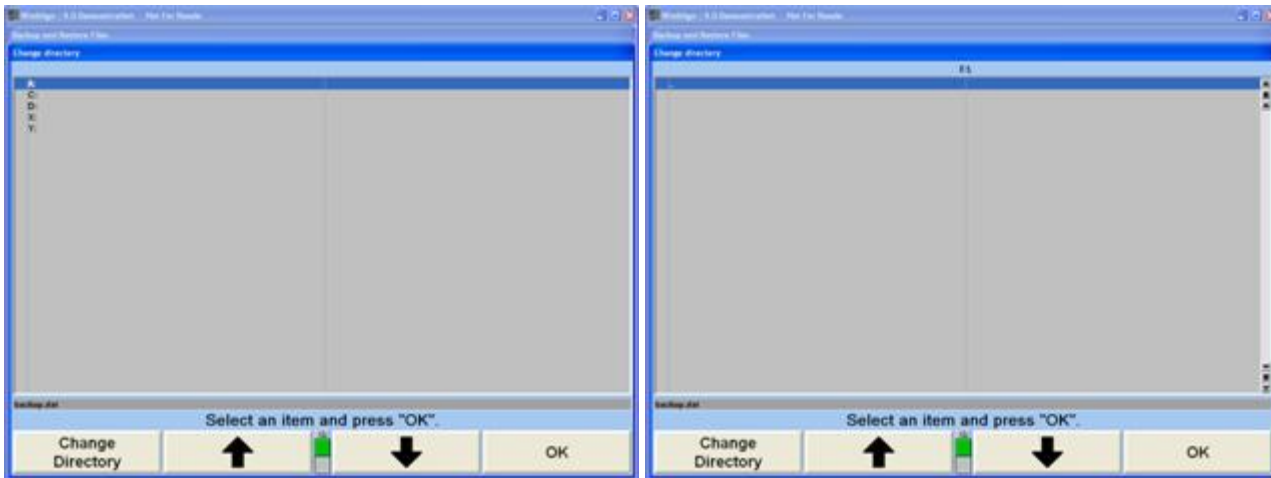
**CAUTION:** If the machine is reset, or the backup procedure is canceled at anytime during the back up procedure, WinAlign® deletes the backup file from the floppy disk and the backup is invalid. It is strongly recommended that Cancel or Reset is not used during the procedure.



Select "Start Backup". The program defaults to installing on a floppy disk on the "A:" drive. Select "Change Directory" to install in a different location.



Double-click on the directory to install the backup.



Insert removable media into the appropriate drive, or select "C:" to install on the aligner hard drive.

WinAlign® will check the media for formatting, write-protection, and the existence of previous back up data. If the media contains an earlier backup, WinAlign will inform the user that the disk contains data, and asks for confirmation to overwrite the information. Select "OK" to proceed with the backup.

**CAUTION:** If the media contains the latest backup prior to the one being performed, it is recommended not overwrite the disk. Select NO. WinAlign will prompt to insert another removable media. Insert a disk, either blank or from another set, and begin backup process again.

If the backup requires more than one disk or media, WinAlign will prompt to remove, and label as WinAlign Backup followed by the disk number and the current date and time and to insert a new disk for each disk required to complete a successful backup.

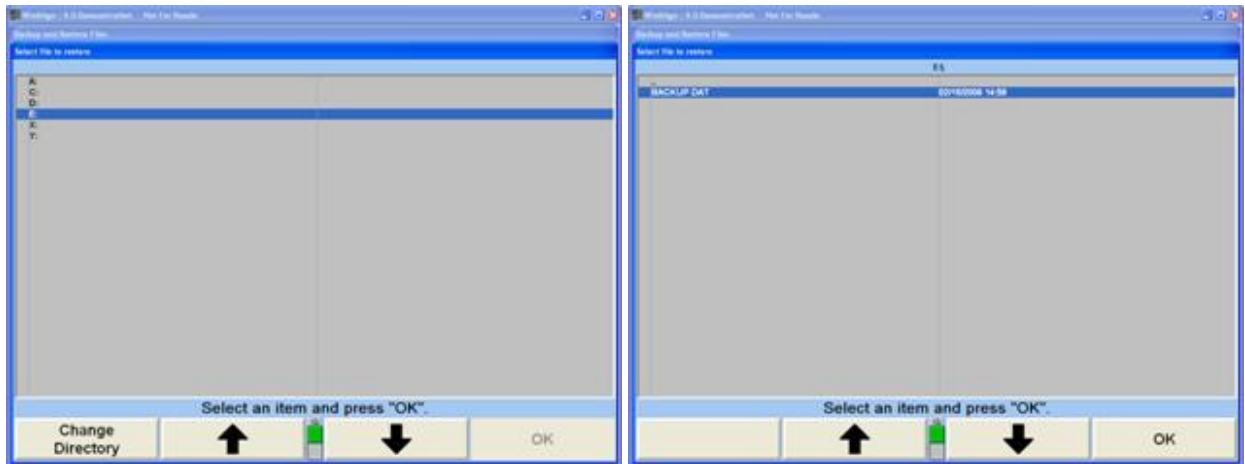
After WinAlign completes the backup procedure, the user will be prompted that backup was successfully completed. Select "OK" and exit backup program.

Label the floppy disk(s) or media as "WinAlign Backup" followed by the disk number and the current date and time.

## Restore Procedure

Begin the restore procedure by selecting "Start Procedure" on the "Backup and Restore Files" screen.

Insert disk one of the current backup into drive "A:" or select a different directory for other removable media, or the hard drive. WinAlign® will verify that the information can be read and that it is a valid backup.



If the backup data being restored requires more than one disk, WinAlign will prompt the user to insert each disk in the set (one at a time) to verify each disk. Remove and insert the appropriate disk as requested.

### NOTE:

This step is a necessary step for the restore procedure. It insures that all of the disks in the backup set are accounted for so that the restore procedure may begin.

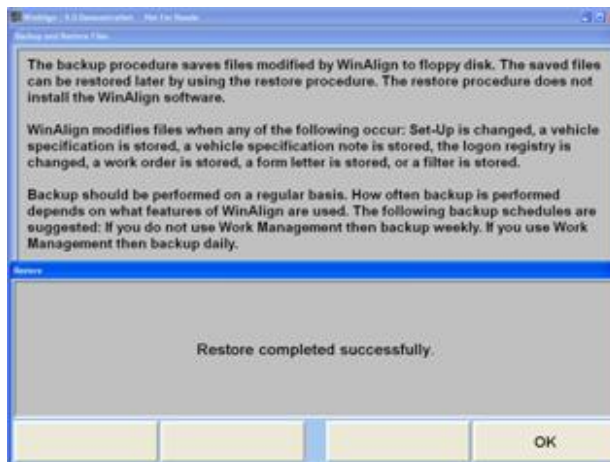
If you do not have all of the disks for the restore procedure, you can cancel Restore at this time by selecting Cancel.



### CAUTION:

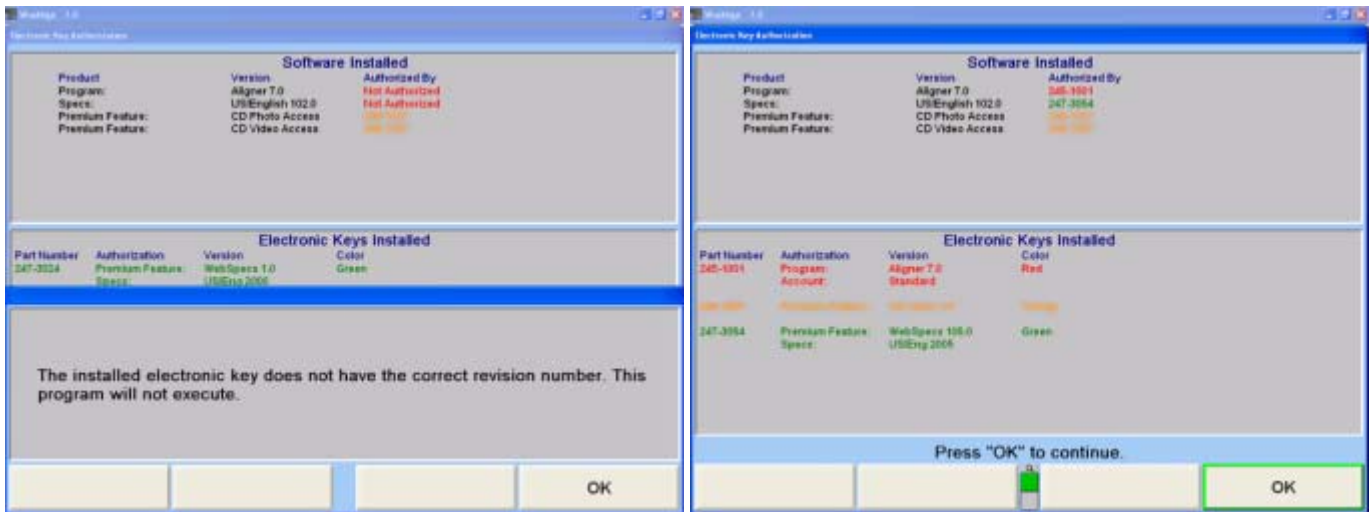
After WinAlign has verified all the disks in the backup set, it will prompt to insert disk one of the set again. It is at this point that the restore procedure begins. If the restore procedure is interrupted at any time during the process, one or more files in WinAlign may be corrupted. This would require a complete re-installation of WinAlign.

Select "OK" when the Restore completed successfully screen appears, and exit the restore program.



## Electronic Keys

Included with a shipment of diskettes are one or more electronic keys that look similar to large watch batteries. These keys are needed to run the WinAlign® program. If the program is loaded onto a 411/611 unit without the proper keys being inserted in the Hunter Interface Board or Hunter Interconnect Board, an error message will appear, similar to the one shown below on the left.



Electronic keys can be placed in any of the available sockets on the Hunter Interconnect Board and/or the electronic key holder. It does not matter which key is in which socket.

A red key is always required to run WinAlign. A green key is required to access the Factory Specification Database. If the aligner has a CD-ROM an orange key is required to use the WinAlign features which access the CD-ROM, such as the digital photos (adjustment illustrations and inspection illustrations) or the MPEG video segments (Just-In-Time Training and adjustments videos).

WinAlign will **NOT** operate properly if the required electronic keys are not installed!

Additional keys can be used to allow access to other features within WinAlign. An additional orange key provides access to Digital-VIDEO and Digital-PHOTO. A yellow key provides access to features that meet the needs of certain national accounts.