
Operators Manual

Imaging Alignment Systems with Pro42

SAFETY INFORMATION

For your safety, read this manual thoroughly before operating the equipment.

The Aligner is intended for use by properly trained skilled automotive technicians. The safety messages presented in this section and throughout the manual are reminders to the operator to exercise extreme care when performing wheel alignments with this product.

There are many variations in procedures, techniques, tools, and parts for servicing vehicles, as well as the skill of the individual doing the work. Because of the vast number of vehicle applications and potential uses of the product, the manufacturer cannot possibly anticipate or provide advice or safety messages to cover every situation. It is the automotive technician's responsibility to be knowledgeable of the vehicle to be aligned. It is essential to use proper service methods and perform wheel alignments in an appropriate and acceptable manner that does not endanger your safety, the safety of others in the work area or the equipment or vehicle being serviced.

It is assumed that, prior to using the Aligner, the operator has a thorough understanding of the vehicle systems being serviced. In addition, it is assumed he has a thorough knowledge of the operation and safety features of the alignment rack or lift, and has the proper hand and power tools necessary to perform wheel alignments.

When using your garage equipment, basic safety precautions should always be followed, including:

1. Read all instructions.
2. Care must be taken as burns can occur from touching hot parts.
3. The socket-outlet (wall outlet) shall be located near the equipment and shall be easily accessible.
4. Do not operate power tools or equipment with a damaged power cord or if the equipment has been dropped or damaged until it has been examined by a qualified serviceman.
5. Do not let cord hang over edge of table, bench or counter or come in contact with hot manifolds or moving fan blades.
6. 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 than the equipment may overheat. Care should be taken to arrange the cord so that it will not be tripped over or pulled.
7. Always unplug equipment from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp plug and pull to disconnect.
8. Let equipment cool completely before putting away. Loop cord loosely around equipment when storing.
9. To reduce the risk of fire, do not operate equipment in the vicinity of open containers of flammable liquids, such as gasoline.
10. Adequate ventilation should be provided when working on operating internal combustion engines.
11. Keep hair, loose clothing, fingers, and all parts of body away from moving parts.
12. To reduce the risk of electrical shock, do not use on wet surfaces or expose to rain.
13. Use only as described in this manual. Use only manufacturer's recommended attachments.
14. ALWAYS WEAR SAFETY GLASSES. Everyday eyeglasses only have impact resistant lenses, they are NOT safety glasses.
15. Know and understand the proper operating procedures for all power tools used.
16. *Caution:* Risk of explosion if any battery is replaced by an incorrect type. Dispose of used batteries according to local and state government regulations.

**IMPORTANT!! SAVE THESE INSTRUCTIONS
DO NOT DISCARD!!**

Safety INSTRUCTIONS

IMPORTANT!! SAVE THESE INSTRUCTIONS



Risk of electrical shock.

- **Do not operate equipment with a damaged power cord or if the equipment has been dropped or damaged, until it has been examined by a qualified service person.**
- **If an extension cord is necessary, a cord with a current rating equal to or greater than that of the equipment should be used. Cords rated for less current than the equipment can overheat.**
- **Unplug equipment from electrical outlet when not in use. Never use the cord to pull the plug from the outlet. Grasp plug and pull to disconnect.**
- **Do not expose the equipment to rain. Do not use on wet surfaces.**
- **Plug unit into correct power supply.**
- **Do not remove or bypass grounding pin.**

Contact with high voltages can cause death or serious injury.



Risk of electrical shock. High voltages are present within the console unit.

- **There are no user serviceable items within the console other than the keyboard and printer.**
- **Service on the unit must be performed by qualified personnel.**
- **Do not open any part of the console other than noted areas.**
- **Turn power switch off and unplug the unit before servicing.**

Contact with high voltages can cause death or serious injury.



Risk of eye injury. Debris, dirt, and fluids may drop from vehicles.

- **Knock off any loose debris. Clean surfaces as needed to avoid any materials from falling.**
- **Wear approved safety glasses when servicing.**

Debris, dirt, and fluids can cause serious eye injury.



Risk of crushing. Vehicles may roll off alignment lift if not secured.

- **Leave automatic transmission in park or manual transmission in gear unless equipment operation steps require vehicle in neutral.**
- **Apply parking brake unless equipment operation steps require wheel movement.**
- **Use wheel chocks whenever vehicle is positioned on the lift.**
- **Follow rack or lift manufacturer's safety recommendations when lifting a vehicle.**

Vehicles rolling off lifts can cause death or serious injury.



Risk of entanglement or crushing. There are moving parts on vehicle lifts during operation.

- **Keep all persons clear of lifts.**
- **Read lift manufacturer's operation instructions carefully.**
- **Follow lift manufacturer's safety recommendations.**

Contact with moving parts could cause injury.



Risk of pinching or crushing body parts when jacking vehicles.

- **Keep hands and other body parts away from jacking surfaces.**
- **Do not use unapproved adapters (i.e. wooden blocks) when jacking a vehicle.**
- **Do not bypass any jack manufacturer's safety features.**
- **Read jack manufacturer's operation instructions carefully.**
- **Follow jack manufacturer's safety recommendations.**

Improperly used or maintained jacks can cause injury.



Risk of burns.

- **Do not touch hot exhaust systems, manifolds, engines, radiators, etc.**
- **Wear gloves whenever performing a service near hot components.**

Hot components can cause burns.



Risk of injury. Tools may break or slip if improperly used or maintained.

- **Use the correct tool for the task.**
- **Frequently inspect, clean, and lubricate (if recommended) all tools.**
- **Follow recommended procedures when performing vehicle services.**

Tools that break or slip can cause injury.

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INTRODUCTION

The document covers basic and advanced software features which may or may not be included in all aligner models. This document primarily is designed to cover software navigation and features with minimum regard to the hardware platform in which it resides. There are several variations of aligner models each of which may utilize different features of the base software package. References are often made to other sections of the Manual.

Assembly and Setup

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

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

Instructions for operational setup of the aligner program are covered in detail in Section 2 of this Operator's Manual. The setups for the PC hardware and Microsoft Windows® are preset at the factory and should not be altered.

Power On Sequence

The main power switch is located on the back side of the Computer Console. Turn the computer console switch ON followed by pressing the on switch on the front of the PC to begin the power-on sequence.

When the power switch is turned on, the unit initiates the computer boot-up. Text should appear on the screen as boot-up begins and counting numbers are shown as the memory of the unit is checked and verified. Many additional lines of computer configuration will appear on screen and scroll up as the computer completes the system boot sequence. The Home screen will appear next as the software finishes loading.

This boot sequence will take a few moments. If any problems are encountered during the Power On boot-up sequence, consult the service representative in your area. The unit may become unresponsive in the event of a severe power fluctuation such as Electrical Fast Transients or Electrostatic Discharge. To restore the unit to operating condition, turn off all power switches, wait 10 seconds, and turn them back on. If the unit is still unresponsive contact a qualified service technician for repairs.

Software

There are several ways to control movement within the aligner program. First, each unit is shipped with a pointing device – a mouse. The unit can be equipped with an optional handheld remote control whose various buttons permit full aligner function. Study the *Figure on the next page* carefully to become familiar with the functions of each button.

Windows is a point-and-click software environment. The Aligner software follows Windows navigation conventions. Use the pointing device to navigate through the software as you would with any Windows program. Most functions require a single mouse click to initiate, while a few require double-clicks. The right mouse button is not utilized within the alignment software.

A standard keyboard is included for data entry. All aligner functions can also be controlled from the keyboard as well as the remote. The function keys (F1 - F12) located on the top row of the keyboard have decals that are the equivalent of the remote and keypad buttons. Refer to the diagram for identification of the icons and their respective functions.

The keyboard has a "Print Screen" key. When this key is pressed the currently displayed screen will be captured and printed.

!!IMPORTANT note!! Shutting Down the Computer

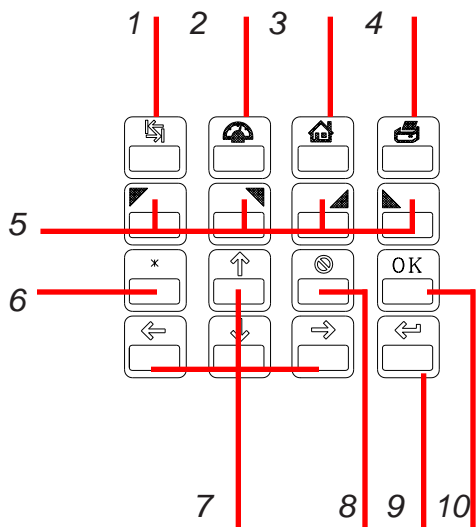
To avoid damaging important files It is necessary to shut down Windows properly before turning off or restarting the aligner or the computer.

Use the following steps to shut down the aligner from within the Alignment software:

1. Return to the Home Alignment screen.
2. Click on the “Shutdown Windows” button located in the lower right corner.
3. Answer “Yes” when prompted, the computer system will then shutdown automatically.

From the Windows desktop:

1. Close any programs or windows that may have been opened.
2. Click the Start button, and then click Shut Down.
3. On the Shut Down Windows box that appears, select “Shut down the computer?” Click “Yes” to proceed.
4. The computer will automatically shutdown, if not, a screen message lets you know when you can safely turn the power off to the aligner.



Remote Functions

1. **Tab Key:** On certain screens, used to tab to next data field
2. **Meter:** Jumps directly to the meter readings screens
3. **Home:** Returns to the Home Alignment screen instantly
4. **Print:** A results printout is generated when pressed
5. **#5 - #8 Buttons:** These correspond to toolbar buttons
6. **Star:** when the system is a 2-camera Ultra Moveable, it toggles into motor-control mode and starts up Camera View - The Up and Down arrow buttons can then be used to move the motor.
7. **Arrow Keys:** Moves through lists and selections
8. **Cancel:** Same function as the on-screen Cancel button
9. **Enter:** Accepts a selection and advances program to next step
10. **OK:** Same function as the on-screen OK button

Screen Layout and Navigation

The software features a common interface throughout its many screens. Becoming familiar with the various screen navigation functions is essential for efficient use of the aligner.



1 - Carousel Control - Select primary alignment functions from the scrolling icons. Icons can be “Scrolled” up or down the selection window using either the mouse wheel or the Windows scroll bar. they can be selected by clicking on the desired icon with the mouse pointer.

2 - Previous and Next Buttons

3 - Toolbar – these buttons appear on every screen, and correspond to the F1-F12 keys on the keyboard, as well as the keys on the remote. The functions for F1-F4 are common to every screen, while the functions of F5-F12 vary depending on the screen.

4 - Display Area - When a desired function (such as Display Meters) is selected, the action is displayed in this screen area.

5 - Shut Down Windows - When it is necessary to close the alignment program and Windows - use this icon to properly close all application to avoid damaging any files in use.

Toolbar Buttons

Toolbars are found on all screens within the software. This page describes the buttons found on the Home Screen, some of these buttons can also be found on other pages.



Help – launches context-sensitive help screens.



Meters – jumps directly to the alignment meter screens.



Home – jumps directly to the Home Alignment tab.



Print – launches the Print Report screen.

F1 - F4 Toolbar buttons
found on all pages



Rack Drive-on Aid - An option allowing use of a Webcam to assist the operator in placing the vehicle onto the alignment rack.



Shop Management - Invokes Shopkey or other *optional* programs used to manage alignment results and databases.



Information Systems - Opens a wealth of databases including Tire Pressure monitoring systems, Vehicle TSBs, Shopkey Information Systems, and the MAP standards page.



Regional Settings - Allows selection of the desired screen language and the regional specification data base to be used in the alignment process.



Select Wizard - Several Wizards can be selected based on the vehicle or procedures required by the service shop.



Log In/Out - Allows login and logout of users and Administrators.



MKS - Invokes the Mercedes Benz “MKS” Measurement System.



About - Reveals the current software version and the specifications database.



Measure – from any Readings screen, launches the Measure screen.



Adjust – from any Readings screen, launches the Adjust features.



Zoom – makes the selected meter fill the entire screen.



Unzoom – returns from a zoomed meter to the standard meter screen.



Edit - Edit the Customer data currently in use.



Aligner Diagnostics - When in any of the Readings screens select this function to view the camera image or view the camera data. This feature is useful in the event the cameras cannot “See” a target for some reason.



Camera View - Select to view the live camera image.



4 - Wheel Split Positioning - Use when the alignment rack is too short for full roll back compensation. The vehicle can be rolled forward and a shorter distance rearward.



Single Wheel Rollback - Select this feature to compensate only one wheel. If the target has been removed to replace parts or service the wheel assembly - Select to re-compensate only that one wheel. The wheel assembly is lifted to perform.

Main Carousel Bar

These buttons or icons are located on the sliding “Carousel” located to the left of the display screen. The Carousel bar contents will change with the content of the screen currently displayed. Subjects related to alignment will be displayed when performing an actual alignment while subjects pertaining to aligner Setup or Calibration may be displayed when Calibration or Preferences is selected. All Carousel Bar selections when “Moused Over” will display a “tool tip” which briefly explains its function.



Diagnostics - Certain alignment system diagnostics are accessed through this selection. These diagnostics are generally used by qualified service personnel to assist with problem solving.



Data Base Utilities - Select to back-up, restore or delete the customer database.



Customer Data - Use to select or add information to the customer database.



Vehicle Selection - Select the vehicle make, year, model and sub-model to be measured.



Begin Alignment - Select to start the alignment wizard and all its content path. Selections include choosing or adding a customer name, choosing a vehicle, and performing all the necessary functions for reliable alignment readings.



Quick Alignment - Select to get alignment readings quickly without the tasks of selection customer name or performing inspections etc. This feature is helpful when checking a vehicles conformance to specification before the customer commits to the actual alignment.



Alignment modification Wizard - This is useful for making vehicle modifications. This icon invokes the Vehicle Modification Wizard (Platinum only). It is used to recall a previous Vehicle Modification session or to start a new one. Recalling a previous session recalls readings for comparison.



Vehicle Specifications - Select to view the specifications of the vehicle currently selected. Specs can be edited and renamed as a “Custom Vehicle” from this screen as well.



Preferences - User desired characteristics can be tailored to the operators “Preferences” in this selection. Security of the system, the system configuration, store name and address, units of measure, languages, and others are selected for the user.



Calibration - Various subsystems are calibrated with this selection. Calibration factors can also be backed-up and restored from here.



Setup - Preferences

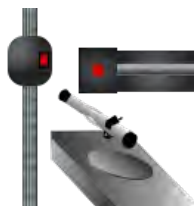
Preferences is used to setup various functions and features within the Aligner software. Numerous operating attributes or “preferences” can be altered to suit the operators individual tastes. Although the Aligner is shipped with the most common elements selected as default, an operator is able to tailor several elements of the alignment process as well as the display features to customize his machine. Operator preferences can be altered before the alignment process begins or any time thereafter.

Preferences Selections:

Preferences is located near the bottom of the Carousel bar. The Preference icon allows access to the following setup selections, each identified by an icon:



Security - Shows the user what features have been installed on the aligner. Features are purchased and activated by the sales or service representative using “Key codes”.



System Configuration - Select the camera system used, select the wheel clamps used.



Store Name – allows a store name and address to be entered for the customer printout.



Units of Measure – selects the units to be displayed for angle and linear measurements. Once a prescribed unit of measure has been chosen, all readings and specifications will be stated in those units on all readings screens.



User Login - This utility is used to control access to the aligner software and track usage. When login is activated, only “authorized” users who have been set up with a user name and password can operate the aligner.



Languages – Selects from various languages for the screen display and printout.



Specifications - Select the desired specifications database to be used if installed.



Features - Provides control of operational properties, both standard and those which are optional.



Displays - Custom logos may be placed in the “logo” subdirectory of the program on the hard drive for operators who have a license to use them. Users may also create their own logos in the “BMP”, “JPG” or “PNG” graphics format and copy to the “logo” subdirectory.

Note: Unauthorized use of copyrighted logos may be illegal without license or the owner’s permission.



Connectivity – activates access to an optional shop management networking system. (Note: not all machines will display this selection)



CSR Preferences - (password protected) – allows a Service Technician to access system configuration screens.

Steps to Performing a 4-Wheel Alignment

There are many reasons why a wheel alignment may be performed on a vehicle such as:

- Accelerated or uneven tire wear
- Pull, wandering, or other steering / handling problems
- After replacement of worn suspension or steering system components
- After-collision repairs
- Routine vehicle maintenance

Regardless of the reasons for alignment, it is important that the technician performs these **Basic** steps necessary to address and correct all problems. Other diagnostics are available for advanced testing.

1. Gather information from the vehicle owner – ask about any symptoms of misalignment. Inquire if the vehicle has been in a collision or has had any parts replaced recently.
2. Perform a test drive to verify owner's complaint – try to recreate the problem. If unable to duplicate, have the vehicle owner explain further or have him/her drive with you.
3. Place vehicle on the alignment lift – center the vehicle on the lift and turntables. Raise the lift to a solid, level lock position.
4. Inspect the tires for any signs of abnormal wear – tires often reflect any misalignment conditions.
5. Perform a thorough component inspection. Replace defective parts prior to performing the alignment. Always check tire pressure and ride height.
6. Mount measuring targets to the vehicles wheels. Use the safety straps in the event of grip failure.
7. Choose the proper Wizard procedure for the vehicle.
8. Perform rollback compensation – the purpose of performing rollback is to eliminate measurement errors due to the wheel runout and clamp mounting error. This procedure builds a virtual “model” of the vehicle.
9. Measure caster, camber, and toe.
10. Determine what needs to be done – Examine the vehicle and any reference materials to determine the procedures for angle corrections. Determine what items are needed to correct any problems (i.e. aftermarket kits, special tools, etc.).
11. Make any needed angle corrections – center the steering wheel carefully when prompted. Use this order of adjustment:
 - a. Rear camber
 - b. Rear toe
 - c. Front caster
 - d. Front camber
 - e. Front toe
12. Re-center the steering wheel and readjust front toe if needed – crooked steering wheels are the leading cause of customer dissatisfaction with wheel alignments.
13. Print the results – the printout is useful for showing the customer before and after results. Many shops keep a printout on file for future reference.
14. Perform a test drive to verify proper alignment.

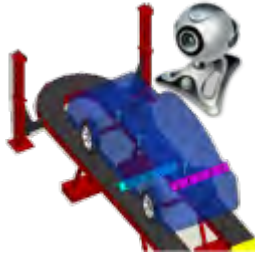
BASIC ALIGNMENT PROCEDURES

Positioning the Vehicle on the Lift

Proper vehicle positioning on the alignment lift is an important step for safety and accuracy.

1. Make sure the front turntable and rear slip plate locking pins are in place.

NOTE: Steps 2 - 5 are recommended to make sure the front tires are placed in the center of the turntables.



2. From the Home Screen click on the “Rack Drive-on Aid” icon located on the upper tool-bar.

3. While viewing the screen, drive the vehicle onto the alignment lift and stop just before the turntables. Take care to insure the vehicle is centered on the runways.

4. Place the vehicle in park (or in gear on a standard transmission), turn the ignition off, and set the parking brake on. Place wheel chocks behind the tires to prevent rolling.

Failure to use the wheel chocks can allow the vehicle to roll off the rack/lift.

5. Position the turntables as needed to insure the tires will be centered.

6. Drive the vehicle forward onto the center of the turntables.

Alternative Method: This method extends turntable life due to relief of load and stresses encountered when the brakes are applied (or acceleration on a FWD vehicle).

7. Place the vehicle in neutral, release the parking brake, and pull or push the vehicle forward onto the turntables. Reposition the wheel chocks, place the vehicle in park, reapply the parking brake.

To avoid personal injury or damage to property, follow the rack/lift manufacturer’s operating and safety procedures.

8. Raise the alignment lift so that the targets, when attached, will be in the cameras’ “field of view”. Lower the lift onto its mechanical stops.

9. Place the transmission in neutral and release the parking brake just before beginning the Vehicle Positioning process.



Attach the Targets

The targets are attached to the wheels using the self-centering wheel clamps. The large targets go on the rear wheels, the small targets on the front.



There are several methods of attachment depending on the wheel lip configuration. The integrated claws provide the versatility needed to grab virtually any wheel. The claws can be rotated to adjust for different wheel configurations.

Claws may have sharp edges. To avoid personal injury, use caution when working with wheel clamps.

The clamps should be installed in a straight-up vertical manner (knob at the top), unless low rear fender skirts prohibit this. For these vehicles, the rear target can be rotated 90 degrees on the clamp.

To accomplish this, loosen the nut located on the back side of the target, then rotate the target as far as possible. Tighten the nut to secure the target, and mount the clamp horizontally on the wheel. NOTE: Each time the target is relocated, TID must be performed. See page 4-68 of this manual for instructions.

Use the mounting method that provides the greatest security to keep the target from falling off the wheel. Most wheels can be grabbed from the outside-in by placing the claws between the bead of the tire and the outside edge of the rim. Others can be mounted on the inside of the rim such as with steel wheels.

For outside rim mounting:

1. Extend the clamp to a size larger/smaller than the rim by turning the knob.
2. Place the upper claws on the outside of the top of the rim. Push the claws in between the tire bead and the rim. It may be necessary to “pop” the upper clamp bracket with the palm of your hand to seat well. Note that it is not necessary for the clamp to be mounted perfectly vertical on the wheel.
3. Tighten the clamp by turning the knob clockwise until the lower claws engage the rim.
4. Push the lower claws into place. Again, it may be necessary to pop them in further for security. Continue tightening the knob until secure.
5. Test the security by pulling outwards on the clamp. If it comes off easily, reattach the clamp or select an alternative mounting method.



Begin Wizard Procedure

The *Wizard* procedure sets the aligner to follow a certain process path resulting in a completed alignment. Each pre-programmed procedure, called a *Wizard*, sets the aligner up to perform certain functions in a predetermined order and determines whether certain functions can be skipped.

Wizard versus Manual Operation

When the Run Wizard icon is selected from the Home Screen, the alignment process is performed using the Wizard that is currently selected. A technician can also choose to manually execute individual alignment functions directly from the Home Alignment tab by clicking on the appropriate icon, such as Measure or Adjust. Generally, it is recommended to use the Wizard process to obtain the initial readings.

Special Wizard Procedures (Optional)

Several special procedures are pre-programmed to follow manufacturer's recommended alignment methods.

When the Aligner is turned on for the first time a "factory default" Wizard is in place. Special as well as OEM Wizards can be set to default.

The following procedures are a sample of a Standard Alignment Wizard from start to finish.



Run Wizard

Click on the *Run Wizard* icon on the Home Screen Carousel Bar.



Quick Align

Selecting this icon starts the alignment procedures while skipping screens such as "Entering Customer Data".



Begin a New Alignment

This screen gives the choice to: “To begin a new alignment” or “Continue an alignment”

If the “NEXT” icon is selected the computer memory of the previous alignment is erased allowing a new customer and vehicle to be setup. If the “Continue an alignment” icon is selected, all customer, vehicle, and alignment measurements are retained and the software returns to the alignment readings screens.



With a new alignment selected



Enter Customer Data

The Customer Database feature allows entry of information about the customer and his vehicle. With the database this information can be saved for later recall. In addition, the aligner stores this information along with the results of the wheel alignment service. A *database* is a collection of information to be sorted and retrieved as needed for analysis. Available information includes the car owner’s name, address, phone number; the vehicle make/model/year, VIN number, and mileage; plus the date of service along with before and after alignment readings. This information is stored on the computer hard drive for later retrieval. Once retrieved, the information can be reviewed and can become the starting point for a new alignment.

Adding Customer Information

Using the pointing device move around each of the text blocks, the operator enters information about the customer and his vehicle using the keyboard. Selecting OK will save the record to file for later retrieval.



Selecting a Stored Record

Stored or existing records can be sorted and retrieved in several different ways—drill down through data records, sort alphabetically by last name, by telephone number, vehicle license plate number, vehicle VIN number, by date or by listing of all records. Once the desired record is visible, clicking on the plus sign expands the list to bring up a particular data set. When selecting alphabetically, select the first letter of the customers name and highlight it using the pointing device. Double click with the left button when the desired record is highlighted. The complete record will be displayed with stored data.



Adding a New Customer

A new record can be entered by clearing all information on the data window. Information is cleared by selecting Clear Fields on the toolbar (F7). Once the screen has been cleared, enter the new customer information as desired. If another record is desired for an existing customer, highlight his name as using the pointing device, and begin entering information at the blank screen.



Editing an Existing Record

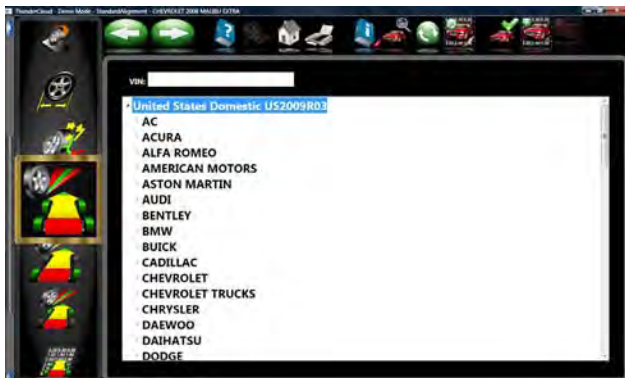
An existing record can be edited by selecting the desired customer record. Once the record is displayed, move between information fields with the pointing device or TAB key. When the "I" bar is within the field to be edited, make the desired corrections. Data is saved when "OK" is entered.

Backup and Restore

Datafiles can be backed-up for security and restored upon demand. See the "Maintenance" chapter for more information on this feature.

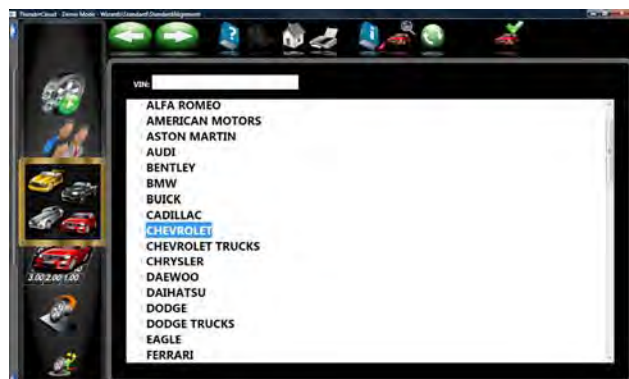
Select Vehicle Manufacturer, Year and Model

Note: The order the manufacturer, year, and model appear will vary depending on how the specifications are set up (see Setup).



Vehicle Manufacturer

This screen shows the vehicle manufacturers in specification database. The vertical scroll bar on the right indicates there are additional choices further down the page. Click on the down arrow on the scroll bar move down. Using the down arrow key on the keyboard also moves down the screen. Once the desired manufacturer is in view, double-click on the name to expand out the model selections. Double-click again to contract. Also, the keyboard's right arrow key expands and the left arrow key contracts the list.





Selecting a Default Make

To select a desired Make of Vehicle as “Default so it comes up first every time, highlight the Make then click on “F10” select default make Icon. This will anchor the selection. This is useful for dealership or shops that work on same makes the majority of the time.

TIP: To move to the manufacturer selection quicker, using the keyboard, press the first letter of the manufacturer name. This causes the selection bar to move directly to the first name starting with that letter (i.e. press “H” - moves to Honda).



Vehicle Year

Select the year of manufacture using the up/down keys or pointing device on the scroll bar to move up or down to the desired year, then double-click or press the right arrow key to expand out the years this model was made.



Vehicle Model

Use the direction keys or pointing device to select the model of the vehicle, then select “OK”, press Enter, or double click the selection.



View Specifications

This screen displays Year, Manufacturer, and Model of the selected vehicle with Minimum, Preferred and Maximum specifications for the front and rear wheels. Dashes in any position indicate there are no manufacturer specifications for that wheel or angle. For angles not displayed on this screen, refer to the specification book included in the literature package. A “wrench” icon to the right of the specifications field indicates the Aligner has assistance available for adjusting that angle. Clicking on the wrench launches the adjustment help features described on the next page. The Edit Specs toolbar button (F8) allows editing of the displayed specifications prior to beginning the measurements. This is useful if a Technical Bulletin has been issued that alters manufacturer’s specifications. Pressing “Ctrl-Alt-F8” simultaneously allows specs to be viewed at any time from within the alignment process.



Using an Optional VIN Reader

If the aligner is equipped with an optional VIN Reader kit, the vehicle can be entered quickly and with assurance the correct sub-model is selected. With the scanner properly installed, simply read the VIN bar code of the vehicle being aligned while the “I” bar is located in the “VIN Entry” box located on the vehicle selection screen.



Editing Specifications

Use the pointer to click on the specification edit icon as shown to the left. Click on the number to be edited (i.e. left camber). Once it is highlighted, enter the desired value.

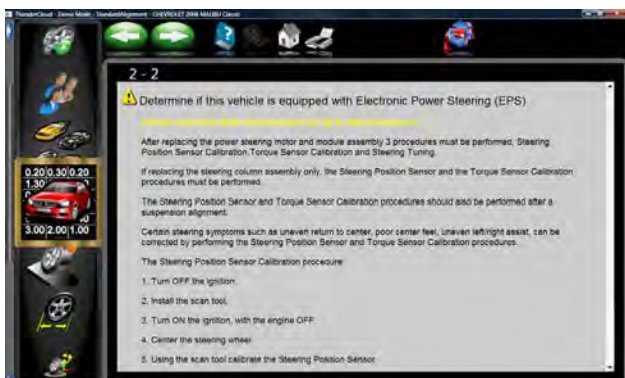


Use the pointer to move to any other values to be changed. When all editing is complete, click on NEXT.

Since these edited specs are now custom, enter in a description of the new custom specification which can be recalled later.

Vehicle Stability Programming

If the vehicle selected features a Vehicle Stability Assistance programming (VSA), some adjustments may be necessary after alignment which are required by the manufacturer. The screen shown to the left appears informing the operator that additional diagnostics or calibrations may be required. In many cases an optional scan tool is required to perform system resets or zero adjustments to certain sensors.





Adjustment Animations

Illustrations of adjustments specific to the selected vehicle can be viewed by clicking on the “INFO” icon on the Toolbar. Animations are also accessible from the readings screens. An animation of the adjustment procedure will appear on the screen. Animations can be paused, stopped and restarted at the operators preference by using the controls at the immediate bottom of the animation screen. Select “OK” or “Cancel” to return the operation to the current screen.

Additional Assistance

Included to the right of the animation window is a text box which illustrates three types of information regarding the current alignment adjust procedure. Information is requested by clicking on the icon associated with the assistance. These icons are:

1 Adjustment Instructions

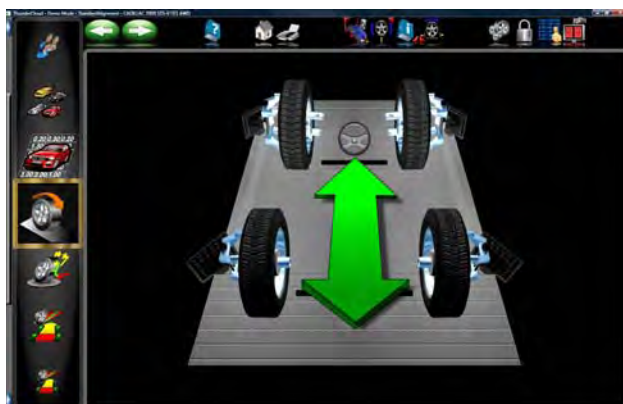
Adjustment instructions are provided by selecting the first of three function buttons on the Animation screen.

2 Parts Required

The center selection displays parts required to complete the alignment process, parts such as shims, eccentrics or other aftermarket supplied parts.

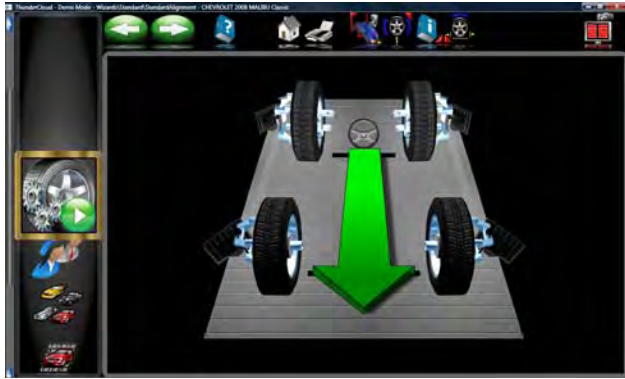
3 Special Tools

The third icon button displays any special tools which may be required to perform the alignment properly.



Vehicle Positioning Sequence

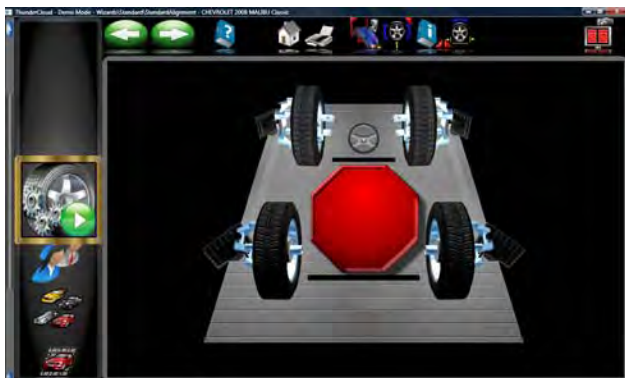
The next screen displayed is the *Target Acquisition* screen. This screen shows the status of each target and prompts the operator to proceed to the next step when all four targets have been acquired. The vehicle is then moved approximately 8” (20 cm) causing the targets to rotate about the spindle. The computer compares the initial target positions with the final target positions to calculate the axis of rotation for each wheel.



When the *Target Acquisition* screen is first displayed the cameras search for the wheel targets. The graphic images of each wheel target are shown away from the wheel and are displayed in red. As the cameras locate each of the wheel targets, the target graphics change from red to black and appear installed on the wheel. This means the target has been “acquired”. When all four wheel targets are located, the first *Vehicle Positioning* screen is displayed.

NOTE: *If one or more targets are never acquired, chose the Camera View button (F12) on the toolbar to help determine the cause, such as blocked vision.*

The *Vehicle Positioning* screen displays arrows that prompt you to move the vehicle backwards, approximately 8 inches (20 cm). Find a spot under the front of the car to push backwards. Some users prefer to use the left rear wheel to pull the vehicle back. The graphic image on the screen follows the vehicle’s movement as you roll the vehicle backward.



IMPORTANT!

If it is not possible to roll the vehicle back the required distance, select the Single Wheel Positioning button (F5) on the toolbar to perform positioning one wheel at a time with the wheels elevated..

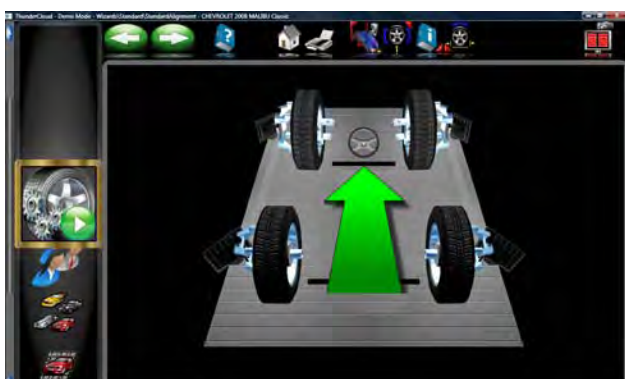
A very long vehicle which may be too long to roll back far enough for proper positioning can be compensated by selecting the “Split Position” button, (F6) from the tool bar. This allows the vehicle to be rolled a short distance forward then backward.

Too Far Back

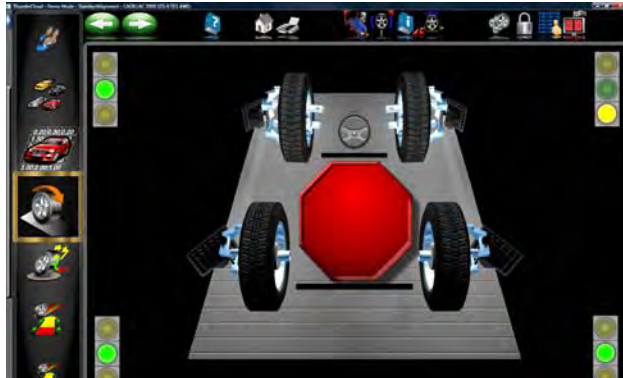
If the vehicle is moved too far in one direction, a yellow arrow will appear prompting you to move the vehicle the other direction a small amount.



Asmall red STOP sign will prompt you when the necessary backward wheel rotation has been reached. Hold the vehicle steady until the stop sign disappears.



When the aligner is ready, the screen displays a green arrow to prompt you to move the vehicle forward and return it to its starting position Grab the vehicle where it is convenient and roll it forward onto the turntables where it began.



Positioning Assistant

Once the stop appears and the vehicle does not stabilize within 5 seconds the stability indicators appear. Green means the wheel is stable, yellow means close to stable, and red means unstable. Check the non green wheels for stability problems such as loose target, slightly rolling vehicle due to un-level rack, running engine, and so forth.

A large red STOP sign will prompt you when the wheels have returned to their original start positions. Hold the vehicle steady until the stop sign disappears.

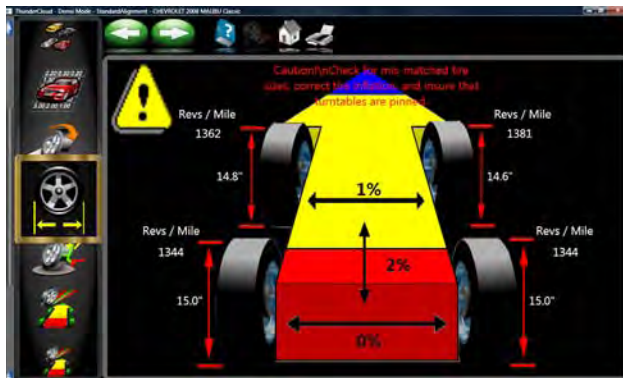


Single Wheel Rollback

If it is necessary to perform compensation on just wheel select this icon as shown from the toolbar. Follow instructions.

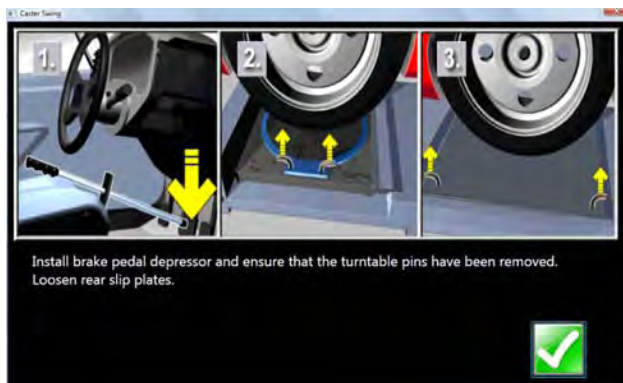
4 Wheel Split Position

If the vehicle being measured is too long for the rack select the icon shown. This feature allows the vehicle to be rolled forward first followed by moving rearward thus shortening the amount of travel for long vehicles.



Tire Size Mismatch

Tire size mismatch is a common contributor to handling problem. Once a wheel positioning sequence has been completed the diameter of each tire is displaying indicating any potential problems. The error flag can be set to whatever percentage of difference is desired in the Preferences Menu. If the side to side or front to back difference varies more than the selected tolerance an indicator will turn red showing where the deviation is. Tire size mismatch often causes a pull. Poor handling because of altered or an unequal scrub radius can also be a concern. If no problem is detected a tire size screen will be shown without the caution message.



Install Brake Pedal Depressor and Pull Turntable and Slipplate Pins

Once positioning has been completed a prompt appears to install the brake pedal depressor. This is done to prevent rolling of the wheel during the Caster/SAI swing. Also pull the pins on the turntables and slipplates.

NOTE: Free moving turntables and slipplates will greatly reduce suspension binding/loading during Caster/SAI swing.



Perform Steering Angle Measurement

The Standard Wizard goes to the Steering Measurement screen before displaying any readings. It is also possible to begin steering measurements from any of the readings screens by simply rotating the steering wheel in either direction, assuming this has been set up from Features on the Preferences carousel bar. As you rotate the steering wheel, the aligner tracks the wheel targets. When the steering wheel is rotated, the *Steering Measurement* screen is automatically displayed.



As you rotate the steering wheel toward each measurement position, a “Green indicator” at the top of the meter tracks the wheel movement. The left and right caster and SAI measurement positions are at approximately +10 and -10 degrees, while the TOOT positions are at approximately +20 and -20 degrees.

An Arrow adjacent to the steering wheel displayed in the lower portion of the screen prompt the correct direction to rotate the steering wheel. A numerical readout below the steering wheel indicates the steering angle in degrees.



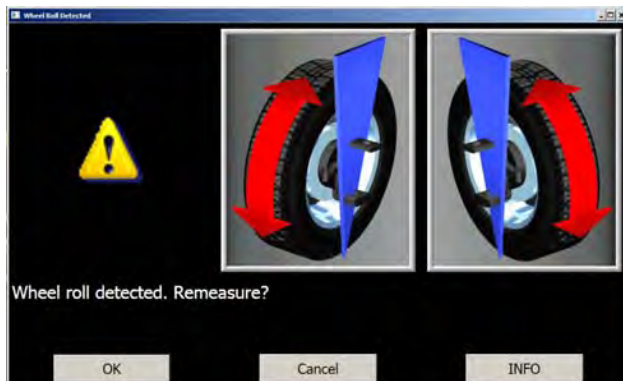
When the wheels reach the correct position, the meter stripe turns yellow when close then turns green. As the measurement for each position is complete, a green stripe appears around that icon, the icon appears depressed, the status bar turns green.



The Aligner prompts you where to stop, depending on which measurements you want. For example to measure caster and SAI only, move the wheels from one caster position to the other caster position, and then return to the center steering position. To measure caster, SAI, **and** TOOT, move the wheels from the caster position and then to the TOOT position, then to the other caster and TOOT positions, and then return to the center steering position.

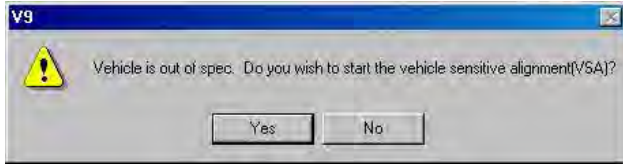


During steering measurements, the Aligner may briefly lose track of one or more wheel target. When this occurs, wheels displayed on the lower-left and lower-right will indicate a red X to indicate the lost wheel targets. Losing the rear targets during steering angle measurements does not cause a problem. When the front wheel targets are lost, stop steering rotation until the aligner finds the lost targets. When centering the steering wheel at the end, the Aligner must see the rear in order to update toe and thrust angle. Stand clear of all targets when the stop sign appears to display the *Readings* screen.



Wheel Roll Message

If the aligner detects excessive wheel roll during the steering angle measurements, a error message appears. We recommend restarting the steering measurements if this occurs. Select OK and the software begins a new steering angle measurement sequence. Wheel roll can usually be corrected by firmly installing the brake pedal depressor. On many vehicles it is necessary to start the engine to enable the power brakes in order to keep the wheels from rolling.



Vehicle Sensitive Alignment (VSA)

If “Vehicle Sensitive Alignment” is activated in the preferences menu, the message to the left will appear. Select “Yes” if this feature is desired or “No” if standard alignment procedures are desired. The “VSA” feature in most cases will speed the alignment process by skipping procedures not required for completion of the alignment. The VSA procedure is activated by selecting “Prompt When Available” on the “Features” menu, under the Preferences tab. See illustration to the left.

When the desired steering measurements are completed, the software prompts the operator to center and lock the steering wheel before performing any alignment adjustments. After a few seconds the *Aligner* automatically advances to the alignment readings screens if “Screen Timeouts” has been enabled..



Steering Asymmetry

If during the caster swing the values side to side were found to differ an unacceptable amount this message will prompt the operator to perform further checks of the steering geometry.



Readings Screen

The *Readings* screen displays the primary vehicle alignment information in an intuitive, three dimensional format. The screen appears as a vehicle with the body lifted off, viewed from the rear and above. Review the figure above to become familiar with the screen layout and functions.



Each wheel angle has a numeric reading as well as a graphical meter display indicating directional orientation and relationship to specifications. Camber meters, located along the top of each tire, have a line that indicates camber relative to the preferred specification. Toe meters, projected onto the ground in front of each tire, have an arrow that indicates the toe angle. Caster is represented by a meter in front of each wheel. The numeric value for caster is directly above the meter. When a meter is green, the reading is within specifications. When the arrow is centered within the green it is at the preferred value. A red meter indicates the reading is out of specification. The red meter contains a green band, indicating the direction of needed change. A gray meter indicates there is no specification for that angle.

All numeric readings on this screen are actual live measurements, including caster. If any angles require correction, make sure the brake pedal depressor is engaged and the steering wheel is centered and locked, then simply begin the adjustment. As the angles change the display will update to reflect the new readings. The numeric values change and the meter indicators move in the direction of change. Click on OK to proceed to the next readings screen.



Turn Wheels Straight Ahead

The screen then changes to indicate the requirement to turn the wheels to the straight ahead position. Centering the steering allows the geometric center-line to be established for the rear readings which in turn will determine the thrust angle or rolling direction. Thrust Angle is the direction of the vehicle travel determined by the total toe of the rear wheels. The thrust angle is used as a reference when adjusting the front toe so that a straight steering wheel is the end result. Toe error on many rear wheel drive vehicles cannot be corrected, creating a dog tracking effect and/or a crooked steering wheel.

If the wheels are already straight ahead this screen will briefly appear and automatically proceed.



Rear Readings Screen

After the *All Readings* screen, the *Rear Meter Readings* screen appears. This screen displays, both in meter and numerical format, the angle measurements and information needed to determine if corrections are necessary. The display is divided into three rows: **Camber**, **Toe** and **Thrust Angle**. The columns represent the left and right side of the vehicle. The readings meters have a numeric readout of live readings, and a color coding to indicate the relationship of live values to specification and preferred specifications on a mouse over “tool tip”. Grey meters indicate no specification has been entered for this angle. Red meters indicate the angle is beyond manufacturer’s specification. Green meters indicate live values are within specification. Elevated readings can be viewed by selecting the “Jack” icon located right of the cross values.



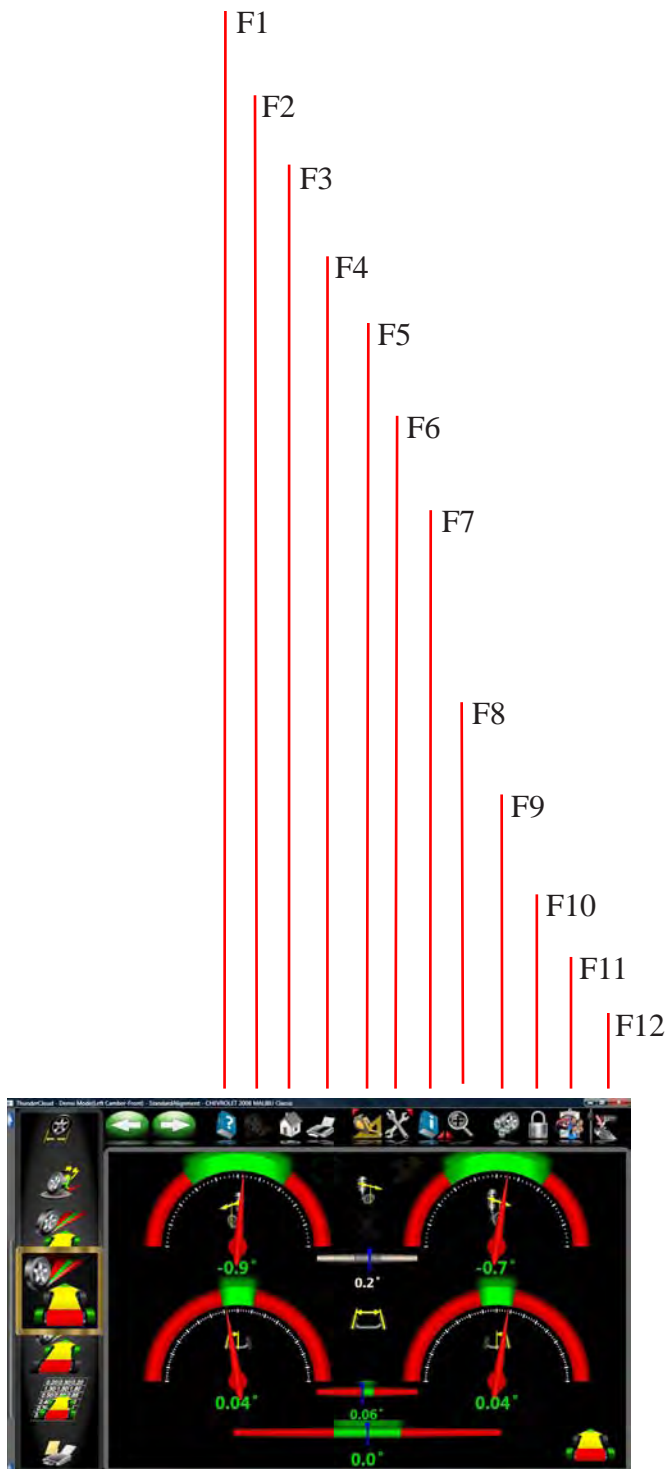
Adjust Front First

In the event this ICON appears on the readings screens, the front should be adjusted before rear correction.

Cross Values / Total Toe

The numeric value between the camber meters indicates cross values (side-to-side), the difference between left and right readings. This cross value is important on many vehicles for proper handling. Cross Camber and Caster readings can be set to “signed” or “unsigned” in the “Units of Measure” screen under “Preferences”.

The numeric value between the left and right toe meters indicates the rear Total Toe (sum of individual toe).



Readings Toolbar Buttons

Buttons available on all the Readings Screens toolbar from left to right are:

Previous and Next buttons

Also icon buttons associated with the keyboard “F” keys are:

- F1 Help – displays operation assistance for the screen presently open
- F2 - Not used on reading screens.
- F3 Home – returns the software to the opening Home Alignment tab
- F4 Print – accesses the print report menu
- F5 Measure – access to measuring additional angles
- F6 Adjust – access to assistance for the technician with angle corrections
- F7 Information – assists the technician with a variety of information about the alignment. Selections include animations, Tire pressure monitoring systems information, Vehicle TSBs, Shopkey access, and MAP standards.
- F8 Zoom – brings any meter to full screen size to aide viewing
- F9 Select Wizard - Selects the desired wizard procedures.
- F10 Login – user Login or Logout
- F11 Edit – allows editing of the vehicle selection, specifications, customer information, and inspections within the current alignment
- F12 Aligner Diagnostics – allows user to observe “camera view” and manually adjust cameras up or down. Camera search mode can also be invoked here.

NOTE: *If a toolbar button is “grayed out” it means the function is not available on that particular screen.*



Level and Lock Steering Wheel

Before front readings are displayed it is necessary to level the steering wheel and lock it in place using the steering wheel holder. Once these steps are completed, press “OK” to move forward.



Front Meter Readings Screen

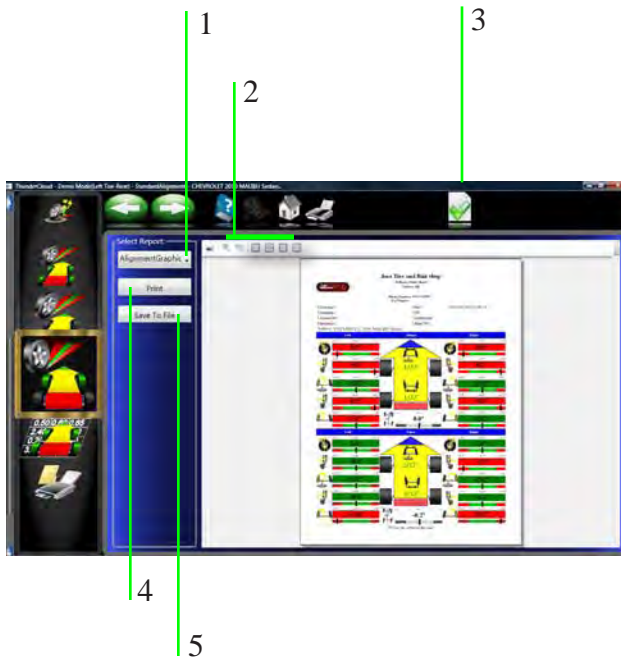
The *Front Meter Readings* screen is similar to the rear. Caster is displayed with the top meters. Camber meters are located in the middle of the screen and toe meters are at the bottom. Caster, camber, and toe are “live” displays which can be referenced while making adjustments. When measurements are within specification, the center portion of the meter is green. If red is displayed, the readings are outside of specifications. Grey meters indicate this angle has no specification. Elevated camber and caster readings can be viewed by selecting the “Jack” icon located right of the cross values.



All Readings Screen

After *Front Readings*, the final readings screen is *All Readings*. This screen shows all alignment readings numerically in a chart format. The numbers are color-coded to indicate the reading’s relationship to specifications.

A scroll bar on the right side of the screen indicates there is more information below. Click on the down arrow of the scroll bar to reveal Front and Rear Diagnostics values (if measured).



Print Results

Select Print on the toolbar (F4) on either the Front or Rear Readings screen to go to the Printer Menu screen. The options are:

1-Select Desired Alignment Report - Select the desired type of report to be printed from the drop down box.

2 - Zoom - Select these buttons to enhance to the desired size of the *displayed* report.

3 - Set Default Report - Determine the desired report to be used as default and for one click printing.

4 - Print - Sends the selected report to the printer.

5 - Save to File - This selection allows a report to be saved to a file. When selected a window will open allowing the use to select the desired location to save the file. The default location is "Documents". Name the file something that indicates its contents.



Measure Menu

Measure Front

When the Measure icon is selected from the Home Screen or from the toolbar on any readings screen, a screen appears that allows the operator to measure any wheel alignment angle. The icons on this screen are defined in, and are explained below:

- **Caster Swing** – measures the Caster and SAI angles on the turnplates.
- **Steering Level Check** - Selecting this feature allows the user to check the level of the steering wheel.
- **Rollback** – repeats the rollback / roll-forward process that locates the vehicle spindles in 3 dimensional space.
- **Caster Measurement Elevated** – measure the Caster and SAI angles with the wheels elevated (unloaded).
- **Vehicle Dimensions** – Provides additional information about the condition of the vehicle's frame, such as setback and axle offset.
- **Tire Diameter** - This is a diagnostic which measures the diameter of each tire. A positioning sequence must be performed to determine diameter values.
- **Max Turns** - Is selected to measure the amount of steering angle to the right and to the left. These are generally symmetrical and this test can help determine if a steering linkage is damaged.
- **Single Wheel Rollback** – instead of the rolling vehicle positioning sequence, the vehicle can be jacked to allow each wheel to be positioned independently. This is useful if a wheel must be removed during the alignment, for example to install a shim in the rear. It can also be used to align a long wheelbase vehicle on a short rack that does not allow rolling back 8" (20cm).
- **Toe Curve Change** – measure the individual wheel toe change as the suspension goes through jounce and rebound.
- **Ride Height** - Use this screen to enter ride height values as measured per manufacturers instructions. These values can be compared to specification to determine suspension conformance.
- **Measured Ackermann** - Steering Geometry is measured and analyzed with the unique *ProAckerman™* feature.
- **Scrub Radius and Caster Trail** - Provides valuable angular measurements critical to analyzing the steering geometry. Especially useful when examining aftermarket wheels and components.
- **Camber at 0 Toe** - This process is recommended by some vehicle manufacturers, such as Mercedes Benz. It measures the camber of each front wheel separately with the wheels straight ahead (zero toe).



Measure - Rear

- **Rollback** – repeats the rollback / roll-forward process that locates the vehicle spindles in 3 dimensional space.
- **Vehicle Dimensions** – Provides additional information about the condition of the vehicle's frame, such as setback and axle offset.
- **Tire Diameter** - This is a diagnostic which measures the diameter of each tire. A positioning sequence must be performed to determine diameter values.
- **Single Wheel Rollback** – instead of the rolling vehicle positioning sequence, the vehicle can be jacked to allow each wheel to be positioned independently. This is useful if a wheel must be removed during the alignment, for example to install a shim in the rear. It can also be used to align a long wheelbase vehicle on a short rack that does not allow rolling back 8" (20cm).
- **Ride Height** - Use this screen to enter ride height values as measured per manufacturers instructions. These values can be compared to specification to determine suspension conformance.

Measuring Caster and SAI

Caster and SAI are measured directly during the ± 10 degree sweep made when caster is measured. SAI can be measured either on the turntables (loaded) or with the front wheels elevated (unloaded). The results of loaded or unloaded will be similar, but some variation may occur due to the type of vehicle suspension. For accurate results follow the on-screen instructions carefully. See caster instructions in the "Operation" section of this manual.

1. Whether measuring SAI on the turntables or elevated, it is mandatory to lock the vehicle's brakes. Start the car to initiate the power brakes and install the brake pedal depressor between the seat and the brake pedal.
2. Follow the on-screen instructions. During the elevated measurement, the instruction say to raise the front wheels using rigid supports. This is typically done with a jack included with the alignment lift.
3. The turning sequence is identical to the process for obtaining steering angles on the turntables
4. When measuring elevated Caster/SAI, the final instructions will be to lower the vehicle and jounce the suspension.

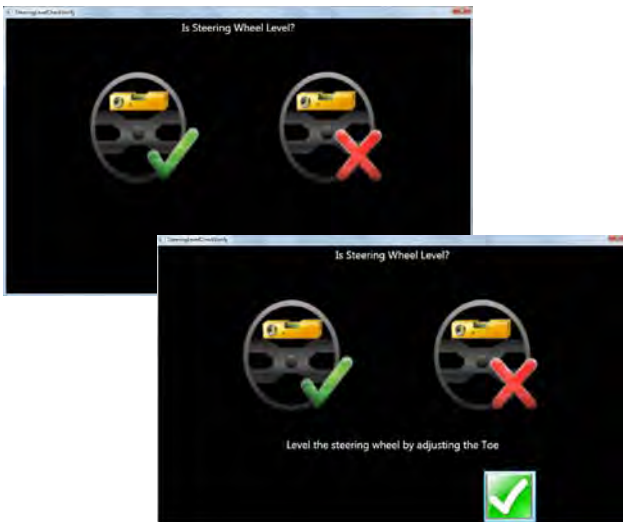
5. The Caster/SAI values are displayed on the All Readings screen. Caster is displayed on the All Readings screen as well as the Front Readings meter screen.
6. Use SAI to diagnose a handling problem or a bent part that is limiting the adjustment of camber.

NOTE: *Not all vehicle manufacturers publish specifications for SAI. All available manufacturers' specifications are included in the Aligner database.*

Steering Level Check

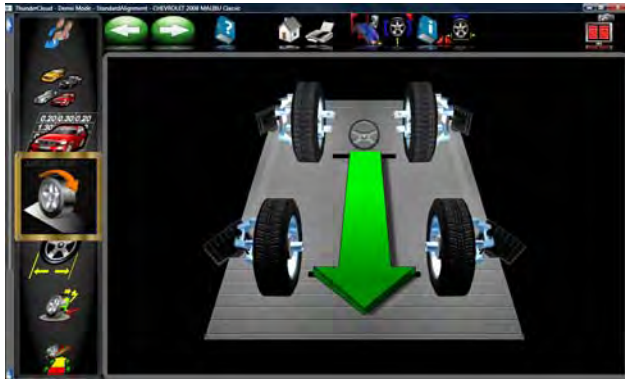
Selecting this feature allows the user to check the level of the steering wheel.

When selected you will be asked to turn the steering wheel left then right then return to center.



The screen asks if the steering wheel is level. If so, select the green check mark, if not select the red "X".

If the wheel is not level, adjust the toe to correct to a level condition.



Rollback

Select to go to the *Rollback* or Vehicle Positioning Screen. The arrow prompts you to move the vehicle backwards, approximately 8 inches (20 cm). Find a spot under the front of the vehicle to push backwards. Some users prefer to use the left rear wheel to pull the vehicle back. The graphic image on the screen follows the vehicle's movement as you roll the vehicle backward.

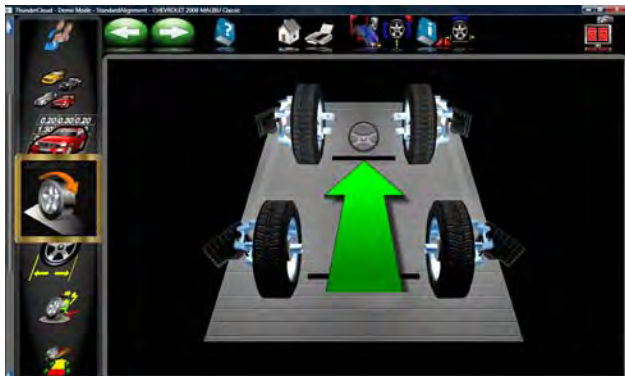
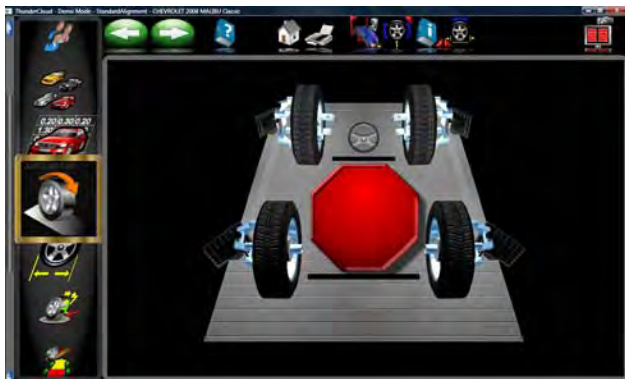
When the red stop sign is displayed wait a few moments while images are processed. A green arrow will again be displayed indicating to move the vehicle back to the starting position.

A large red STOP sign will prompt you when the wheels have returned to their original start positions. Hold the vehicle steady until the stop sign disappears.

IMPORTANT!

If it is not possible to roll the vehicle back the required distance, select the Single Wheel Positioning button (F6) on the toolbar to perform positioning one wheel at a time with the wheels elevated..

A very long vehicle which may be too long to roll back far enough for proper positioning can be compensated by selecting the "Split Position" button, (F8) from the tool bar. This allows the vehicle to be rolled a short distance forward then backward.



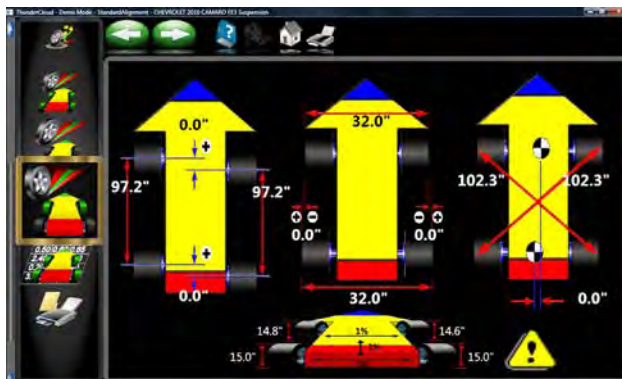


Caster Measurement Elevated

Some vehicles may require the suspension to be unloaded for a caster measurement. Measurement is similar to Caster on the turnplates with the exception of the requirement to raise the vehicle using a rigid support. The brakes must be locked in order to ensure an accurate SAI reading.



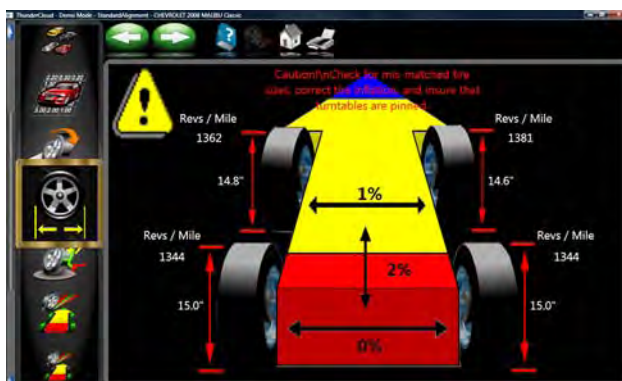
Raised measurement can also be made from the readings screens by clicking on the “Raised Icon”. Follow the on-screen directions.



Vehicle Dimensions - (Platinum Option)

Vehicle dimensions are useful measurement tools to diagnose vehicles that may have been involved in a collision. Setback occurs when one wheel on an axle is not even with the other. With the *Aligner* dimensional measurements are automatic, and additional information about the vehicle’s frame can be determined. These measurements are accessed from the Measure toolbar button on any readings screen, or from the Measure icon on the Home Alignment tab.

The results of the vehicle dimensions measurements are displayed with a visual reference to a vehicle depicting wheelbase difference, track width difference, and front and rear setback. In addition, setback and offset values are displayed on the *All Readings* screen and are printed during the alignment results printout. Vehicle dimensions and setback can be displayed in inches or millimeters, selectable in the Units setup.



Tire Diameter- (Platinum Option)

Tire size mismatch is a common contributor to handling problem. Once a wheel positioning sequence has been completed the diameter of each tire is displaying indicating any potential problems. The error flag can be set to whatever percentage of difference is desired in the Preferences Menu. If the side to side or front to back deference varies more than the selected tolerance an indicator will turn red showing where the deviation is. Tire size mismatch often causes a pull. Poor handling because of altered or an unequal scrub radius can also be a concern.



Maximum Turns

Maximum Turns is selected to measure the amount of steering angle to the right and to the left. These are generally symmetrical and this test can help determine if a steering linkage is damaged.

Install the brake pedal depressor and pull the turnplate pins if installed.



First Turn to the 20 degree mark on the screen. Wait for the prompt.

Next turn to the left to the maximum possible, wait for the prompt.

Next turn to the 20 degree mark to the right, Wait for the prompt.

Next turn to the right to the maximum possible, wait for the prompt.



Center the steering wheel.

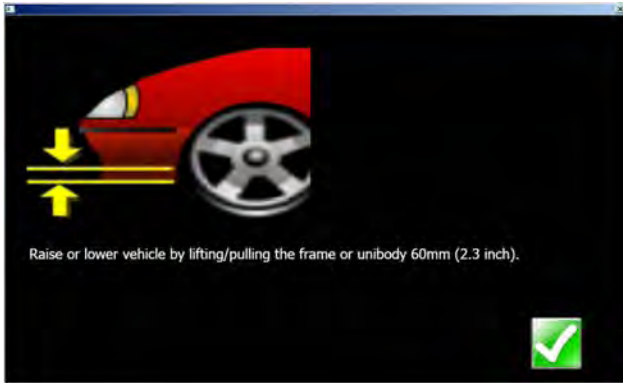
A results screen will show the left and right side values and specifications if available. Determine any damage by comparing any disparity between the readings.

Single Wheel Rollback

Instead of the rolling vehicle positioning sequence, the vehicle can be jacked to allow each wheel to be positioned independently. This is useful if a wheel must be removed during the alignment, for example to install a shim in the rear. It can also be used to align a long wheelbase vehicle on a short rack that does not allow rolling back 8" (20cm).

1. Select *Single Wheel Rollback* from the Measure screen. The screen shows the vehicle's 4 wheels with a red box around the left front wheel. If a check appears in the box, it indicates that the wheel has been previously successfully positioned. Use the up/down arrow keys or mouse to place the box around the wheel to be positioned and click OK. After positioning of the selected wheel is completed for each wheel, the software returns to this screen to allow additional wheels to be positioned if necessary.
2. Raise the wheel being positioned as instructed. Install the steering wheel holder if you selected one of the front wheels to keep the wheels from going into a turn or moving side-to-side. Start with the target rotated to the clamp tightening knob is straight up. Wait a few moments to proceed. Notice that VODI, in the upper left corner, shows which wheel has been selected.
3. Following the on-screen graphics, rotate the wheel/target back approximately 30 degrees until a stop sign appears. Hold the wheel steady at this point.
4. The software automatically advances to the next screen, instructing you to rotate the target forwards to the starting point (straight up). When the stop sign appears hold the wheel steady and wait for the screen to advance.
5. When the screen advances, an instruction screen appears reminding you to lower the vehicle. This is only necessary when all wheels that need to be positioned individually have been done. It is acceptable to leave the vehicle elevated if additional wheels require positioning. Lower the vehicle and jounce the suspension prior to returning to any readings screen.
6. As each wheel positioning is completed the software returns to the selection screen and a check mark appears next to the wheels that have been successfully positioned. Click on the Cancel button once all wheels are positioned to return to the alignment readings screens.

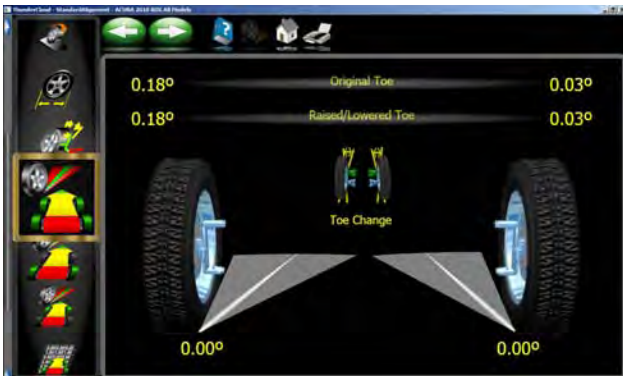




Toe Curve Change

This feature allows measurement of individual wheel toe change as the suspension system goes through jounce and rebound (spring compression and expansion). An excessive amount of toe change can cause premature tire wear. A large change on only one side can cause “bump steer”, a dangerous condition causing the vehicle to rapidly change directions when bumps are encountered. While there are no specifications for the amount of change, it should be fairly small, and a comparison of left and right wheels can assist in diagnosing defective steering system components.

Follow the on-screen instructions carefully to move the suspension through a 60mm (2.3”) travel. This can be done by pulling down or pushing up the suspension.



Use a ruler or tape measure to observe the proper amount of frame movement. Select OK when completed to display the results.

.....
TIP: On cars with rack and pinion steering, a bump steer condition is usually created by worn rack mounting bushings that allow the entire rack to shift when bumps are hit.
.....



Ride Height

The alignment of many vehicles are dependent on a ride height measurement. Variations in ride height may alter desired specifications. Examine the vehicle and determine the proper method of ride height measurement. Highlight the measurement method displayed for both front and rear. Press “Enter”. Input the measured values into the provided spaces to record into the database

Many vehicles may not have manufacturers ride height specifications, however the side to side and front to rear relationship can be measured and compared to diagnose a potential problem.



Ride Height (Platinum Option)

An optional Ride Height measuring device is available for automatically entering the ride height values into the database for correction calculation.

The Ride Height Targeting device is useful for inputting values for those vehicles with “externally” accessible Ride Height measurement points. Those vehicles requiring an “Internal” measurement such as a SALA pickup truck will require the technician to measure using conventional methods.

How to use the optional Ride Height Device

From the Tool bar, select “F5” for target measurement. Note the location of the target “Dot” on the illustration. Place the pointer on the location as directed until the value is detected and input. Move the pointer to the next directed position and hold steady until values are input. Move to the opposite side of the vehicle. The view indicator in the lower left side of the screen shows the target image.

If one of the desired points to be measured is from the center of the wheel, the values will be input automatically at time of rollback as they are determined with the standard targets.

Measured Ackerman (Platinum Option)

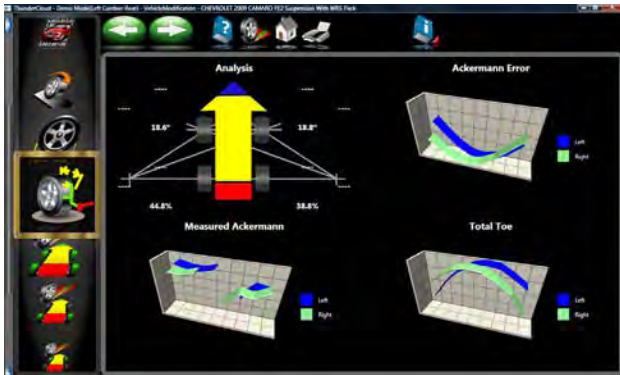
Explanation: Steering Geometry is measured and analyzed with the unique *ProAckerman™* feature.

Manufacturers generally do not publish specifications for the desired Ackermann relationships for their vehicles. However, many manufacturers do publish a preferred specification for Toe Out On Turns (TOOT). This provides information for one point on the Ackermann curve. In addition, most vehicles are designed to be symmetric, side to side, in their Ackermann characteristic. These facts allow some diagnostics to be performed.

Procedure:

Select the “Measured Ackermann” button from the “Measure” Menu. Set the desired parameters or click “OK” if selected variables are preferred. A “HELP” button is provided for information regarding these parameters. Once “OK” has been clicked, turn the steering to the right or to the left. The graphic shows the turn progress.





Once turn requirements are satisfied, the results screen will show a screen with the measured Ackermann angles. A “HELP” button is provided for information regarding these four charts.

Charts illustrate a graphical analysis showing a representation of the measured vehicle with its diagnostic results, measured Ackermann, the error or deviation from a “true” Ackermann principle, and a total toe measure.

Explanation of the four Charts:

Chart 1 - Graphical analysis

Toe Out on Turns Specification given by the Manufacturer.

The difference between the Toe Out at 20 degrees and the specification.

Toe Out at 20 degrees.

Ackermann Specification calculated from Toe Out on Turns given by the Manufacturer. (Valid only at 20 degrees.)

Difference between the measured Ackermann and the specification.

Chart 2 - Ackermann Error

Ackermann Error is the difference between the full(100%) Ackermann angle for the outside wheel and the measured angle of outside wheel at each steering angle. Red is for the steering turning left and green is for the steering wheel turning right.

Chart 3 - Measured Ackermann

Measured Ackermann is given as the percentage of the measured total toe to total toe based on the outside wheel calculated with full(100%) Ackermann at each steering angle. Red is for the steering turning left and green is for the steering wheel turning right.

Chart 4 - Total Toe

Total Toe at each steering angle. Red is for the steering turning left and green is for the steering wheel turning right

NOTE: Each data point on the Ackermann screens contains a “tool tip” explaining the values displayed. Move the mouse pointer over the point to show the explanation. See Chart 4 at the left for an example of the “tip” information.



Scrub Radius and Caster Trail (Platinum Option)

Scrub Radius is the radius formed between wheel centerline and steering axis projected load points at the road surface.

When compared at ground level, the distance between the SAI line (drawn through the steering pivots) and the tire centerline is called **SCRUB RADIUS**. When the scrub radius is toward the inside of the tire tread, the vehicle has a **POSITIVE SCRUB RADIUS**. When the scrub radius is toward the outside of the tire tread, the vehicle has a **NEGATIVE SCRUB RADIUS**. Mounting wheels with offset other than OEM can alter the scrub radius thus affecting the vehicle handling.

Scrub Radius is measured during the normal caster swing and values are saved for these and other diagnostics. Input the rim width of the wheels as in the illustration to the left. Tire diameter, scrub radius and caster trail is automatically determined and displayed.

The first display of the Scrub Radius/Caster Trail values are considered the initial values and stored to the alignment record if a customer name has been entered in the Database screen.

All subsequent visits to the Scrub Radius/Caster Trail Screen are treated as "After" values and are updated each time the screen has been exited.

Changes can be made to the suspension then select the Begin Alignment ICON from the "Main Menu". Then select the "Vehicle Modification Wizard" to select the vehicle from the stored database.

Perform the required compensation and swing.

The Scrub Radius/Caster Trail Screen will then be displayed. Select the "Compare" ICON to see recommendation for best handling, least tire wear and safety.

The initial and final values will be compared and a recommendation of correction is then made.

Scrub Radius/Caster Trail can also be measured when selected from the "Measure Menu".

Click on the "Help" button for more information about Caster Trail and Scrub radius. A brief discussion is shown below.

What does scrub radius do? Scrub radius causes any fore or aft forces generated by the tire (acceleration, braking, or drag from rolling friction), to try to steer the tire. The larger the scrub radius, the more torque is applied to the steering effort. If the scrub radii are equal side to side, and the tire forces are the same, then the steering torques cancel, and there is no “feedback” through the steering wheel.

Why have a scrub radius? The purpose of scrub radius is to keep a constant slight force on the steering linkage to take up any looseness or compliance. This reduces the tendency of the vehicle to wander as it is driven down a straight road. It also makes the steering more responsive to initial steering input, when a steering correction is made - the linkage is prestressed and ready to add just a little bit of motion to the wheels.

Steering and suspension changes which can adversely affect ride, handling, and tire wear are: lift kits, lowering, alignment settings out of manufacturer’s tolerance, suspension bushings, dampers (shocks), custom spindles, link arms, tire tread or compound mismatch, tire size mismatch, worn ball joints or other worn or bent linkage components.

Caster Trail: The distance between the pivot axis of the spindle and the center of the contact patch of the tire at the road surface. Vehicles with more caster trail will be directionally stable but will require more effort to steer. Those with less caster trial will take less effort to change direction but will be less stable at speed.

Camber at Zero Toe

This routine measures camber on the left and right front wheels individually at zero toe. This is the recommended procedure for vehicles with high caster specifications, such as Mercedes-Benz.

The procedure is as follows:

1. Select Camber at Zero Toe from Measure Screen.
2. Using the on-screen meter, turn the left wheel towards the center until the meter turns green.
3. Press OK to continue.
4. Repeat this process for the right wheel. Click OK to continue.
5. The software returns to the readings screen.





Adjust Menu

One of the most powerful features of the Aligner Series is the assistance given to the alignment technician when performing adjustments on a vehicle. These features are on the Adjust screen, and are accessed through the Adjust icon, located on the Home Alignment screen, and from the Adjust button on the toolbar when alignment readings are displayed.

There are numerous features designed to improve the efficiency and effectivity of the alignment technician. Icon choices are from the Adjust screen are defined in and are explained below:

Caster, Camber and Toe Adjust Elevated - Several different options available to assist with these angles, including elevated adjustment modes.

EZ Toe – this software routine is a new and improved method of setting front toe, making it easier to obtain straight steering wheels.

Shims and Kits – many front wheel drive cars use a shim on the rear axle/spindle to adjust camber and/or toe. This program determines the proper shim to use.

A-Arm Adjust – for vehicles whose caster and camber adjustments are located on the suspension A-Arm, this selection allows both angles to be corrected simultaneously.

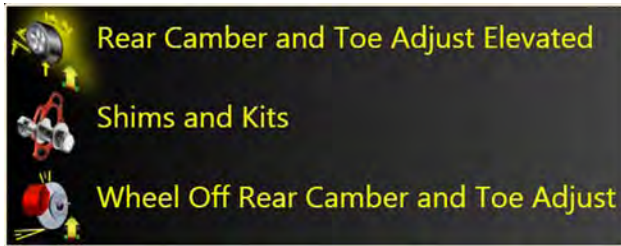
Wheel Off Caster, Camber, and Toe Adjust - This feature allows the operator to remove the wheel and attach the clamp/target assembly directly to a brake rotor for easier access to adjustment of certain angles.

Offset Cam Bushing - Many 2 and 4 -wheel drive trucks utilize offset sleeves and inserts around the upper or lower ball joints to adjust the caster and camber angles.

Cradle Adjust – assist with the adjustment of the engine cradle on many front wheel drive cars.

Adjust Drag Link – assists with steer direction and straight steering wheel when performing toe adjustments on trucks with a drag link adjustment.

Single Tie Rod Adjust – helps with vehicles having a single tie rod toe adjuster.



Adjust - Rear

Rear Camber and Toe Adjust Elevated - Several different options available to assist with these angles, including elevated adjustment modes.

Shims and Kits – many front wheel drive cars use a shim on the rear axle/spindle to adjust camber and/or toe. This program determines the proper shim to use.

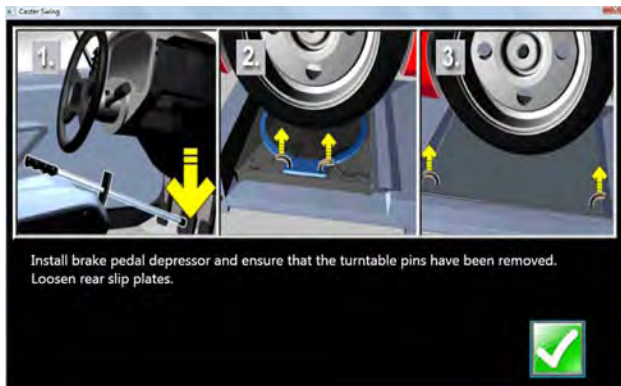
Wheel Off Rear Camber, and Toe Adjust - This feature allows the operator to remove the wheel and attach the clamp/target assembly directly to a brake rotor for easier access to adjustment of certain angles.

Each of the Adjust Menu selections are described in the following pages.

Adjust Caster and/or Camber, and Toe Elevated

After selecting this icon, instructions appear in preparation for the adjustment.

- Bounce the suspension
- Install brake pedal depressor (should already be locked from caster/SAI measurement)
- Press OK



- Raise front wheels using rigid supports
- Press OK

IMPORTANT!

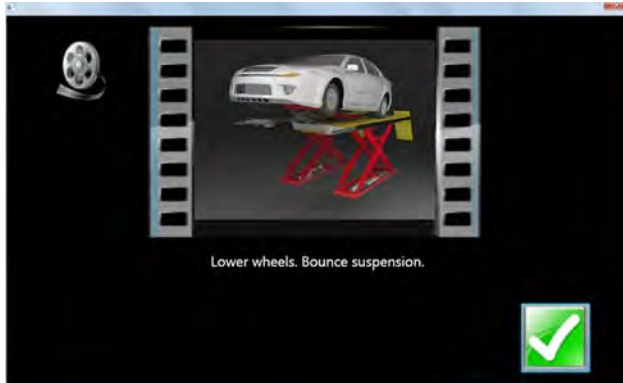
Follow all on-screen instructions carefully. Incorrect adjustment readings are possible if these steps are ignored.

When OK is pressed, a screen very similar to the standard Front Readings display appears with a highlighted Jack indicating raised condition.



Adjust caster, camber or toe as required while viewing the screen – for example, camber and caster change will be shown as an eccentric cam is turned. As the adjustments are made, the meter movements and numeric values change. The meters are color coded to show the readings' relationship to specification.





Once the adjustments are completed, press OK. Post-adjustment instructions will be displayed.

- Lower wheels. Bounce suspension
- Unlock the brakes
- Press OK

The software automatically returns to the readings screen where you started.

EZ Toe

This software routine is an improved method of setting front toe, making it easier to obtain straight steering wheels. It also makes it possible to adjust toe with the wheels turned at any angle left or right, an aide when setting toe on cars with firewall mounted rack and pinion units.

Use the following procedures:

1. Perform all alignment steps normally used to obtain alignment readings. Correct any misalignment in the rear as well as front caster and/or camber.
2. Select the EZ Toe icon from the Adjust screen.
3. Level the vehicle steering wheel, Select OK.



4. Steer the right wheel to the adjust position. Select Next.



5. The next screen shows a meter indicating the amount of toe change needed for the right wheel.

6. Adjust the right tie rod until the meter needle is in the green. Select OK after completion.



7. Follow the same procedures for the left wheel.



8. Select Next once the left toe adjustment is made.

9. Return to the Front Readings screen and recheck toe and steering wheel position.

NOTE: *If using EZ Toe at a large turn angle, it will be necessary to use the Steering Wheel Clamp to hold the linkage steady at that position.*



Shims and Kits

Many front wheel drive vehicles utilize aftermarket shims to correct front and rear camber and/or toe. This correction is achieved by placing the shim between the rear axle and the spindle.

When a vehicle that utilizes rear shims is accessed from the specification database, the technician can use the *aligner* to determine the proper shim to correct a misalignment. From the "Adjust" drop down menu select Shims and Kits.



At this point the computer will examine the live camber and toe readings, compare them to preferred specification, and calculate the amount of change needed. It will then recommend the shim needed to make this correction. The screen to the left will be displayed.



Default Part Vendor

Determine the desired part vendor to select as the default aftermarket supplier. This selection will vary location to location and upon the Technicians preferences.

The part number of the shim or adjuster kit is automatically selected and displayed dependant on the vehicle selected and the amount of correction required.

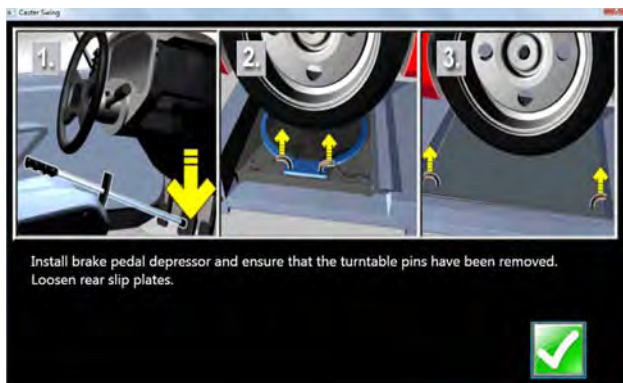


Highlight one of the part numbers displayed, then click on the "Info" ICON to invoke a screen describing the correct orientation of shims or other corrective aftermarket parts. The "Info" ICON can be selected from several places of the screen. If highlighted, information is available. See sample screen at left.



Installation video and detailed Instructions may also be available.

Click the "Aftermarket Tools Available" ICON to view tools required for the specific procedure if available.



Adjust A-Arms

Many vehicles have adjustment provisions for caster and camber located on the suspension A-Arm (control arm), either on the upper or lower arm. The adjustments may be made with shims, eccentric cams, or slots in the frame. Both angles are easily corrected to manufacturer's specification using the Adjust A-Arm icon.

First, a screen instructs the operator to apply the brake pedal depressor (important) and remove the lock pins from the turntables. Select OK.

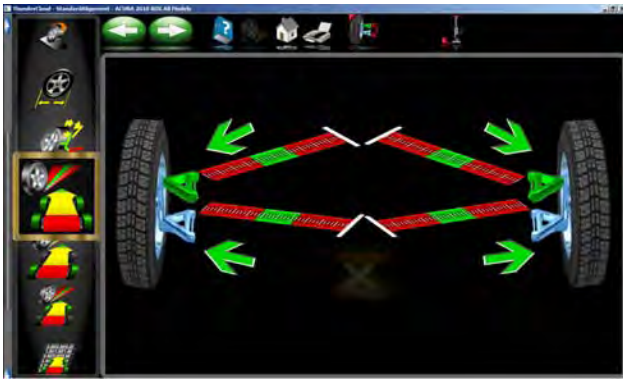
The next screen, *A-Arm Adjust*, allows selection of the location of the adjustable A-Arm and whether the corrections will be made on the turntables or elevated. Examine the vehicle for the location of the adjusters. It does not matter whether the a-arms have shims, slots, or cams.



Select to adjust upper A-Arm or Lower A-Arm on the Adjust A-Arm screen.

The icon looks like that to the left. Selecting switches from upper to lower and back.

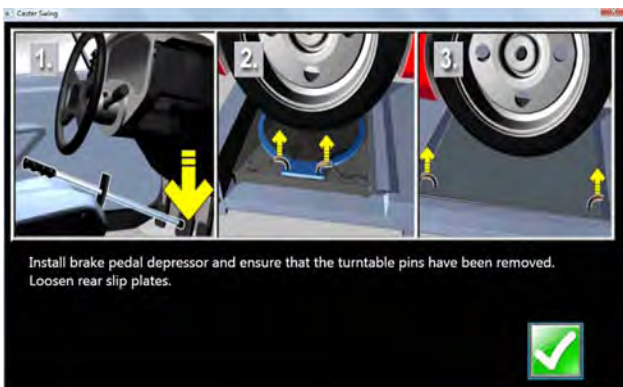
The adjustment screen contains a graphic of the right side a-arm along with two meters. These meters represent the movement of the front and rear of the a-arm, and their relationship to the desired readings. Move each side of the a-arm by adding/removing shims, loosening the bolts and sliding the arm, or turning the eccentric cams, until each meter indicator is centered in the meter – this is the desired value for both caster and camber. Press Next when complete.



Wheel Off Caster, Camber, Toe Adjust

Follow the Same procedures as outlined in Caster, Camber and Toe Elevated above but with the *Wheel-off* option.

First install the brake pedal depressor and remove the lock pins from the turn plates and slipplates.



Raise the vehicle using rigid supports.





Remove the wheels that require service and mount the clamp target assembly to the brake rotor.



The "Raised Jack" icon on the readings screen indicates the vehicle should be in the raised position for these adjustments.

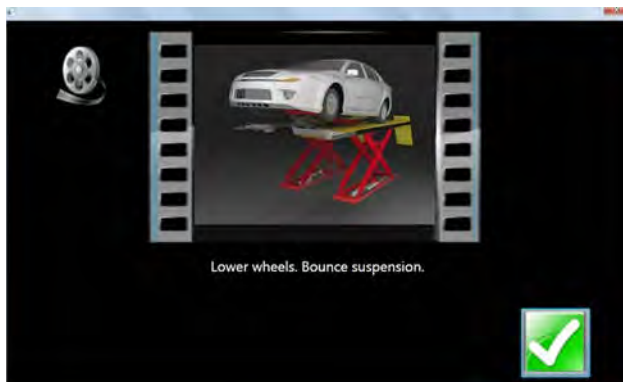


Make "Live" adjustments as required to correct angles to specification.



Re-Mount wheels and Mount clamps.

NOTE: The wheel(s) that have had the clamp assemble removed will need to be re-compensated.



Lower the vehicle and bounce the suspension.



Offset Cams and Bushings

Many Ford 2-wheel drive trucks and many Ford/GM/Dodge 4-wheel drive trucks utilize offset sleeves and inserts around the upper or lower ball joints to adjust the caster and camber angles.

The program compares the current reading for caster and camber with the preferred specification, displaying the meters on-screen for reference. The required sleeve/insert to correct the angles is shown below the meters, along with the orientation of the slot. Proper orientation of the slot insures the correct amount of caster and camber is obtained from the sleeve/insert.

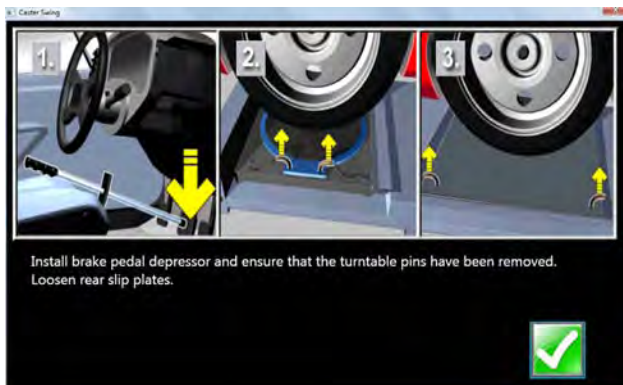
The calculations assume the current sleeve/insert is a ZERO (no offset). If it is not, examine the slot orientation to determine if the previous installation corrected camber or caster. Enter the value of the old sleeve/insert in the box below either caster or camber, whichever most accurately reflects the orientation of the slot.

Note: Whenever there is a sleeve/insert installed that is not zero, it is difficult to determine its affect on the calculation of the new required sleeve/insert. It is a good idea to have a few zero sleeves available to install in the truck and remeasure caster to get a true initial reading.

Cradle Adjust

Cradle adjustment is a growing necessity for front wheel drive vehicles. Many front wheel drive vehicles are designed where the engine cradle also serves as the attachment point for the lower pivots of the suspension system. This assembly is bolted to the sub-frame as a unit from the bottom of the vehicle. The assembly must be properly aligned with the sub-frame to assure that front alignment is maintained.

A closer look shows that the lower control arms are bolted to the engine cradle. The control arm is attached to the spindle through the lower ball joint. The strut is attached to the top of the spindle and is then attached to the body via the upper strut mount to complete the suspension steering axis.



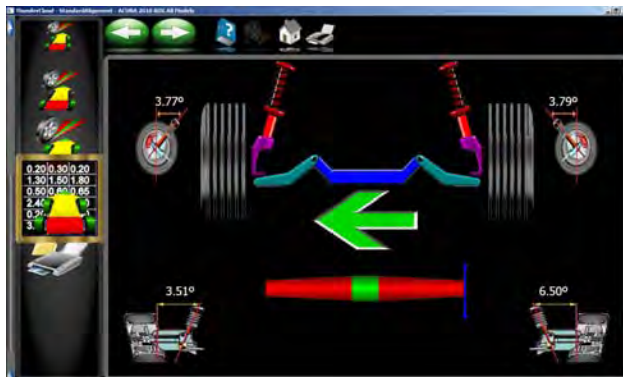
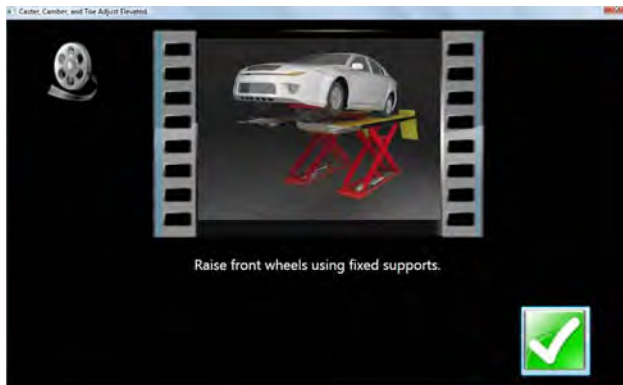
The engine cradle can potentially move side to side, changing the camber and SAI angles. Prior to beginning a cradle adjustment, examine the left and right camber values. If one side has excessive positive camber and the other side excessive negative, this vehicle is a candidate for cradle adjustment.

Consult the vehicle service manual for details on how to loosen the engine cradle.

To adjust a cradle using the Aligner, click on the Cradle Adjust icon on the Adjust Screen.

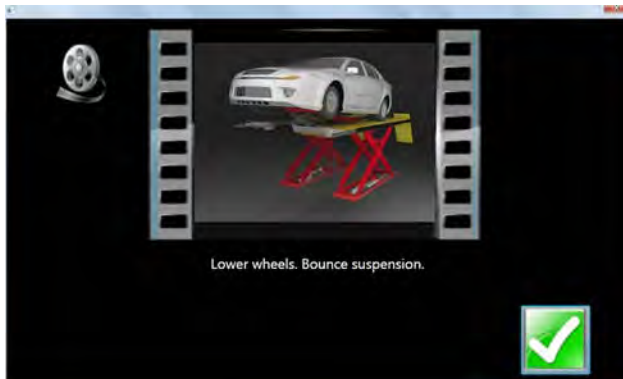
Install Brake pedal depressor and remove turntable and slipplate pins. Click "OK" when ready.

Raise front wheels using fixed supports. Click "OK".



The Cradle Adjust screen has a graphic of the cradle showing the direction of needed movement. A meter display determines exact placement. Loosen the cradle and slide in the direction of the arrow until the meter indicator is centered – this is the ideal placement of the cradle. In addition, live caster and SAI readings are shown for reference or for making a minor caster correction.

When Complete, lower and bounce suspension.



Drag Link Adjust

The steering linkage on some 4-wheel drive trucks has a single total toe adjuster along with a drag link adjuster to correct the steering direction and straighten the steering wheel.



1. Steer the front wheels to equalize toe by bringing the lower meter into the green area. Click Next.



2. Adjust the single tie rod to the total toe specifications while observing the upper meter. Click Next.



3. Straighten and lock the steering wheel as prompted, then click Next.



4. Adjust the drag link sleeve until the steering direction is straight ahead, as indicated on the lower meter display. Click Next when complete.



Single Tie Rod Adjust

Some vehicles, such as earlier Ford trucks and 80's Volkswagens, have a single tie adjuster for total toe, with no provision for adjusting for straight steering direction with a straight steering wheel. For these vehicles, click on the Single Tie Rod Adjust icon.

The screen that appears is similar to the Drag Link Adjust screen. Use the following steps:

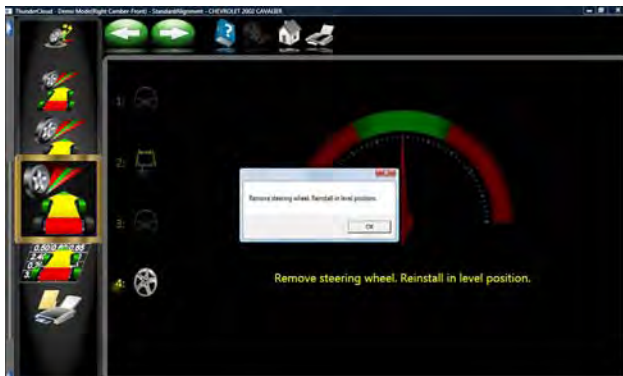
1. Steer the front wheels to equalize toe by bringing the lower meter into the green area. Lock the steering wheel at this position.
2. Adjust the single tie rod to the total toe specifications while observing the upper meter.



3. Again steer the front wheels to equalize toe by bringing the lower meter into the green area. Lock the steering wheel at this position.



4. If a straight steering wheel does not result, yet is desired, remove the steering wheel from the steering column (see factory recommended procedures prior to removing) and replace it as needed for a straight condition.



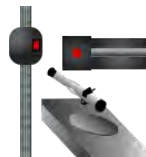
Calibration Menu

This carousel screen selection is the hub of user maintenance and aligner service. The Imaging alignment machines are relatively maintenance free when compared to conventional systems. Some routine tasks may be required from time to time to assure optimum performance. Calibration accesses the utilities required for these tasks. Selections are:



ISO

Utility used for performing ISO calibration. A special fixture is required to perform this procedure. The procedures are included with the fixture. This should only be done by a qualified technician.



SYSTEM CONFIGURATION

Utilities used to configure the systems camera configuration.



TID

Utilities used for performing Target Identification for 3 different types of clamps available to the end-user including Standard Clamps, Universal Clamps and Hub Pin Clamps.



CAMERA VIEW

Live camera view. This utility is very useful for determining proper camera operation.



RELATIVE CAMERA POSITION (RCP)

Process used to identify the camera's distance from one another.



RIDE HEIGHT TARGET CALIBRATION

Utility used to calibrate the "Ride Height Target" if available.



CALIBRATION UTILITIES

Utility used for backing up calibration data.



ISO Certification

This purpose of this procedure is the calibration certification procedure for the Imaging family of wheel alignment products, using traceable measurement standards and ISO methods.

This procedure may optionally serve as a fine tuning of the calibration by allowing offset values to be applied.



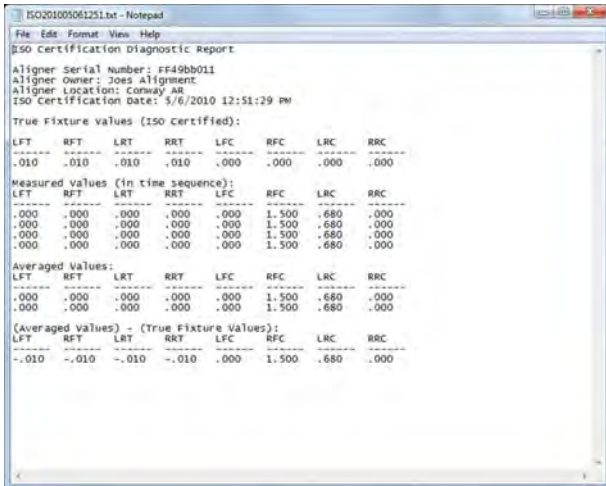
The basic alignment system calibration is performed using the service calibration functions of target identification (TID) and relative camera position, both normally performed by the Service Representative.

The procedures tend to certify the calibration of the 3D camera-based wheel alignment products. The aligner will be certified for accuracy using an apparatus consisting of axles, stands, and spacers, which are themselves certified annually. All inspection findings regarding the aligner, will be annotated on the Certificate of Calibration.

The certification frequency can be a customer-defined. The certification will alert the user at one year intervals to recertify if not performed earlier. The customer may determine the calibration and certification intervals needed and the accuracy to be specified.

Information about the aligner and its location are entered first.

Next enter the information obtained from the certification tag located on the ISO fixture. Include all offset numbers.



Once all information is entered, the file shown to the left is brought up. Follow the instructions to complete the calibration procedure.



When ISO calibration is complete a screen will appear with the offset values displayed. These are the values that will be correlated in the aligner for traceable accuracy.

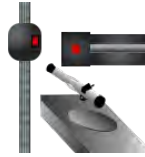


System Configuration

Several camera configurations are selectable in this screen. Generally once the system is setup with the cameras and wheel clamps this screen will not be re-visited unless changes are made with the system hardware.

After a camera has been installed it will be necessary to train the alignment system which side the new camera has been installed.

NOTE: FAILURE TO FOLLOW THIS PROCEDURE AFTER A NEW CAMERA INSTALLATION WILL RESULT IN IN-ACCURATE ALIGNMENT RESULTS.



1. From the calibration menu click on the “System Configuration” icon.

2. Select the proper “Imaging System Type”

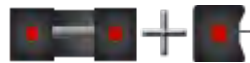
- Two Camera System



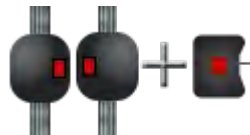
- Three Camera System



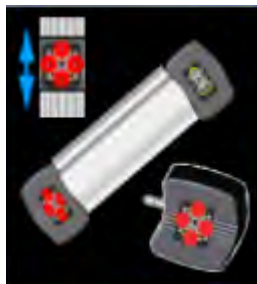
- Two Cameras with remote camera



- Three Cameras with remote camera

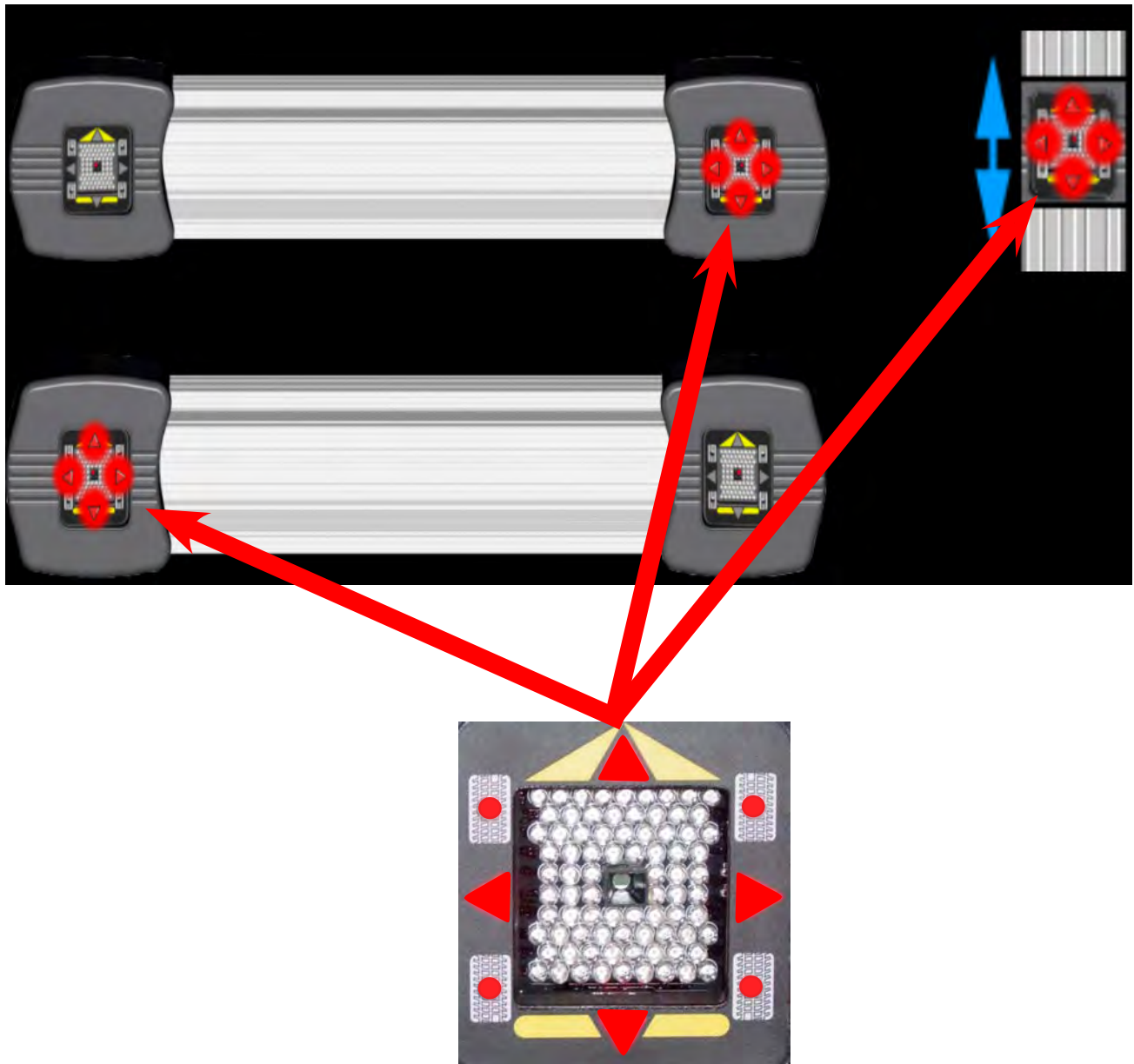


After selecting the correct camera configuration, each of the cameras must be identified. By clicking on “Camera Identification” icon a display with a camera beam will appear.



After gaining access to the camera identification, look closely at the illustration of the two camera beams. The upper camera beam illustrates the left directional arrows illuminated and the lower camera beam illustrates the right directional arrows illuminated. If a 3 Camera system was chosen in the previous screen the user will also need to identify the calibration camera or if a remote camera is present it will also need to be identified. Use the pointing device, click on the illustrated camera beam that matches the camera beam that is being serviced. After selecting the correct illustration the illuminated directional arrows should swap from one camera to the other. Again using the pointing device click on the camera beam that matches the beam being worked on. After all cameras have been selected the user is prompted to restart the alignment software.

NOTE: IF THE INCORRECT CAMERA IDENTIFICATION IS SELECTED THE CAMERA' IMAGES WILL BE SWAPPED FROM LEFT TO RIGHT AND ALL IMAGES WILL APPEAR IN THE CAMERA VIEW AS UPSIDE DOWN



There is also three additional selection buttons available once the Imaging system has been determined.

1. Less than 2.3 Meters (90 Inches)

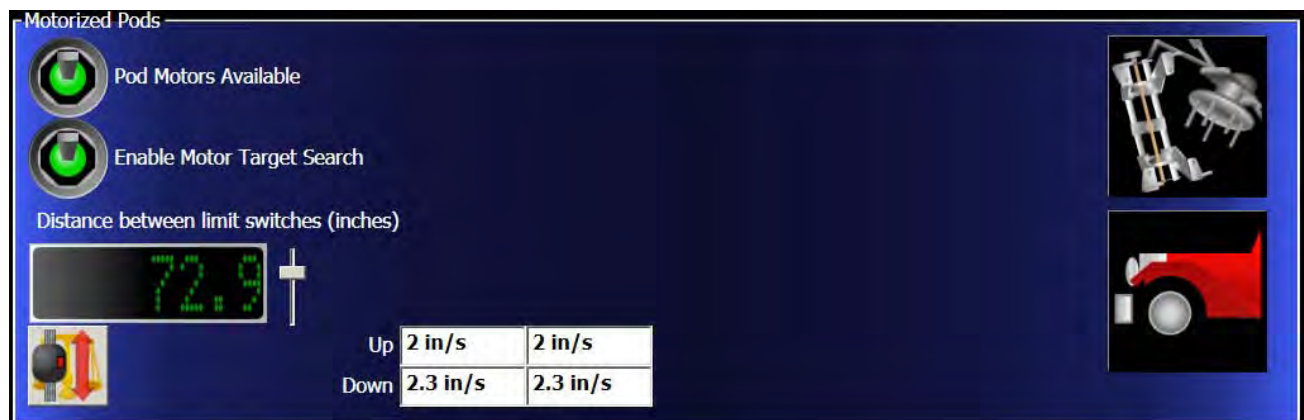


- This button should be set to the ON (up) position if the cameras are less than 90 inches from the turnplates. Changes the acceptable range and tolerance of camera based on the installation baseline.
2. Ride height target in use (calibration explained later)
 - If a ride height target is available this must be turned on the utilize the ride height target capabilities.
 3. Front clamps uses 20 degree offset .
 - If 20 degree offsets are used on the front clamps this selection must be turned on.

Motorized Pods

If a 3 camera system is selected the user is given additional selection buttons. Each of these buttons should be turned on the utilize the pod motors on the Arago system. If the auto search mode is not working the user should check to ensure of these are on.

After enabling the pod motors the user must calibrate them. Using a tape measure, determine the distance



from the bottom camera switch on the beam and the top camera switch on the beam. Each side must be identical for proper operation. Move the slider bar until the correct distance in displayed (72.9 used on our system). Make sure the camera pods are free from all obstructions and click on the “calibrate camera motor” button. The system will run the pods from top to bottom or vice versa. After the pods have automatically calibrated the system will auto input the inches per second that the pods are traveling.





Wheel Clamp Selection

The customer has 3 different options of the types of wheel clamps being used. The conventional wheel clamp is sold with the system and in most cases will always be selected. If additional wheel clamps are used the customer must enable them using the “Wheel Clamp Types”. Any wheel clamps that are selected must be ID by the system (Explained below) before they are put into use.



Next select the distance for camera installation. The installer will setting these values.

Select whether a Ride Height Target Option will be used .

Select if 20 degree offset front clamps are to be used.

If the system is configured for Motorized Pods, click “Available”.

Enable the “Target Search” mode if desire for the pods to automatically track the targets up and down.

Measure the distance between the two limit switches and enter the value using the slide bar.

Follow the on-screen arrows instructing you to rotate

TARGET ID

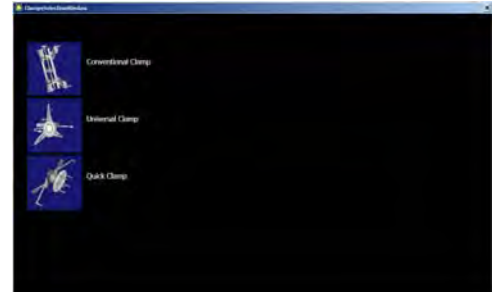
The G4 system has 3 different types of wheel clamps available to the end-user.

Each clamp has a specific use. The “Conventional Clamp” comes standard with the aligner. Each target / clamp must be ID’d before using them in the alignment process. Once these targets have been ID’d the customer will then have to choose which clamp assembly he/she will be using for each alignment.


Conventional Clamp - Used to perform Target Identification on Conventional Wheel clamps. These clamps and target come standard with the aligner. See “Target ID” earlier in this chapter for procedures.

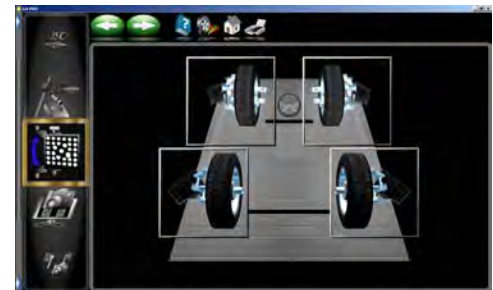
Universal Clamp - Used to perform TID using the universal clamp. Procedure is the same as Conventional Clamps.

Hub Pin Clamp - Used to perform TID using the Hub Pin Clamp. Procedure is the same as Conventional Clamps.



TARGET ID PROCESS

1. Click on any of the target ID icons to begin the process. Make sure that the process chosen is for the correct target and wheel clamps. For illustration purposes the Conventional Clamps are used. 
2. Move the box around the screen using the arrow keys and click NEXT, or you can double-click on the desired wheel.
3. Once the wheel is selected the screen will instruct the operator to place the target/clamp assembly on the front wheel and lock the steering wheel using the clamp. This step insures the wheels will not move laterally during the Target ID procedure. The next step on this screen is to elevate the front wheels to allow them to rotate as needed. Click OK when ready to proceed.



NOTE: USE RIGID SUPPORTS (JACKS ON LOCKS), ANY DOWN MOVEMENT OF THE WHEELS CAN AND WILL CAUSE INCORRECT MEASUREMENTS WHICH WILL IN TURN CAUSE INACCURATE ALIGNMENT READINGS.

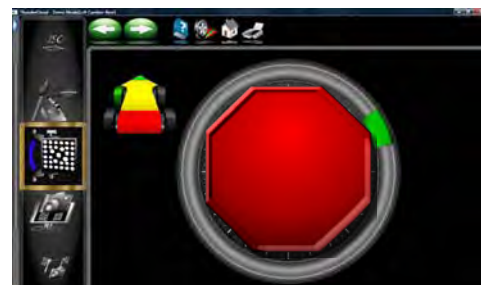
1. Once the system acquires the target an arrow indicates the direction to rotate the target/wheel. The initial rotation is 25° forward.
2. If the tire and wheel is rotated past the 25° point the meter will change to red letting the operator know to rotate back.



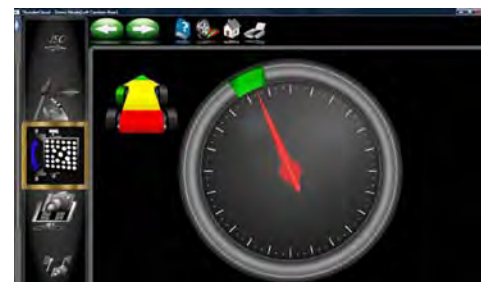
3. Once the wheel has reached the desired location a stop sign will appear in the center of the wheel. Hold the wheel steady as the aligner will take a reading.



4. After the readings have been taken the screen instructs with arrows indicating to rotate the wheel and target back 90°. This 90 degrees is from the first 25° forward, rotate the tire back until a stop sign appears as in step 6 and hold the wheel steady as another reading will be taken.



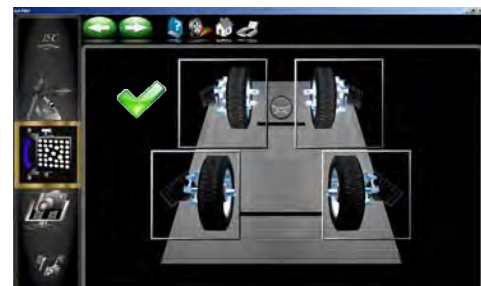
5. After the readings are taken the arrows indicate to rotate the tire and wheel assembly forward 90°. Rotate the wheel until a stop sign appears and hold the wheel steady as a reading will be taken.

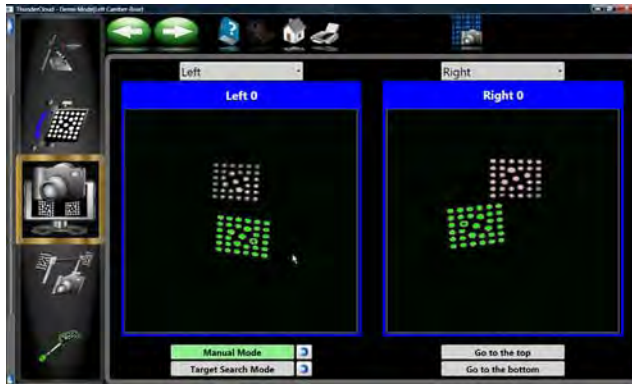


1. After the completion of a successful target ID the screen indicates to lower the wheel. This is not necessary if the opposite side target is needing to be ID, click on the <OK> button and select the next target. Lower the wheels after all four targets have been ID'd.



2. The program returns to the Target Selection screen to allow additional targets to be ID'd. Repeat this process for all targets. A green check mark appears next to the targets that have been ID'd.





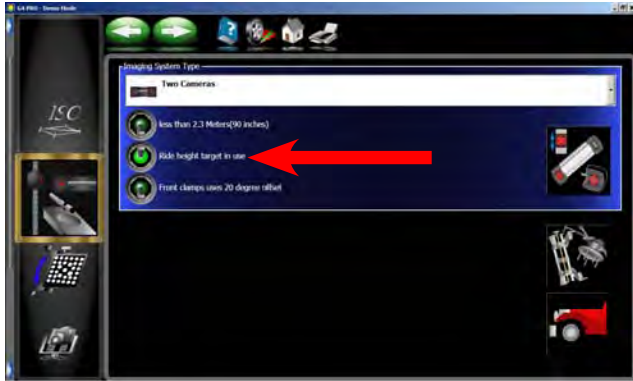
Camera View

Used to acquire raw camera images. This screen shows the view of the targets as seen by the cameras on each side of the vehicle. Camera View can be used to assure proper positioning of the camera beam when a movable beam is used to mount the cameras. The Movable Camera Beam can be lifted to varying heights for vehicle adjustment. This is also valuable as a troubleshooting aid whenever the software has difficulty during target acquisition, or loses a target for a long time period. In order for the aligner to work properly, the cameras must see the front and rear targets within the “field of vision” described by this screen.



Relative Camera Positioning (RCP)

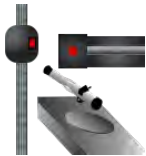
This is a utility to check the accuracy of the current RCP used by the aligner. This is a utility procedure normally performed by a Service Technician to verify conformance to specification. A calibration fixture is required to perform this task. See your Authorized Service Representative for details.



Ride Height Target Calibration- (Platinum Option)

ACTIVATE AND CALIBRATE THE RIDE HEIGHT MEASURING DEVICE

From the **Calibration Menu**, click on the **System Configuration** icon and click on **Ride Height Target** switch to activate the Ride Height Target feature.



CALIBRATE

1. From the **Calibration Menu**, click on **Ride Height Target Calibration** icon to begin the calibration process.
2. Locate the Ride Height Calibration fixture and place the fixture on one of the lift runways so the straight edge is toward the camera.
3. Select the side of the rack you are to calibrate from.
4. Place the tip of the target pointer into the hole in the base of the calibration fixture.

NOTE: THE POINTER TIP MUST REMAIN IN THE HOLE DURING ALL STEPS OF CALIBRATION.

5. Tilt the target to the first position. The reflective surface of the target should be facing the camera. The target should be steady during each step.





6. The <NEXT> button will illuminate once the target has been acquired. Click on the <NEXT> button, a check mark will appear prompting the user to proceed to step 2.



7. Proceed with calibration, until all three steps have been completed.
8. Should calibration of the ride height target fail, a warning dialogue box will pop up and the user must begin the process from the beginning.



9. After the process completes the 3rd step the software auto advance to the main menu.



CALIBRATION BACKUP AND RESTORE

Calibration and Preference backup offers the user or technician a way of backing up all customized options and alignment calibration to a flash drive. Should an alignment machine require a hard drive replacement the user or technician can simply restore all data from a saved flash drive back on to the newly installed hard drive. From the **Calibration Menu** click on the **Backup** icon.



Backup - It is recommended after every calibration that the user backup the new data in case of a PC or Hard Drive failure. This enables the user to quickly restore the alignment system's calibration after the operating system has been restored. It is recommended that each time the system is backed up the user date the flash drive. This ensures that the most current data backup be restored. Insert the flash drive into one of the open USB ports on the PC. Click on the <FIND> button to point to the flash drive and click on <OK>. After the selection is made click on the backup button. The user is prompted to confirm the location.



Restore - Should a hard drive failure occur, simply install the last known alignment calibration and preference data disk and restore the aligner back to the user's preferred preference.

NOTE: IF THE OPERATOR IS NOT SURE IF THE SAVED DATA ON THE FLASH DRIVE IS NOT CURRENT IT IS RECOMMENDED THAT A CALIBRATION BE PERFORMED. FAILURE TO HAVE ACCURATE CALIBRATION DATA CAN AND WILL CAUSE EXCESSIVE TIRE WEAR.

DATABASE UTILITIES

Pro42 backup and restore functions should be periodically performed in case a malfunction should occur with the Alignment System. These periodic backups allow the customer/technician to restore all data from that backup date when the Alignment System is once again functional. When a backup on a Pro42 aligner is performed using the “database utility” function, this information should only be restored on the aligner that the backup came from.

NOTE: THE BACKUP DATA CONTAINS CALIBRATION DATA AND CUSTOMER DATA. RESTORING DATA TO A DIFFERENT ALIGNMENT SYSTEM WILL OVER WRITE ALL OF IT'S CALIBRATION DATA AND CAUSE INCORRECT ALIGNMENT ANGLES ON THE ALIGNER THE DATA WAS RESTORED TOO.



From the main menu select the “Database Utilities” button from the Main Menu Carousel bar.

Select whether to backup to a thumb drive or to restore data from that drive.

Also available is the ability to delete the customer database. Do not select this unless it is desired to permanently lose all the customer data. This feature might be used when an aligner is transferred to a new owner or location.



ADDENDUM - Shop Key Setup (Optional Advanced Feature)

ShopKey Setup for a Networked Aligner

1. The Aligner system must be “mapped” to the ShopKey host server location. Recruit assistance from your network support representative if necessary to do so.
2. The Host computer containing ShopKey must be shared with the aligner so to allow the aligner read and write privileges.
3. From the Aligner Main or Home screen, scroll to “Preferences”
4. From Preferences, scroll down to “Connectivity Options” and select. The screen shown in Figure 1 will appear.



Figure 1

5. From the section labeled “Internet Data Provider”, select “ShopKey Information”.
6. Under the first heading labeled “Shop Management Options” click on “Setup”
7. Under the second heading labeled “Shop Management Options” enter the server Host Name where the ShopKey program resides.
8. Next in the same selection area select “Find” to locate the Database Location for ShopKey. The file you are looking for is named “skcore32.mdb”. See the sample in Figure 1.
9. Next click Find to locate the “YmmDatabase Location”. The file you are looking for is named “car32.mdb”. Make sure the screen resembles that shown in Figure 1.

10. Next, enter the share name given to the drive and folder on the ShopKey server for the location of the ShopKey database. For example, if a folder and share named "Snap-on" on a server name "Conwntwshopkey" was to be mapped, the Host and Shared Drive Name entries would contain that information as shown in Figure 1.



11. When you are sure the file locations are correct click on the green "Next" arrow to save the information to the CAS.INI file.

12. Open the CAS.INI file with Notepad to make sure the information is correctly entered. The file is located in the "Windows" root directory. See Figure 2 for an example.

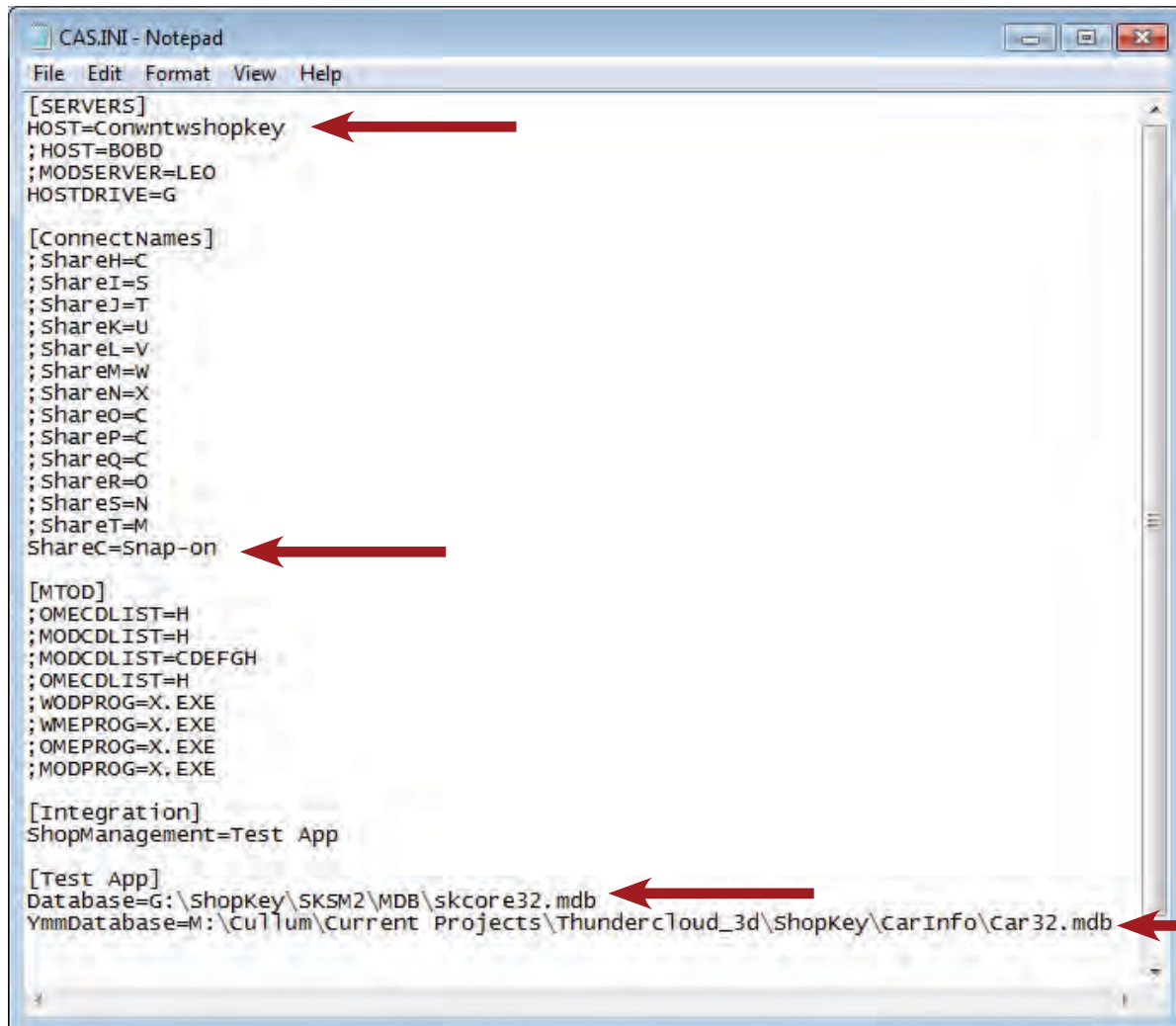


Figure 2

13. When all information has been setup the Aligner is ready for Client use of the ShopKey management system.

NOTE: It must be noted that ShopKey is a third party software package that is stand alone and 13.not supported by the Snap-on Equipment group. If there are issues or questions regarding the operation of ShopKey, those issues must be forwarded to the appropriate parties.



Addendum I - ShopKey Setup

- To use the ShopKey services, from the main screen select the “Shop Management” icon at the top of the screen.
- The screen shown in Figure 3 will appear showing the current work orders from ShopKey.



Type	R.O. #	License	Hat	Customer	Vehicle	Promised
RO	465	XYZ123		Point Tech Appliance	1995 Chevrolet - Blazer	9/16/1999 05:00 PM
INV	474	2TLG119		Hammel, Charlie	1994 Honda - Accord DX	9/15/1999 05:00 PM
INV	475	DITO D		Diez, Dilo	1990 Toyota - Celica GT	9/21/1999 05:00 PM
RO	476	HYY15Y		Doe-Jones, Jane	1992 Nissan - Maxima SE	9/15/1999 05:00 PM
RO	483	SAYHOY		Hanlon, Gail	1993 Mercury - Capri	9/17/1999 05:00 PM
RO	493	BIG G		Beronja, Gerry	1996 Ford - Explorer	9/17/1999 05:00 PM
INV	494	GOLFR		Winn, Billy	1989 Nissan - 300ZX	11/17/1997 06:45 AM
INV	496	BIGRED		Dahl, Charlie	1987 Toyota - Land Cruiser	9/18/1999 05:00 PM
RO	501	98W2831		Hanlon, Chris	1986 Toyota - Camry DX	9/15/1999 05:00 PM
RO	502			jbc	2000 Chevrolet - Monte Carlo SS	9/20/2005 05:30 PM
RO	503			Kunert, Joel	1994 Chevrolet Cavalier	9/20/2005 05:30 PM
RO	504			Stephen, Rigsby	2000 Toyota RAV4	10/28/2005 05:30 PM
RO	505	444ABC		Doe, Jane	2007 Infiniti - M35	4/24/2009 05:30 PM
RO	506	DF A		Cullum, Dick	1974 Plymouth Fury Custom	1/12/2011 05:30 PM

Figure 3

- Select the desired work order to use to service the associated vehicle.
- The next screen to appear will be the “Begin Alignment” screen. Select “To continue an alignment” to use the information associated with the work order. See Figure 4.

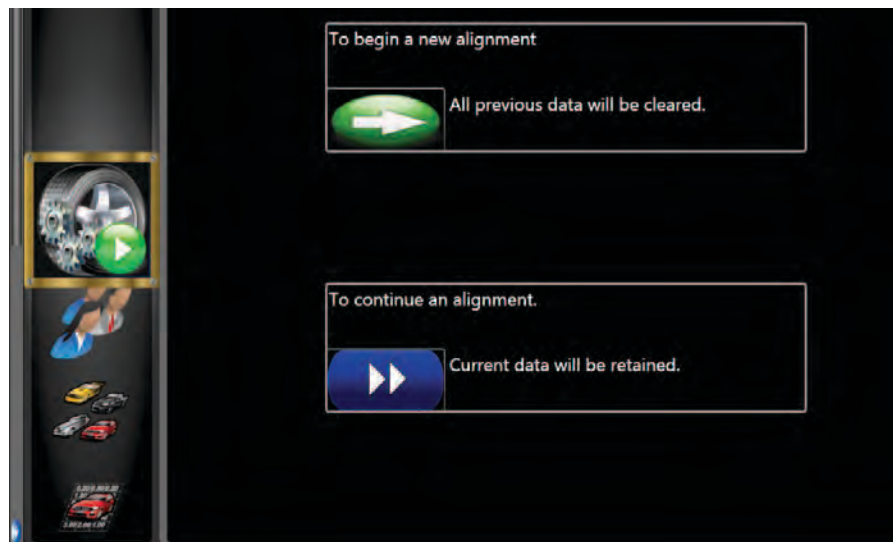


Figure 4

- Perform the alignment as normal. The alignment results will be saved to the open work order and can be reviewed by the Shop manager.

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USA
Equipment Services
309 Exchange Avenue
Conway, Arkansas 72032
Tel.: (800) 362-8326 o (501) 450-1500
Fax: (501) 450-1585

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