
Operators Manual

VAG Imaging Alignment Systems

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.

For those units powered by PC-in-Box, should the equipment be used under 220-230V power, switch the PC's power supply setting to 230V.

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 Explosion.

- **This equipment has arcing or sparking parts which should not be exposed to flammable vapors.**
- **This equipment should be located at least 460mm/18inches above the floor, and not in a recessed area.**
- **Do not operate with the cover of the electrical box removed.**
- **Do not remove/alter grounding wires.**



Risk of pinching when camera beams and/or pods are in motion

- **Keep hands and other body parts away from camera beams and/or pods when they are in motion**



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

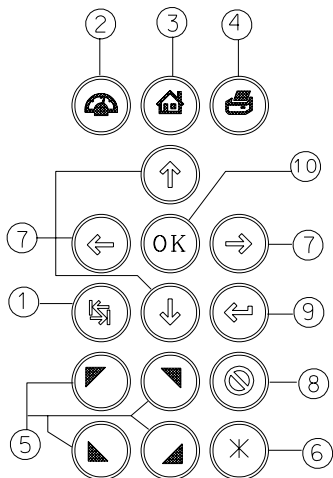
To avoid damaging important files It is necessary to shut down Windows properly before turning off or restarting the aligner or the computer.

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.



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.



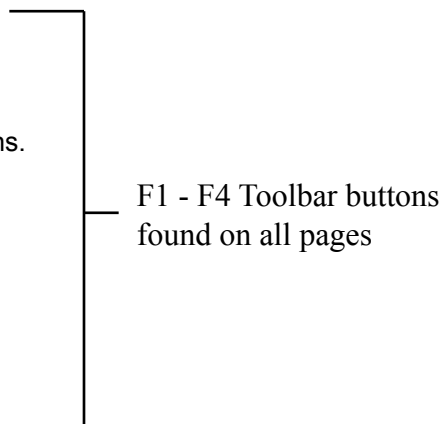
Select Wizard - Several Wizards can be selected based on the vehicle or procedures required by the service shop.



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



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.



ADR Adjust - This feature is selected to invoke Vehicle Driver Assistance device adjustment procedures.



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.



Calibration Check - A series of checks used to qualify the aligner for conformance to installation specifications.



Setup - Preferences

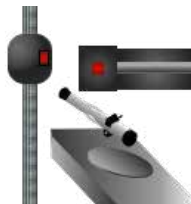
Preferences is used to setup various functions and features within the Aligner software. Numerous operating attributes or “preferences” can be altered to suit the operators individual tastes. Although the Aligner is shipped with the most common elements selected as default, an operator is able to tailor 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. Select “VAG” as the database to be used with this system.



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.
7. Choose the proper Wizard procedure for the vehicle. "VAG Standard" is selected as the default and should not be changed unless directed.
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. Follow the screen instructions carefully for measurement and adjustment order.
12. 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.
13. Perform a test drive to verify proper alignment.

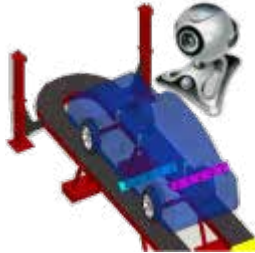
BASIC ALIGNMENT PROCEDURES

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.

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

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 alignment functions in a predetermined order as determined by the manufacturer.

When the **Run Wizard** icon is selected from the Home Screen, the alignment process is performed using the Wizard that is currently selected as default. If a vehicle model is selected that requires unique procedures the aligner will automatically change the Wizard called for by the specifications database.

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 follow the Wizard process to ensure conformance to manufacturers specifications.

Special Wizard Procedures

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 VAG aligners should have "VAG Standard" or "VW Standard" as default. When a make and model are selected, the VAG specifications selected sub-wizards may include other procedures not included in the standard wizard. The order of procedure execution is altered to satisfy the requirements of the vehicle design. Wizards are selected default based on the dealership as well.

The following procedures are samples of Special Alignment Wizards from start to finish.

VAG Standard

Begin Alignment
 Vehicle Selection
 Vehicle Specifications
 Customer Data
 Inspections
 4 Wheel Positioning
 Caster Swing
 Vehicle Dimensions
 Suspension Unstress
 All Readings Screen
 Rear Meters
 Front Meters
 Print

Porsche Standard

Begin Alignment
 Vehicle Selection
 Ride Height Analysis
 Customer Data
 Tire Information
 Load Weight Information
 Load Weight Analysis
 Vehicle Specifications
 Information Pages
 4 Wheel Positioning
 Caster Swing
 Max Turn
 All Readings Screen
 Rear Meters
 Information Pages
 Front Meters
 Caster Swing
 Max Turn
 All Readings Screen
 Print

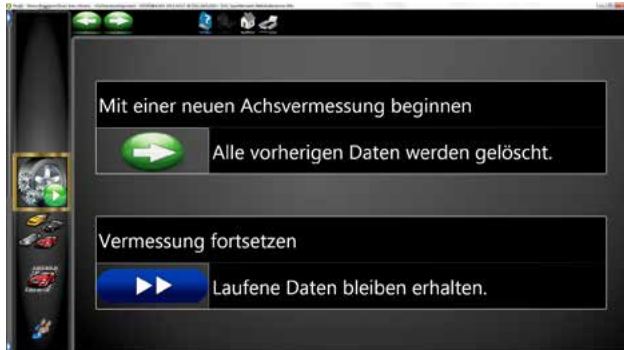
Skota Standard

Begin Alignment
 Vehicle Selection
 Vehicle Specifications
 Customer Data
 Inspections
 Mercedes Benz Tire Information
 Load Weight Analysis
 4 Wheel Positioning
 Ride Height
 Caster Swing
 Vehicle Dimensions
 All Readings Screen
 Rear Meters
 Front Meters
 Print



VAG Standard Wizard

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



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.

Click “New Alignment” to proceed.



Select Vehicle Manufacturer, Year and Model

Note: The order of 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 “V” - moves to Volkswagen).
.....



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.

	Min	Std	Max	Max Diff	Min	Std	Max
Vorne							
Steil	-1.3°	-0.9°	-0.6°	0.3°	-1.3°	-0.9°	-0.6°
Nippel	---	---	---	---	---	---	---
Einwinkel	0.10°	0.15°	0.23°	---	0.10°	0.15°	0.23°
Gesamtwinkel	0.13° 0.15° 0.10°						
Hinten							
Steil	-1.7°	-1.3°	-0.8°	0.5°	-1.7°	-1.3°	-0.8°
Einwinkel	0.10°	0.20°	0.30°	---	0.10°	0.20°	0.30°
Gesamtwinkel	0.21° 0.20° 0.15°						
Fahrschwindigkeit	0.2° 0.0° 0.2°						

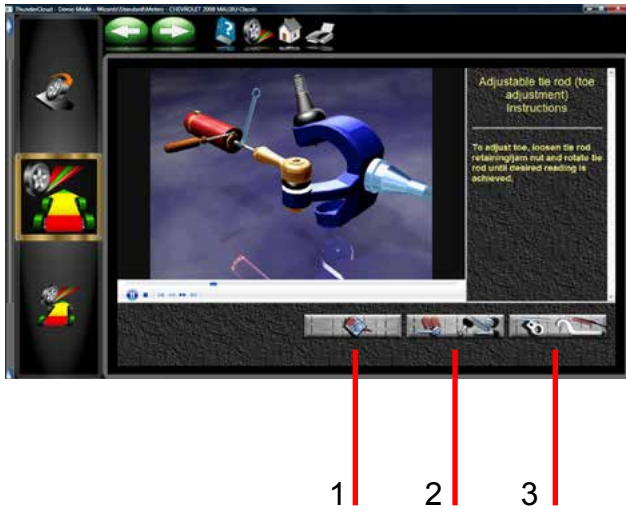
View Specifications

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. 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.

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.

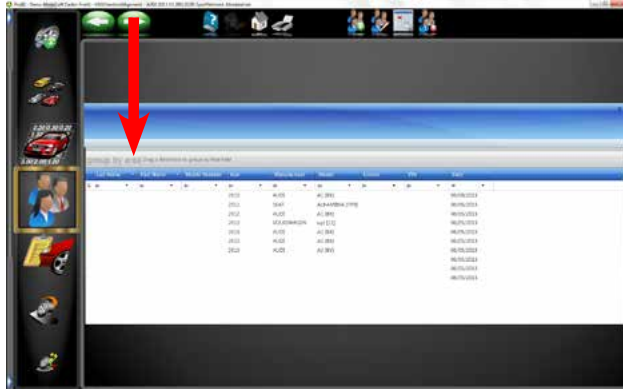


Enter Customer Data

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.

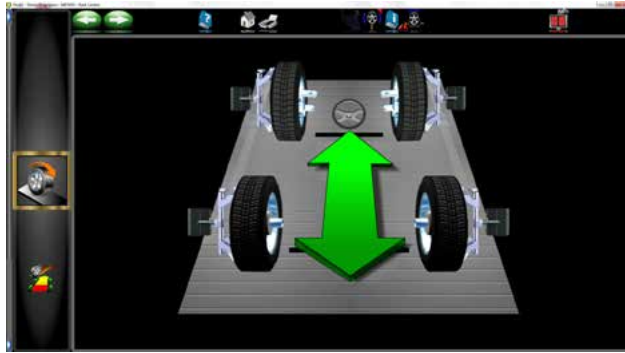


Editing an Existing Record

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.



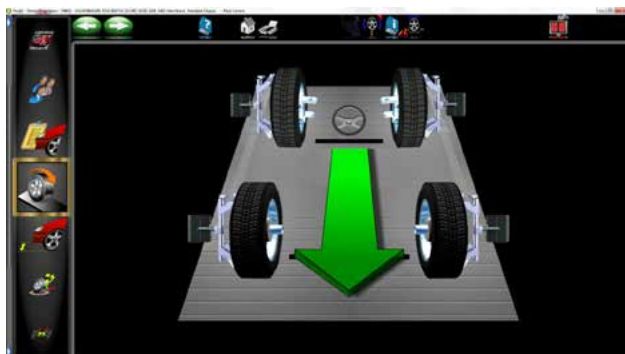
Vehicle Positioning Sequence

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.

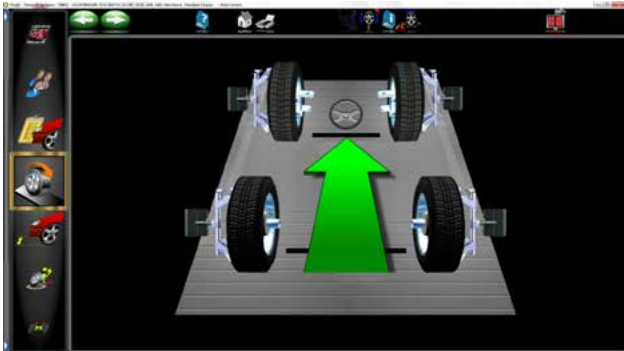
Too Far Back

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.



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

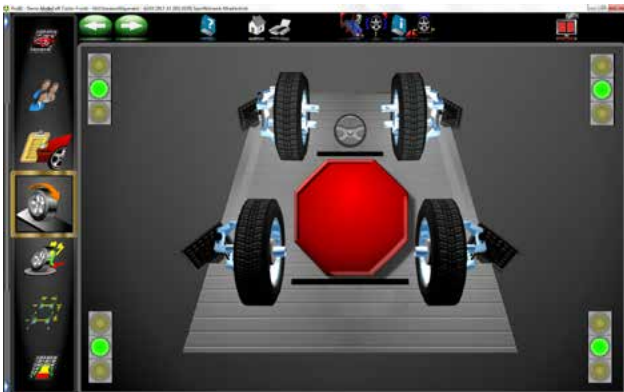
When the aligner is ready, the screen displays a green arrow to prompt you to move the vehicle forward and return it to its starting position. Grab the vehicle where it is convenient and roll it forward onto the turntables where it began.



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.





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.

Continue to turn wheels to the indicated point on the meter. When the turn to that direction is completed you will be directed to turn the opposite direction an equal amount.



As you rotate the steering wheel toward each measurement position, a "Green indicator" tracks the wheel movement. The left and right caster, SAI and TOOT measurement 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.



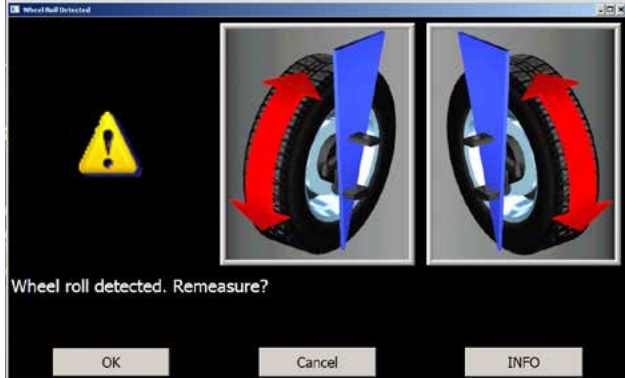
When the wheels reach the correct position, the meter stripe turns yellow when close then turns green. As the measurement for each position is complete, a green stripe appears around that icon, the icon appears depressed, the status bar turns green.

The Aligner prompts you where to stop, depending on which measurements you want. For example to measure Caster, SAI and TOOT, move the wheels from one 20 degree position to the other 20 degree position, 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

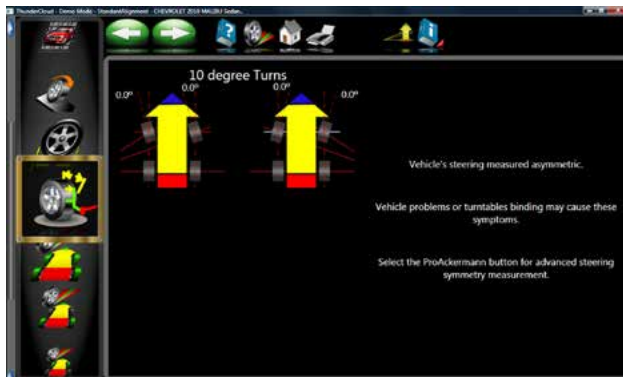
If the aligner detects excessive wheel roll during the steering angle measurements, a error message appears. We recommend restarting the steering measurements if this occurs. Select OK and the software begins a new steering angle measurement sequence. Wheel roll can usually be corrected by firmly installing 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.





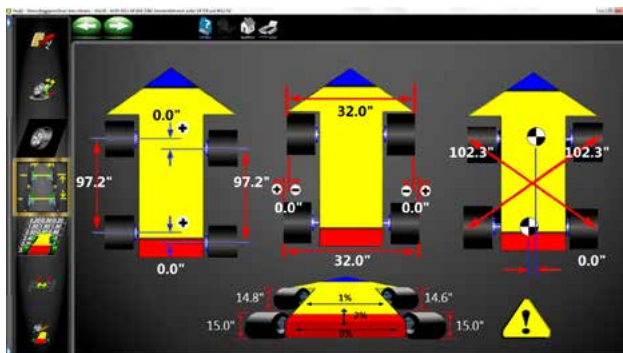
Suspension Unstress - Audi only

Next you are directed to alternately turn the steering left and right in decreasing increments to remove any stress in the front suspension. Follow the arrows and steer to that direct as shown to complete the procedure.



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.



Vehicle Dimensions

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.

Vorne	Links	Rechts
Nachlauf	0.0°	0.0°
Sturz	0.0°	0.0°
Spur	0.00°	0.00°
Spreizung	0.0°	0.0°
Eingeschlossener Winkel	0.0°	0.0°
Spurdifferenzwinkel	0.0°	0.0°
Max. Lenkwinkel	----	----
Radversatz		0.0°
Hinten		
Sturz	0.0°	0.0°
Spur	0.05°	0.00°
Fahrachswinkel		0.0°

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).



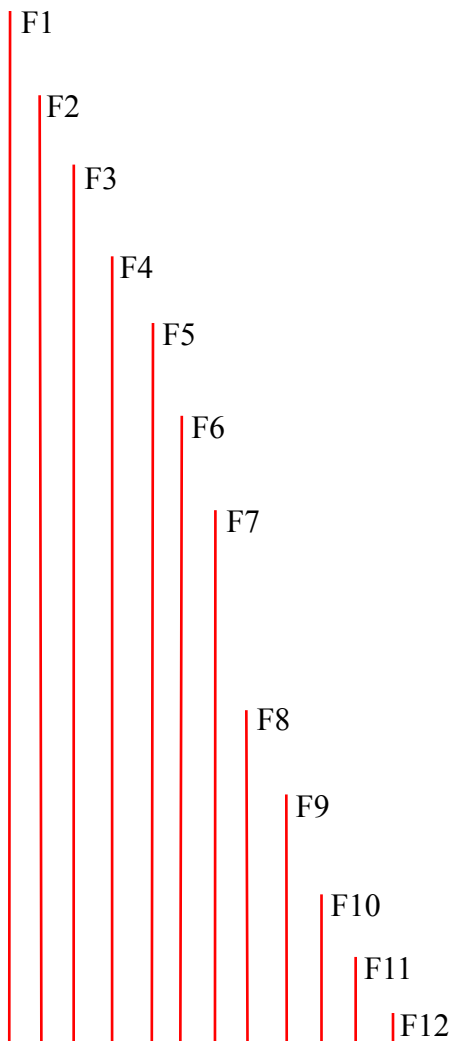
Rear Readings Screen

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.





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 Steering Wheel

Before front readings are displayed it is necessary to level the steering wheel. Once these steps are completed press "OK" to move forward.

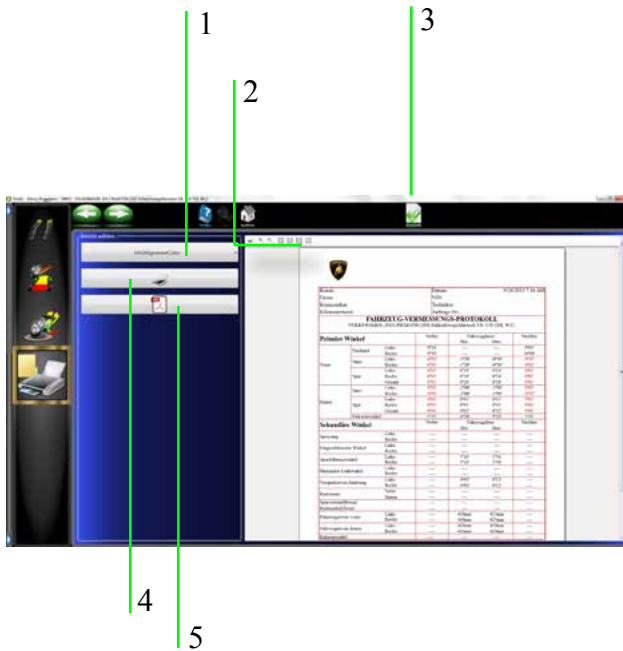


Front Meter Readings Screen

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.

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



VW Standard Wizard

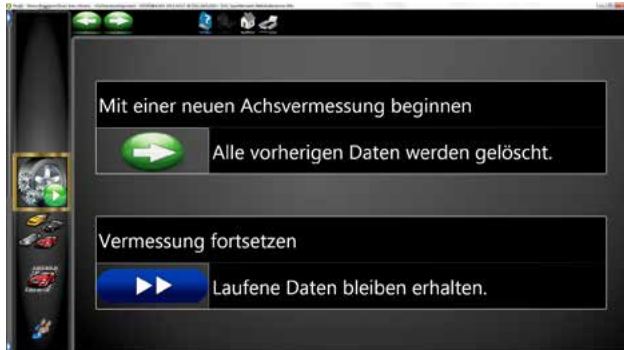
The following procedures are a sample of a VW Standard Alignment Wizard from start to finish.

- Begin Alignment
- Vehicle Selection
- Vehicle Specifications
- Customer Data
- Inspections
- 4 Wheel Positioning
- Caster Swing
- Vehicle Dimensions
- All Readings Screen
- Rear Meters
- Front Meters
- Caster Swing
- Print



Run Wizard

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



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.

Click “New Alignment” to proceed.



Select Vehicle Manufacturer, Year and Model

Note: The order of 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.



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.....



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.



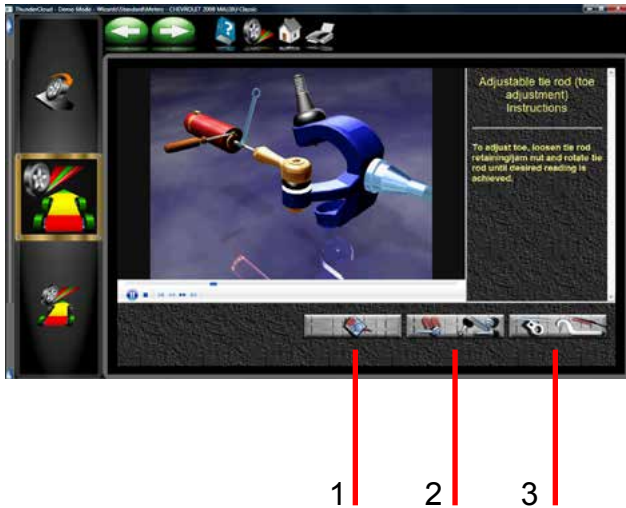
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Included to the right of the animation window is a text box which illustrates three types of information regarding the current alignment adjust procedure. Information is requested by clicking on the icon associated with the assistance. These icons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

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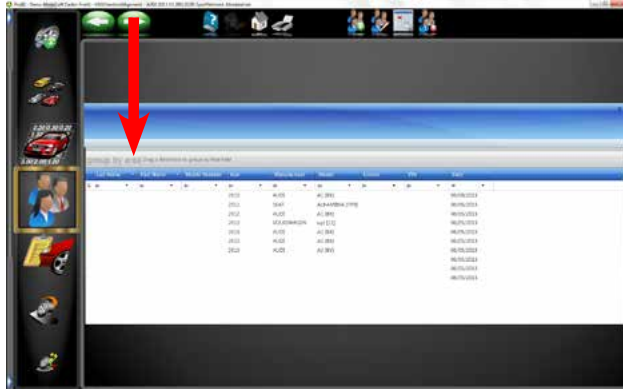


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Adding Customer Information

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.



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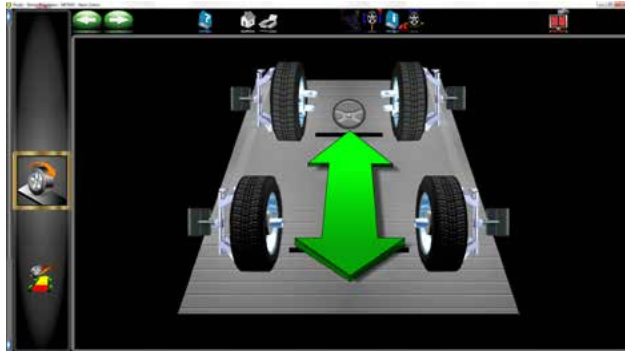


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Datafiles can be backed-up for security and restored upon demand. See the “Maintenance” chapter for more information on this feature.



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.

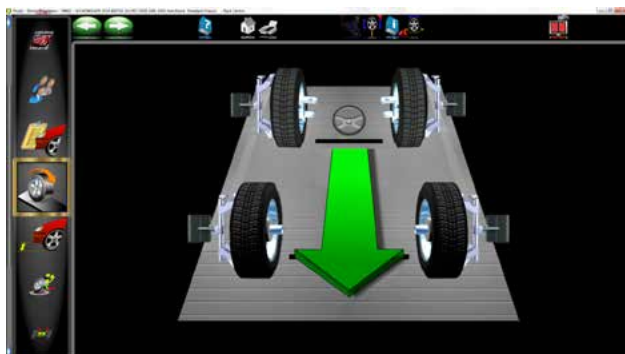
NOTE: *If one or more targets are never acquired, chose the Camera View button (F12) on the toolbar to help determine the cause, such as blocked vision.*

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. The graphic image on the screen follows the vehicle's movement as you roll the vehicle backward.

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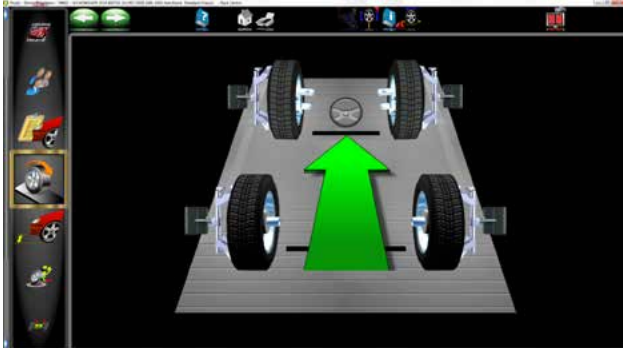
Too Far Back

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.



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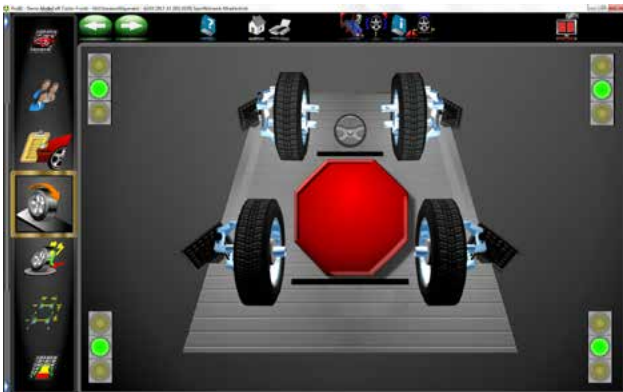
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Once the stop appears and the vehicle does not stabilize within 5 seconds the stability indicators appear. Green means the wheel is stable, yellow means close to stable, and red means unstable. Check the non green wheels for stability problems such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

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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.





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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.

Continue to turn wheels to the indicated point on the meter. When the turn to that direction is completed you will be directed to turn the opposite direction an equal amount.



As you rotate the steering wheel toward each measurement position, a "Green indicator" tracks the wheel movement. The left and right caster, SAI and TOOT measurement 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.



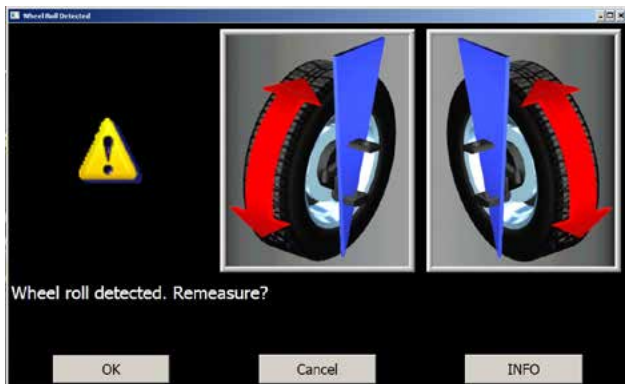
When the wheels reach the correct position, the meter stripe turns yellow when close then turns green. As the measurement for each position is complete, a green stripe appears around that icon, the icon appears depressed, the status bar turns green.

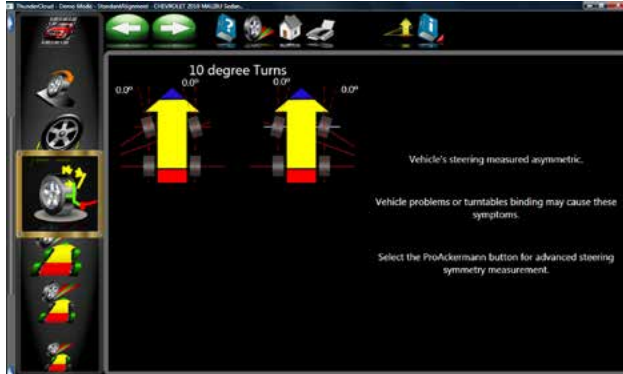
The Aligner prompts you where to stop, depending on which measurements you want. For example to measure Caster, SAI and TOOT, move the wheels from one 20 degree position to the other 20 degree position, and then return to the center steering position.

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.





Steering Asymmetry

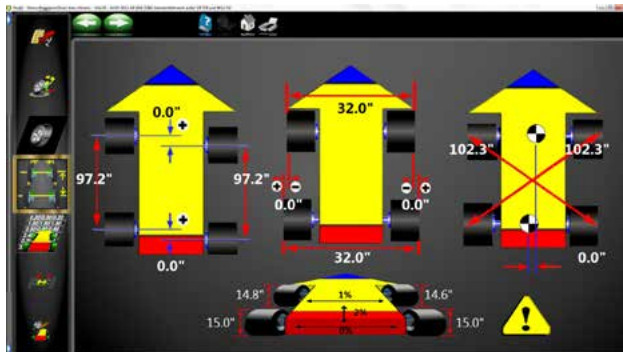
If during the caster swing the values side to side were found to differ an unacceptable amount this message will prompt the operator to perform further checks of the steering geometry.

	Links		Rechts
Vorne			
Nachlauf	0.0°	0.0°	0.0°
Sturz	0.0°	0.0°	0.0°
Spur	0.00°	0.00°	0.00°
Spreizung	0.0°		0.0°
Eingeschlossener Winkel	0.0°		0.0°
Spurdifferenzwinkel	0.0°		0.0°
Max. Lenkwinkel	----		----
Radversatz		0.0°	
Hinten			
Sturz	0.0°	0.0°	0.0°
Spur	0.05°	0.05°	0.00°
Fahrachswinkel		0.0°	

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).



Vehicle Dimensions

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.

	Links		Rechts
Vorne			
Nachlauf	0.0°	0.0°	0.0°
Sturz	0.0°	0.0°	0.0°
Spur	0.00°	0.00°	0.00°
Spreizung	0.0°		0.0°
Eingeschlossener Winkel	0.0°		0.0°
Spurdifferenzwinkel	0.0°		0.0°
Max. Lenkwinkel	----		----
Radversatz		0.0°	
Hinten			
Sturz	0.0°	0.0°	0.0°
Spur	0.05°	0.05°	0.00°
Fahrachswinkel		0.0°	

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).



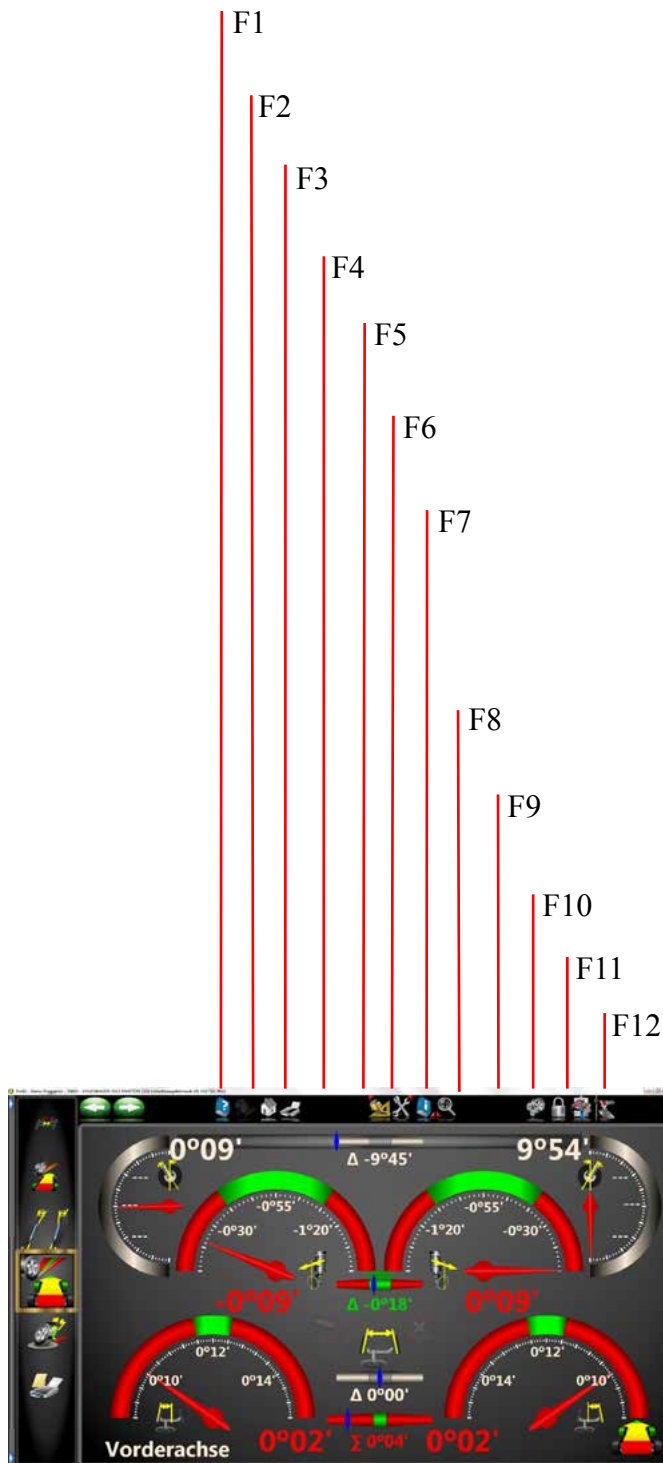
Rear Readings Screen

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.



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 Steering Wheel

Before front readings are displayed it is necessary to level the steering wheel. 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.

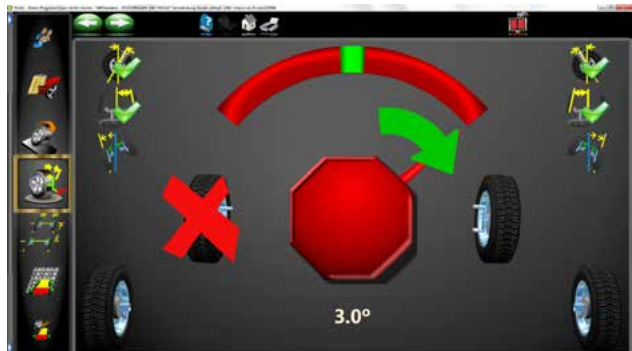


Perform Steering Angle Measurement

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.



Continue to turn wheels to the indicated point on the meter. When the turn to that direction is completed you will be directed to turn the opposite direction an equal amount.



As you rotate the steering wheel toward each measurement position, a “Green indicator” tracks the wheel movement. The left and right caster, SAI and TOOT measurement 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.

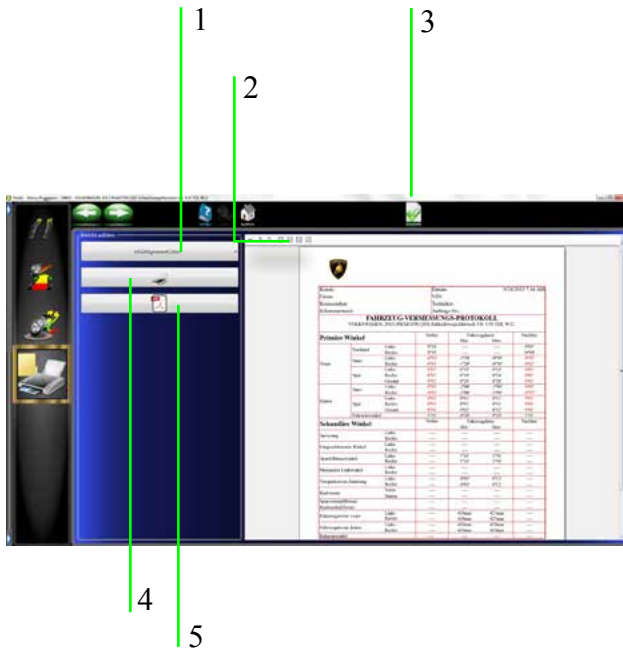
During steering measurements, the Aligner may briefly lose track of one or more wheel target. When this occurs, wheels displayed on the lower-left and lower-right will indicate a red X to indicate the lost wheel targets. Losing the rear targets during steering angle measurements does not cause a problem. 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.

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.

Vorne	Links		Rechts
Nachlauf	0,0°	0,0°	0,0°
Sturz	0,0°	0,0°	0,0°
Spur	0,00°	0,00°	0,00°
Sprenzung	0,0°		0,0°
Eingeschlossener Winkel	0,0°		0,0°
Spurdifferenzwinkel	0,0°		0,0°
Max. Lenkwinkel	----		----
Radversatz		0,0°	
Hinten			
Sturz	0,0°	0,0°	0,0°
Spur	0,05°	0,05°	0,00°
Fahrrachswinkel		0,0°	

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:

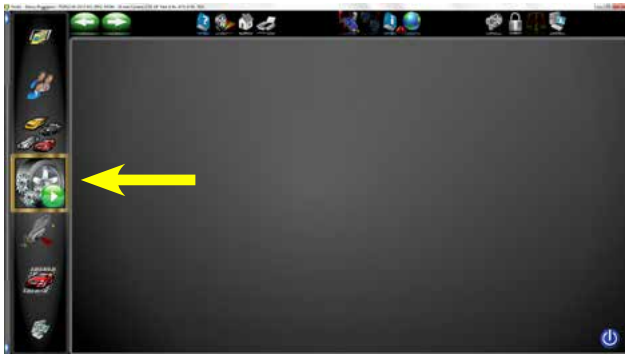
1 - Select Desired Alignment Report - Select the desired type of report to be printed from the drop down box.

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



Porsche Standard Wizard

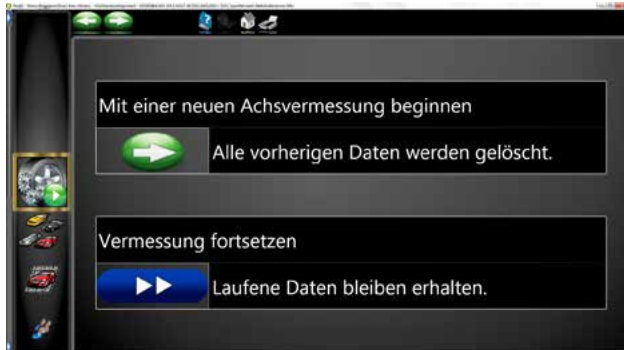
The following procedures are a sample of a Porsche Standard Alignment Wizard from start to finish.

- Begin Alignment
- Vehicle Selection
- Vehicle Specifications
- Customer Data
- Ride Height
- Ride Height Analysis
- Tire Information
- Load Weight Information
- Load Weight Analysis
- Information Pages
- 4 Wheel Positioning
- Caster Swing
- Max Turn
- All Readings Screen
- Rear Meters
- Information Pages
- Front Meters
- Caster Swing
- Max Turn
- All Readings Screen
- Print



Run Wizard

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



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.

Click “New Alignment” to proceed.



Select Vehicle Manufacturer, Year and Model

Note: The order of 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

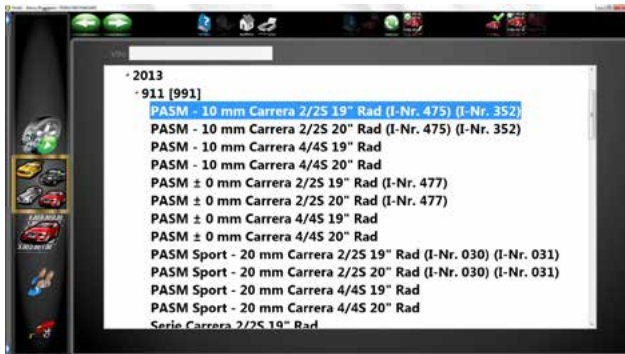
To select a desired Make of Vehicle as “Default so it comes up first every time, highlight the Make then click on “F10” select default make icon. This will anchor the selection. This is useful for dealership or shops that work on same makes the majority of the time.

.....
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 “P” - moves to Porsche).
.....



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. Pressing “*Ctrl-Alt-F8*” simultaneously allows specs to be viewed at any time from within the alignment process.

Adjustment Animations

Illustrations of adjustments specific to the selected vehicle can be viewed by clicking on the “INFO” button 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.



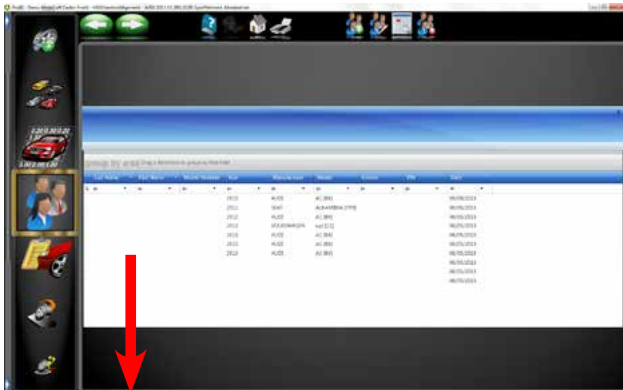
Enter Customer Data

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.

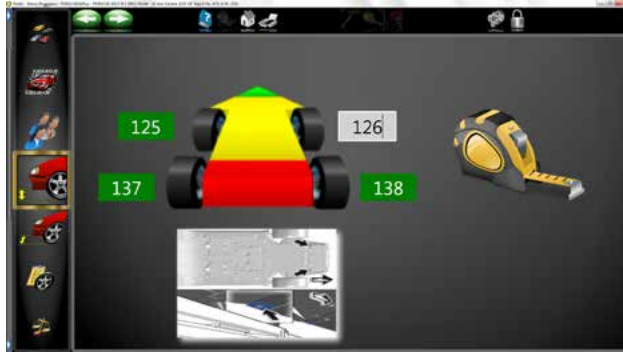


Editing an Existing Record

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

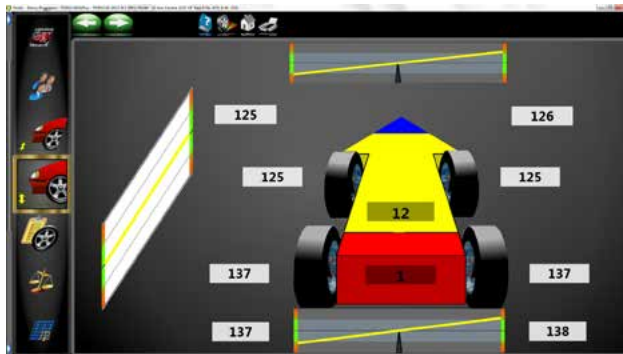
Datafiles can be backed-up for security and restored upon demand. See the “Maintenance” chapter for more information on this feature.



Enter Ride Height Information

Measure and enter the proper information regarding the vehicles ride height in the provided entry boxes.

The entered values must be with-in the range specified in the vehicle specification database.



Next to be displayed is a visual indicator that shows how equal the values are and depicts the vehicle as favoring one side or the other if not equal.



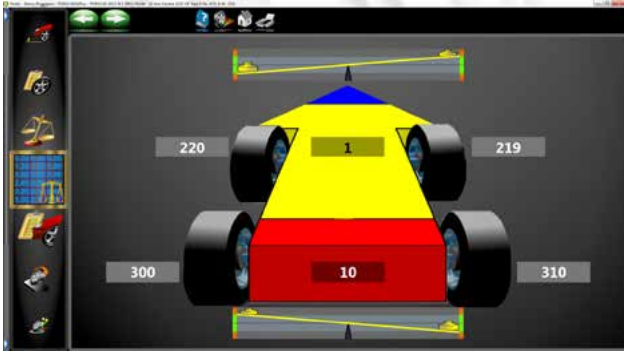
Enter Tire information

Information regarding tire type, size and performance rating are entered here as well as the tire pressure.



Enter Vehicle Weight

Each wheels weight is determined and entered in this screen. The total weight for each axle and the sum of both axles is displayed as well.



Vehicle Weight

This screen represents the vehicle and how a disproportionate weight can affect the balance of the vehicle.



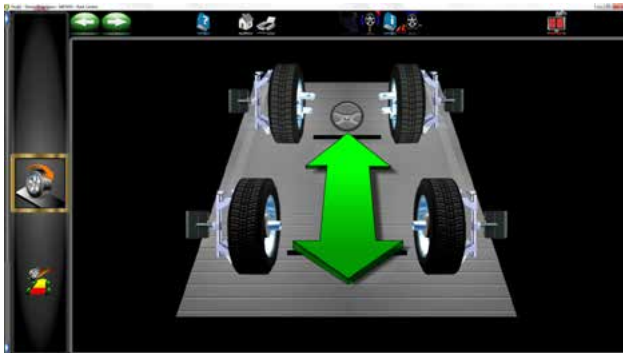
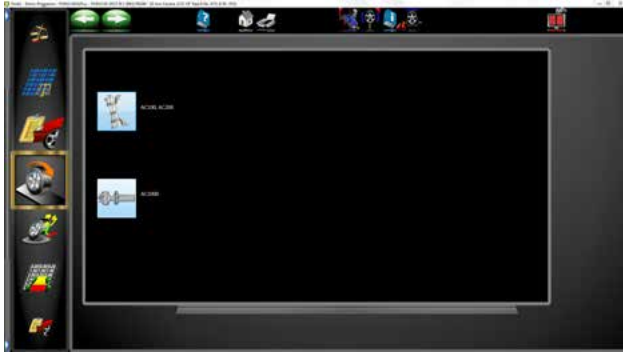
Information page

Important information regarding the alignment procedure is displayed next. These are procedures required by the manufacturer to ensure all components meet design specifications after alignment procedures.

Vehicle Positioning Sequence

Select the wheel clamp to be used during the alignment procedures.

NOTE: If the AC1000 Porsche clamp is selected vehicle positioning will not be performed, you will proceed directly to steering angle measurements.

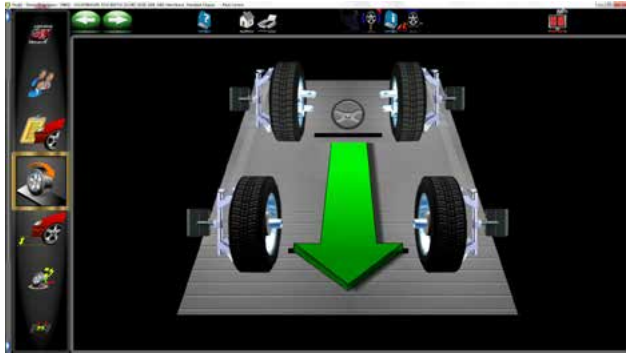


The next screen displayed is the *Target Acquisition* screen. This screen shows the status of each target and prompts the operator to proceed to the next step when all four targets have been acquired. The vehicle is then moved approximately 8" (20 cm) causing the targets to rotate about the spindle. 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.



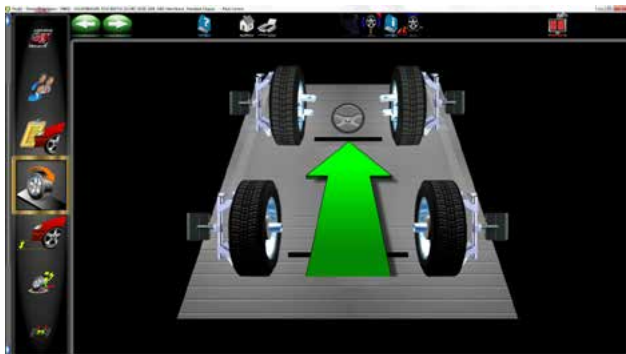
IMPORTANT!

*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.*

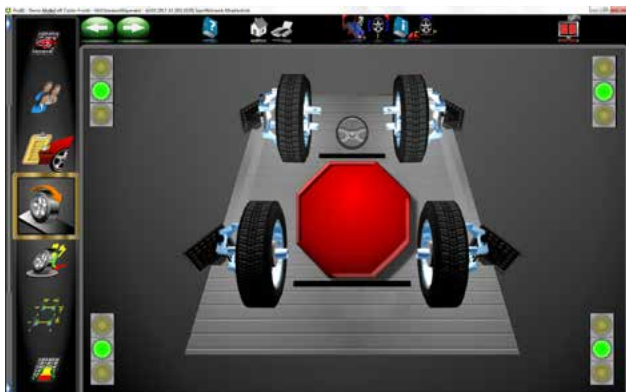
Too Far Back

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.



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

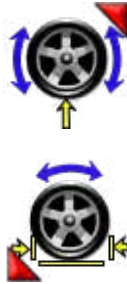
When the aligner is ready, the screen displays a green arrow to prompt you to move the vehicle forward and return it to its starting position. Grab the vehicle where it is convenient and roll it forward onto the turntables where it began.



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.



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.

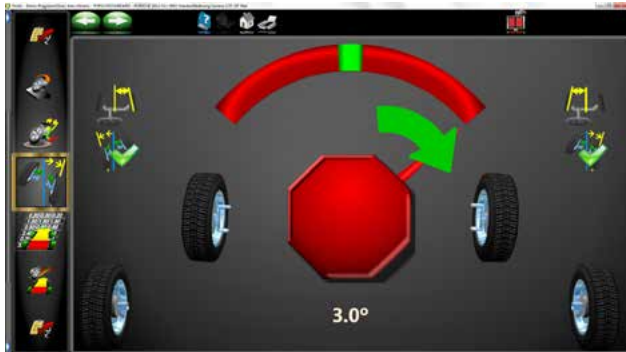
Continue to turn wheels to the indicated point on the meter. When the turn to that direction is completed you will be directed to turn the opposite direction an equal amount.



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

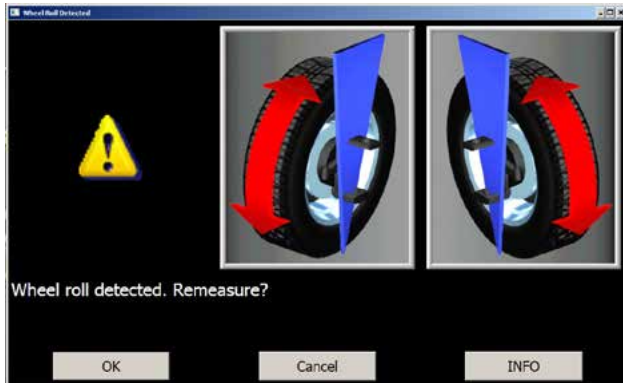
An Arrow adjacent to the steering wheel displayed in the lower portion of the screen prompt the correct direction to rotate the steering wheel. A numerical readout below the steering wheel indicates the steering angle in degrees.

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.



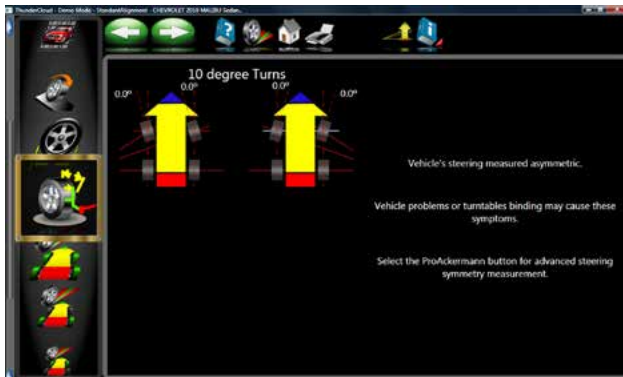
The Aligner prompts you where to stop, depending on which measurements you want. For example to measure Caster, SAI and TOOT, move the wheels from one caster position to the other caster position, and then return to the center steering position.

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 some vehicles it is necessary to start the engine to enable the power brakes in order to keep the wheels from rolling.



Steering Asymmetry

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



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.

Vorne	Links	Rechts
Nachlauf	0,0°	0,0°
Sturz	0,0°	0,0°
Spur	0,00°	0,00°
Spreizung	0,0°	0,0°
Eingeschlossener Winkel	0,0°	0,0°
Spurdifferenzwinkel	0,0°	0,0°
Max. Lenkwinkel	----	----
Radversatz		0,0°
Hinten		
Sturz	0,0°	0,0°
Spur	0,05°	0,00°
Fahrachswinkel		0,0°

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).



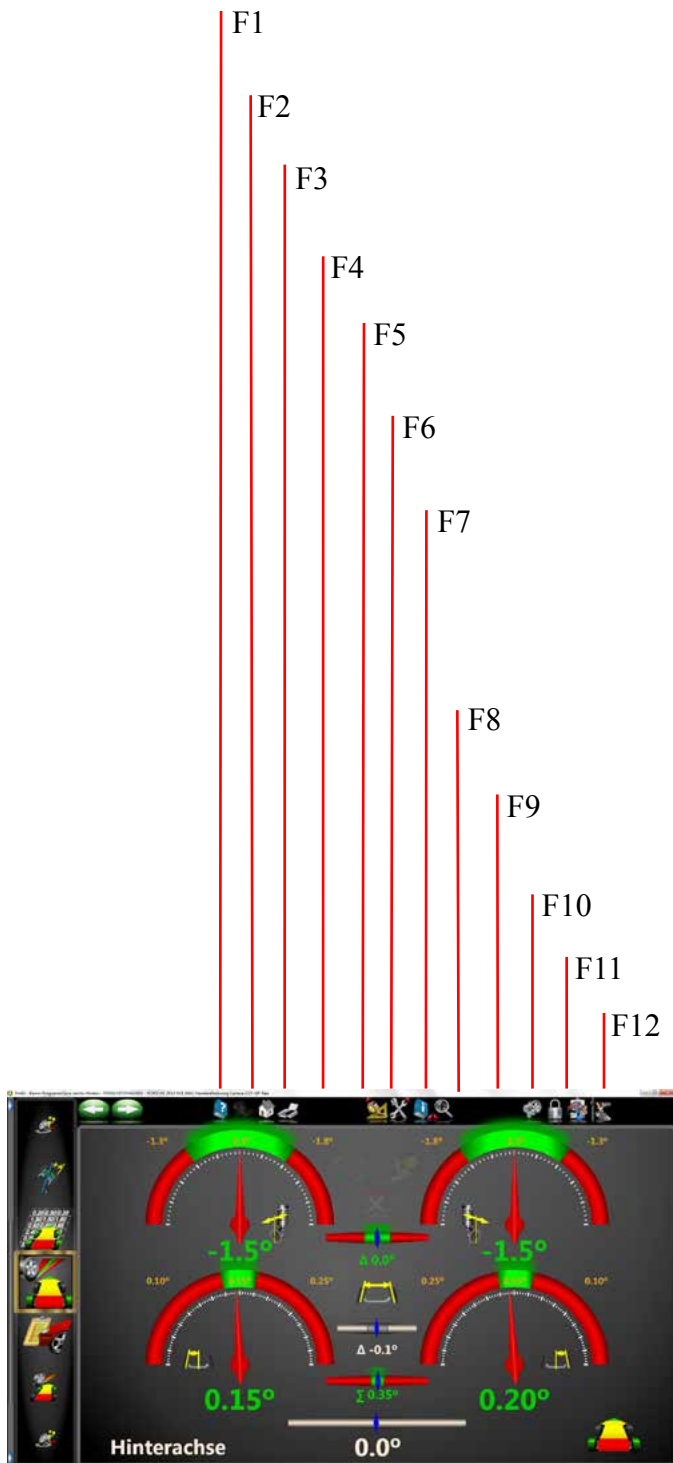
Rear Readings Screen

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.



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 aid 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.*



Information page

Important information regarding the alignment procedure is displayed next. These are procedures required by the manufacturer to ensure all components meet design specifications after alignment procedure



Level Steering Wheel

Before front readings are displayed it is necessary the level the steering wheel. 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.



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.



Continue to turn wheels to the indicated point on the meter. When the turn to that direction is completed you will be directed to turn the opposite direction an equal amount.

As you rotate the steering wheel toward each measurement position, a "Green indicator" tracks the wheel movement. The left and right caster, SAI and TOOT measurement 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, SAI and TOOT, move the wheels from one caster position to the other caster position, 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.



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.

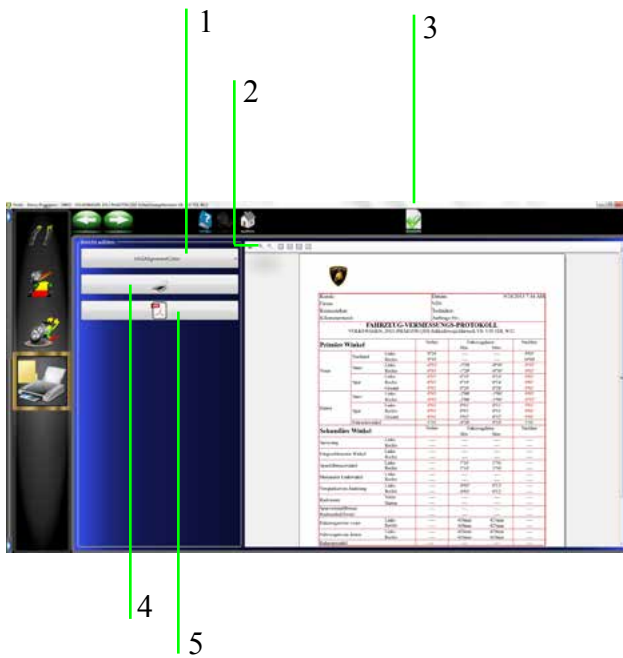
A results screen will show the left and right side values and specifications if available. Determine any damage by comparing any disparity between the readings.

	Links		Rechts
Vorne			
Nachlauf	0.0°	0.0°	0.0°
Sturz	0.0°	0.0°	0.0°
Spur	0.00°	0.00°	0.00°
Sprenzung	0.0°		0.0°
Eingeschlossener Winkel	0.0°		0.0°
Spurdifferenzwinkel	0.0°		0.0°
Max. Lenkwinkel	----		----
Radversatz		0.0°	
Hinten			
Sturz	0.0°	0.0°	0.0°
Spur	0.05°	0.05°	0.00°
Fahrachswinkel		0.0°	

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

Other Vehicles

Some vehicles require procedures unique to that vehicle. We will discuss some of these procedures and how to complete as they are called from the wizards.

Skoda

The Skoda Octavia III is one of the vehicles that require a unique procedure to be performed prior to alignment measurements. The steering column must be centered prior to making measurements or adjustments to the suspension.

Raise the steering column to its highest position and measure the distance between the steering column and the display. Insert the distance in the location provided.



Move the steering column to its lowest position and measure the distance between the steering column and the display. Insert the distance in the location provided.



Move the column up the amount calculated and displayed.



This new position will be the center point of travel at which the alignment measurements will be made and serviced if required.

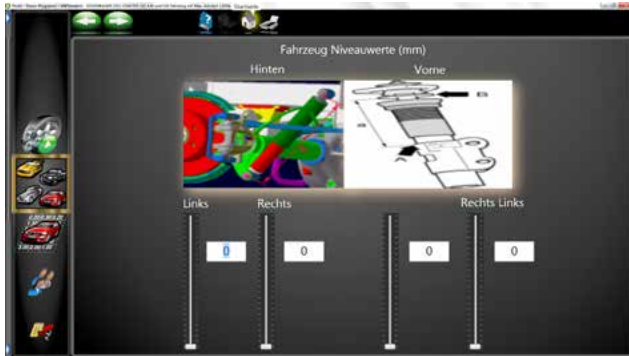


Volkswagen - Amarok

Immediately after vehicle selection you are required to make a frame angle check or the “longitudinal inclination” of the vehicle.

Locate the protractor tool and place on the vehicle frame between the ride side wheels.

Enter the measured value as indicated on the protractor. For forward tilting vehicles the value will be negative while a backward tilted vehicle will require a positive number to be entered.

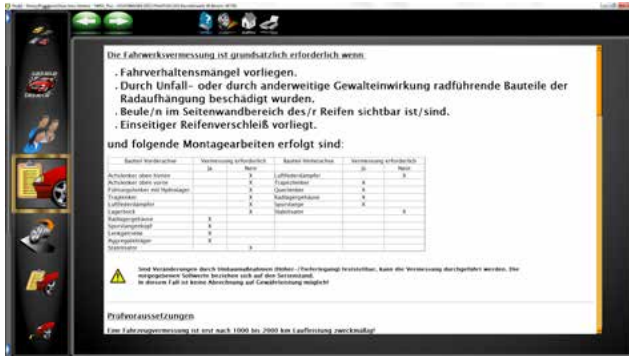


Volkswagen Crafter

Earlier model Volkswagen Crafters have a unique Ride Height Measurements screen. Make ride height measurements as shown and enter the values as determined in the slide boxes provided.

Later model Crafter ride height is measured from the center of the wheel to the edge of the fender well.

Ride height measurements are required for proper specifications selection.



Volkswagen Phaeton

The Phaeton wizard contains several unique procedures required for proper alignment.

The Phaeton and some other models display “**Information pages**” prior to the actual measurement procedures and after the vehicle selection and customer data entry.

The technician is required to qualify the vehicle for alignment. Several checks of mechanical integrity are performed to qualify for alignment as listed below:

A wheel alignment is necessary when:

- There is poor handling
- Parts of the suspension have been damaged in an accident or by other means
- There is visible tire wear on the sides
- There is tire wear on one side of the vehicle

A wheel alignment is necessary after adjustment or Replacement of various suspension components.



Checking and adjustment conditions:

- Vehicle must be in a cooled state
- Runout compensation must be carried out
- The distance between the wheel center and the top of the wheel arch must be measured.

After the runout compensation has been completed rotate the wheel to a position that allows a straight line measurement between the wheel center and the wheel arch with the measurement device

The tire must have its specified pressure

The vehicle must be at its specified ride height prior to measuring turn angles.

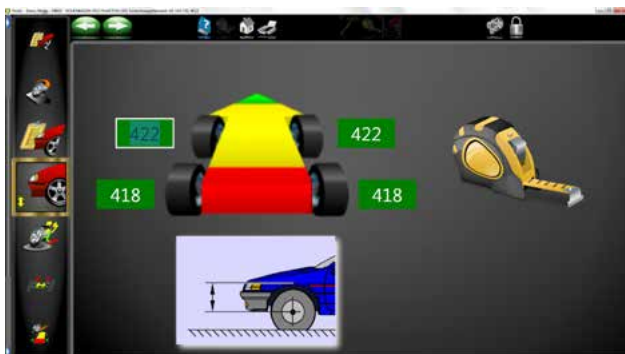
There must be no pause or break during the alignment. The ride height may change over time if the vehicle is left standing due to temperature effects (air suspension only)

The sequence of steps must be observed!

The vehicle is raised then lowered then returned to a normal height before making the Ride Height measurement.



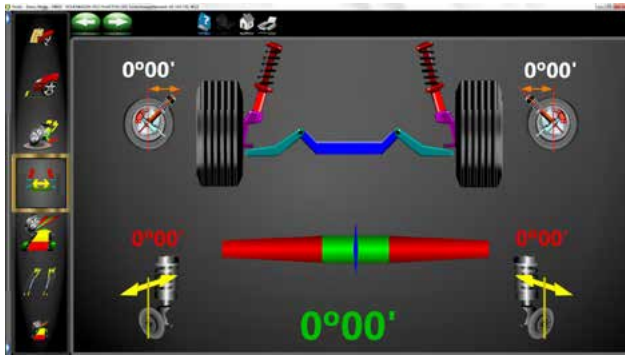
Next the Technician will be required to insert the key into the ignition before making the turn angle measurements. This unlocks the steering.



Next enter the ride height measurements followed by making the turn angle measurements.

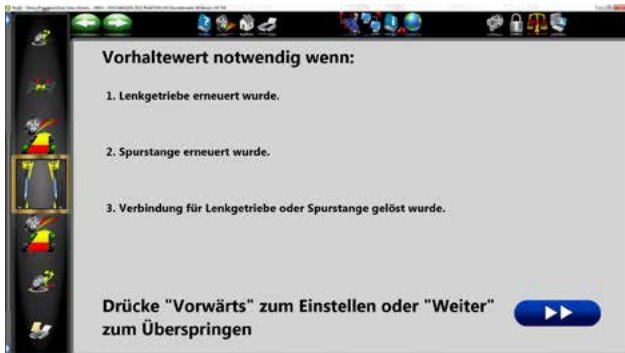


After turn angle measurements, remove the key from the ignition to lock the steering.



Next is a cradle adjust screen, make any corrections required using this live screen.

Readings screens are displayed, with the message between rear and front readings alerting the technician to check the toe constant if any one or a number of turn angle components have been adjusted or replaced.



A check or adjustment of Toe Constant or Toe Curve Change is required next.

Select "Next" to continue.

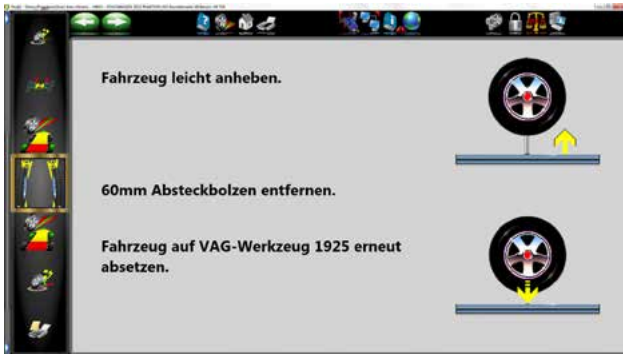
The "pre-toe" value is required when certain steering components are replaced or serviced.



Use the VAG 1925 device and insert rods until they touch the underside of the vehicle.



Next you will see the raised toe measurement.

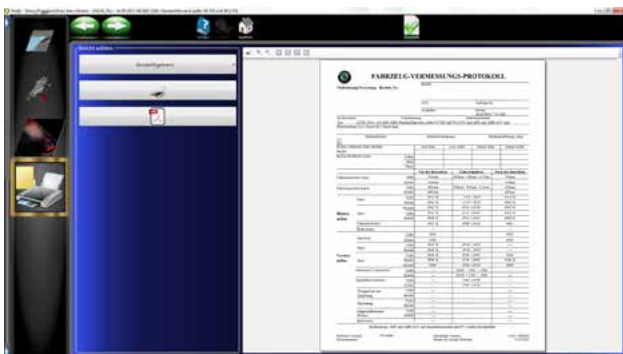


Raise the vehicle and remove the adapters then lower the vehicle.



Adjust toe until both meters and the difference are green .

Select "Next" and complete the alignment.



An alignment report can then be printed or saved.



Volkswagen Touareg

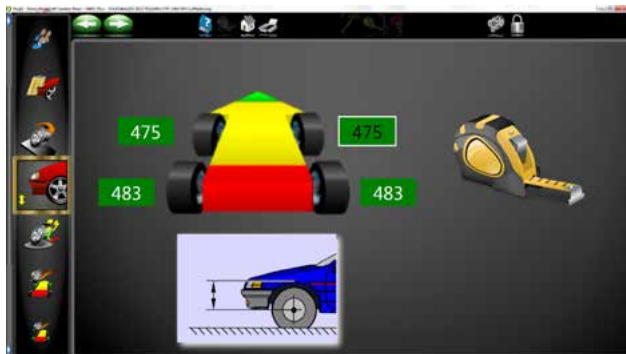
Alignment of the Touareg requires special attention. Technicians are instructed to inspect the vehicle for various problems such as handling problems, tire irregularities, or asymmetrical tire wear.

If any steering or suspension components have been replaced or damaged.

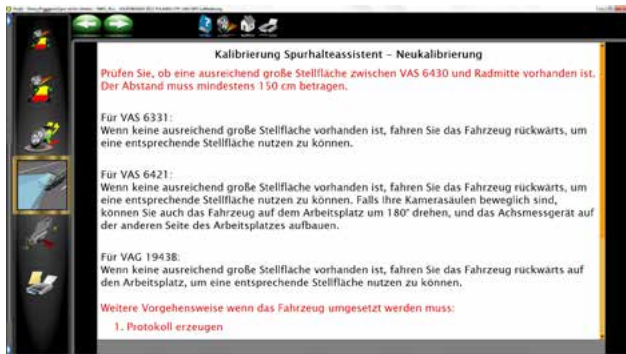
The alignment procedures must be followed as directed for proper completion. Once the alignment has started it should be completed since variations in ride height can occur due to various reason on air suspensions only.



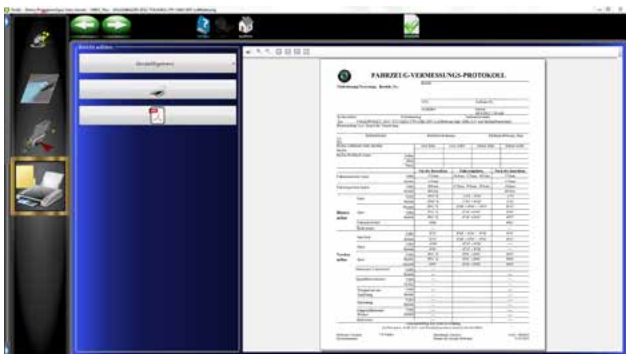
After selection of the vehicle specifications select whether the vehicle has an Adaptive Cruise Control (ACC) sensor or a Lane Departure Warning (LDW) camera. If either are selected calibration of the sensors or camera will follow the alignment procedures.



Before the Steering Measurements can be performed the vehicle ride height must be entered and be within the manufacturers specifications in the normal level position. Follow the instructions provided in the “Information Pages” displayed during the procedures.



If the vehicle contains an Adaptive Cruise Control (ACC) sensor or a Lane Departure Warning (LDW) camera proceed with the calibration procedures as directed in the information and procedure pages.



After a successful alignment and calibration print or save the results if desired.

Driver Assistance Features

Some vehicles may have Driver Assist Features that may require re-calibration in the event of certain component replacement or vehicle damage. Driver Assist Features utilize a combination of sensors: Adaptive Cruise Control (ACC), Lane Departure Warning (LDW), Infrared night vision, radar and ultrasound sensors.

ADS - Adaptive Drive Select is an option that includes Dynamic Steering and Adjustable suspension. The optional Adaptive Drive Select changes handling and response to suit driving styles. Select from five modes: Efficiency, Comfort, Dynamic, Auto and Individual.

LDW - Lane Departure Warning - For greater safety and convenience, particularly on freeways and main thoroughfares the optional active lane assist helps you stay in lane with gentle pulses through the steering wheel. LDW uses a forward viewing camera to sense roadway markings.

The Audi Side Assist offers safe lane-changing even if there's another vehicle in your blind spot. At speeds over 18 mph, it monitors the area to the rear and sides of the car and detects whether the lane is occupied by another vehicle. If it is, LEDs on the corresponding door mirror warn you before you begin to pull out.

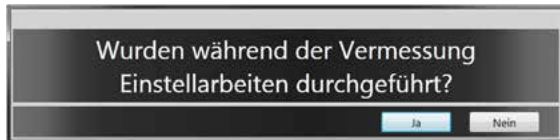
ACC - Adaptive Cruise Control utilizes the standard cruise control system along with forward sensing radar. The driver can set the system to maintain a set distance from the vehicle in front. If the distance is too close, the system reduces speed by easing the throttle or braking. Once the road ahead is clear again, the ACC accelerates the car to the previous speed.

Night Vision - The core component of the night vision assistant is a thermal imaging camera located at the front of the vehicle. It has an scanning angle of 24 degrees, its protective window is cleaned by its own washer nozzle, and it is heated in cold weather. A computer converts detected radiant heat emitted by objects from the camera to black-and-white images and displays them on a display. The principle focus of night vision is the detection of human beings and other animate object.



Calibrating Adaptive Drive Select

If ADS is selected as available during the alignment setup you will be directed to follow instructions for calibration following the readings screens. ADS calibration is the same for all models.



If any correction or adjustments have been made it will be necessary to perform ADS calibration.



First perform a series of vehicle inspections as directed by the screen.



Connect the vehicle diagnostic testing and information system to the vehicle.

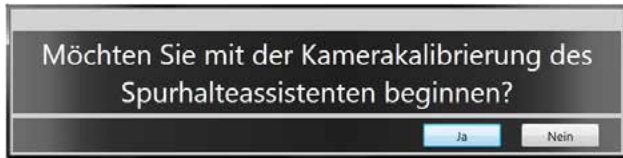
Start the "Guided Fault Finding" sequence the vehicle being serviced.

Connect the battery charger.



Equalize the front toe.

Follow directions on the vehicle diagnostic testing and information system to complete calibration while keeping the front wheels equalized.



Lane Departure Warning Calibration

Complete the vehicle alignment as directed then select "Yes" when asked to perform LDW calibration.



Perform several checks of the vehicle chassis as directed.



Read and rectify any memory faults.

Connect the vehicle diagnostic testing and information system to the vehicle.

Start the "Guided Fault Finding" sequence the vehicle being serviced.

Connect the battery charger.



Position the LDW device VAS 6430 as directed.

Measure the rack offset and enter the value in the space provided.

Follow screen directions to adjust the height of the setting device to the expected value as calculated.

Place the camera on the right side of the stand.

Adjust the level of the stand with the screw (1) as shown.



To fine adjust the LDW stand, use the screen to move forward and aft, side to side and square relative the thrust line of the vehicle.

When adjusted, tighten the brake screws to brake the stand.

Adjust the stand around the vertical axis.

Level the stand and double check the height. Adjust if necessary.



Follow the calibration instructions on the screen of the tester to complete calibration.

NOTE: The LDW calibration is not complete until the VAS 5051/5052 displays "Control element test ended" Select OK when complete.



Adaptive Cruise Control Calibration

Make sure there is adequate clearance (2.7 meters) in front of the lift. If space is not available it may be necessary to move the vehicle backwards on the lift.

Follow the guidelines and preparations presented on the information page.

More information is provided in the next information pages.

Note any adjustments, component replacement or vehicle damage, adjustment will be required if any of those are met.

Prepare the vehicle for adjustment procedures. Required equipment include the vehicle diagnostic testing and information system, diagnosis cable, the ACC setting device and the wheel aligner.

Start "Guided Fault Finding" for the vehicle in question and select "ACC Adjustment". Make sure to close the hoods and doors.

Connect the battery charger.

Remove the right side grill.

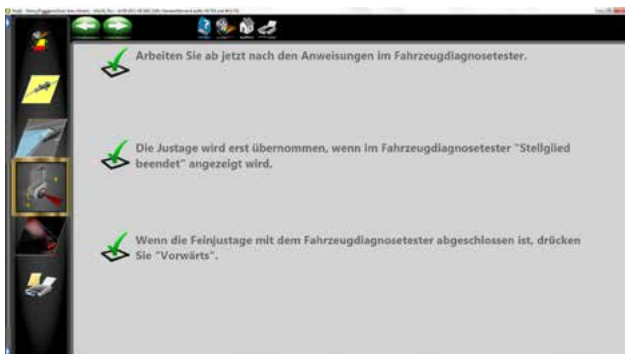




Follow the page by page instructions for adjusting the Setting device.



Once the setting device is properly adjusted, follow the page by page instructions for adjustment.



When the fine adjustment of the sensor and the diagnostic tester is finished select "OK".

NOTE: Some vehicles may have two radar detectors, in that case repeat the procedure following the directions provided on that opposite side.



Night Vision Calibration

Read the information page containing preparation instructions of driver assistance. Follow the required guidelines to ensure proper calibration.

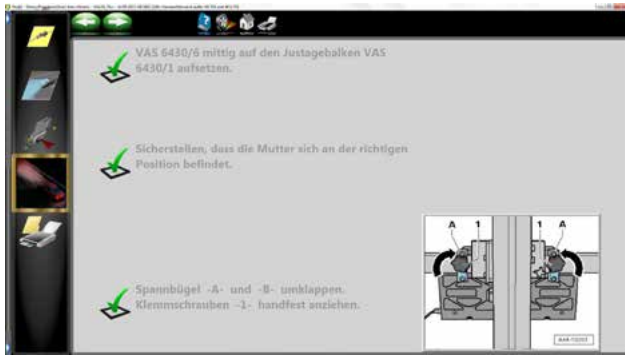


Make sure there is adequate clearance (2.7 meters) in front of the lift. If space is not available it may be necessary to move the vehicle backwards on the lift.

Additional information is provided about the night vision system.

Connect the vehicle diagnostic testing and information system to the vehicle. Run lead through the open door and window. Close the hoods and doors. Change the mode to "Activate Wheel".

Connect the battery charger.



Connect the VAS 6430/6 in the center of the VAS 6430/1 making sure it is in the right position. Follow the screens for setup.



Equalize front toe.



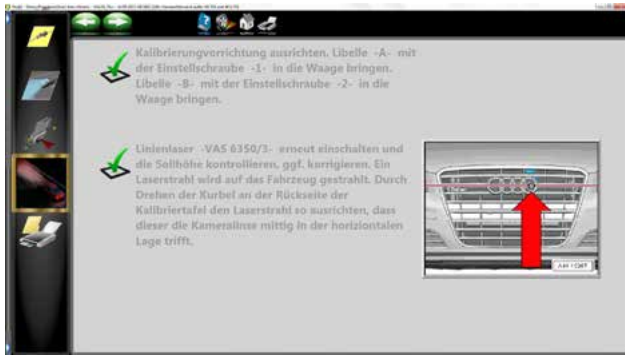
Follow several screens that instruct how to properly position the VAS 5430 setting device.

Basically you are setting the laser to the center of the Night Vision camera in the horizontal plane.

Place aligner camera on right side of setting device.

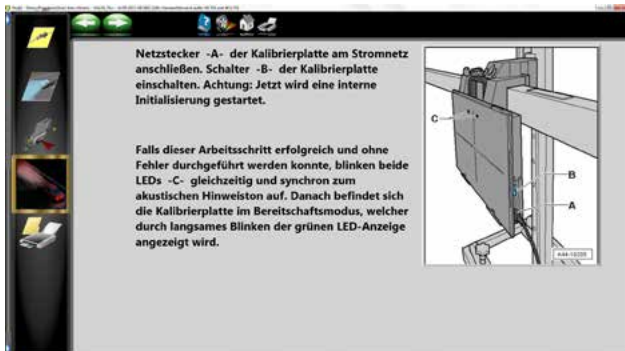


Fine adjust the position of the setting device using the screen shown. Adjust side to side, front to back and along the vertical axis.



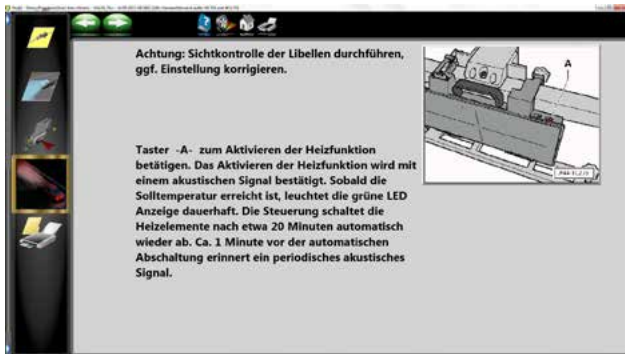
Switch on the laser line and adjust so the laser line coincides with the center of the Night Vision camera.

Turn off the Laserline.



Connect power to the VAS 6430/6 and let it initialize.

Wait until the LEDs start blinking.



Make sure the unit is still level in all planes.

Press button to activate heating function. When the necessary temperature is attained, the green LEDs will stay on permanent.



Switch on the Vehicle Testing and Information unit, followed by switching on the ignition.

Select "Guided Fault Finding" and enter the vehicle make, model and year.



Follow the adjustment/calibration instructions on the screen.



When all calibrations and adjustments have been performed, a report will appear to print or save.

Alignment results and ADS calibrations are displayed if performed.



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 instructions 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.

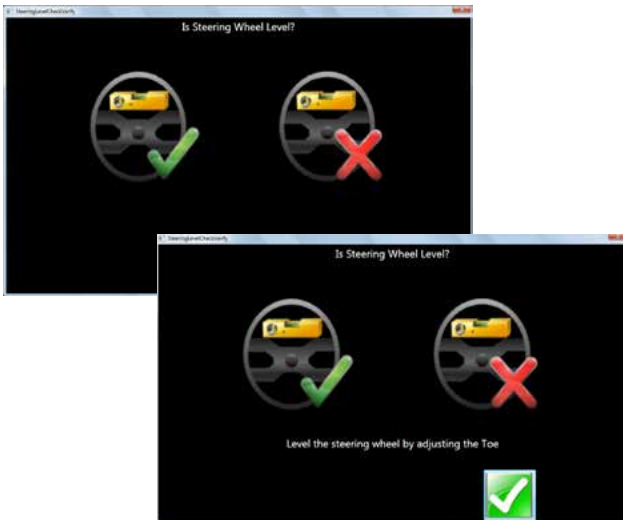
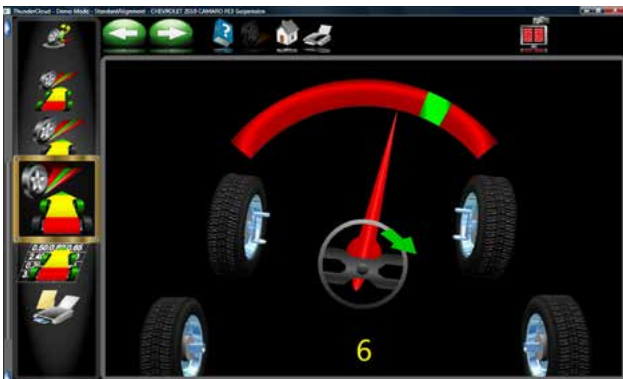
5. The Caster/SAI values are displayed on the All Readings screen. Caster is displayed on the All Readings screen as well as the Front Readings meter screen.
6. Use SAI to diagnose a handling problem or a bent part that is limiting the adjustment of camber.

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

Steering Level Check

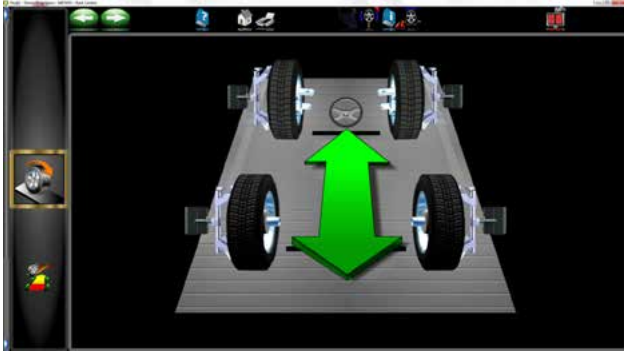
Selecting this feature allows the user to check the level of the steering wheel.

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".

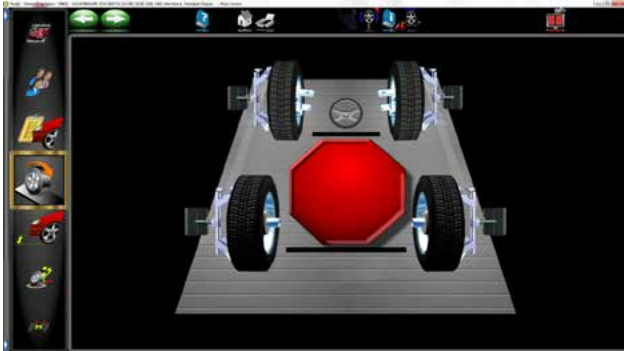
If the wheel is not level, adjust the toe to correct to a level condition.



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.

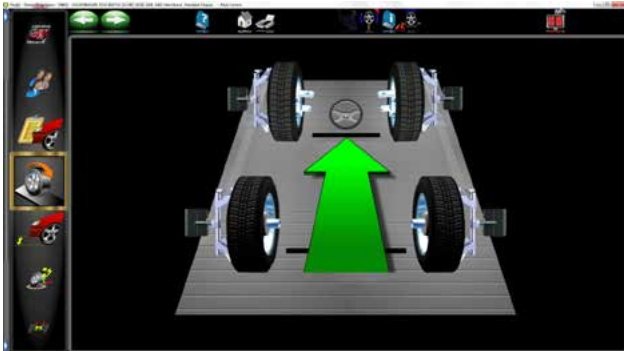


A large red STOP sign will prompt you when the wheels have returned to their original start positions. Hold the vehicle steady until the stop sign disappears.

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.*



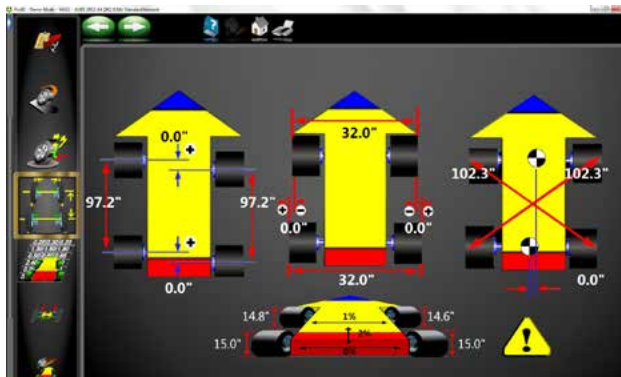


Caster Measurement Elevated

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.



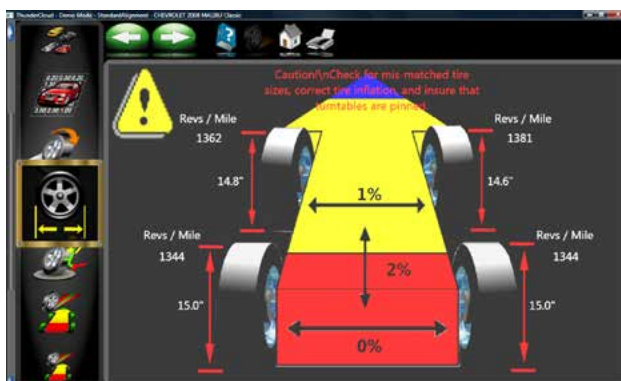
Raised measurement can also be made from the readings screens by clicking on the "Raised Icon". Follow the on-screen directions.



Vehicle Dimensions

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

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.

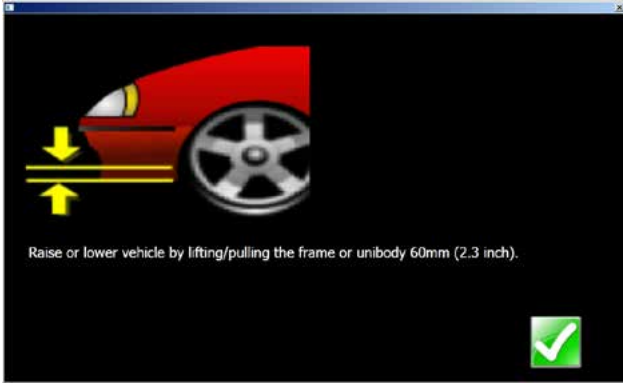
A results screen will show the left and right side values and specifications if available. Determine any damage by comparing any disparity between the readings.

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.

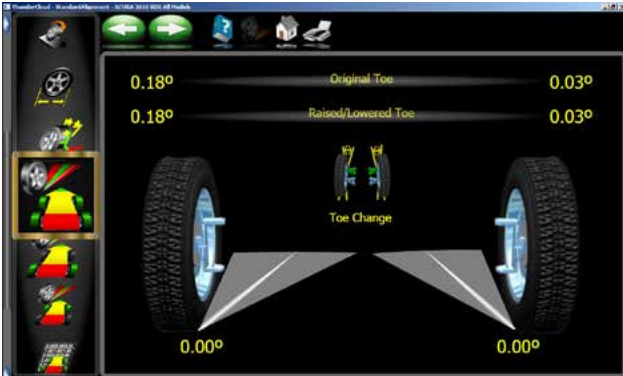




Toe Curve Change

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.



Active Ride Height

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

The Active Ride Height Targeting device is useful for inputting values for those vehicles with “externally” accessible Ride Height measurement points.

How to use the optional Ride Height Device

From the Tool bar, select “F5” for target measurement.

Refer to Addendum I on page 126 for Active Ride Height instructions.



Measured Ackerman

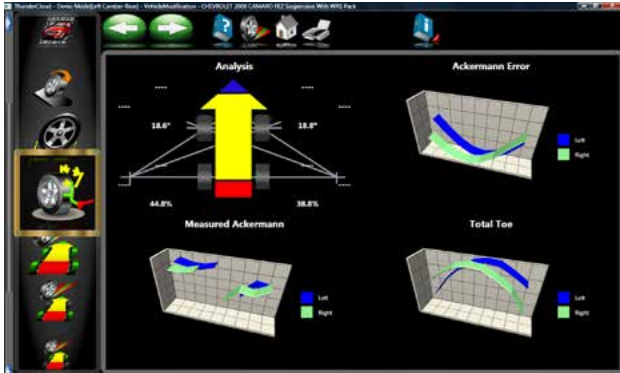
Explanation: Steering Geometry is measured and analyzed with the unique *ProAckerman*™ feature.

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. Blue is for the steering turning left and green is for the steering wheel turning right.

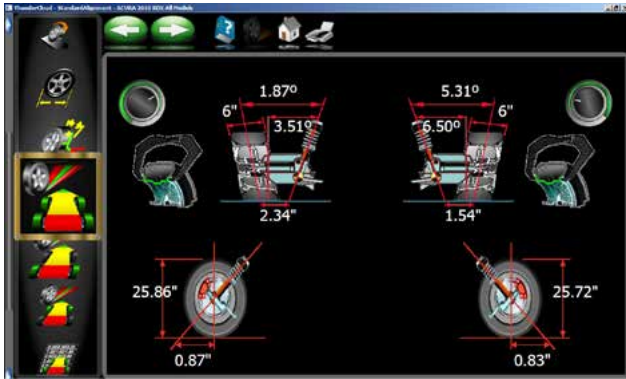
Chart 3 - Measured Ackermann

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. Blue 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. Blue 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 trail 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

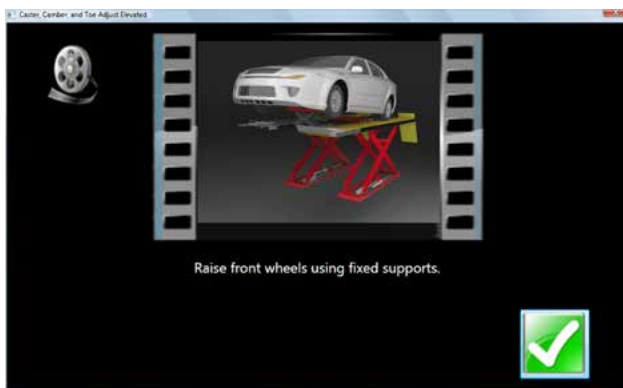


- Raise front wheels using rigid supports
- Press OK

IMPORTANT!

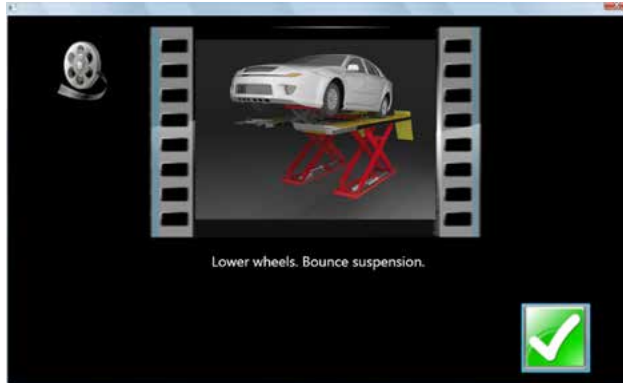
Follow all on-screen instructions carefully. Incorrect adjustment readings are possible if these steps are ignored.

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.

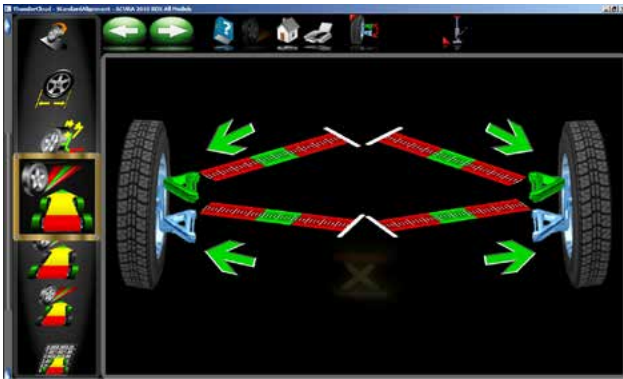
The next screen, *A-Arm Adjust*, allows selection of the location of the adjustable A-Arm and whether the corrections will be made on the turntables or elevated. Examine the vehicle for the location of the adjusters. It does not matter whether the a-arms have shims, slots, or cams.



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.

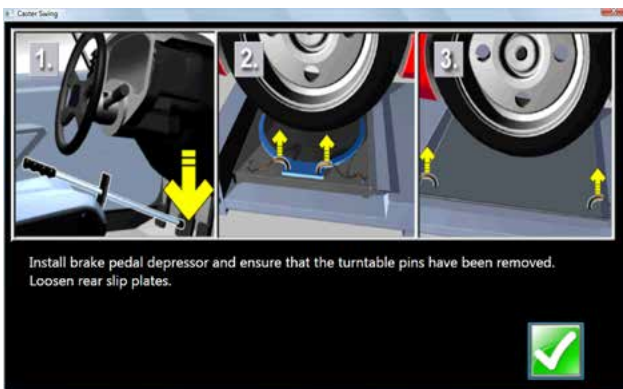
The adjustment screen contains a graphic of the right side a-arm along with two meters. These meters represent the movement of the front and rear of the a-arm, and their relationship to the desired readings. Move each side of the a-arm by adding/removing shims, loosening the bolts and sliding the arm, 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.



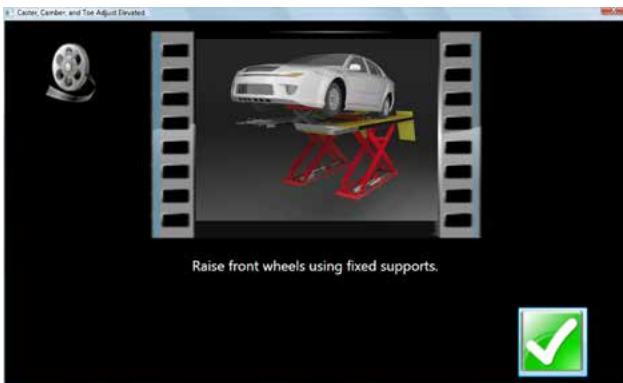
Wheel Off Caster, Camber, Toe Adjust

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.

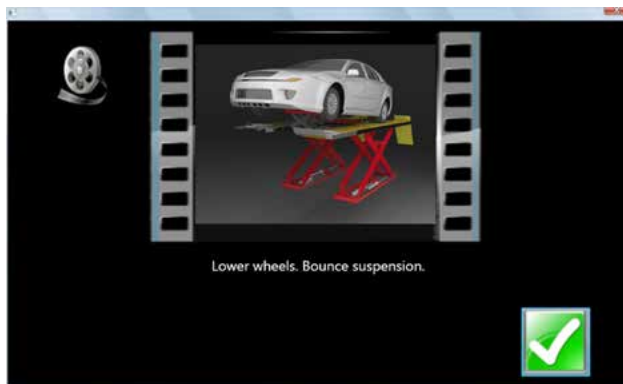


Make "Live" adjustments as required to correct angles to specification.



Re-Mount wheels and Mount clamps.

NOTE: The wheel(s) that have had the clamp assembly 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.

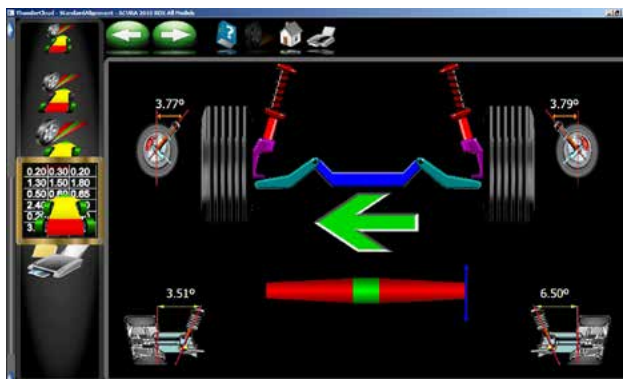
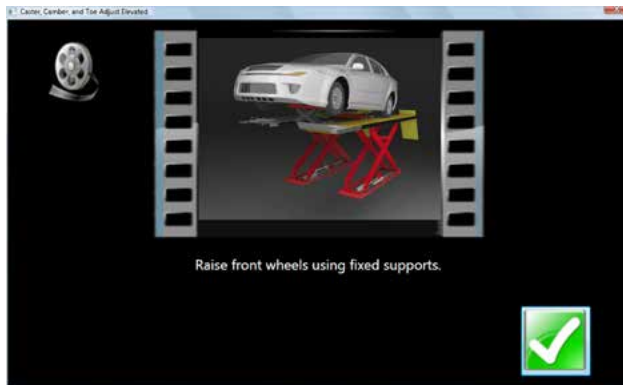
The engine cradle can potentially move side to side, changing the camber and SAI angles. Prior to beginning a cradle adjustment, examine the left and right camber values. If one side has excessive positive camber and the other side excessive negative, this vehicle is a candidate for cradle adjustment.

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.

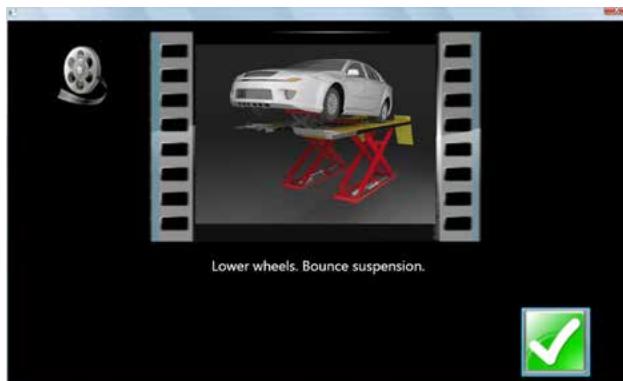
Install Brake pedal depressor and remove turntable and slip plate pins. Click "OK" when ready.

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 2 different types of clamps available to the end-user including 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.



SINGLE BAR CALIBRATION

A method of very accurate calibration of the aligner using a special bar and procedures.



BAY CHECK

A series of plausibility tests used to qualify the aligner, camera and rack for conformance to specifications. See Addendum II for complete instructions.



RIDE HEIGHT TARGET CALIBRATION

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



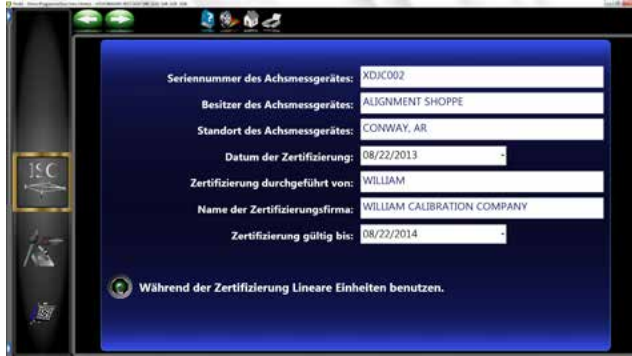
REMOTE CAMERA CALIBRATION

Required procedures for proper calibration of the remote camera.



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.



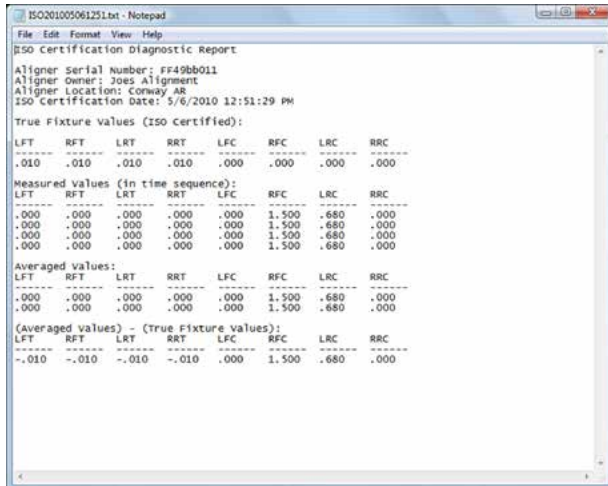
The basic alignment system calibration is performed using the service calibration functions of target identification (TID) and relative camera position, both normally performed by the Service Representative.

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.

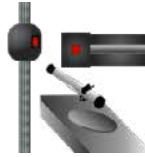


System Configuration

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”

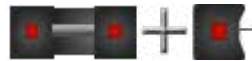
- Two Camera System



- Three Camera System



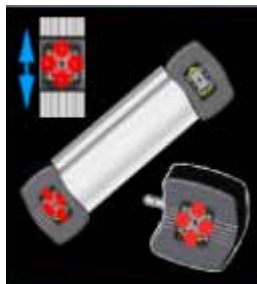
- Two Cameras with remote camera



- Three Cameras with remote camera

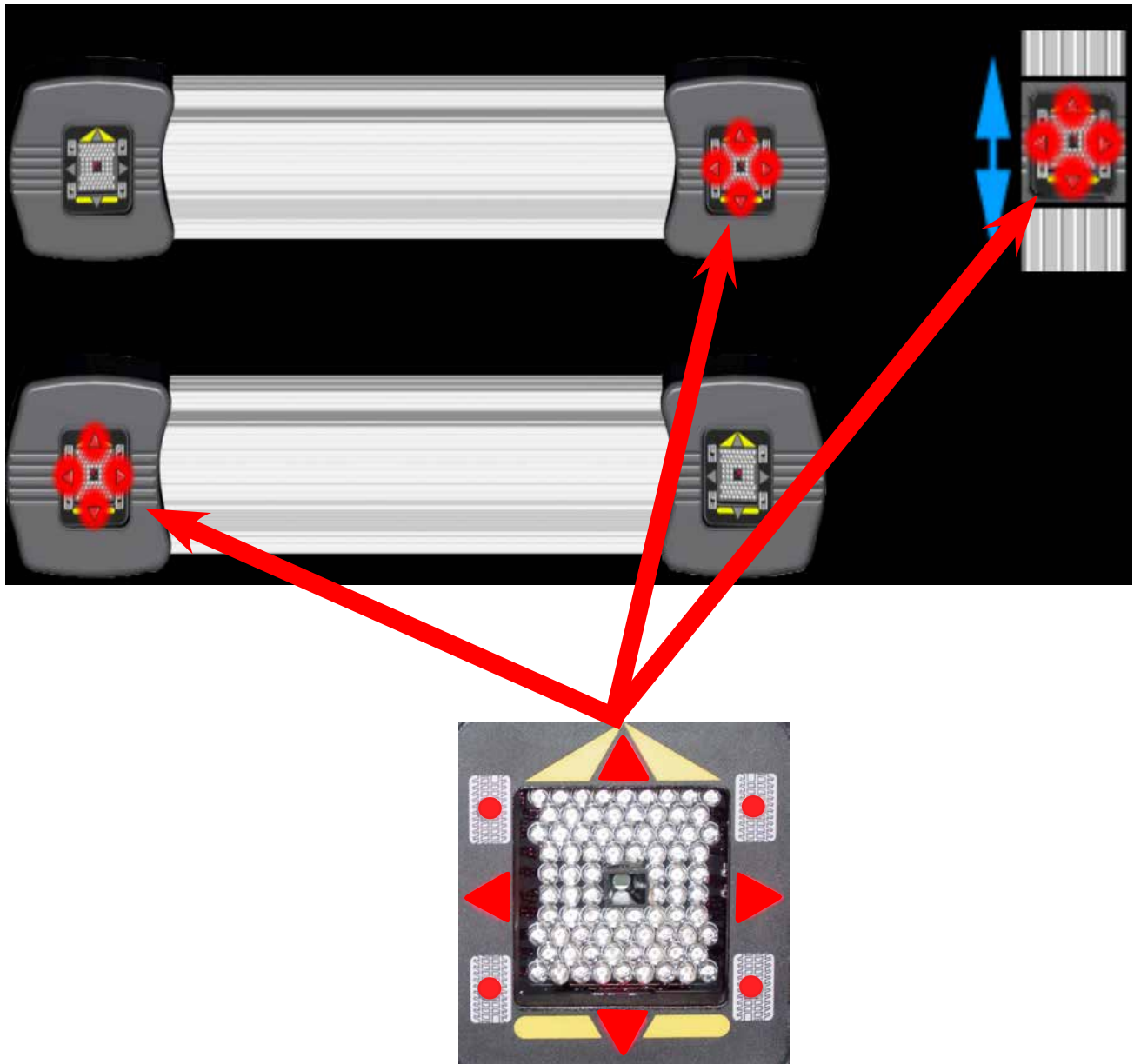


After selecting the correct camera configuration, each of the cameras must be identified. By clicking on “Camera Identification” icon a display with a camera beam will appear.



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



Chapter IX Maintenance

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 aligner system. If the auto search mode is not working the user should check to ensure both of these are on.





Wheel Clamp Selection

The customer has 2 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.



Select whether a Ride Height Target Option will 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.

Follow the on-screen arrows instructing you to rotate

TARGET ID

The alignment system has 2 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.

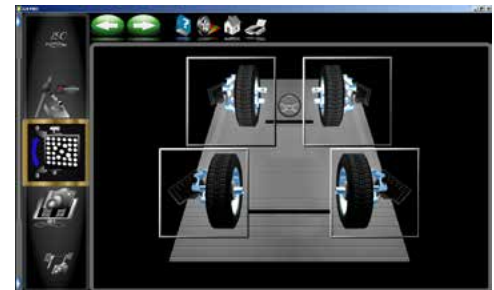
Conventional Clamp - Used to perform Target Identification on Conventional Wheel clamps. These clamps and target come standard with the aligner. See “Target ID” earlier in this chapter for procedures.

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

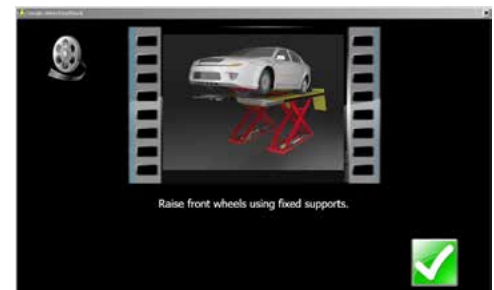


TARGET ID PROCESS

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.



NOTE: DO NOT PERFORM RCP OR TID FOLLOWING SINGLE CALIBRATION AS IT WILL NEGATE SINGLE BAR CALIBRATION VALUES.

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.



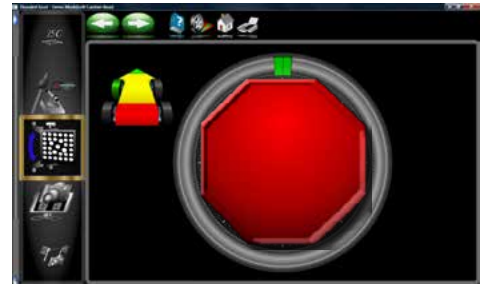
4. After the readings have been taken the screen instructs with arrows indicating to rotate the wheel and target back 90°. This 90 degrees is from the first 25° forward, rotate the tire back until a stop sign appears as in step 6 and hold the wheel steady as another reading will be taken.



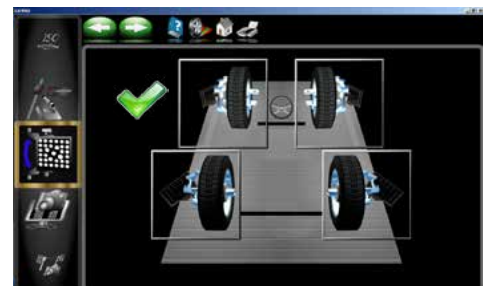
5. After the readings are taken the arrows indicate to rotate the tire and wheel assembly forward 90°. Rotate the wheel until a stop sign appears and hold the wheel steady as a reading will be taken.

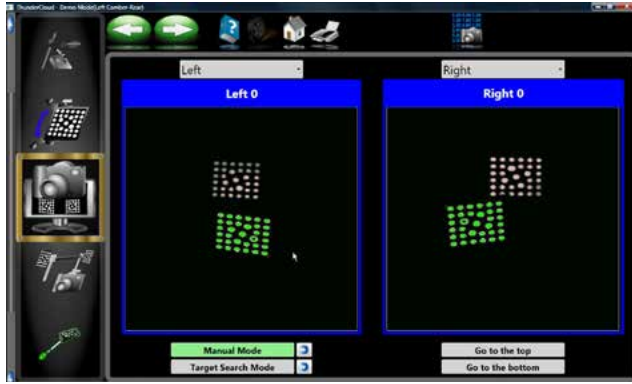


1. After the completion of a successful target ID the screen indicates to lower the wheel. This is not necessary if the opposite side target is needing to be ID, click on the <OK> button and select the next target. Lower the wheels after all four targets have been ID'd.



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

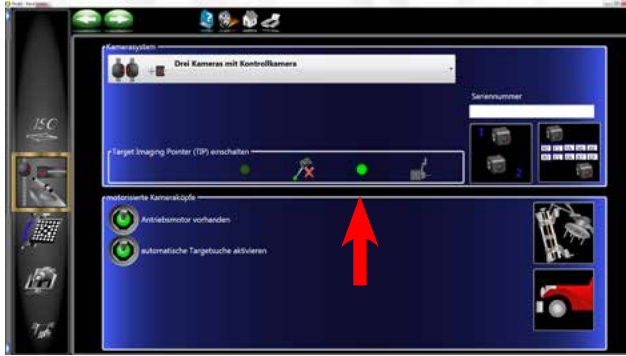
Used to acquire raw camera images. This screen shows the view of the targets as seen by the cameras on each side of the vehicle. Camera View can be used to assure proper positioning of the camera beam when a movable beam is used to mount the cameras. The Movable Camera Beam can be lifted to varying heights 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.

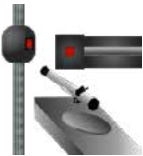
NOTE: DO NOT PERFORM RCP OR TID FOLLOWING SINGLE CALIBRATION AS IT WILL NEGATE SINGLE BAR CALIBRATION VALUES.



Plausibility Target Calibration

ACTIVATE AND CALIBRATE THE PLAUSIBILITY MEASURING DEVICE

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

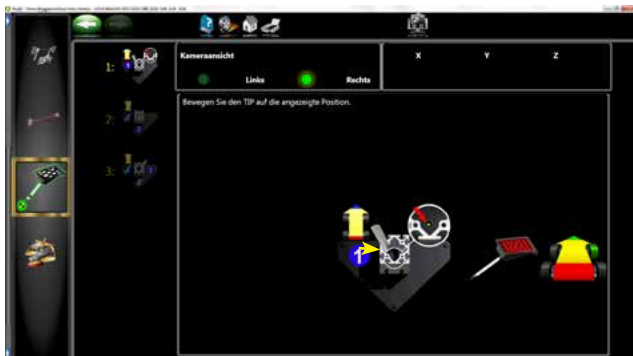


CALIBRATE

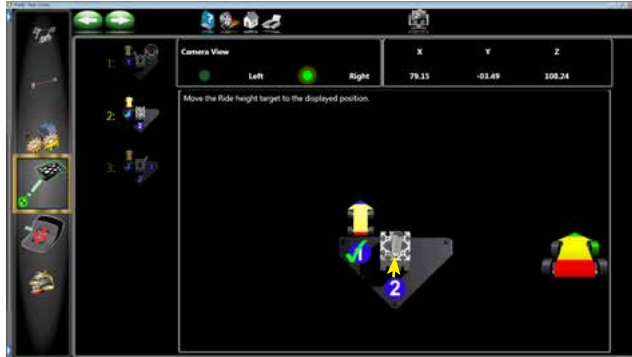


1. From the **Calibration Menu**, click on **Plausibility Target Calibration** icon to begin the calibration process.
2. Locate the Plausibility Target Calibration fixture and place the fixture on one of the lift runways so the straight edge is toward the camera.
3. Select the side of the rack you are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

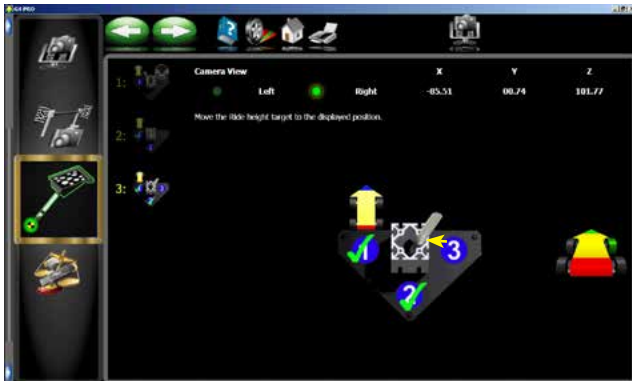
NOTE: THE POINTER TIP MUST REMAIN IN THE HOLE DURING ALL STEPS OF CALIBRATION.



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 Home Screen 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.



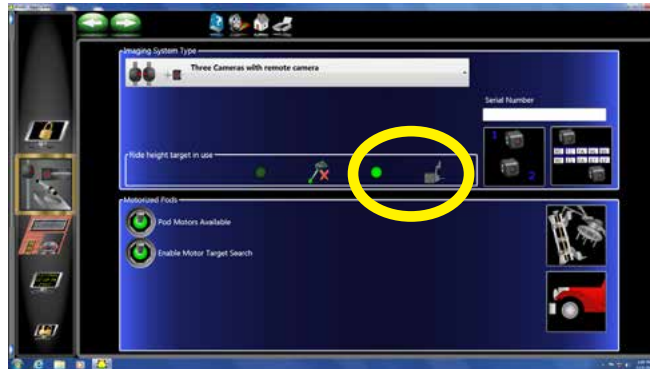
Also available is the ability to delete the customer database. Do not select this unless it is desired to permanently lose all the customer data. This feature might be used when an aligner is transferred to a new owner or location.

ACTIVE RIDE HEIGHT TARGETS

GENERAL OVERVIEW

These instructions provide details on how to properly use and care for live ride height targets. Live ride height targets utilize a suction mechanism to attach to the body of a vehicle. If used properly, the alignment software will provide continuous, live readings of the ride height of a vehicle.

Active Ride Height Targets must be selected in system configuration prior to use in order to be recognized.



PRIOR TO VEHICLE ATTACHMENT

1. Locate the Active Ride Height Targets normally stowed on a vertical slide-out in the lower section of the cabinet.

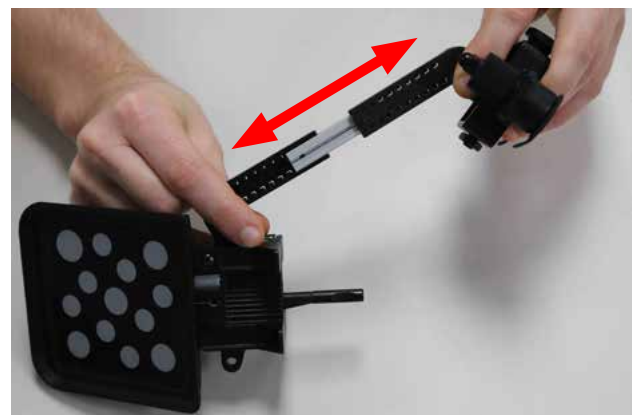
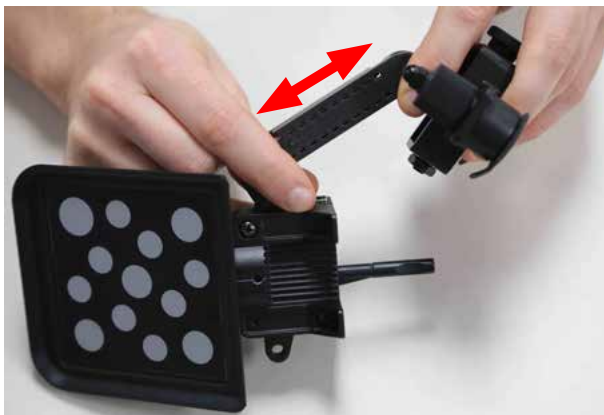


Addendum I - Ride Height Device

2. Inspect the work surfaces, always ensure that the surfaces of the suction cups and vehicle attachment areas are free of dirt, grease, dust, and other debris that would prevent proper suction. The surfaces of the suction cups can be cleaned via a damp, lint-free rag.



3. If required, adjust the length of the arms of the targets by grabbing the target as shown and pushing or pulling the arms apart. This adjustment is a rough approximation of how far down the target will need to hang below the vehicle attach point and be able to touch the underside of the wheel well.



4. Adjust the lead screw to position the fine tuning adjustment block to the center of the adjustment range. This will allow for a wider range of fine tuning once the target is attached to the vehicle.

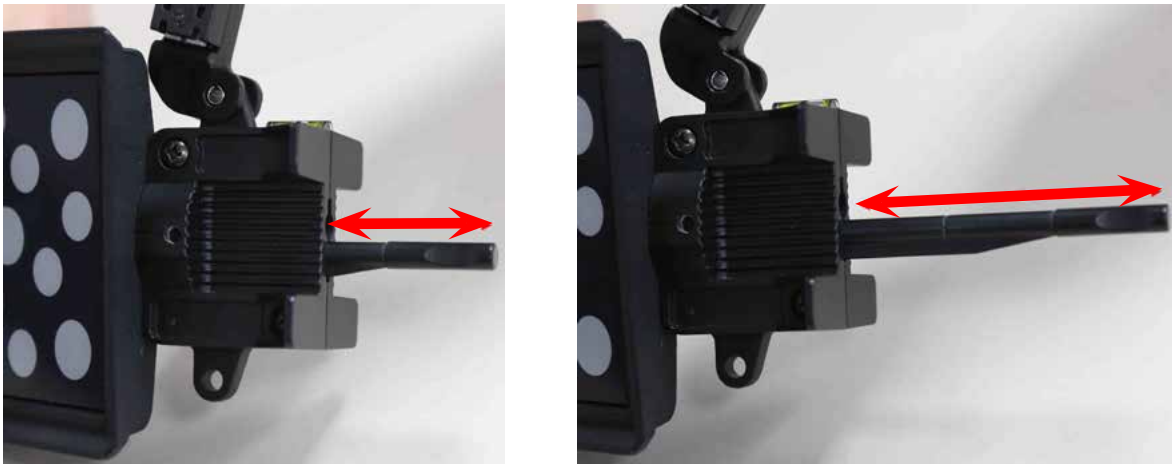


Addendum I - Ride Height Device

5. Ensure that the locking knobs on the suction cups are in the unlocked position. Toggle between the locked and unlocked positions by rotating the knobs clockwise.



6. Extend the wheel well locator as required to ensure proper contact with the underside of the wheel well.



7. Press the target assembly against the vehicle as shown to evacuate the air from the suction cups. The target assembly is to be located above the center of the wheel on the upper-most wheel well arc on the vehicle and such that each suction cup will attach to a smooth area.

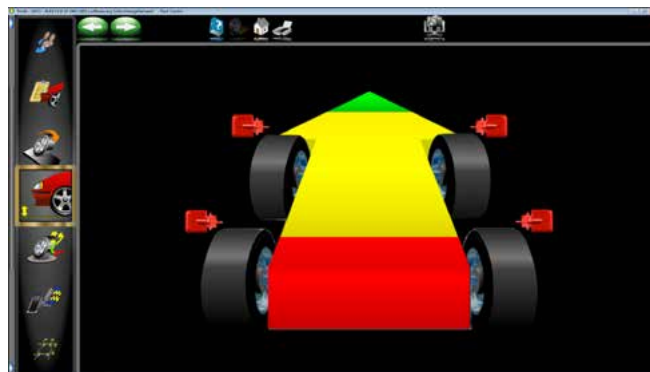


8. While still applying pressure against the vehicle, turn the knobs on the suction cups clockwise until a click is heard. This locks the suction cups against the vehicle.
9. Ensure that a proper seal has formed with the suction cups by gently pulling the target assembly away from the vehicle. If seal does not hold, verify that the suction cup and vehicle surfaces are clean and repeat the attachment process.
10. Level the target assembly via the lead screw adjustment on the target assembly. Proper leveling function is directed within the alignment software.



USING THE ACTIVE RIDE HEIGHT TARGETS

When a vehicle is selected that requires active ride height, the following screen will be shown immediately after performing rollback.

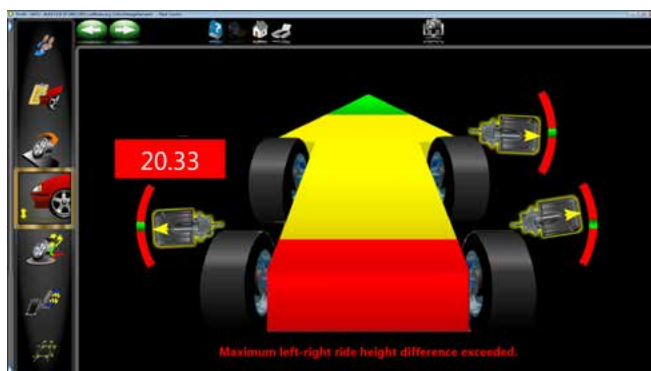


Addendum I - Ride Height Device

Attach the active ride height targets as directed in the previous pages. The screen will show the presence of the targets and direct you to adjust the targets fore and aft and tilt upward or downward. Follow the instructions viewed on the screen. Carefully turn the adjust knob so the target tilts up or down until the target is leveled.



Once the target is leveled, the ride height value is displayed next to the wheel. Values will be displayed using the units selected in "Preferences", "Units of Measure".



Follow the screens to complete the alignment process.

REMOVING FROM VEHICLE

While supporting the target assembly with one hand, rotate each of the suction cup knobs clock-wise to unlock the suction pull. Lift the tabs on each of the suction cups to release the suction seal.

PLAUSIBILITY TESTS

Before alignments can be performed, several aspects the alignment bay area must conform to requirements of VAG.

You will be instructed to perform: 1) visual inspections of the site, 2) measure the bay layout for conformance to installation specifications and 3) check the rack surface for planar/coplanar.

Visual inspection

- Clean Targets
- Check for cracks, delamination, scratches or other malformations of targets
- Make sure the wheel clamps upper and lower jaws meet at center
- Make sure the target mounting stub shaft is fully engaged with the clamp, no gaps
- Make sure the wheel clamp claws are firmly seated in the clamp
- Ensure the claws are not damaged, broken or bent in any way

Bay Check

You will be required to check camera and rack installation for conformance to specifications.

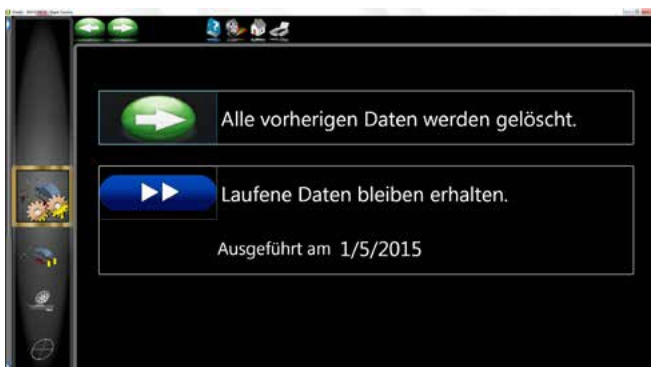
NOTE: Calibration of the Plausibility Target

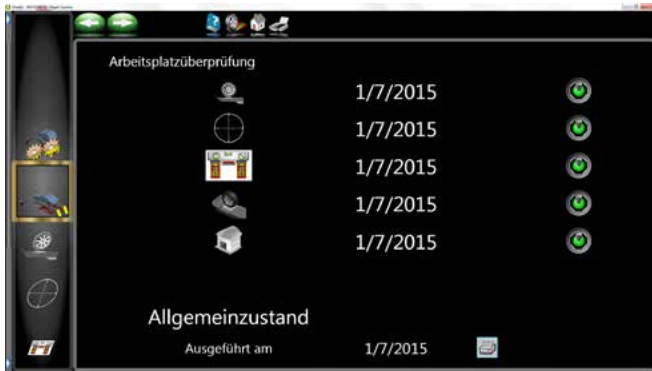
Before Bay Check can be performed, calibration of the Plausibility Target must be completed. Refer to page 9-122 of the Maintenance chapter for calibration instructions.

From the Main or Home screen, select “Calibration” from the Carousel bar. From the Calibration Menu select “Begin Bay Check”.



Select “Next” to continue.





Next a “Bay Check” Status page is displayed. The dates of the last check performed, if available, are shown.



Also available are switches that allow you to turn off or on the five levels of Bay Checks.

It is advised you perform all tests initially to qualify the Bay for use.

Select “Next” to proceed to tests.



Visual Inspection

You are required to perform a visual inspection of the alignment surface.

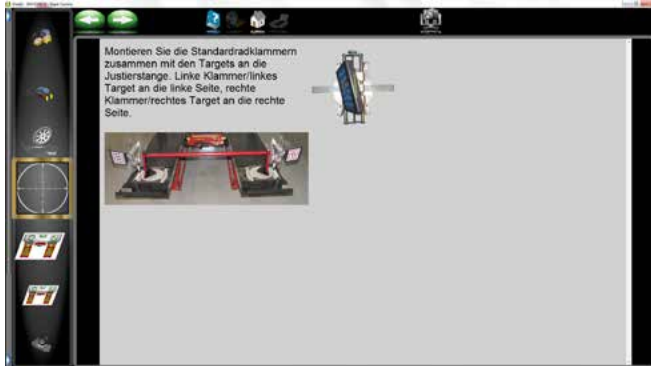


- Make sure the Turnplate surface, rollback spacer paddle and the rack runway are less than 1mm difference.
- Inspect the gap between the roll back spacer paddle and the rack saddle leading edges and make sure they are less than 4mm (.2 inches).
- Is the Height difference between all rack surfaces less than 1mm.

Select “Next” when inspections have been satisfactorily performed.



Select the type of wheel clamps to be used. Select the “Check” box to continue.



Visual Checks

- Inspect the targets for smudges and grime.
- Check targets for deformations and scratches.
- Inspect the wheel clamps and ensure the upper and lower clamp brackets meet equally in the center of the clamp assembly.
- Make sure each target to clamp connection is flush.
- Check that the wheel clamp grabber claws are firmly seated .
- Inspect the claws and ensure they are not damaged or broken.



Select “Next” to continue.

Single Bar Calibration

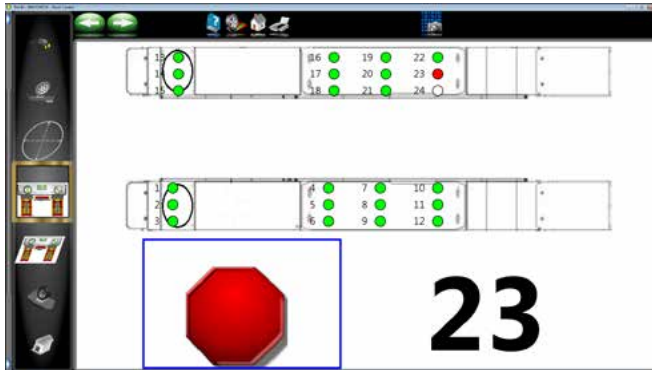
Next you must perform the “Single Bar Calibration” procedure.

This procedure requires the use of a Single Bar Calibration kit. Also gravity gauges must be attached as directed.

Follow the screens to complete the procedure.

NOTE: Do Not perform RCP or TID following Single Calibration as it will negate calibration values.

NOTE: Reference Form TEAK0305J25V for Single Bar Calibration details.



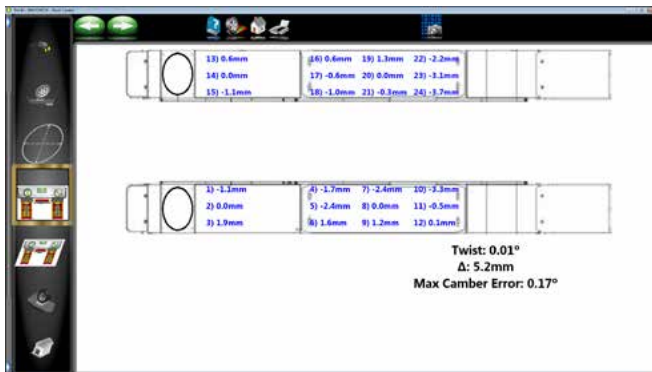
Rack Check

Next you will use the Plausibility target to measure certain points on the rack runways for “Planar/coplanar”).

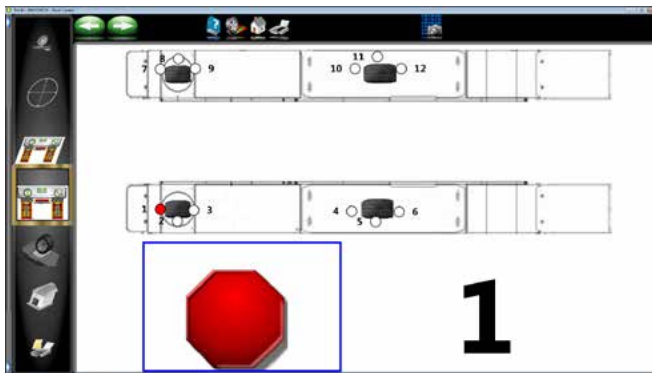


Follow the screen for required points for testing. The location to test will be “Red” and a “Stop Sign” will be displayed while that location is being determined.

When the location data has been successfully entered that location will turn green and the numeric display will show how many have been entered.



A total of 24 locations are required to proceed. The test results of each location are displayed numerically, also shown is the Twist, Total over-all change (Delta) and the Maximum Camber Error.



Make sure the turnplates and skidplates have locking pins in place.

Next place a vehicle on the rack. Follow the screen and make the measurements as directed on the screen

Three measurements per wheel are required.

Select Next to continue.

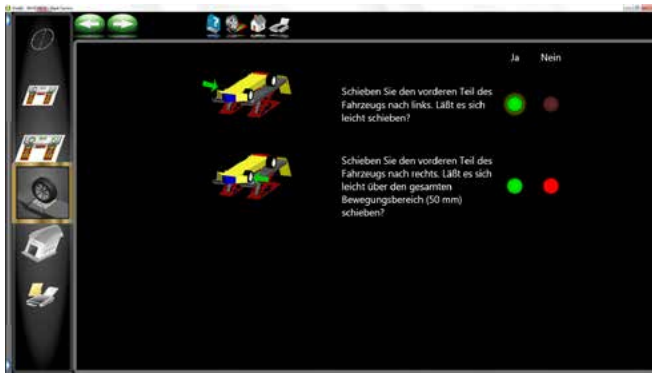


Loaded Turntable and Skidplate Checks

Place a vehicle on the rack if not already present. Locking Pins must be present when placing the vehicle.



Remove the locking pins from both turnplates and skidplates.



Push the front of the vehicle to the left and select if the movement was easy.

Push the front of the vehicle to the right, respond how easily it moved.



Push the rear of the vehicle to the left, did it move freely?

Push the vehicle to the right, did it move freely?



If all tests were successful and answered Yes then the tests will pass, if any were difficult the test will fail.



Alignment Environment

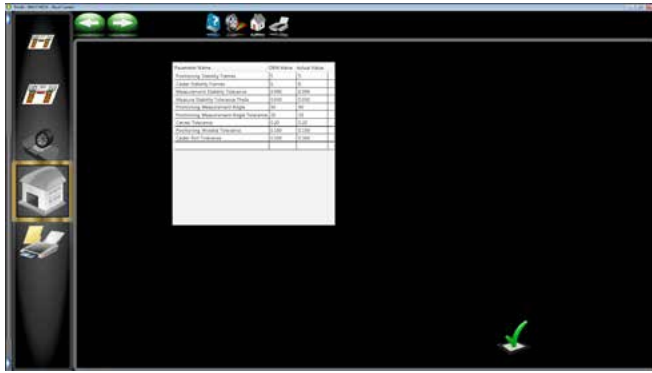
Check to make sure the alignment environment is free from heated air directly between the camera and targets.



Select Yes if it is clear.

Make sure the approach to the rack is straight onto the rack.

Select Yes if OK.



Results of the parameter tests are displayed



Enter the distance measured from the center of camera pod baseline to the turntable centerline.

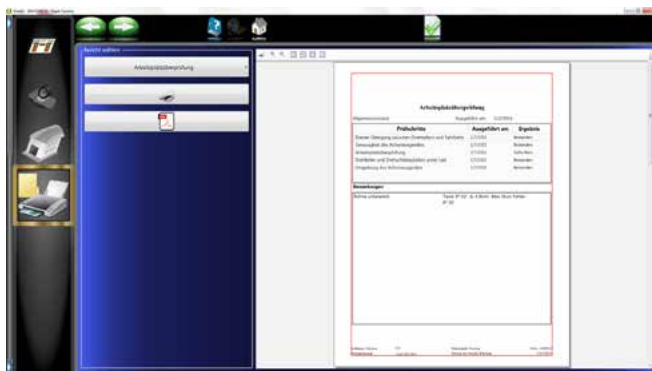
The values should be 85" to 113" (2159mm to 2870mm) with a preferred distance of 95" to 105" (2413mm to 2667).



Enter the distance measured across the center of both camera supports.

Distances can be from 100" to 110" (2540mm to 2794mm) with a preferred distance of 105" (2667mm).

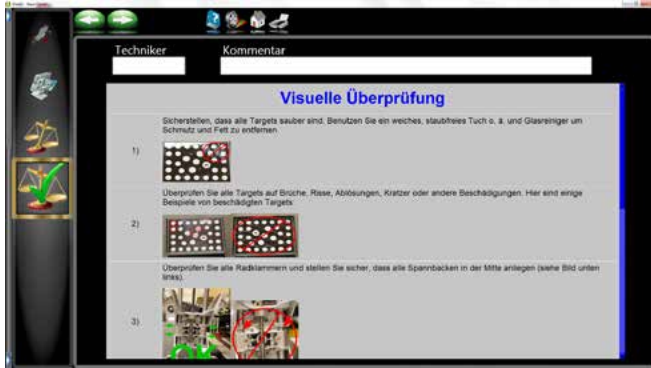
If the entered values for both measurements are within the accepted values the test will pass.



Bay Check Print Results

When all tests are complete, a print out of bay Check results can be saved or printed for review.





Calibration Check

From the Main screen select “Calibration Check” from the carousel bar.



Visual Checks

- Inspect the targets for smudges and grime.
- Check targets for deformations and scratches.
- Inspect the wheel clamps and ensure the upper and lower clamp brackets meet equally in the center of the clamp assembly.
- Make sure each target to clamp connection is flush.
- Check that the wheel clamp grabber claws are firmly seated .
- Inspect the claws and ensure they are not damaged or broken.

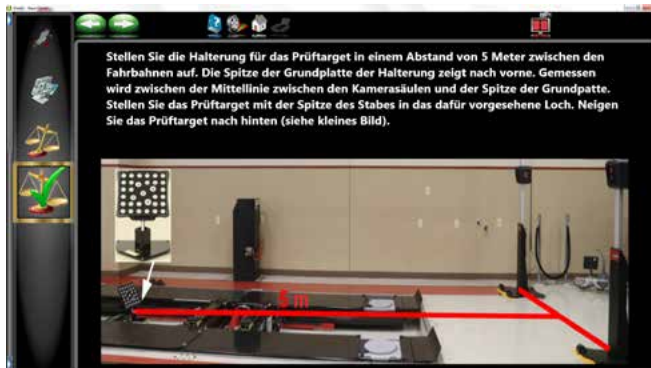
Select “Next” to continue.



Place the Plausibility Target in its calibration stand 5 meters from the center line of the cameras on the center line of the rack.

Click on Next when ready.

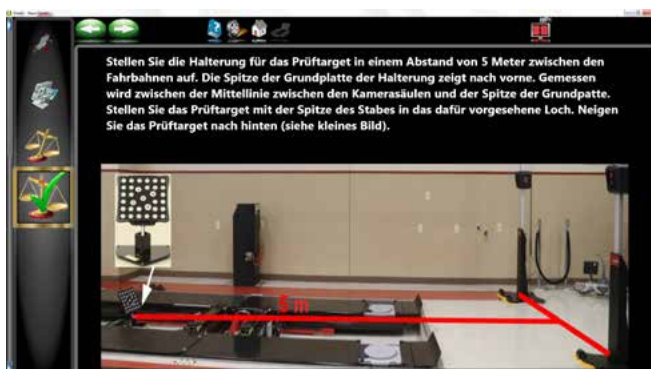
Wait while the data is being collected.



Move the Plausibility Target in its calibration stand 5,3 meters from the center line of the cameras on the center line of the rack.

Click on Next when ready.

Wait while the data is being collected.





Place the left front wheel clamp on left front turntable. Place the right front wheel clamp on right front turntable.

Place left rear clamp on left rear slip plate. Place right rear clamp on right rear slip plate.

Select Next when ready.

Please wait while data is collected.

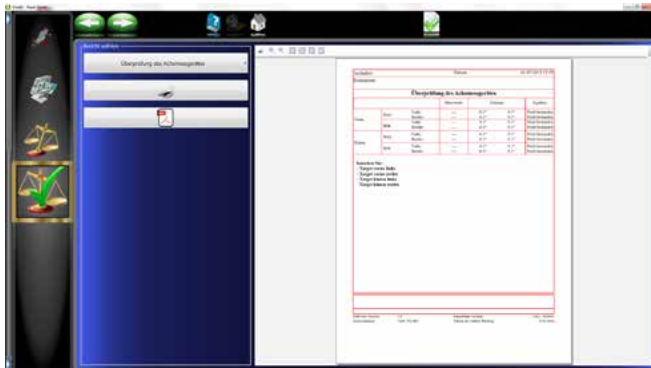


Switch left and right front clamps on the turnplates.

Switch the left and right rear clamps on the rack.

Select Next when ready.

Please wait while data is collected.



Once the data is collected it is saved with a printout of the results available.

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