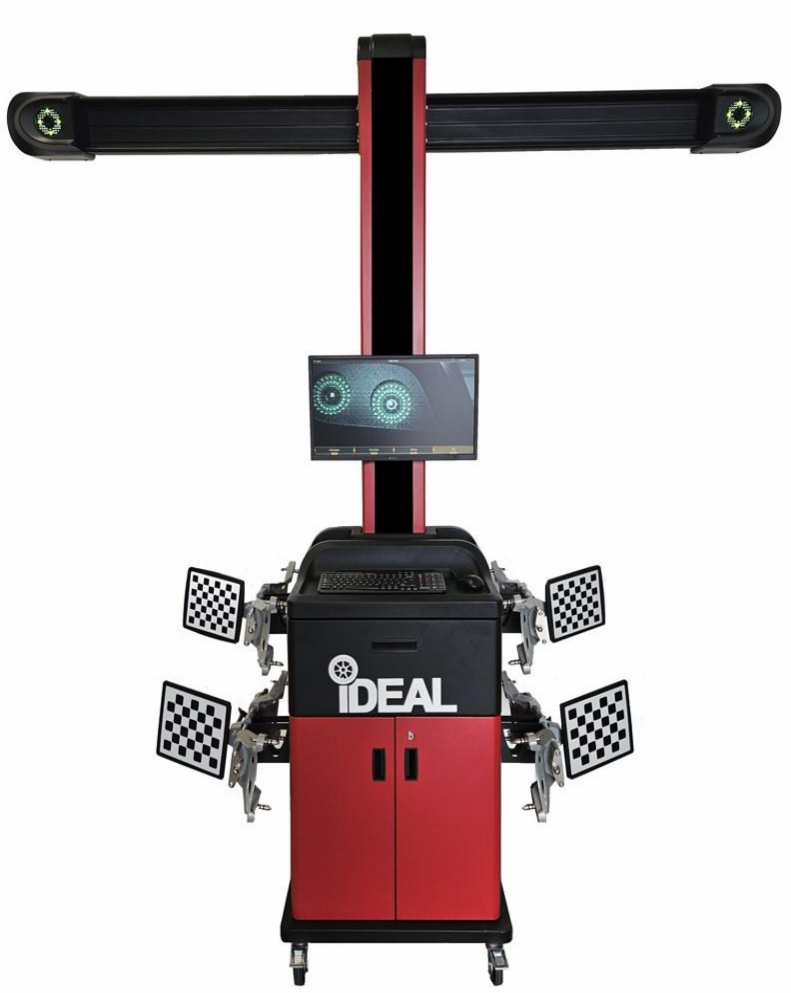
A Division of TUXEDO Distributors, LLC.

3D iPRO
IMAGE WHEEL ALIGNER
Operation Manual

IWA-60-2000T-K



By Techno Vector

iDEAL IWA-60-2000T-K

NOV 2023

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Introduction

Thank you for choosing the **iDEAL** 3D W**heel Aligner** from a wide scope of equipment that iDEAL provides.

This operating manual describes the **IWA-60-2000T-K** modification of the wheel aligner and provides information on safe and efficient ways of using it. The operating manual is considered to be an essential part of the wheel aligner and therefore must be kept safe near the aligner for future references.

This operating manual refers to the iDEAL wheel aligner as **an aligner** or **device**, if not specified otherwise.

This operating manual uses the following annotations and icons:

FL	**Front Left**
FR	**Front Right**
RL	**Rear Left**
RR	**Rear Right**
MT	**Measurement Targets**
RT	**Reference Targets**
Targets	**Measurement Targets**
	**Important information. Following it allows using the device safer and more efficiently. Not following it may cause injury or damage the equipment.**
	**Extra in-depth information and tips.**

A device technician must be instructed on basic safety and machine handling to work with the aligner.

This operating manual is applicable for version 1.11.23.3 of the software. If you have an earlier version of the software, some features that this manual describes may not be available. We recommend that you update the software to the latest version available.



Read this manual carefully before mounting, installing, using, or performing any maintenance over the aligner.



iDEAL accepts no liability for damage caused by ignoring these manual instructions or by the improper use of the device.



iDEAL reserves the right to modify the construction or function of the device this manual describes for commercial or technical purposes.

To get a short description of the wheel aligner operation please see the 'Quick Start' section.

Identifying your Aligner

There are several wheel aligner modifications that differ by their design, number of camera units, and number of targets and their placement. If you are unsure what type of the aligner you have, check the following:

iDEAL IWA-60-2000T-K 3D Passenger Car Aligner

- 2ea 3D Cameras - cameras are installed in front of the vehicle
- 4ea Targets & Wheel Clamps - one target for each wheel
- 1ea Mobile Cabinet & Camera Tower
- 1ea mini CPU
- 1ea Wireless Remote Controller
- 1ea Steering Wheel Holder
- 1ea Brake Depressor
- 1pr Wheel Chocks
- Most current Alignment Software Specs available at time of purchase

Quick Start. Wheel Aligners for Motor Cars - Modification 7212

Step 1. Turn on your computer and cameras.

Step 2. Start the iDEAL software on your desktop.

Controlling Your Wheel Aligner

Control your wheel aligner with F1, F2, F3, F4, Enter and arrow keys **(←↑↓→)**.

Create an Order

Step 3. Press F2 (Create Order).

Step 4. Enter the information about the vehicle and its owner.

Step 5. Select the vehicle model from the TechnoVector database.

Step 6. Review the illustrations.

Step 7. Review the specifications and check the tire pressure.

Installation of Targets, Compensation and Measurement

Step 8. Mount the targets onto the vehicle. Rotate the targets in the clamps in the direction shown on the screen.

Step 9. Press F2 (Next).

Step 10. Roll the vehicle backwards until the STOP sign appears on the screen. Stop.

Step 11. Roll the vehicle to the original position until the STOP sign appears on the screen. Stop.

Step 12. Unlock the turn tables.

Step 13. Apply the brake lock.

Step 14. Press F2 (Next).

Step 16. Turn the steering wheel to the **left** so that the gauge's indicator is in the green zone. Wait until the measurements are automatically taken.

Step 17. Turn the steering wheel to the **right** so that the gauge's indicator is in the green zone. Wait until the measurements are automatically taken.

Step 18. Set the steering wheel straight ahead. Wait until the measurement is automatically finished.

Report and Adjustment

Step 19. Review the report. If the vehicle needs to be adjusted, press F2 (Adjustment).

Step 20. Select a convenient display mode by pressing F2, F1 and **left/right** keys.

Step 21. Make adjustments using the data displayed on the screen.

Step 22. Repeat the measurement. To do that, return to the report mode by pressing F4 (Back). Then press F3 (Repeat Measurement).

Step 23. Print out the report if necessary. To do that, press F1 (Print) in the report mode.

Step 24. The report preview will be displayed on the screen. If necessary, you can customize it by pressing F3 (Customize Report).

Step 25. Print out the report.

Step 26. Finish your order by pressing F4.

1 Safety Requirements

	**Read this manual carefully before operating the device.**
	**When working with the aligner, follow general safety rules applied to equipment with 220V supply voltage.**
	**Working without grounding is forbidden!**
	**You must not use the aligner if the power supply cable is damaged.**
	**When assembling the aligner at its workplace or when using or calibrating it, you must use a grounding socket. Neutral point in any alternating current systems must be grounded.**
	**Do not use the aligner if it is disassembled, with protective covers and housings removed.**
	**Do not use the aligner in damp locations or if the floor is wet.**
	**Do not remove or replace safety locks.** **Do not connect or disconnect electric circuits of the aligner when it is connected to the power supply.**
	**The power button must be off when transporting and storing the device.**

1.1 Obligations and Liability

The wheel aligner has been designed in compliance with general safety and accident prevention rules.

The device manufacturer guaranties the device safety if it is used in comply with the IEC 61010-1-2014 standard.

A technician (wheel aligner operator) must:

– Read this manual carefully, learn how the aligner and its parts function.
– Be trained to operate the aligner.
– Be trained or have experience in working with electric equipment. Be aware of general electric safety rules and follow them.
– Be aware of the basic workspace safety rules and follow them.



The device manufacturer accepts no liability for injuries or property damage caused by improper use of the device or ignoring the safety requirements.

1.2 User Training

Technicians who operate the aligner must:

– Read the operating manual, in particular the *Safety requirements* section.
– Have basic training in operating the electric equipment and machines, be aware of hazards and safety requirements on working with electric equipment.

1.3 Safety Measures

– Operate the device only if the device and all its parts are fully functional and intact.
– Check the device for visible damage regularly.
– Check power cords for damage.

1.3.1 Transporting and Assembling the Device:

– To move the device, always use the lifting and transportation devices, for example, a fork lift. The lift must have capacity sufficient to handle the device (with its package).

– Make sure that your power source meets the power source requirements of the device. You can find the requirements in the *2.2 Specifications* section of this manual or on the identification plate of the device itself.

– The wheel aligner must be grounded according the OSHA Standard, 29 CFR 1926 Subpart K, Electrical, or other applicable electrical safety regulations adopted in your location.

– When assembling the device, connect the PC only when the device is disconnected from the power source.

1.3.2 Operating the Device:

– Only technicians that have the required experience or training and who have studied this operating manual carefully are allowed to operate the device.

– Make sure that the working environment meets the required conditions. For instance, the temperature must fit the –40°C - +40°C range.

– The working environment must be covered from precipitation.

– When operating the device, make sure that that power cords are not bent, intertwined, or damaged.

1.3.3 Maintenance and Repair:

– Before performing any maintenance over the device, always disconnect the device from the power source line first.

– Perform the device maintenance regularly, at the intervals that the *Maintenance* section of this operating manual specifies.

– If you detect any fault in the device operation or in its parts, contact the technical service to have the faults eliminated.

1.3.4 Keeping the Working Area and the Device Clean:

– Keep the area around the device dry and clean. Cover the device from precipitation.

– Keep the working area well-lit.

– Do not clean the device or its parts with a water jet or compressed air.

– Keep the camera lens and the camera's area of view away from direct sunlight.

– To clean the dust from the lens, use a lint-free cloth or a lens brush.

1.3.5 In Case of an Emergency:

– Disconnect the device from the power source line.

– Proceed with the safety instructions adopted in your company or in your location.

1.3.6 If the Safety Requirements are NOT Complied with:

Not following the safety requirements may result in electric shock or injury and/or equipment damage.

2 General Description of the Aligner

iDEAL / Techno Vector 7212 wheel aligners are based on the machine's vision system. They include cameras and high-precision image targets.

The wheel aligner software processes images received from cameras and determines the target position in space with high precision. Then it uses the target positions to measure wheel angle parameters. 3D technologies provide convenience, high-speed operation, and accuracy of measurements.

The software has a user-friendly interface; 3D models and prompt messages on the screen will give you a clear idea about the current operation.

The wheel aligner can be calibrated to detect any faults in its measurements and adjust its measurement capacity accordingly. We recommend that you perform the full calibration procedure of the wheel aligner semiannually. We also recommend that you perform the calibration each time the temperature in the working area lowers or rises 8-10°C.

If the wheel aligner has been hit or dropped or got any other type of damage that could have deformed its elements, perform the full calibration.

2.1 Intended Use

The diagnostic device based on a computer-aided system of measurement processing and displaying is designed to check wheel alignment parameters in any types of vehicles that meet the following requirements:

Wheel rim diameter:	**12–24”**
Wheelbase:[1]	**Up to 4 m / 13’**

The device allows checking the following wheel alignment parameters shown in the table below:

Front axle	Camber; Total toe; Caster; SAI/KPI; Front wheel turning angles; Lock angle.
Rear axle	Camber; Total toe; Individual toe;
Symmetry angles	Front set back;

[1] The actual wheelbase dimensions that the device can measure depend on the camera mounting height and the distance between the cameras and the front turntables and can vary slightly.

	Rear set back; Thrust angle; Geometrical driving axis.

2.2 Specifications

The measurement parameters of the device are shown in the table below.

Parameter	Measurement Range	Maximum Error in Measurement	Average Error in Measurement
Front Wheel Alignment			
Camber	±8º	±3'	±2'
Front total toe	±5º	±3'	±2'
Caster	±19º	±8'	±5'
SAI/KPI	±19º	±8'	±5'
Lock angle	±45º	±10'	±5'
Rear Wheel Alignment			
Camber	±8º	±3'	±2'
Rear total toe	±5º	±3'	±2'
Rear individual toe	±2.5º	±3'	±2'
Symmetry Angles			
Front set back	±2.5º	±3'	±2'
Rear set back	±2.5º	±3'	±2'
Thrust angle	±2.5º	±3'	±2'
Geometrical driving axis	±2.5º	±3'	±2'

Parameter	Value
Power supply requirements: Voltage, V Frequency, Hz	 220±10% 50±1
Power consumption, W	350
Wheel rim diameter, ”	12–24
Wheel base length, m	4
Operating temperature range, °C Humidity, % Atmospheric pressure, mmHg	+10–+35 80–85 630–795

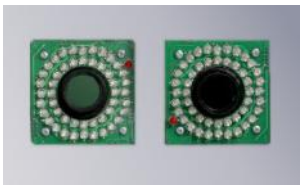
The device can be operated 48 hours continuously, complying with its specifications is guaranteed.

2.3 Scope of Supply

The table below shows the major components of the wheel aligner. For the full scope of supply, please see *Appendix 1*.[1]

Table 2.1 – Wheel aligner components

Video cameras



The main element of the wheel aligner's machine vision system is video cameras equipped with LEDs and IR light filters.

Depending on the configuration, the TechnoVector wheel aligners can be equipped with 2 or 4 cameras.

Mounting system for video cameras

Depending on the wheel aligner modification, the following camera mounting systems are available:

- Pillars. Can be both stationary and mobile;
- T-shaped pillar. May be equipped with a rotation beam;
- Wall-mounted beam;
- T-shaped pillars mounted onto the computer cabinet.

The dimensions and design of the mounting systems vary depending on the wheel aligner modification and function (lift or floor or repair pit).

Camera beam

Cameras mounted onto beam can monitor vehicles on any lift height.

Computer cabinet

The computer cabinet stores the wheel aligner's PC, power unit, and its tools and accessories:

1 Remote control

2 Control panel

3 Drawer for keyboard and printer (printer is not supplied)

4 Cabinet with PC system unit and power unit

5 Monitor

6 Mouse

7 Speakers

8 Holders for wheel adapters

[1] Wheel aligner components design is subject to change by the manufacturer. Which components are supplied with the wheel aligner may vary depending on the wheel aligner modification. The information in this section is for the reference purpose only.

Measurement targets



Measurement targets are flat boards with high-precision pattern. You attach the targets to wheel adapters (clamps) with a pivot pin and then mount them onto wheels.

The number of targets that are supplied with the wheel aligner, their dimensions and pattern orientation depend on the wheel aligner modification.

By default, your wheel aligner modification is supplied with 4 targets.

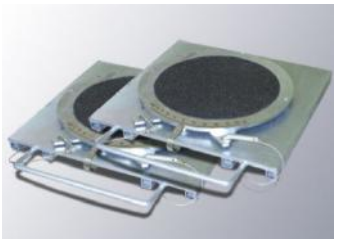
Wheel adapters (clamps)



Wheel adapters (clamps) are tools that you use to mount targets onto wheels.

Wheel adapters design may vary depending on the wheel aligner version and modification.

Front Turntables



Front turn tables are used to unload the front (steerable) wheels of a vehicle during the measurements. If your front turn tables are equipped with a turn scale, you can also use them to estimate the lock angle.

Steering wheel holder



Use the steering wheel holder to lock the steering wheel position while making adjustments.

Brake lock



Use the brake lock to keep the brake pedal pressed while measuring caster and SAI/KPI and while performing the adjustments.

2.1 Wheel Aligner Serial Number

Serial number plate

Serial (factory) number of the product is stamped on the table on the rear of the system unit. It is also stated in the product certificate.



Provide this number when you call the service department. This will considerably reduce request processing time.

2.2 Operating Principle

iDEAL wheel aligners implement a machine vision system and base their operation on it. The system includes a set of cameras and high-precision targets. The targets are mounted onto vehicle wheels. The wheel aligner software processes the camera feed, detects the targets and estimates the wheel position based on the target position. This kind of 3D technologies provide convenience, high-speed operation, and accuracy of measurements.

To increase the operation speed, the software implements the target position prediction when processing the camera feed. Only the frame regions that contain the target image are sent from cameras to the processing software. If the target is not found, the software will request a larger region. If the target is not found again, the software will request the full frame. This allows restoring the shooting and processing quicky after a target is temporary lost.

To detect any faults in wheel aligner's measurements and adjust its capacity accordingly, the wheel aligner can be calibrated. Typically, you calibrate the wheel aligner before putting it into operation and then on regular basis (see the *Maintenance* section below).

2.3 Software Structure

The aligner's software is using Microsoft Windows as an operating system. The workflow can be broken down into the following sections:

Order Management	Register an order, search, and select vehicle model, check the specifications and illustrations for a selected model;
Measurement	Perform the necessary measurements;
Report	Review the measurement results. Print them out;
Adjustment	Adjust the vehicle's parameters, monitoring actual values on the screen

3 Using the Wheel Aligner

3.1 Preparation

Connect the power supply cord to the socket.

Check the front surface of the targets and camera lenses visually. If there is dirt, clean them (see the section Maintenance for details).

3.2 Switching On

Press the buttons on the rear of the computer cabinet in order to turn on the computer and cameras. Press the power button on the computer. Wait until Windows is loaded.

Start the Vector software clicking on the desktop shortcut.

The loading screen is displayed while the software is being loaded. After the Vector software is loaded, the main menu is displayed on the screen.

3.3 TechnoVector / iDEAL Software Basics

3.3.1 Interface Basics

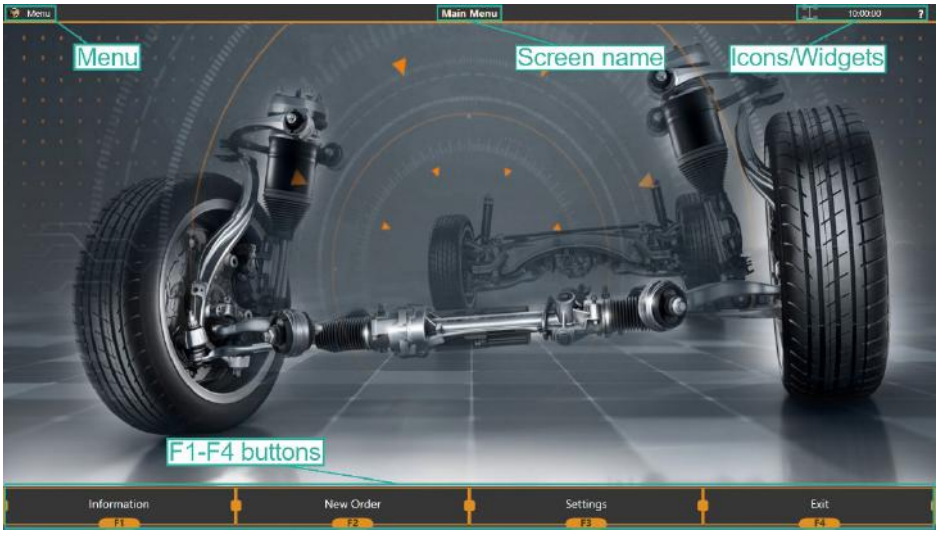


Figure 3.1 – The overall view of the software interface

At the bottom of the screen there are **control buttons**. By pressing them you can perform all basic operations with the aligner. You can use your mouse, keyboard or the TechnoVector remote control to press these buttons (**F1**, **F2**, **F3**, **F4**).

At the top of the screen there is a title bar that includes the current **Screen name,** a **Menu button**, and an **Icon/Widget area**.

By clicking on the Menu **button**, you can access additional actions. The list of actions depends on the current active screen.

The contents of an **Icon/Widget** area depend on an aligner's model, current screen and/or additional selections made by the user.

If the wheel aligner's calibration was not performed or was performed incompletely, there

will be an additional disclaimer displayed on the screen in the main menu.

The software will not allow to proceed to make any measurements or adjustments unless the full calibration is performed (or restored from back up).

3.3.2 Widget List



View current order info. Available during the Measurement and Adjustment. Allows viewing and editing the current order. For example, you can update the owner's name or the mileage or add a comment to the order.



View current vehicle model info. Available during the Measurement and Adjustment. Allows viewing current vehicle model specifications and instructions on how to load the vehicle or perform the toe/camber adjustment, if any are available in the database.



View and edit photos attached to the order. Allows attaching a vehicle photo to the current order. You can get the photo from a web camera feed if any is connected to the aligner or upload a photo from a file.



Target status. To learn more about available statuses, see the *3.3.3 Target status icon* section below.



Clock



Help. You can use it to start collecting dump data of the software, go to our website, or request a remote assistance.



Extended adjustment. To learn more about available extended adjustment modes, see the *3.11.1 Extended measurement modes* section of this operating manual.



The wheel aligner is connected to the iDEAL web service.



Camera beam movement controls

3.3.3 Target Status Icon

The target status indicator looks like a vehicle chassis icon and is located in the upper right-hand corner of the screen, near the clock. Depending on an amount of targets the wheel aligner has to track, it can contain 4 or more indicators of a target status.



4 target tracking

When a camera is shooting frames, the wheel that corresponds to the target it is tracking will change its color.

Indicator state	Description
Red, not blinking;	The camera does not respond to requests or is not connected;
Red, blinking;	The target is not recognized in the frame;
Yellow, blinking;	The target is found but is not stable, i.e., there are fluctuations in the target position in space;
Green, blinking;	The target is found and is stable
Gray, not blinking.	The camera is connected but is not currently in use;

In any software mode clicking the Chassis icon will open the camera diagnostics window that looks as follows.

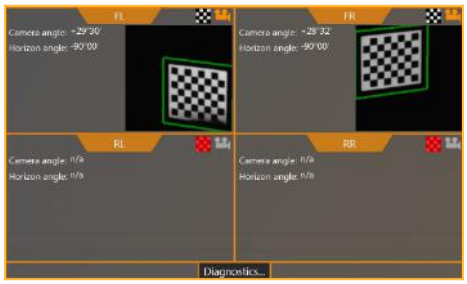


Figure 3.2 – Camera diagnostics

In this window you can see images from active cameras, get information about a current angle to camera, horizon, or switch to diagnostics by pressing *Diagnostics ….*

The camera diagnostics window appears automatically if the camera currently in use cannot find the target. As soon as the target is found, the camera diagnostics window will disappear from the screen[1].

If the diagnostics window was opened by pressing on the chassis icon, it will not disappear from the screen automatically when the target is found. To close it, press on the chassis icon again.

3.3.4 Navigation Basics

You can navigate through various screens of the software using **F1, F2, F3, F4** buttons.

All the basic actions necessary to perform a measurement are streamlined in a linear sequence.

As a rule, in order to go "forward" press **F2**, to go "backward" press **F4**.

The buttons can become disabled, if the progression is currently impossible (e.g., the button is inaccessible in the measurement until the steering wheel is in the required position).

3.3.5 Workflow when using iDEAL wheel aligners



Figure 3.3 – Using wheel aligner workflow

Below you can check a short description of actions performed in each part of the flowchart.

Order & Setup

1. Create an order, fill in the data necessary;
2. Select a car model from the database;
3. Make yourself acquainted with the vehicle specifications and supplementary information provided in the images section;
4. Check vehicle's tire pressure;
5. Prepare the vehicle;
6. Set up clamps with targets onto the vehicle's wheels;

Measurement

1. Perform compensation;
2. Perform the initial measurement;
3. Perform caster measurement;
4. Center the steering wheel;

[1] This option can be disabled in the software's settings

5. Perform steering wheel straight position measurement[1];

Initial Report

1. Review the measurement results;
2. If necessary, proceed to adjustment, or just print the report and finish the order;
3. Adjustment
4. Perform the vehicle's adjustment;
5. Return to the report;
6. Repeat the measurement to fill the second column of the report[2];

Final Report

1. Review the final results;
2. Print the report if necessary;
3. Finish the order;

3.4 Creating an Order

To place an order, press **F2 (Create Order)** in the Main Menu. The software will proceed to the Order Registration screen. Fill in all the information you need to identify the order.

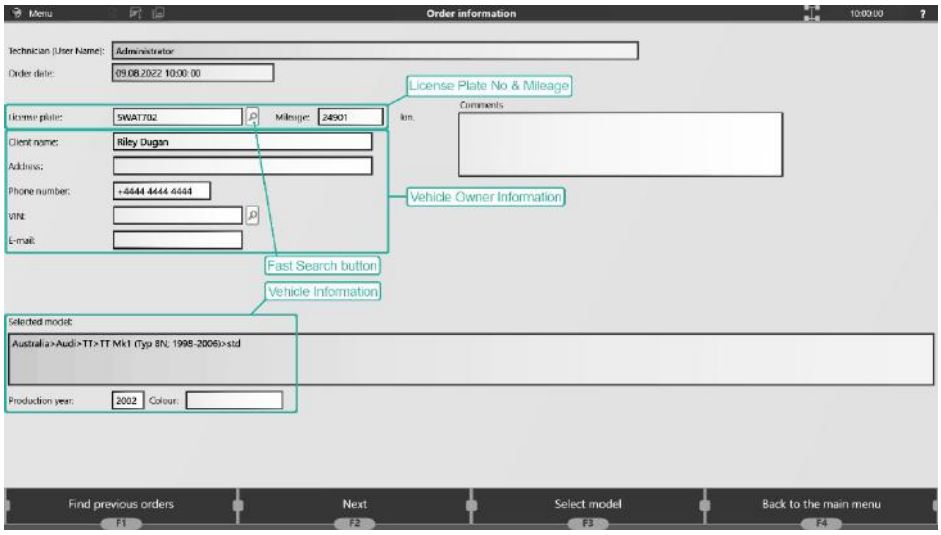


Figure 3.4 – Create Order form

The software allows entering the following data. In the table, required fields are marked with an asterisk (*). If no data is available, you can enter "---".

License Plate No*	Vehicle's license plate. If the vehicle is already registered in the wheel aligner data base (a returning client), you can press to fill the rest of the fields using the existing data automatically.
Mileage*	Total mileage of the vehicle at the time of the adjustment.
Client Name*	Vehicle owner's name.

[1] If selected in software's settings

[2] The second column can be populated automatically with data from the adjustment screen if enabled in the software's settings. When adjusting **Caster,** we specifically recommend repeating the measurement, as the data displayed during the adjustment is preliminary;

Address	Vehicle owner's address.
Phone Number	Vehicle owner's phone number.
VIN	VIN code of the vehicle. If you have a VIN scanner connected to your wheel aligner, you can fill the field by scanning the code. In addition, you can press  to find the appropriate vehicle model by the specified VIN and fill the **Selected model** field automatically. If there are several vehicle models that match the specified VIN, select the appropriate model from the list.
E-mail	Vehicle owner's e-mail address. This address is required if you intend the software to send your client an e-mail with the adjustment report. If the client has the ReportViewer application installed on their mobile device, specify the e-mail address of the client's ReportViewer account. After the order is complete, the software will send the report to the appropriate ReportViewer account automatically.
Chosen model	The model's name in the database. To select a model, press F3 (Select model). To learn how to choose a vehicle model, see section *3.5 Selecting a vehicle model*.
Year of manufacture	Vehicle's year of manufacture.
Color	Vehicle's color.
Comments	If needed, you can add a free-form comment to the order. If needed, you can also add comments after performing measurements. For example, you may want to comment on any vehicle issues you have encountered during the measurement.

To navigate between order form's fields, you can press **Tab** on the keyboard.

You can configure the software to allow skipping entering the client data. To do this, on the **Settings > Interface** screen, clear the **Require correct data when registering an order** check box.

If you have a VIN-code scanner connected to your wheel aligner, when you scan a new VIN, an appropriate new order with the scanned VIN will be registered automatically. In this case, the vehicle model will be specified by the VIN.

Instead of filling in the information for a returning client, you can find a previous order and use all the information from it:

1. Press F1 (Find Client)
2. On the resulting screen, you can narrow the search by specifying the search criteria: Lic Plate, Client Name, Model Name.
3. You can also narrow the search by specifying the date range.

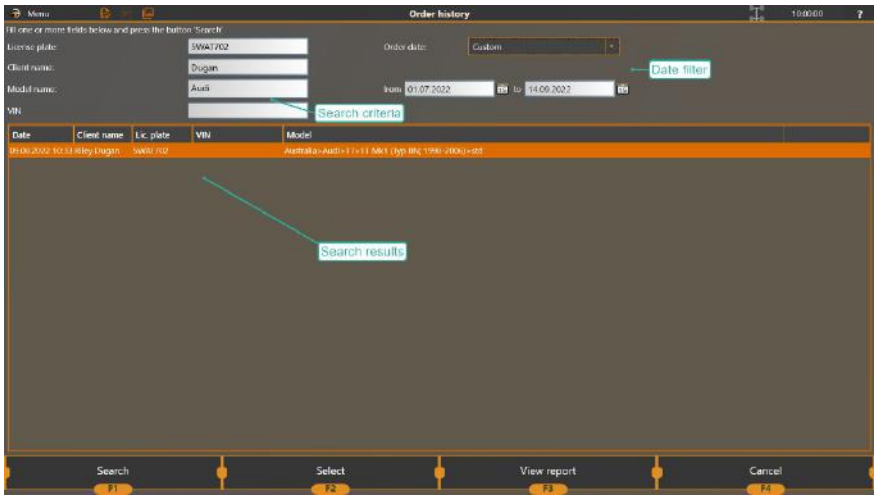
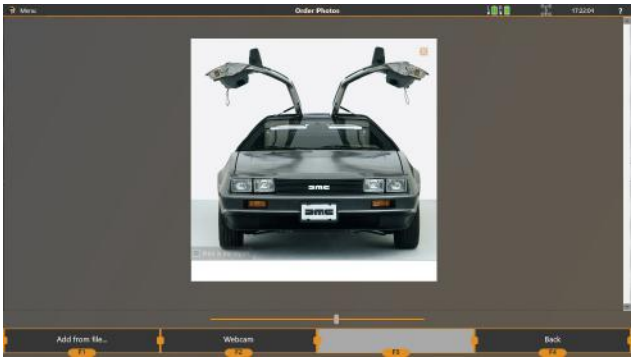


Figure 3.5 – Find Client screen

4. Press the F1 (Search). The software will show all the existing orders that match the specified search criteria.
5. Select an appropriate line in the Search Results lists.
6. To preview the selected order, press F3 (View Report). To close the order preview and return to the search results, press F4 (Cancel).
7. To copy data from the selected order to your new order, press F2 (Choose).

To attach a vehicle photo to the order, click . You can get the photo from the webcam feed (if you have one connected) or you can upload a photo from a file.



To proceed with order registration, press F2 (Continue) or F3 (Select model) to select the vehicle model that is being measured[1].

3.5 Selecting a Vehicle Model

Selecting a model from the database determines the specifications: value ranges for each parameter that is measured by the aligner. Selecting a correct model is **essential** in wheel aligners' operation. To select a model, the user navigates a tree-view that consists of several root folders:

iDEAL Database	Contains most of the modern vehicle's models (more than 42000 model entries in the database). This is the most commonly used folder.
Recently Used Models	A list of 20 recently used vehicle models. This is useful when the aligner is situated at a workshop with a limited amount of vehicle models (such as a single-brand dealer's workshop).
Custom Models	Allows the user to create and use previously created custom entries with custom specification values. This is useful, when adjusting a vehicle that

[1] If the model is already selected, F2 Continue proceeds to the Image View screen

	is not present in the database.



Figure 3.6 – Selecting a model

To select a model, navigate the folders in the tree, narrowing down the selection and reaching the leaf of a tree (marked with a 'document' icon). You can navigate the tree using arrows and the enter key on the keyboard, remote control or using a mouse by double clicking the folder to open or close it. You can also iterate through all the subfolders with names starting with a certain letter. To do that press a corresponding letter key on the keyboard.

All the folders and models listed in the database are sorted alphabetically[1].

When the desired model is selected, press **Enter**, double-click, or press F2. Choose to return to the Order Registration screen.

You can search models in the TechnoVector database by text. To do that, press F1 Find button. The software will proceed to the Find Model screen, where you can type in the vehicle's model name and the software will display all matching entries in the database. The software looks for inclusion of all the words listed in the search field, so you can narrow down the search by typing more words into the text field.

For example, when looking for a certain model, you can limit the search to the Autodata folder by typing Autodata:

Or you can narrow down the search to a specific text:

When the folder or model you wanted to find is selected, press F2 to return to the Model Selection screen.

If you have selected a folder, the tree will automatically navigate to this folder and after that you'll need to navigate further and select the appropriate model entry.

If you have selected a model, the model entry will be selected, and you need to confirm the selection when returning to the Model Selection screen.

3.6 Reviewing and Checking the Vehicle's Documentation and Specifications

After creating an order and selecting the vehicle's model, you can review and clarify the vehicle specifications, including:

– Specifying the vehicle ride height to select a proper specification table;

[1] A very common reason of not finding a model during the model selection is model naming. In different countries same car models can be sold using different brand names. Different model names are listed one after the other, and the position of the entry in the list is determined by the first model's name. If the model is not found – try searching using the Find Model screen.

– Reviewing model information, for instance, instructions on how to measure and adjust the vehicle's wheel alignment;
– Reviewing vehicle specifications;
– Reviewing tyre pressure.

3.6.1 Ride Height

Some vehicle models, typically, the ones by Mercedes, Audi and other German manufacturers, have a set of specifications tables. To select the table appropriate for your vehicle, you have to specify the vehicle's ride height. To do this, you may have to measure various parameters, for example, front transverse link or rear drive shaft.

Review the instructions on the Ride height screen, measure the parameters and input the values:

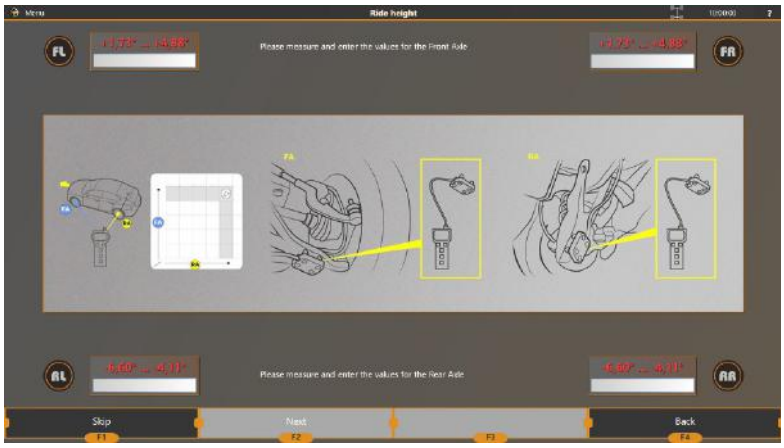


Figure 3.7 – Getting the ride height

This screen is only available if the **F3 (Settings) > Interface > Input ride height instead of a table selection** option is enabled. Otherwise, you have to select values from a table (see *3.6.2 Model information* below).

Follow the instructions on the screen to measure the required parameters and input the values.

Press **F2 (Next)** to proceed.

Otherwise, you can press **F1 (Skip)** and specify the ride height by selecting one of predefined values on the **Model Information** screen.

3.6.2 Model Information

On the **Model Information** screen, you can review all selected vehicle model data available in the wheel aligner database. For example, schemes demonstrating the methods of toe and castor adjustments, vehicle loading schemes, or any other extra information related to the wheel alignment.

Select an entry from the list at the bottom of the screen to view it in details:

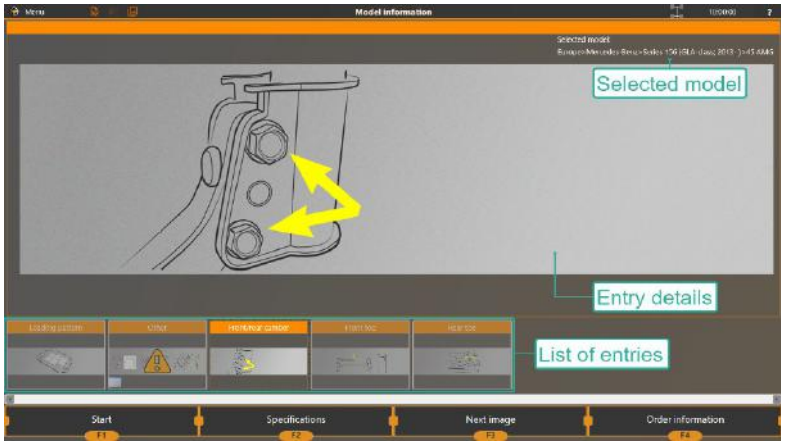


Figure 3.8 – Viewing images attached to the selected vehicle model

For some vehicle models, you may need to clarify one or several parameters, for example, ride height or wheel diameter, to get a proper entry from the vehicle's specifications table. Typically, such entries are marked with the icon:

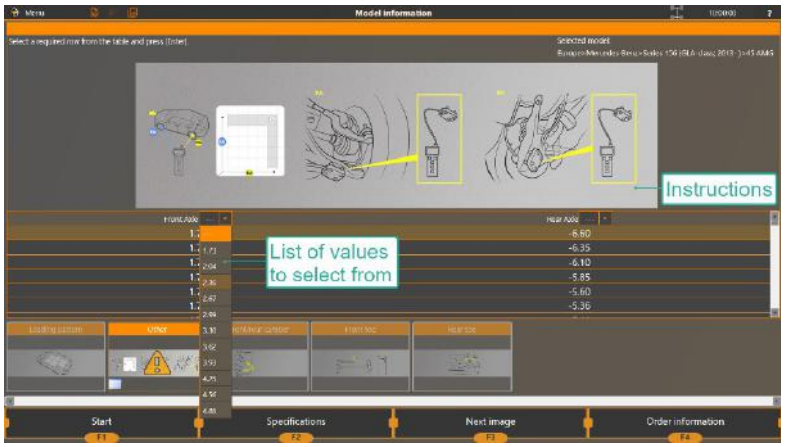


Figure 3.9 – Selecting tables assigned to the selected vehicle model

You can enter the ride height manually instead of selecting it from the table if the wheel aligner is configured accordingly. See above.

You can always review this information any time during the measurements and adjustment, by clicking at the top left corner of the screen.

3.6.3 Specification View

On the **Specifications View** screen, you can review the ranges of wheel alignment values specified by the vehicle manufacturer. The actual wheel alignment values must fit the specified ranges for the vehicle to function correctly:



Figure 3.10 – Viewing selected model specifications

3.6.4 Tire Pressure

For many vehicles, the tire pressure can vary depending on the modification and tire size. Review the expected tire pressure values on the **Tire Pressure** screen and make sure that the actual tire pressure of each vehicle's wheel is set correctly before you proceed.

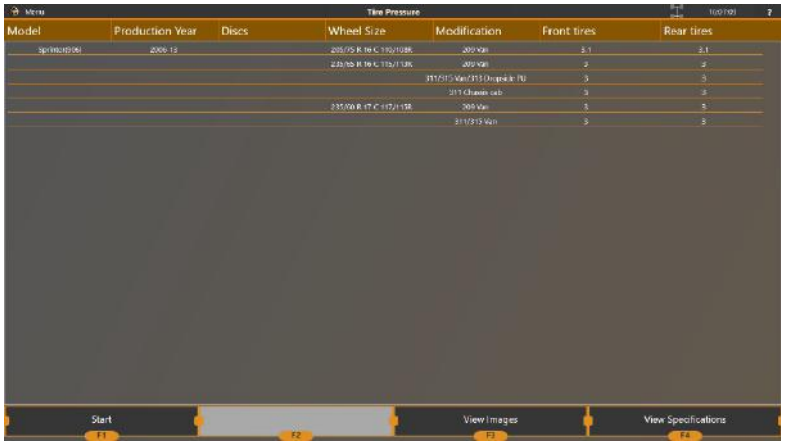


Figure 3.11 – Checking the tyre pressure

3.7 Preparing the Vehicle

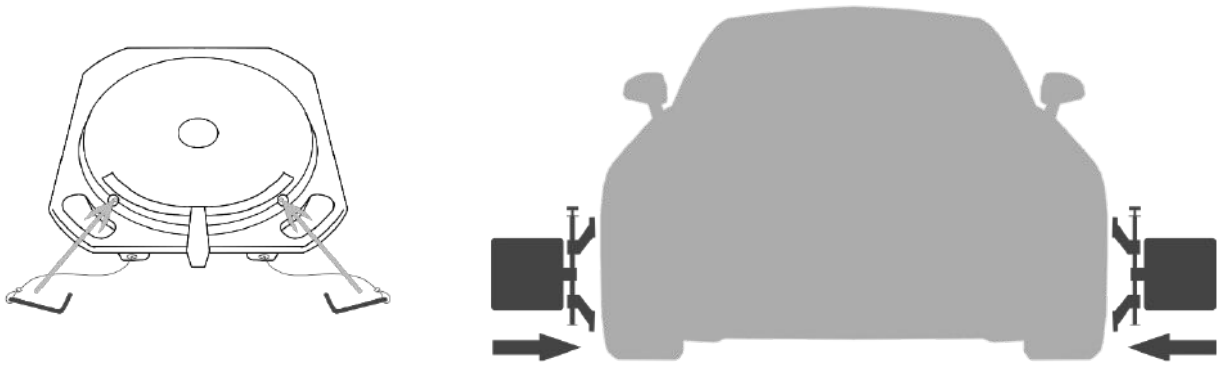


Figure 3.12 – Locking the turnable pins and mounting the wheel clamps

- Block the front turn tables with locking pins;
- Roll or drive the vehicle onto the workplace. Try to avoid big turns of the steering wheel as this may leave residual tension in the suspension of the vehicle;
- The vehicle's front wheels must reside at the center of the turn tables;
- Set wheel blockers to prevent the vehicle from rolling backwards if needed;
- Check all the vehicle's suspension elements meticulously. The suspension should be in a good working order before making a measurement;
- Make sure the tire pressure is within the vehicle's recommended specifications;
- Mount wheel adapters with targets onto wheel rims. To increase/decrease the adapter's designated wheel size, rotate the tension screw of the clamp to move apart two-shoulder consoles;
- To fasten the clamp to the inner side of the rim, attach the clamp to the wheel with two claws (upper or lower). Rotate the tension screw to bring the other pair of claws to the attaching point and lock the clamp to the wheel;
- Make sure that all the clamps are securely attached;
- Make sure that the targets and/or portable camera units (if present) are inserted into the clamp completely (as far as it can go);

3.8 Runout Compensation

To make the measurements more reliable, the position of each target relative to the wheel center must be determined. To do this, a procedure called **Runout compensation** (or just **compensation**) is performed. There are the following compensation modes:

- **Rolling.** You will have to roll the entire vehicle backwards and forwards. This compensation mode is the most commonly used.
- **Rolling extended.** This compensation mode is similar to the ordinary rolling compensation. Use it if the diameter of front and rear vehicle's wheels is not the same.
- **Forward.** You will have to roll the entire vehicle forwards only.
- **Jacking.** You will have to lift the vehicle wheels (one by one, one axle at a time, or all simultaneously) and rotate each of them backwards and forwards.



Compensation is compulsory. It allows adjusting measurement errors that can occur if wheel adapters are mounted incorrectly or if rims are deformed.

Though the software allows skipping the compensation, we strongly recommend that you always perform it. Otherwise, the wheel aligner precision may be compromised.

After you finish examining the vehicle specification and checking the tire pressure, to start the compensation, press F1 (Start).

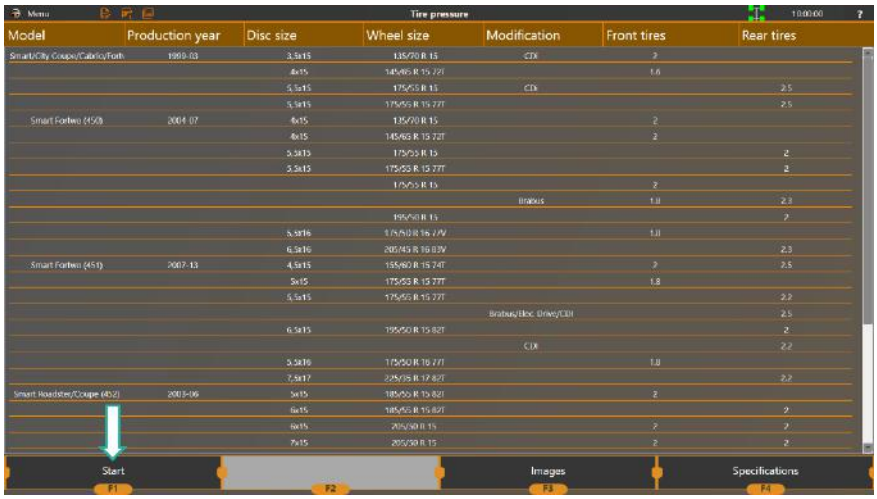


Figure 3.13 – Starting the disk runout compensation

Which compensation mode is enabled by default is specified by the wheel aligner settings. See section *3.13.1 Settings > Main*.

To switch the compensation mode manually, press **F1 (Change compensation mode)**, select the compensation mode in the resulting list and press **F2 (Select)**.

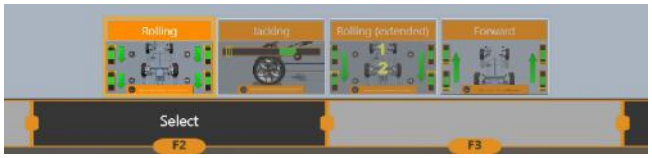


Figure 3.14 – Selecting the compensation mode

3.8.1 Rolling Runout Compensation

Perform the rolling compensation on a *flat surface only*!

Never perform the rolling compensation for a vehicle with large deviations of wheel alignment angles.

When rolling a wheel with an oval or low-profile tire, the lower edge of the wheel adapter can bump into the floor. To avoid this, set the initial position of the clams so that it wouldn't happen during the roll.

1. Apply the steering wheel lock.
1. Mount adapters onto the wheels and rotate the targets clock-wise or counter-clock-wise according the arrows that the software shows on the screen. Monitor the target status by appropriate indicators.

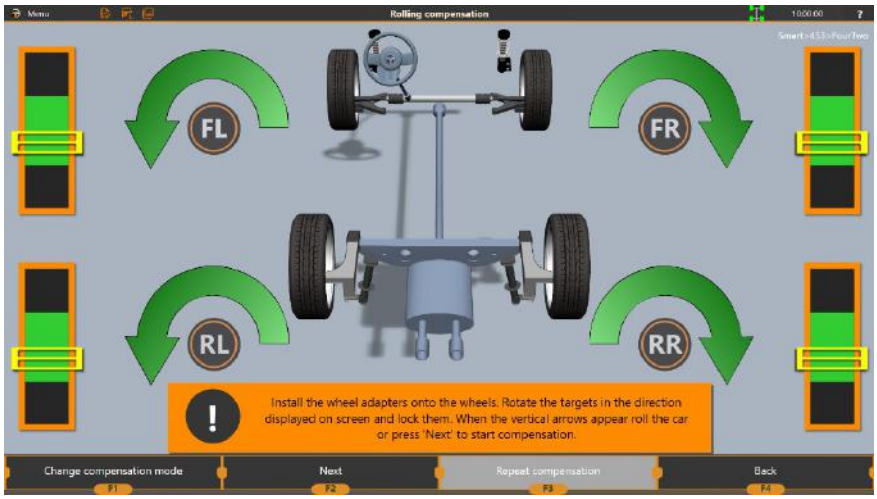


Figure 3.15 – Positioning the targets upon stating the rolling compensation

2. When all targets take the correct position, make sure that they are firmly fixed in their wheel adapter's socket.

3. Press **F2 (Next)** to proceed. If the *Main > Automatic rolling compensation transition* setting of the aligner is enabled (see section *3.13.1 Settings > Main*), you can start rolling the vehicle and the software will proceed automatically.

After you have fastened the targets on the wheel adapters, do not move or rotate the targets. During the following measurement sessions, mount the wheel adapters in the same way, so that you do not have to adjust their position for the compensation.

4. Roll the vehicle backwards. Monitor the targets' position by the indicators on the screen.

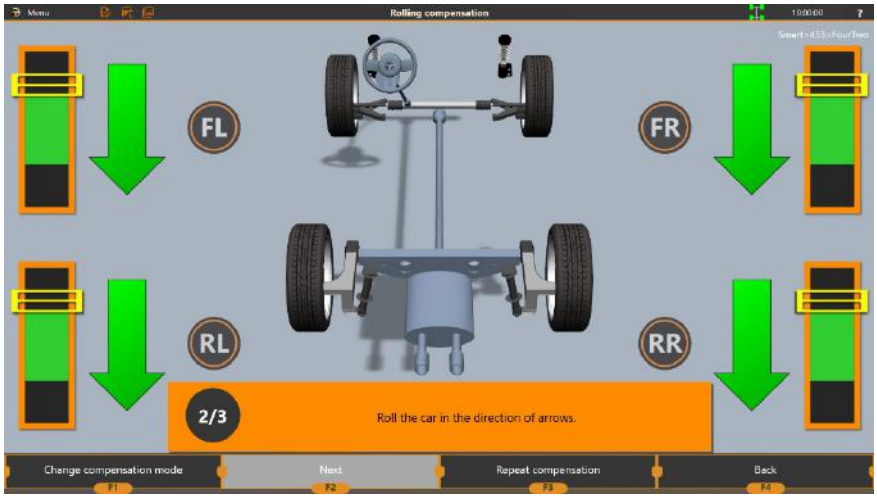


Figure 3.16 – Rolling the vehicle backwards

5. When the indicators reach the green area, the **Stop** sign will appear. Then, halt rolling the vehicle. Hold the vehicle steady and wait until the software proceeds to the next step.

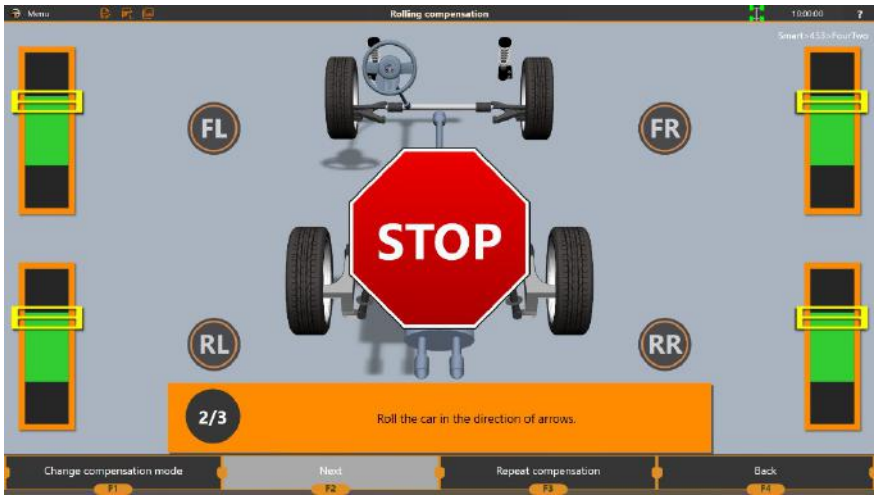


Figure 3.17 – Stop rolling the vehicle

6. Roll the vehicle forward to its initial position. Monitor the targets' position by the indicators on the screen.

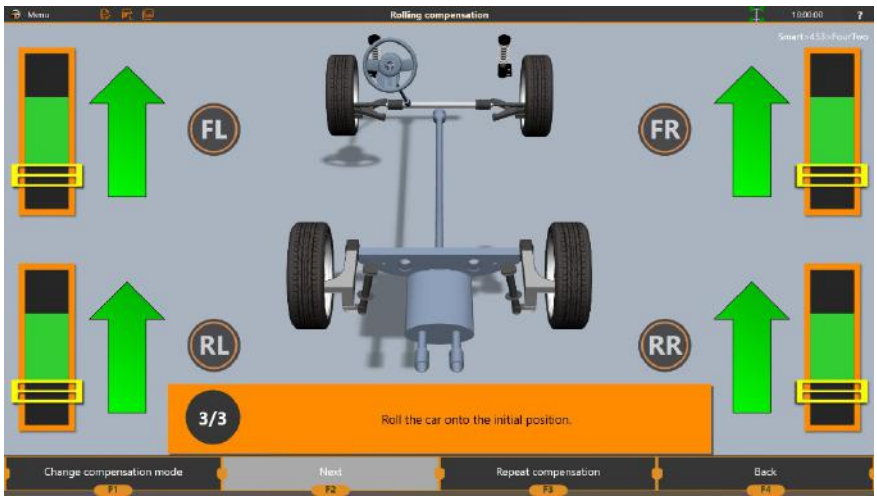


Figure 3.18 – Rolling the vehicle forwards

7. When the indicators reach the green area, the **Stop** sign will appear. Then, halt rolling the vehicle.

8. Depending on the results of the compensation and the wheel aligner settings enabled (see section *3.13.1 Settings > Main*), the software can either proceed to the Measurements screen directly or show the compensation results.

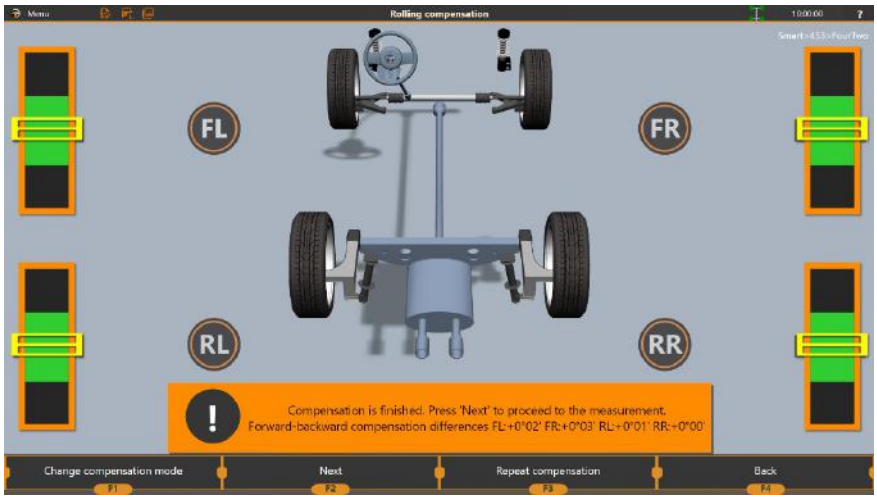


Figure 3.19 – Rolling compensation results

Compensation result is a difference between two calculated axes: the one calculated while rolling backwards, and the other—while rolling forwards.

If compensation results exceed 3', we recommend that you repeat the compensation.

If the compensation errors persist, jounce the vehicle, check the vehicle's suspension for any damage.

Compensation errors can also occur if the surface on which you are rolling the car is not flat enough. Reduce any surface bumps that may induce steering wheel movements during the rolling compensation.

If the errors still persist, you can switch to the **jacking compensation** (see section *3.8.4 Jacking compensation*).

3.8.2 Rolling Runout Compensation - Extended

Use the extended rolling runout compensation for vehicles with rear wheel diameter different from the front wheel diameter.

In this mode, the aligner performs the compensation of each wheel separately.

Similarly to the ordinary rolling compensation, always perform the extended rolling compensation on a flat surface only.

Do not use this compensation mode for vehicles with large deviations of wheel alignment angles, for instance, after body repair or suspension repair.

1. Apply the steering wheel lock.
2. Mount the adapters with the targets onto the wheels. Rotate the targets according to the directions on the screen.

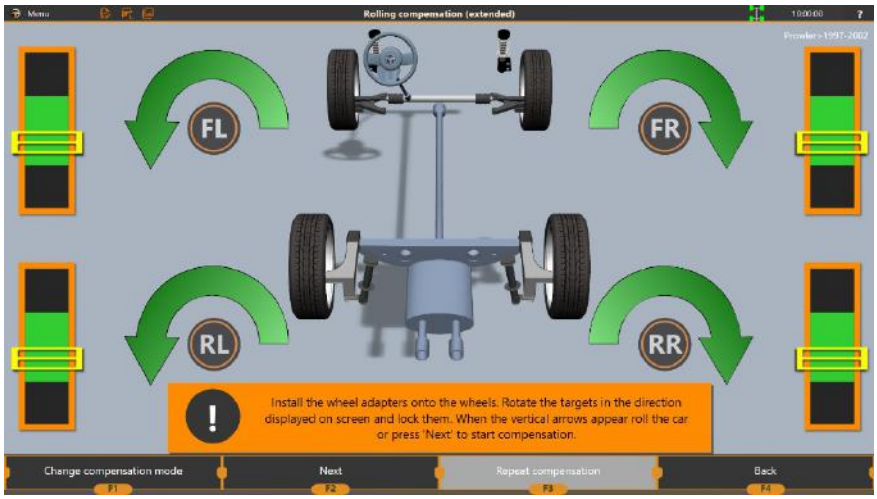


Figure 3.20 – Positioning the targets upon stating the rolling compensation

3. When a target takes an expected position and the corresponding indicator reaches the green area, the **Stop** sign will appear on the screen. Then, proceed to the next target.

4. When all targets take the expected position, make sure that they are firmly fixed in their wheel adapters' socket.

After you have fastened the targets on the wheel adapters, do not move or rotate the targets. During the following measurement sessions, mount the wheel adapters in the same way, so that you do not have to adjust their position for the compensation.

5. Press **F2 (Next)** to proceed.

6. Roll the vehicle backwards. Monitor the targets' position by the indicators on the screen.

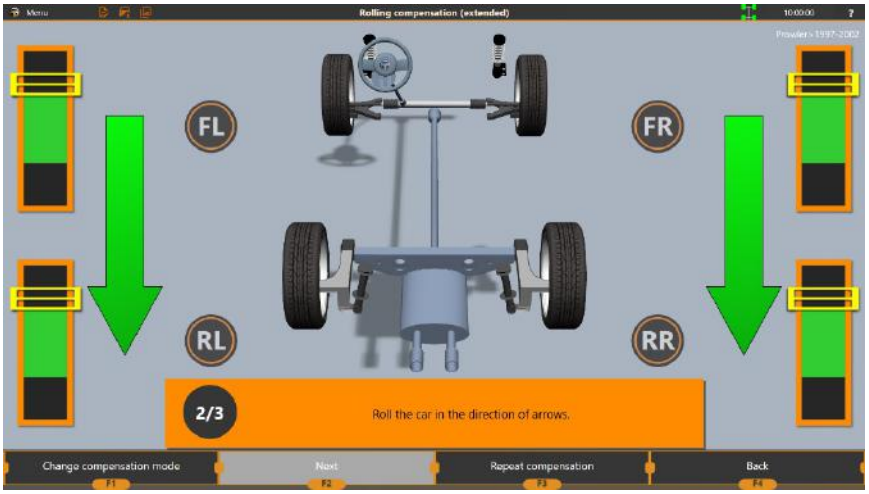


Figure 3.21 – Rolling the vehicle backwards

7. When at least one of the wheels reaches the expected position and the appropriate wheel indicator reaches the green area, the **Stop** sign will appear on the screen. Then, halt rolling the vehicle.

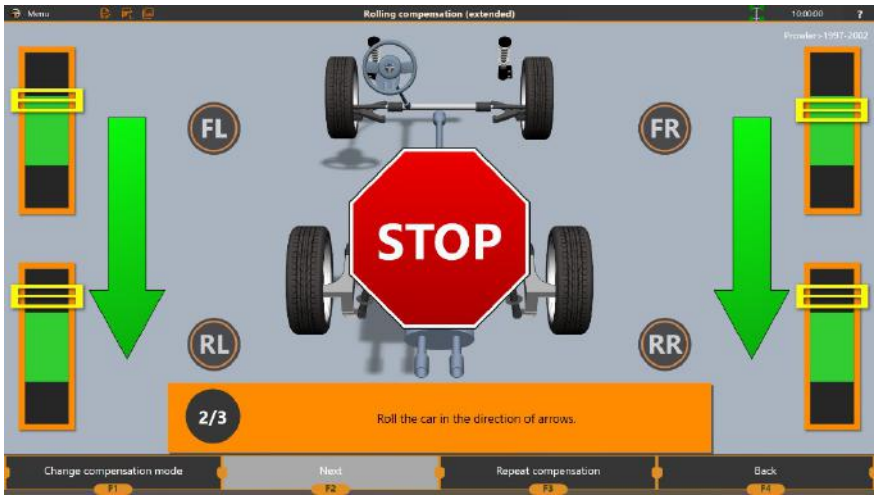


Figure 3.22 – Stop rolling the vehicle

8. Do not move the vehicle and wait until the software proceeds to the next step. The software will hide the indicator for wheels that have reached the expected position.
9. Repeat step *6* until all the wheels are in the expected position.

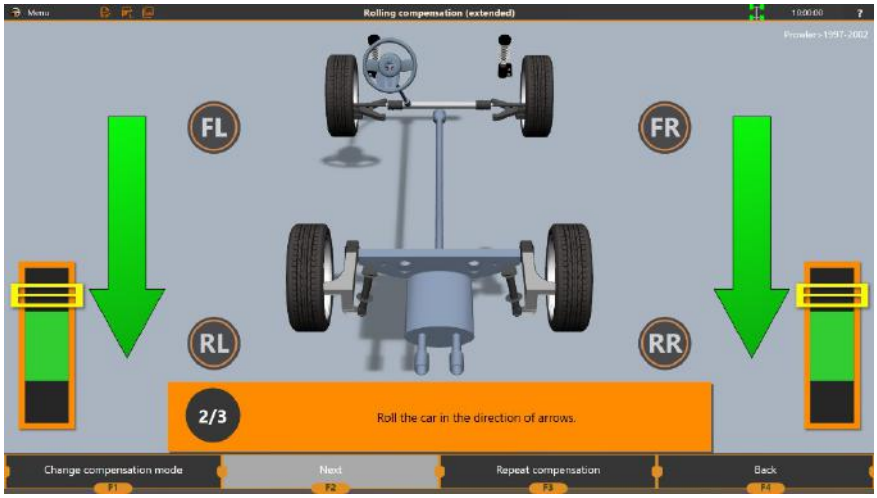


Figure 3.23 – Rolling the remaining wheels backwards

10. Roll the vehicle forwards. Monitor the targets' position by the indicators on the screen.

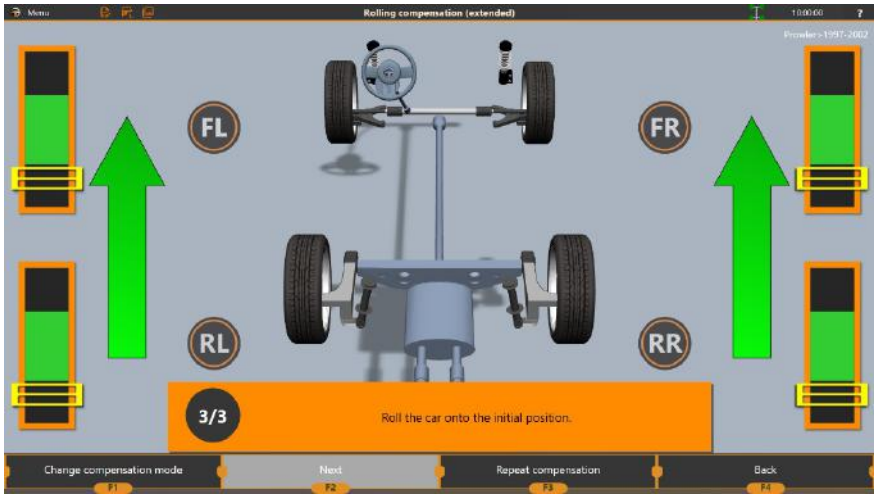


Figure 3.24 – Rolling the vehicle forwards

11. When at least one of the wheel indicators reaches the green area, the **Stop** sign will appear on the screen. Then, halt rolling the vehicle.

12. Repeat step *10* until all the wheels are in the expected position.

13. Depending on the results of the compensation and the wheel aligner settings enabled (see section *3.13.1 Settings > Main*), the software can either proceed to the Measurements screen directly or show the compensation results.

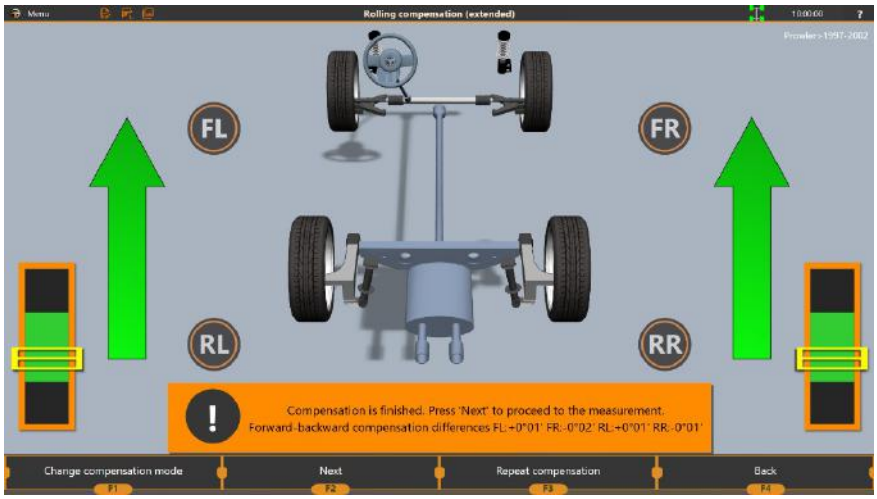


Figure 3.25 – Compensation results

Similarly to the ordinary rolling compensation, if the compensation results are exceeding 3', we recommend that you repeat the compensation.

If the compensation errors persist, jounce the vehicle, check the vehicle's suspension for any damage.

Compensation errors can also occur if the surface on which you are rolling the vehicle is not smooth enough. Reduce any surface bumps that may induce steering wheel movements during the rolling compensation.

If the errors still persist, you can switch to the **jacking compensation** (see section *3.8.4 Jacking compensation*).

3.8.3 Forward Compensation

Perform the forward compensation on a <u>flat surface only</u>!

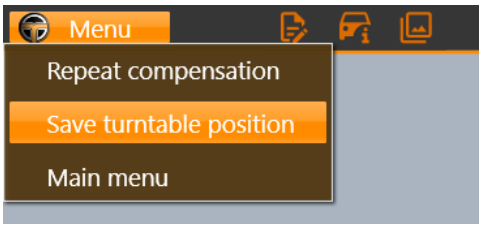
Never perform the forward compensation for a vehicle with large deviations of wheel alignment angles.

Forward compensation is easier to perform than the rolling and the jacking compensation.

In addition, during the forward compensation, the vehicle is subdued to a less load than during the rolling compensation that increases the compensation accuracy.

To perform the forward compensation, the following prerequisites must be met:

- The vertical calibration must be performed.
- If a vehicle is placed on a lift, the lift vertical position must be the same as it has been during the vertical calibration.
- The position of the turntables must be specified. To do this, after positioning your turntables, enter the **Measurement** mode and select **Save turntable position** from the main menu:



Do this **before** the forward compensation during any other measurement session.

Make sure to position your vehicle properly before starting the compensation:

Position the vehicle at some distance before the turntables. The larger the wheel diameter, the farther from the turntables you should position the vehicle, but not farther than 1 m.

Position the vehicle so that rolling the vehicle will stop with its front wheels on the turntables.

1. (Optionally) Apply the steering wheel lock.

2. Mount the wheel adapters with targets onto the wheels. Rotate the targets one after another starting from **FL** so that the cameras are able to detect the targets. Monitor the target position by indicators on the screen.

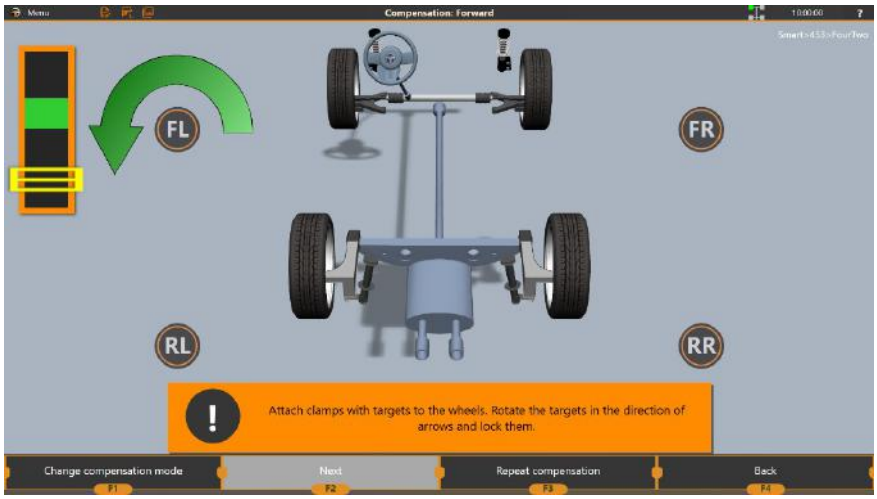


Figure 3.26 – Mounting the targets for the forward compensation

3. When a target takes an expected position and the corresponding indicator reaches the green area, the **Stop** sign will appear on the screen. Then, proceed to the next target.

4. After all targets take the expected position, the next step will become available. Press **F2 (Next)** to proceed.

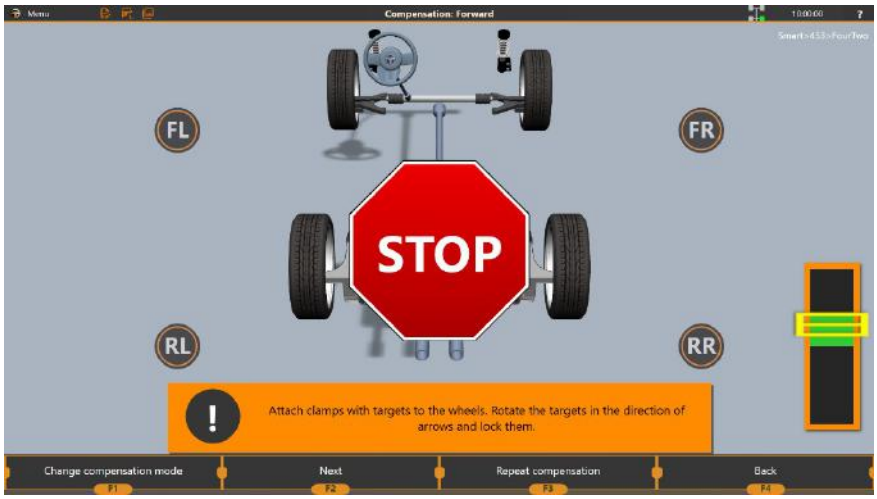


Figure 3.27 – Proceeding with the compensation after all targets are turned as expected

5. Roll the vehicle forward. While you are rolling the vehicle, monitor the targets' position by the indicators on the screen.

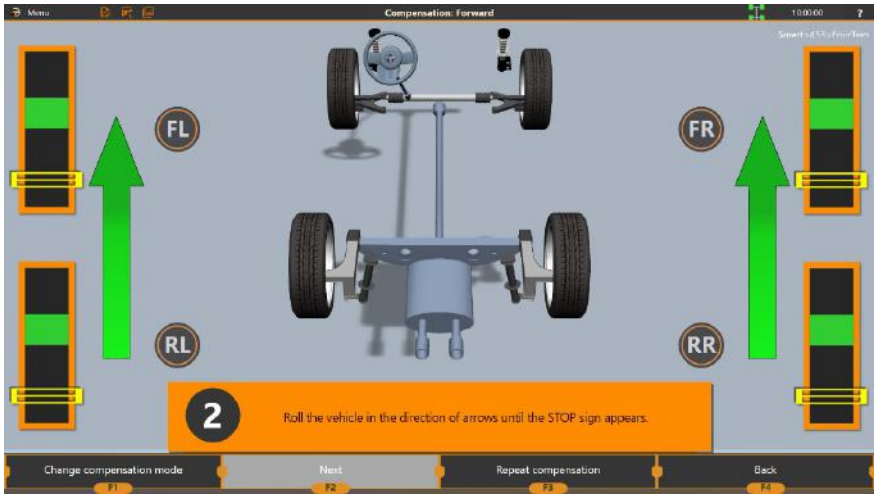


Figure 3.28 – Rolling the vehicle

You can use the pusher to roll the vehicle forward. This way, you can roll the vehicle without starting its engine and avoid vibrations that can affect the wheel aligner accuracy.

6. When all the indicators reach the green area, the **Stop** sign will appear. Then, halt rolling the vehicle.

7. Wait until the software processes the compensation results.

8. Depending on the results of the compensation and the wheel aligner settings (see section *3.13.1 Settings > Main*), the software can either proceed to the Measurements screen directly or show the compensation results.

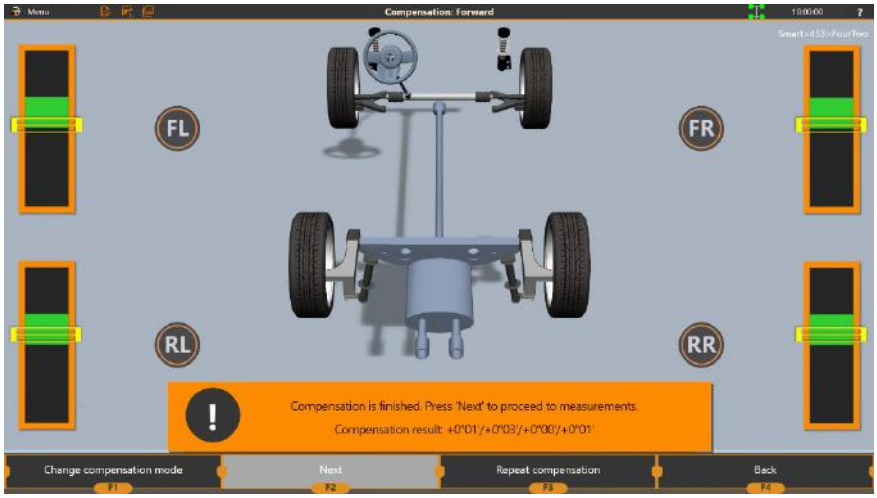


Figure 3.29 – Forward compensation results

If the compensation results exceed 3', we recommend that you repeat the compensation.

If the compensation errors persist, jounce the vehicle, check the vehicle's suspension for any damage.

Compensation errors can also occur if the surface on which you are rolling the vehicle is not smooth enough. Reduce any surface bumps that may induce steering wheel movements during the rolling compensation.

If the errors still persist, you can switch to the **jacking compensation** (see section *3.8.4 Jacking compensation*).

3.8.4 Jacking Compensation

We strongly recommend that you use the jacking runout compensation if the vehicle's suspension is damaged or if its toe value is greater than 2°. We do not recommend that you use the rolling compensation in these cases, because rolling the vehicle can cause the vehicle to swerve unpredictably causing measurement errors.

You can also use the jacking compensation if there is not enough space to roll the vehicle.

1. Mount the wheel adapters with the targets onto the wheels.

2. **Raise the wheels** so that they can be rotated freely. Usually, you do this by using a jackscrew or a car lift.

You can raise each wheel separately, or you can raise them axle by axle, or you can raise the vehicle entirely.

3. Rotate the targets clock-wise or counter-clock-wise according the arrows that the software shows on the screen. Monitor the target status by appropriate indicators on the screen.

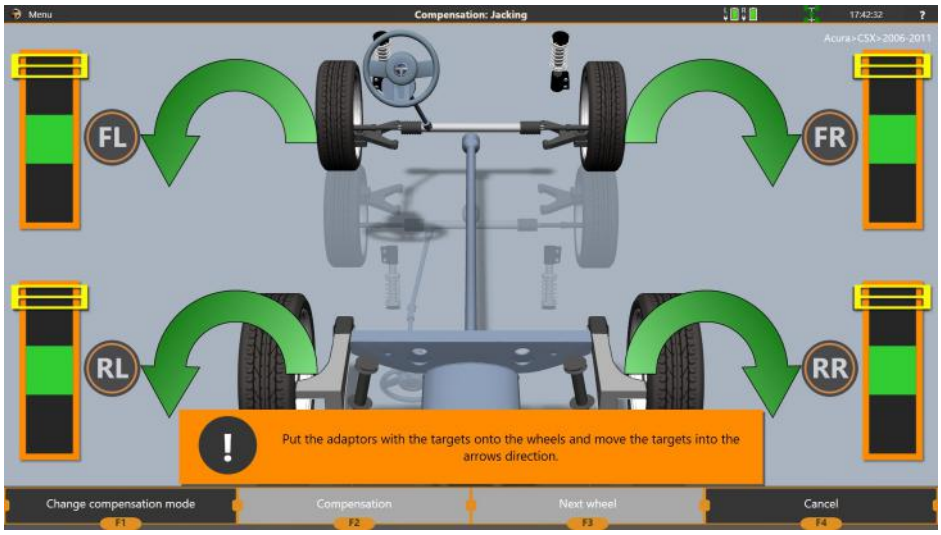


Figure 3.30 – Rotation targets for the jacking compensation

4. Select a wheel to perform the compensation. By default, the order is **FL-FR-RR-RL**. However, you can switch the order during the compensation, if needed.

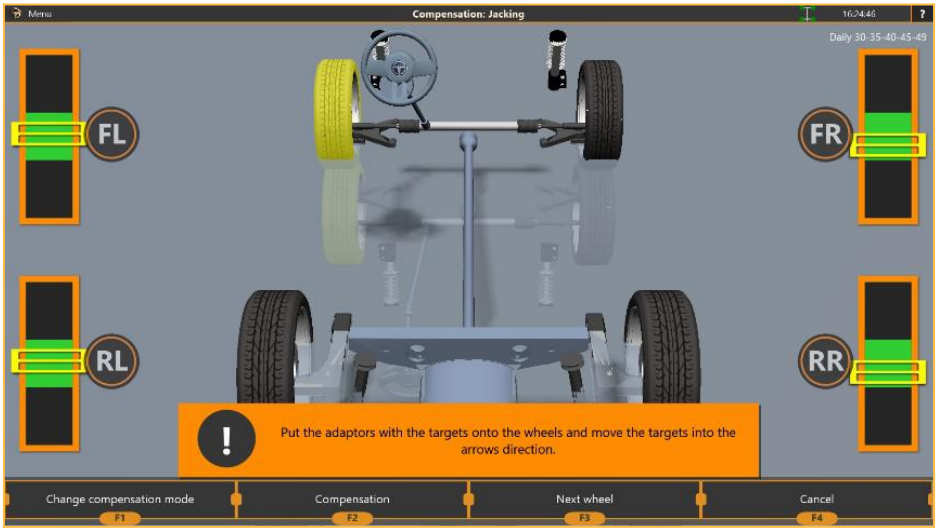


Figure 3.31 – Selecting a wheel to start the compensation

The wheel selected to compensate is highlighted on the screen in yellow. Press **F2 (Compensation)** to start.

5. Wait for the first step to complete automatically and proceed to the next step.
6. Rotate the wheel according the instructions on the screen.

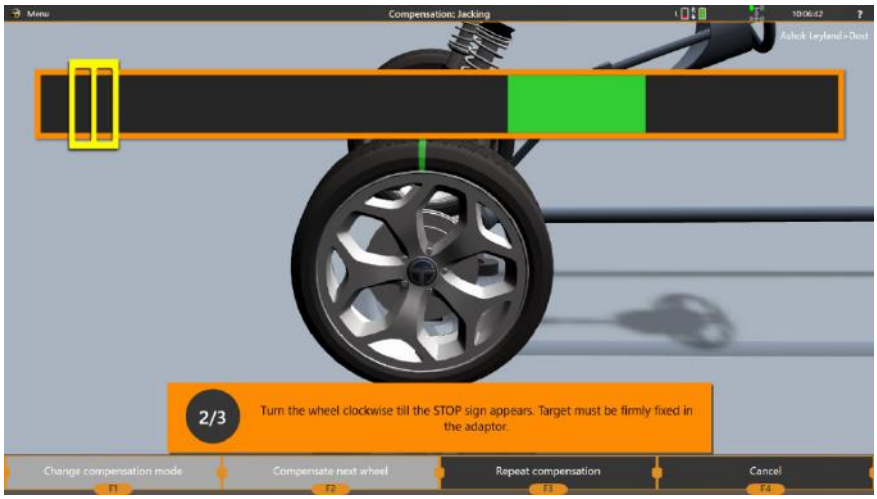


Figure 3.32 – Turning the wheel during the jacking compensation

7. When the wheel takes the expected position, the **Stop** sign will appear. Halt rotating the wheel and wait until the software proceeds to the next step.

8. Rotate the wheel in the opposite direction, according the instructions on the screen. When the **Stop** sign appears on the screen, halt rotating the wheel.

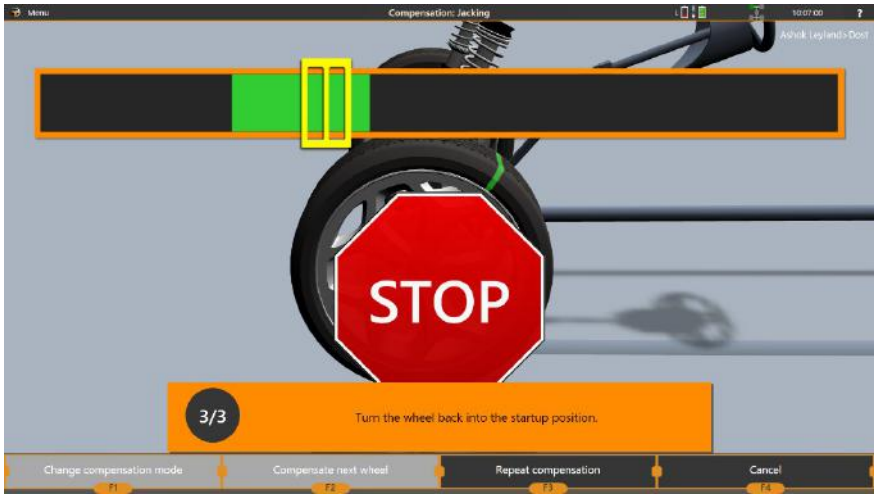


Figure 3.33 – Returning the wheel into its initial position

9. The software will show the wheel compensation result.

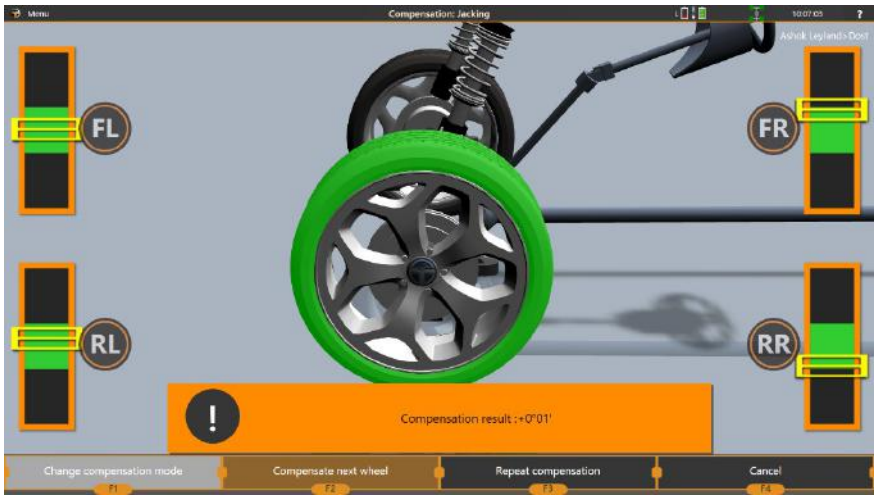


Figure 3.34 – Jacking compensation results

If compensation results exceed 3', we recommend that you repeat the compensation.

<u>Make sure that the steering wheel is not moving during the compensation</u>.

If the compensation errors persist, check the vehicle's suspension for any damage.

10. Wheels that have already been compensated are highlighted on the screen in green.

To proceed to the next wheel, press **F2 (Compensate next wheel)**. To repeat the wheel compensation, press **F3 (Repeat compensation)**.

11. When all wheels are compensated, press **F2** to complete the compensation.

3.9 Measurement

Measurement is performed after all the preparatory steps, including compensation are completed. During this step, the vehicle's wheel alignment parameters are all measured and attached to the order.

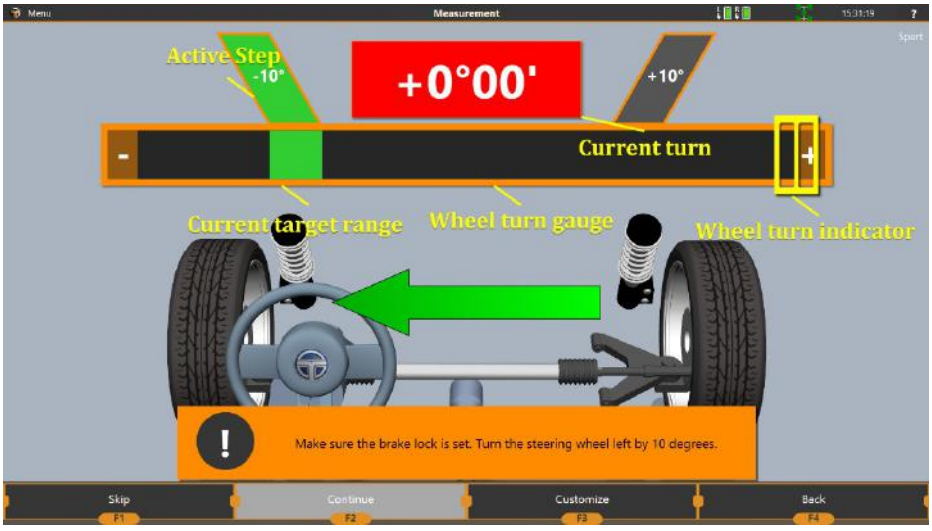


Figure 3.35 – Measuring wheel alignment

It is better to jounce the vehicle before performing measurements. This is especially true in case you performed the jacking compensation

Before proceeding to the measurement. Remove the locking pins of the turn tables. The wheels

must rotate freely during measurement.

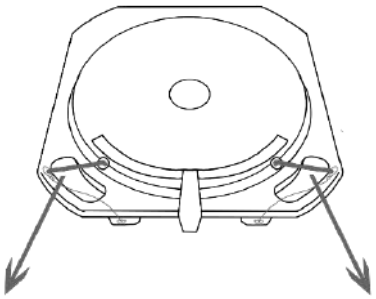


Figure 3.36 – Removing locking pins from the turn table

If you're doing caster or toe-out-on-turns measurement, apply the brake lock.

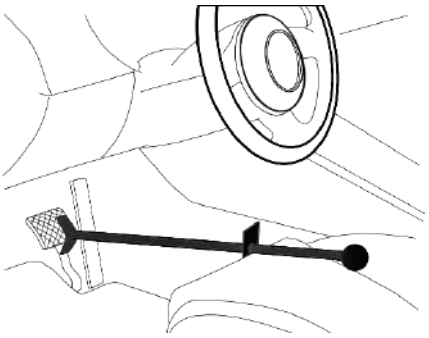


Figure 3.37 – Applying the brake lock

On the measurement screen you can see the gauge with an indicator, that shows the steering wheel position, an arrow, that indicates the direction, where the steering wheel has to be returned to perform current step.

Current active step is colored bright green, finished steps dark green, unfinished steps are grey. The number of steps that are performed during the measurement can vary and depend on the software's settings.

Measurement can have the following steps:

Initial measurement	The steering wheel's position is not relevant, the software acquires the location of the wheels and measures the toe so that it would correctly perform measurements of Caster. Performed automatically when all the targets are stable.
Caster measurement at 10 degrees	If 10 degrees stop is selected, the caster is automatically measured at 10 degrees even if 20 degrees is selected as well. Performed automatically when the wheel's turn enters the 20-degree range.
Additional measurement at 20 degrees	Measures parameters such as Toe-out-on-Turns, Ackerman angles. If 10 degrees measurement is not selected, also measures caster. Performed automatically when the wheel's turn enters the 20-degree range.
Lock angle measurement	Measures steering wheel lock angles. This mode requires the user to press the F2 button to indicate the lock has been reached.
Final measurement	Measures toe and camber. Note that zero on the screen indicates the central line position, not the steering wheel position. Performed automatically when the steering wheel is set to zero.
Steering wheel position measurement	Measures steering wheel position relative to the central line. This mode requires the user to press the F2 button to trigger the

	measurement.

Jouncing the vehicle before starting the measurement is advised because the suspension parts can be in a state of tension, and this can lead to offset in measured values. Jouncing frees up the suspension and leads to more accurate results.

You can select the default set-up of the measurement steps in settings and/or alter it before performing measurements. For the default set-up of steps see **Options** paragraph. To change the measurement steps for the current measurement only, press F3 Customize.

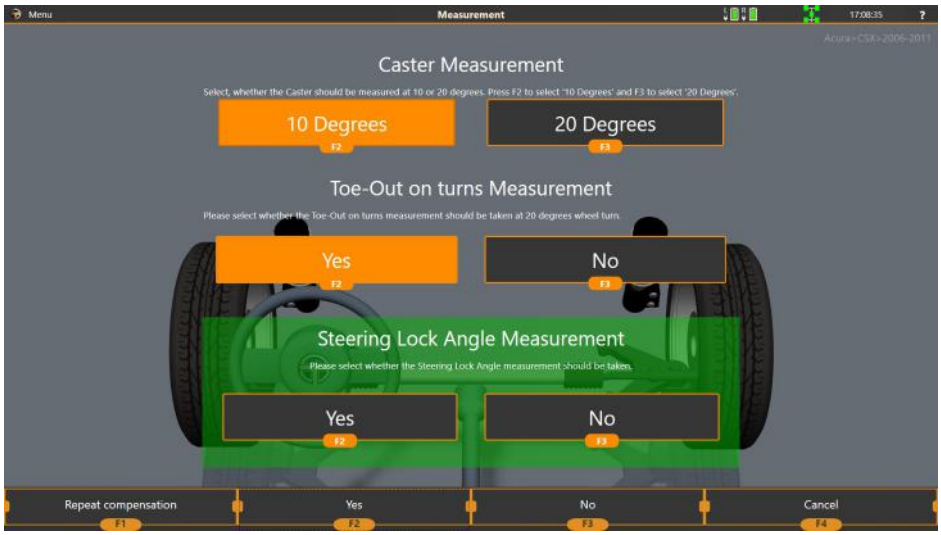


Figure 3.38 – Customizing the measurement

During customization you can select any set of steps you need. For example, on the screen, the measurement of caster will be performed at 10 Degrees, 20 degrees additional measurement will still be performed for Toe-Out on Turns and some other values, while whether the 'Steering Lock Angle' measurement is performed still has to be determined.

All the steps except for the **Final measurement** can be skipped by pressing the F1 Skip button.

Note that in the customization screen there is an additional option available: F1 Repeat compensation. You can always return to compensation using this button or using the menu on top of the screen.

F4 Back in the measurement works differently – it returns to the previous screen. During the first measurement that would still be compensation, but if the measurement is repeated – the return will be performed to the Report View mode.

If measurement of the steering wheel position is enabled, the following screen is displayed after all the measurement steps are done:

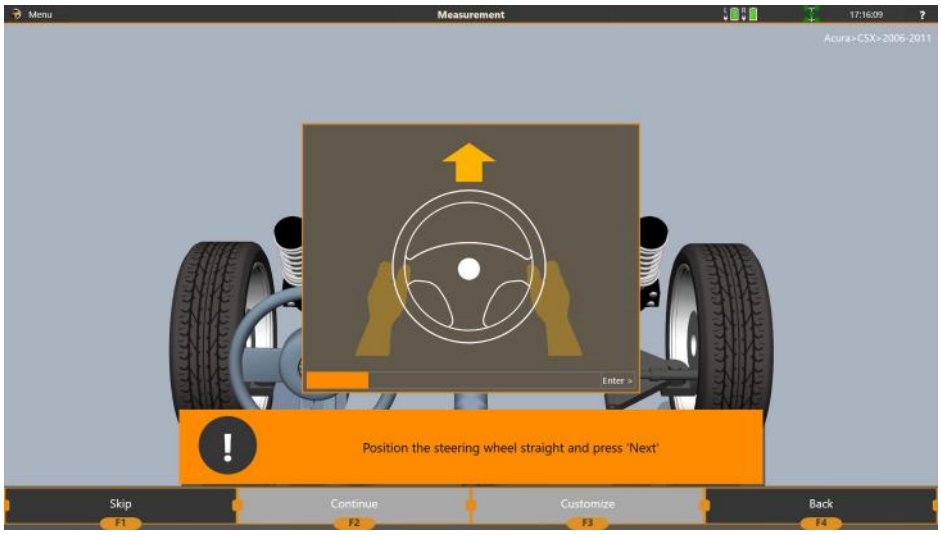


Figure 3.39 – Steering wheel position measurement

When the steering wheel is set straight, press F2 Continue**.** If you do not wish to perform this step, you can press F1 Skip.

3.10 Report View

In the report you can see the results of the measurement, adjustment. From here you can head forward to make adjustments, print the report, repeat measurements among other things.

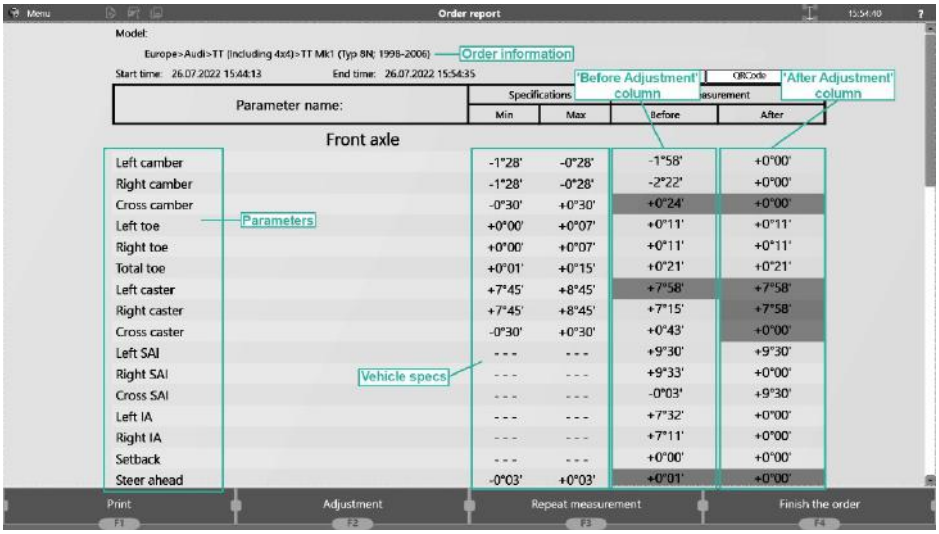


Figure 3.40 – Viewing the measurement report

The report screen is a table of vehicle's wheel alignment parameters and its values.

The first column of the table is the parameter name, such as Toe, Camber, Caster, etc.

The Specifications column of the table is filled out of the vehicle model you selected during 'Select Model' step. If the manufacturer does not have any specifications for the parameter, the values are left empty (- - -).

The Before column is what will be printed out as a 'Before adjustment' column. This is the first measurement you performed for this order.

The After column is what will be printed out as a 'After adjustment' column. This is the last measurement you performed for this order.

On the screenshot above the After column is empty. To fill this column, you have to perform another measurement.
This can be achieved either by repeating the measurement by pressing the F3 button or by exiting the adjustment mode with a feature ‘Use alignment data from adjustment in the report’ enabled in software’s settings.

To proceed to adjustment, press F2 Adjustment.

To print out the report, press F1 Print.

To repeat the measurement or compensation, press F3 Repeat Measurement.

To finish the order and return to the main menu, press F4 Finish the order.

To get access to the report online, press QRCode.

Remember that the caster values that are copied over from adjustment mode may not be precise, because Caster can only be measured when the steering wheel is turned! If you have had the caster adjusted, it is advised to redo the measurement step (with turning the steering wheel 10 or 20 degrees).

You can use Show History button to select any measurement as the Before and the After column if you’ve performed several. This can be useful if one of the measurements was performed with some kind of an error.

3.11 Adjustment

The adjustment screen is the main screen you’re going to work with when performing an alignment. It is used to dynamically track the parameters you are adjusting.

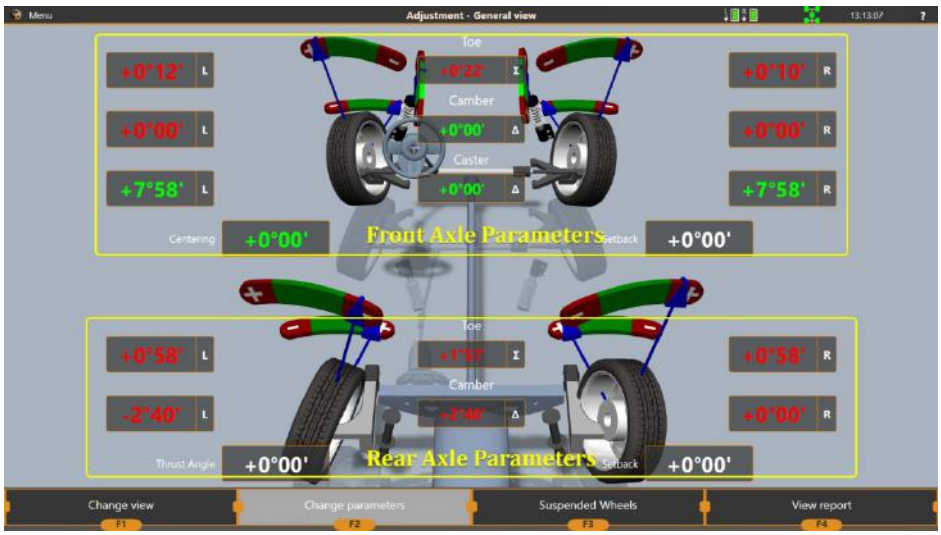


Figure 3.41 – Overall view of the adjustment screen

In the adjustment mode you have several options of how to represent the data on the screen available. The general view provides the overview of all the parameters that are measured live by the aligner.

To change the view, press F1 Change view and pick a view from the list. Other available views include:

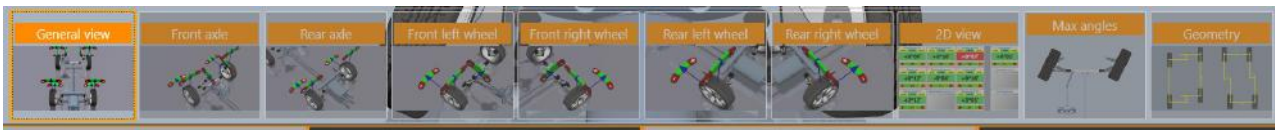


Figure 3.42 – Selecting an adjustment view

Adjustment view list

General View	The overview of all the data
Front Axle	Just the front axle
Rear Axle	Just the rear axle
Front left wheel	Front left wheel only
Front right wheel	Front right wheel only
Rear left wheel	Rear left wheel only
Rear right wheel	Rear right wheel only
2D view	Per-axle view of each axle. You can change the axles by pressing F2 Change Axle.
Max angles	Max turn adjustment angles mode.
Geometry	Geometry parameters mode

You can also select the parameters to be displayed (Toe, Camber, Caster, or any permutation of them).

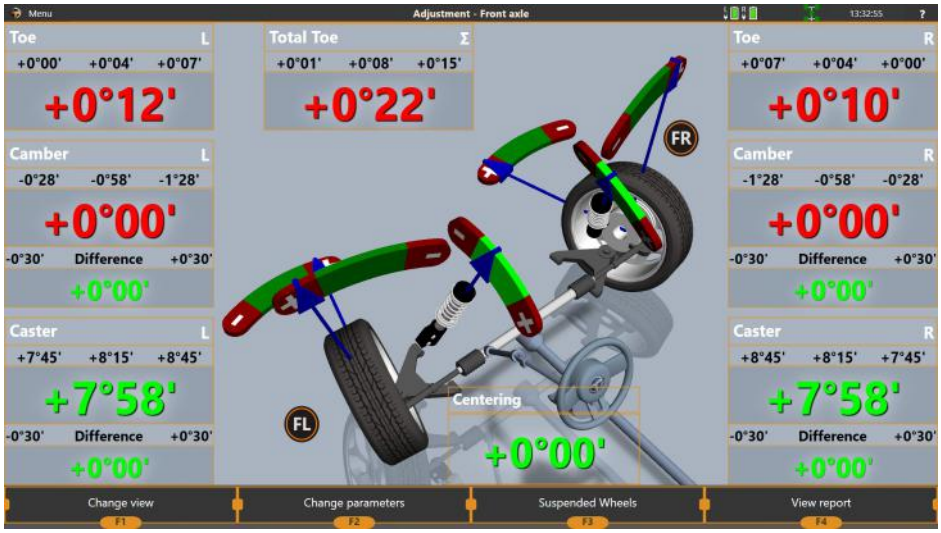


Figure 3.43 – Front axle adjustment mode

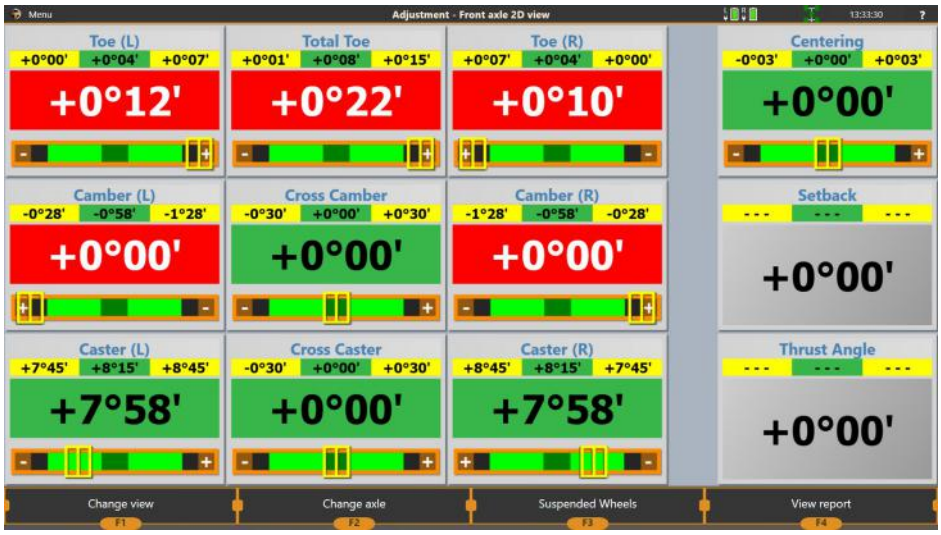


Figure 3.44 – 2D adjustment mode

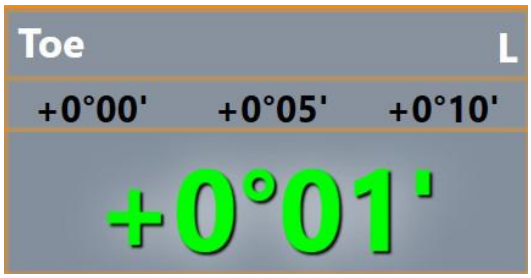


Figure 3.45 – Single parameter. 3D mode

In the first line of goes the name of the parameter: L – indicates **LEFT**, R – indicates **RIGHT**, ∑ - indicates sum (Total toe)

The second line is specification values: minimum, best, maximum.

The third line is a color-coded current value of the parameter. If it falls within the specification it's displayed in **GREEN**, if it's out of the specifications for the vehicle, it's displayed in **RED**. If there are no specifications available, it's displayed in **GRAY**.

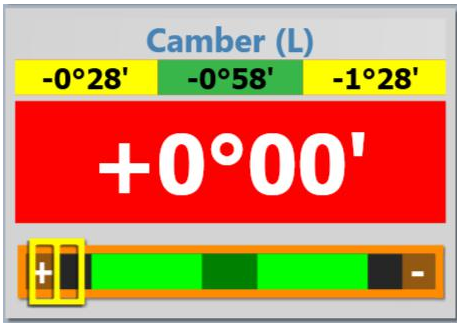
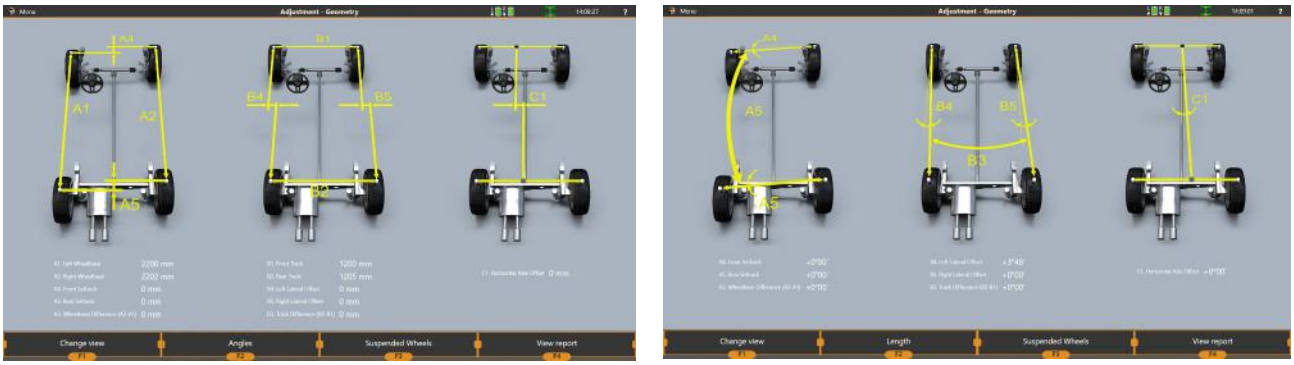


Figure 3.46 – Single parameter. 2D mode

In 2D mode the layout is similar, with extended color coding and a gauge at the bottom.



a) *b)*

Figure 3.47 – Geometry view; *a)* – Length mode; *b)* – Angles mode

3.11.1 Extended Measurement Modes

In some cases, to adjust the wheel alignment, it may be necessary to alter the wheel's state significantly, for instance, turn the steering wheel, or lift the vehicle's axle to have the wheels hanging, or even have the wheel removed.

The iDEAL wheel aligner has several extended adjustment modes for such occasions:

Suspended wheels	You can lift a wheel, or an axle, or the entire vehicle.
Steering wheel turned	You can turn the steering wheel.
Detached wheel	You can remove the wheel and attach the target to the suspension directly. Note that to use this mode, the magnetic clamps are required.

When an appropriate mode is active, the wheel aligner will track the wheel state automatically and add an appropriate offset to the wheel alignment values. That is, it will show the wheel alignment values as if the wheel is in its original state.

Otherwise, it will show the actual wheel alignment values making it hard to check if they meet the expected values:



a) *b)*

Figure 3.48 – Wheel alignment values for the same wheel position a) in the basic adjustment mode; b) in the suspended wheels mode

To switch the wheel aligner into the **Suspended Wheel** mode, press **F3** and then follow the instructions on the screen:



Figure 3.49 – Suspended wheels mode

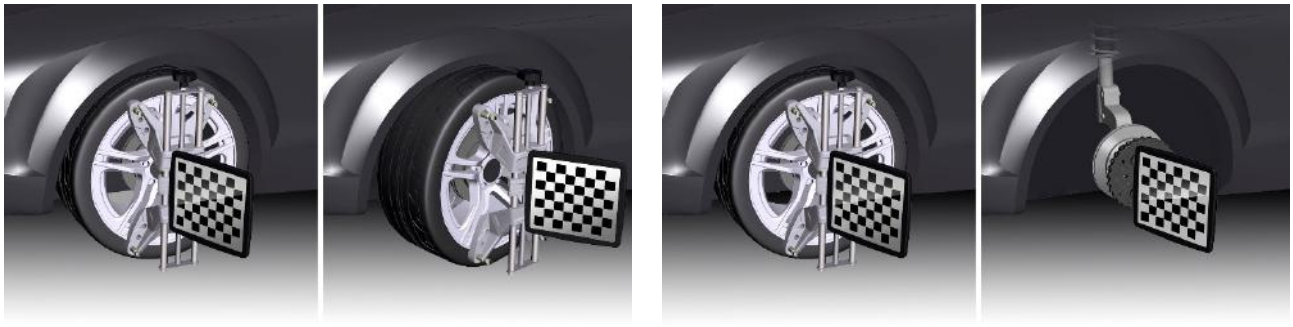
To switch the wheel aligner into the **Steering wheel turned** mode, select **Adjustment with turned steering** from the main menu.

To switch the wheel aligner to the **Wheel detached** mode, select **Adjustment with detached wheel** from the main menu.



Figure 3.50 – Enabling turned steering wheel mode and detached wheel mode

Then follow the instructions on the screen to set the wheel properly:



a) ***b)***

Figure 3.51 – How to set the wheel in the turned steering wheel mode and in the detached wheel mode

The icon in the top right corner of the screen indicates that any of these modes is active.

To exit any of these modes, press **F3**.

After you exit the detached wheel mode and mount the wheel back, to proceed with the adjustments, perform the runout compensation first. See section *3.8 Runout Compensation*.

3.12 Additional Operation Modes

3.12.1 Custom Models

You can create custom models for vehicles that are not present in the iDEAL database and enter their specification data:

1. Select **Custom Models > Add Custom Model** on the **Model selection** screen:



Figure 3.52 – Adding custom models

2. Enter the vehicle name, vendor, and specification data:

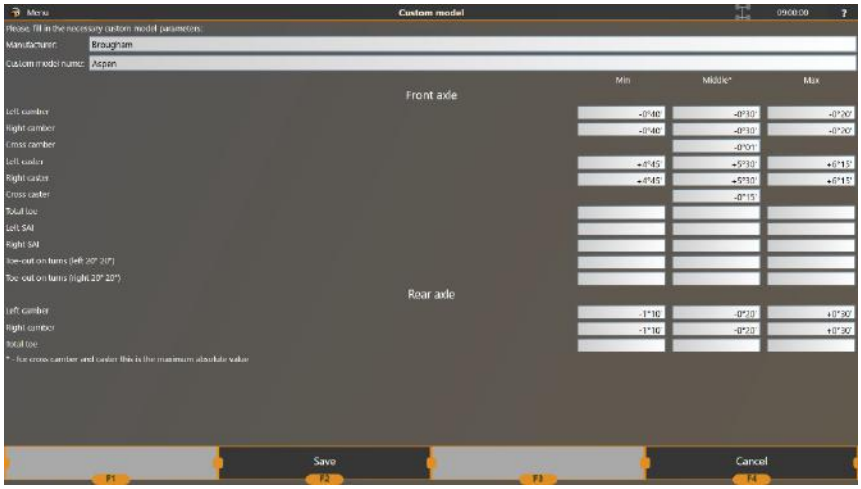


Figure 3.53 – Entering custom model data

3. Press **F2 (Save).** The custom model will be added to the **Custom Models** list in the **Model selection** screen. You can select custom models in the same way you select models from the TechnoVector native database:



Figure 3.54 – Custom models in the vehicle database

If you do not specify your custom model's vendor, it will be added to the root of the Custom Models lists. Otherwise, it will be added to the respective vendor folder.

You can edit and delete custom models:

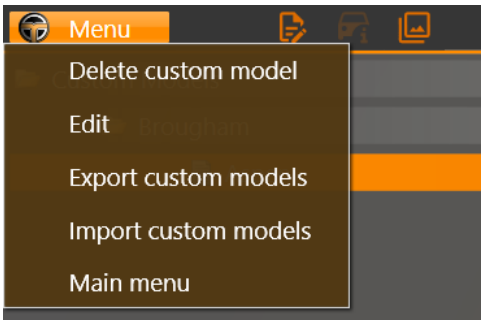


Figure 3.55 – Managing custom models from the main menu

3.12.2 Importing and Exporting Custom Models

You can export custom models from your database to external file and import them from a file to your database. It may be useful when you are migrating your wheel aligner software to a new PC or when distributing custom models' data among multiple wheel aligners.

To export custom vehicle models into a separate file:

1. Select **Export custom models** from the main menu:

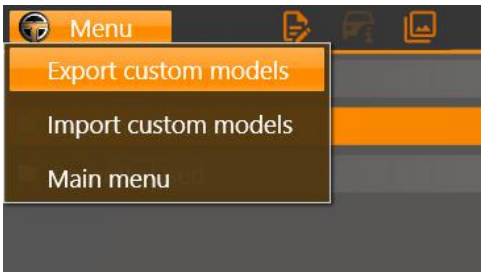


Figure 3.56 – Exporting custom models

2. Select all the models you want to export and click **Export**:

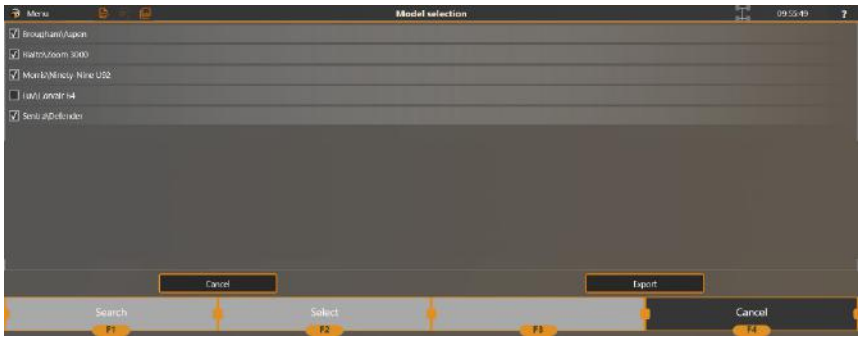


Figure 3.57 – Selecting models to export

3. In the resulting dialog, specify the file name and location and click **Save**.

All the data on the selected custom models will be exported to the specified file.

To import custom models from a file:

1. Select **Import custom models** from the main menu:

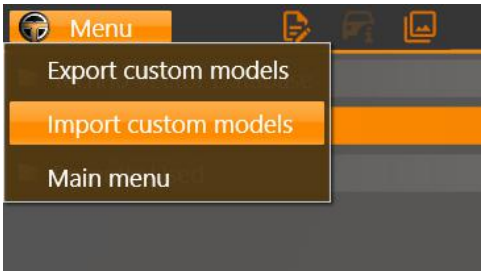


Figure 3.58 – Importing custom models from a file

2. In the resulting dialog, locate the file (*.customcar*) storing the custom models you want to import and click **Open**.

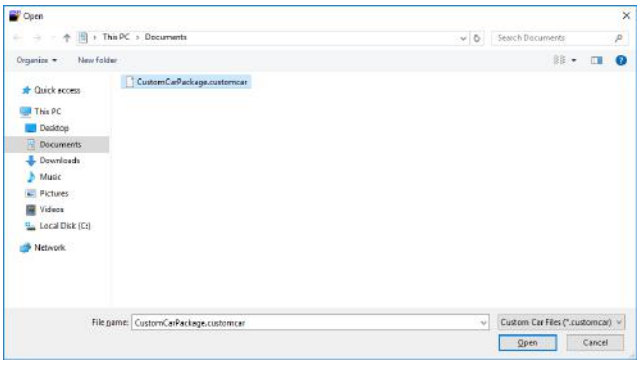


Figure 3.59 – Selecting a file with custom models data

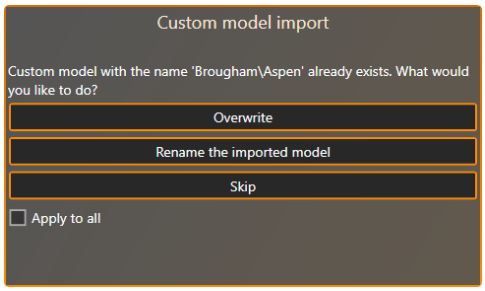
3. Custom models will be added to the Custom Models list of your wheel aligner's vehicle database:



Figure 3.60 – Imported models added to the Custom Models list

You may have to restart the software for the changes to apply.

If the specified file includes custom models that are already present in your wheel aligner's database, the software will prompt you to overwrite the existing models or rename the imported models:



3.12.3 Information about Wheel Aligner

Press F1 **(**Information) in the start-up screen to see detailed information about the wheel aligner.

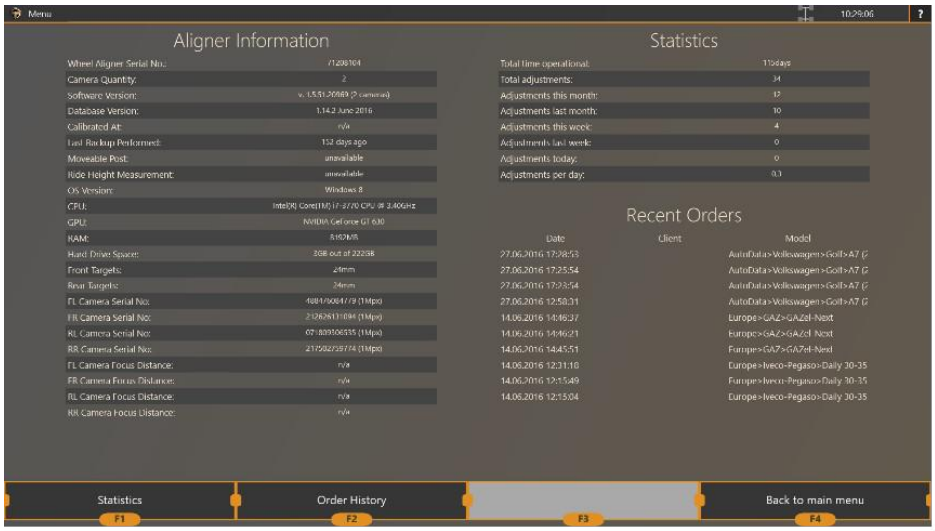


Figure 3.61 – Viewing wheel aligner statistics

Information about wheel aligner includes: serial number of the machine, information about the computer and equipment configuration and summary statistics for days, weeks, months.

3.12.4 Exporting Reports

You can configure your wheel aligner to export reports to an external file to view them outside of the wheel aligner software, or to send them to a customer or to your manager.

Supported Formats

– *.json*
– *.pdf*

Requirements

– The version of your wheel aligner software must be 1.11.23.3 or later. If you use an earlier version of the software, exporting reports will not be available.
– The **Export reports** extension must be available and enabled in your wheel aligner software.

Configuring the Extension

1. From the main menu, navigate to **F3 (Settings) > Extensions > Export reports**.
2. Select the **Enabled** check box.
3. In the **Path** text box, type the full path to the folder on your wheel aligner PC where you want to store the reports. If the specified folder does not exist, it will be created.

4. By default, the reports will be exported to *.json* files. To export them to *.pdf* as well, select the **Save PDF** check box.

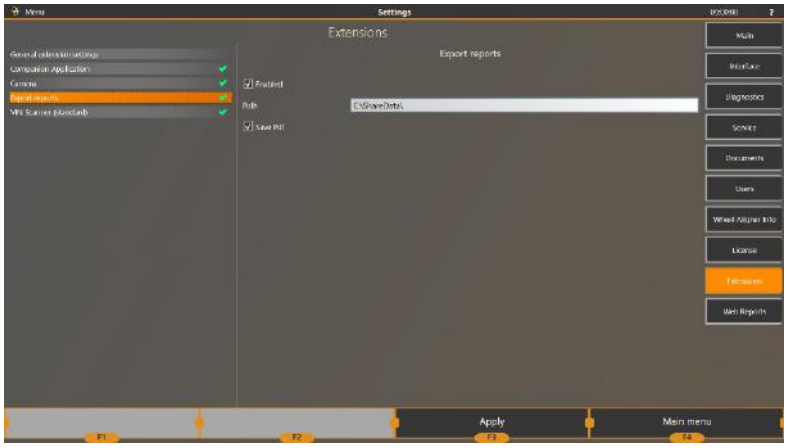


Figure 3.62 – Configuring the wheel aligner software to export reports

5. Apply and save the changes.

Exporting Reports

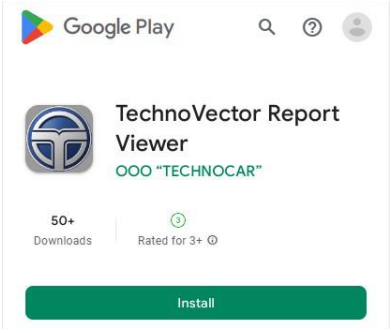
The reports are exported to the specified folder **automatically** upon completing an order.

3.12.5 Viewing Reports Online

You can get access to a report online from a mobile device, for instance, an Android or iOS smartphone. This way, you can view information on the measurement and adjustments perform outside of the wheel aligner software.

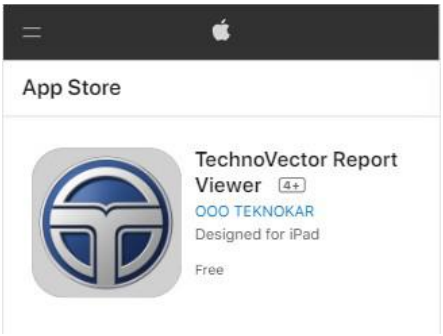
To do this, you can use the **Techno Vector Report Viewer** application.

For Android devices, you can get it in Google Play Store:



- play.google.com/store/apps/details?id=com.car.autoreport

For iOS devices, you can get it in Apple App Store:

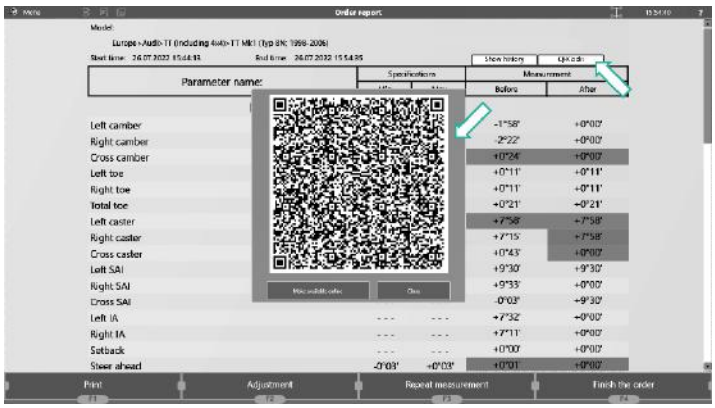


- apps.apple.com/ee/app/technovector-report-viewer/id1578238129

The application is free. To register the application, a valid e-mail address is required.

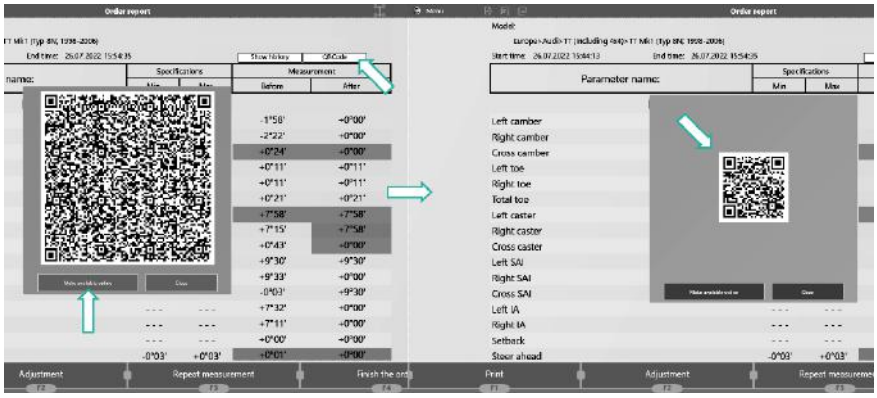
To View a Report Online:

1. On the Report view screen, press QRCode.
2. Scan the resulting QRCode by using the Report Viewer application on your mobile device or by using your device camera.



To get the PDF version of the report:

1. On the Report View screen, press QRCode.
2. In the resulting popup window, press Make available online.
3. Another QRcode will be generated.
4. Scan the resulting QRCode by using the Report Viewer application on your mobile device or by using your device camera.



5. The PDF file containing the report will be uploaded and opened automatically.

When obtaining the reports by using the Report Viewer app, the app will store all the reports and group them by vehicles.

When creating an order, specify the e-mail address used to register the application on a mobile device. The software will send the report to the application automatically when the order is complete.

3.12.6 Controlling the Wheel Aligner from Mobile Devices

You can connect to your wheel aligner from the **TechnoVector Remote Assistant** application installed on a mobile device and control the measurement and adjustment from there.

This can be useful if a wheel aligner operator has no access to the wheel aligner's monitor, for example, while being in a pit.

The figure below shows the overall view of the application main menu:

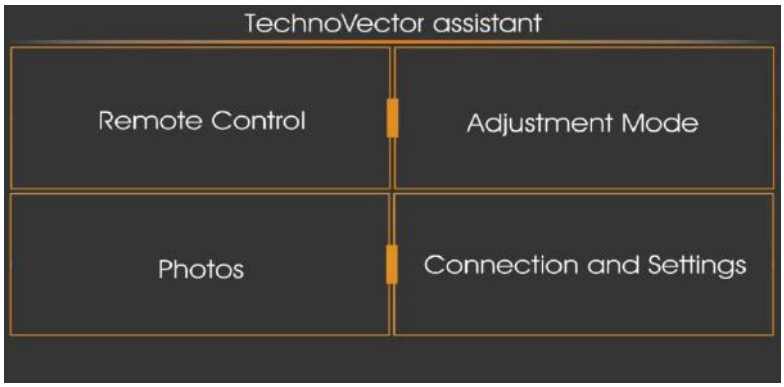


Figure 3.63 – TechnoVector Remote Assistant main menu

Requirements

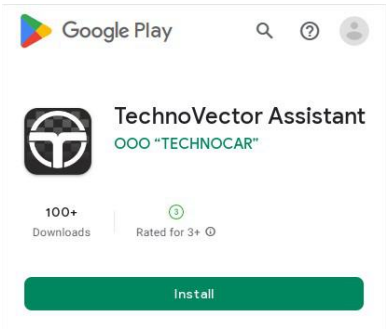
– Android mobile device.

– TechnoVector Remote Assistant application must be installed on the mobile device. To learn how to install the application, see below.

– The wheel aligner and the mobile device must be connected to the same network. Connecting them to the Internet is not required.

Installing TechnoVector Remote Assistant on Mobile Devices

You can install the application on a mobile device directly from Google Play Store:



Scan the following QR-code with your mobile device camera or QR-code scanner:

Connecting to the Wheel Aligner from the Remote Assistant App

1. Make sure that the wheel aligner and the mobile device are connected to the same network.
2. In the TechnoVector software, on the main screen, press **F3 (Settings)**, press **Extensions**, and then press **Companion Application**.
3. Click **Generate QRCode**. The software will generate a QR code:



Figure 3.64 – QRcode to connect to the wheel aligner from a mobile device

4. On your mobile device, run **Remote Assistance**, and press **Connection and settings**.
5. If your mobile device has several cameras, select the camera that you will use to scan the QRcode, from the camera list.
6. Start the camera and scan the QR code on the wheel aligner screen:



Figure 3.65 – Connecting to a mobile device with the QRcode

7. The application will connect to the wheel aligner.

Creating orders by License Numbers and VIN Codes

1. In the application main menu, press **Photos**.
2. Press Scan license number and scan the vehicle license number with your mobile device camera.

The application will detect the license number and create a new order. The **License Plate No** field of the created order will be filled automatically.



Figure 3.66 – Scanning the license number and VIN from a mobile device

If your wheel aligner's order database contains records on the vehicle, the software will fill appropriate fields of the created order automatically. In addition, if your will aligner has the online license plate recognition extension enabled, it will get the vehicle data from on online database and fill appropriate fields of the created order automatically.

As an alternative, you can press **Scan VIN** and scan the vehicle's VIN with your mobile device's camera. The application will detect the VIN and create a new order. The **VIN** field of the created order will be filled automatically.

3. If needed, fill other fields of the order.

Adjustment Mode in Mobile Application

1. In the application main menu, press **Adjustment mode**.
2. The application will show the actual wheel angle parameters that the wheel aligner is monitoring. You can see the example in figure 3.67.



Figure 3.67 – Viewing wheel alignment parameters in the mobile app

If a parameter value fits the vehicle specifications, the application will highlight it in green; otherwise, it will highlight it in red.

Remote Control

1. In the application main menu, press Remote Control.
2. The application will connect to the wheel aligner.

You will be able to control the aligner using the mobile app the same way you can do it by using the desktop version of the TechnoVector software.

To control the aligner, use the **F1–F4** buttons at the bottom of the screen:

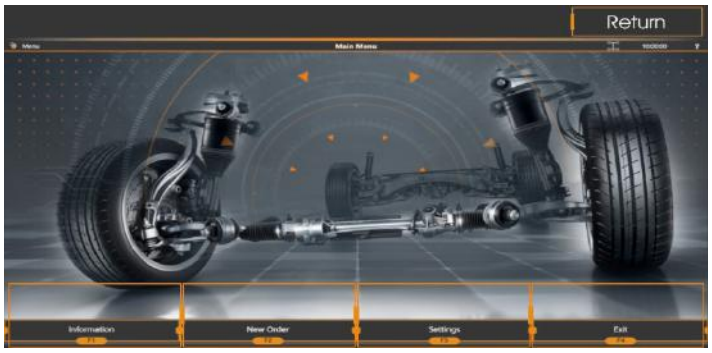


Figure 3.68 – Accessing the TechnoVector software from a mobile device

Adding Photos to Orders

1. On your mobile device, run Remote Assistance and connect to your wheel aligner.
2. In the application main menu, press **Photos**.
3. Press **Add photo**.

The wheel aligner must be configured to allow the Remote Assistant application to add photos to orders.

See section *3.13.9.1 Extensions > General extension settings*.

3.12.7 Order History

On the main screen, press **F2 (Order History)** to view information on all adjustments that have been performed:

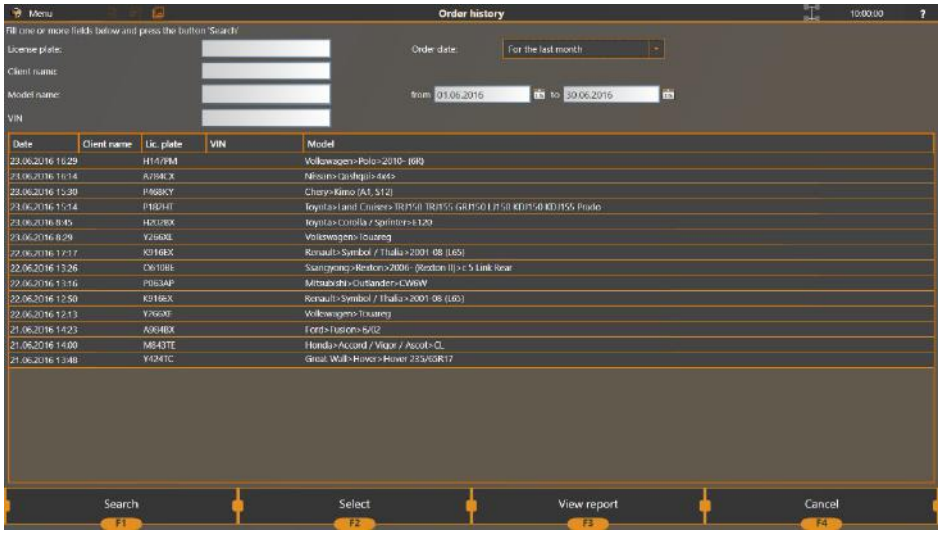


Figure 3.69 – Viewing order history

To Search Orders

You can filter the list of adjustments and view only those that match the search criteria:

- License plate
- Client name
- Model name
- VIN
- Order date

Specify one or several criteria and press **F1 (Search)**.

To discard the filtering and return to the full list, clear the search criteria and press **F1 (Search)** again.

To Export

You can export the list of orders to a *.csv* file, for example, to send it to your manager.

Select **Export to CSV** from the main menu and specify the target file name and location.

To Examine a Report

To view a report in details, select it in the list and press **F3 (View report)**.

To Create a New Order

Select an order that you want to use a base for a new order and press **F2 (Select)**.

A new order will be created, and the client data and the vehicle model will be copied from the existing order to the new one.

3.12.8 Statistics

To see statistics, press F1 **(**Statistics) in the Wheel Aligner Information screen.



Figure 3.70 – Viewing measurement statistics

Select a required type of diagram (adjustments per week, adjustments per day, measurements since placed in service), user and time interval to see all the necessary data in detail.

3.13 Software Settings

Settings screen allows you to control the software, calibrate, check calibration, backup and restore data from the backup copy. To enter the settings mode, press F3 (Settings) in the main menu. After that the software will proceed to the settings screen where the **Main** tab is selected by default.

Wheel aligner operators with the User privilege level cannot access the device calibration and most of the device settings. To access all the settings the Administrator privilege level is required.

Only a skilled professional should edit the settings in Service menu.

You can see the detailed description of lower-level settings in *Installation and Maintenance Manual for TechnoVector™ wheel aligners*. This information is for dealer and service centers only.

You must not change lower-level software settings by yourself because it can result in the impossibility to use the wheel aligner or incorrect measurements.

3.13.1 Settings > Main

To access these settings, the Administrator privilege level is required.

This screen includes the main software settings. At the top right-hand corner, you can see the software version and vehicle database version that is used by the software.

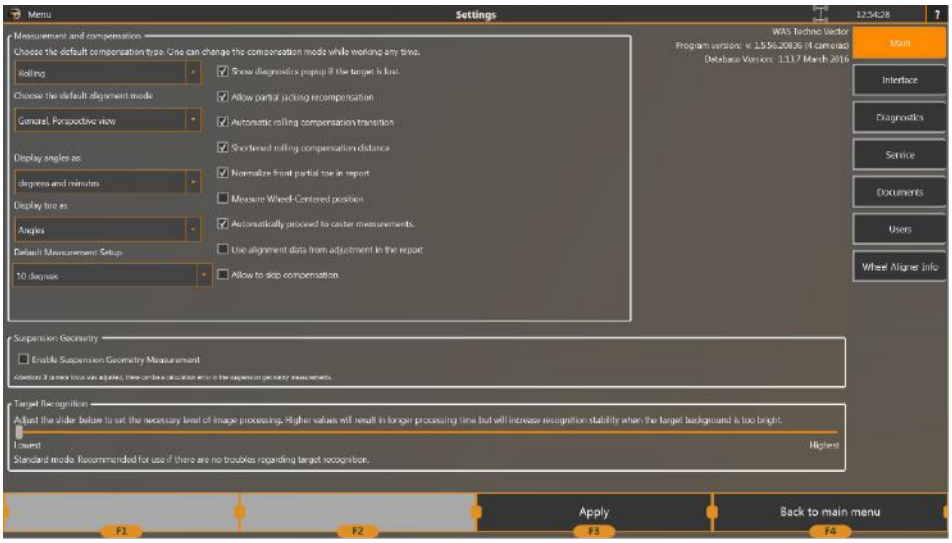


Figure 3.71 – Settings > Main

Parameter	Description
Default compensation type	Specifies the default compensation mode. The following options are available: – Rolling compensation – Jacking compensation – Rolling compensation (extended) – Forward
Default alignment mode	Specifies the screen that will be displayed when you enter the adjustment mode.

Table 3.1 - Settings > Main

3.13.2 Settings > Interface

To access these settings, the Administrator privilege level is required.

On the **Settings > Interface** screen, you can configure the software interface and graphic settings of the 3D model displayed in the adjustment, measurement, and compensation modes.



Figure 3.72 – Settings > Interface

Table 3.2 - Settings > Interface

Parameter	Description
Sound mode	The following options are available: – Full – sound effects and voice support are included – Sound and No Voice – only sound effects are included – No Sound – no sounds are included
Display animated help	If this option is enabled, the compensation and adjustment screen will show dynamic tips and hint.
Use shaders	If this option is enabled, the software will use shader effects on the loading screen. If you use an embedded graphic adapter, we recommend that you disable this option.
Draw reflections	Specifies if the software renders reflections of 3D models on the “floor”. If you use an embedded graphic adapter, we recommend that you disable this option.
Dynamic shadows	Specifies if the software renders dynamic wheel shadows of 3D models on the “floor”. If you use an embedded graphic adapter, we recommend that you disable this option.
Floor shadows	Specifies if the software renders shadows of 3D models on the “floor”. If you use an embedded graphic adapter, we recommend that you disable this option.

User Interface target FPS	Specifies the framerate per second of the interface update. The lower the value, the lower resources the user interface rendering consumes.
3D Model smoothing	Specifies the value used by the antialiasing to smooth the edges of 3D models.
Require correct data when registering an order	If this option is enabled, an order will require a proper client name (containing more than two letters) and the license plate number.
Require login and password	If this option is enabled, the software will support multiple user profiles and will prompt for a user name and a password upon startup. You can create, delete, and manage users on the Settings > Users screen.
Main menu appearance	Specifies the look of the main menu. The following options are available: – Video – Chassis image – Web camera feed
Language	Specifies the language that the software uses. This will not affect the database language[1].
Reminder to wipe cameras and targets	Specifies whether the software shows a reminder to clean cameras and targets. You can specifies the number of hours or the number of adjustments in which the reminder will be shown.
Use Web-Services	This option is obsolete and will be removed in one of the future software updates.
Input ride height instead of a table selection	Some vehicle models may require that you specify their ride height to select a proper specification table. To get their ride height, you may have to measure various parameters, typically, the front transverse link and the rear drive shaft. If this option is enabled, you can specify those parameters manually. Otherwise, you will have to select one of predefined values from a table.

3.13.3 Settings > Camera Diagnostics

The diagnostics mode is used to check the cameras video feed and their recognition capabilities.

Select a camera by pressing the corresponding button.

[1] The database includes only one language. To change the database's language, a corresponding distribution package is required.

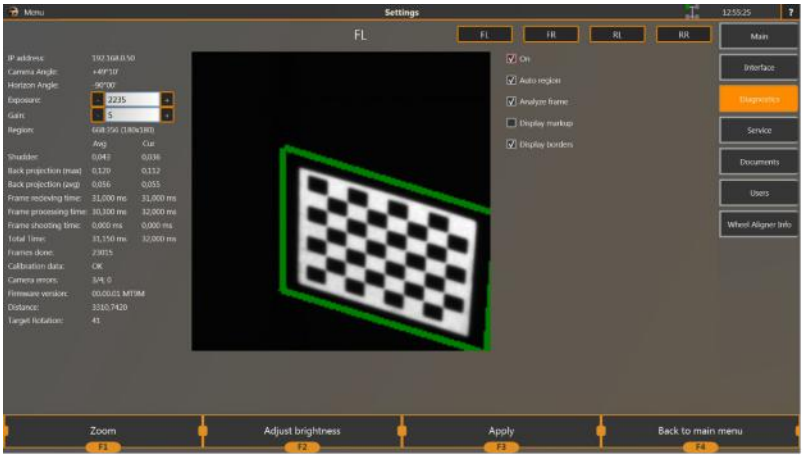


Figure 3.73 – Settings > Diagnostics

Table 3.3 – Settings > Diagnostics

Parameter	Description
On	Specifies whether the selected camera is on.
Auto region	If this option is enabled, the camera will send only the region of interest – the region where the target is located. To examine the target positioning in a full frame, disable this option. Has an effect only if the **Analyse frame** option is enabled.
Analyse frame	Specifies whether the software searches for a target in the frame.
Display markup	Specifies whether extra markup is added to the camera feed for diagnostics.
Display borders	Specifies whether borders are rendered around the frame. This can be useful when setting up the camera to adjust its position.
Compute Focus Quality	Enables the camera maintenance mode that measures the Focus quality value of the camera feed. The mode can be enabled for a single camera at a time. The mode can cause significant performance issues. We recommend that you enable it only when diagnosing camera focus issues.

3.13.4 Settings > Service



To access these settings, the Administrator privilege level is required.

You can see the detailed description of these settings in *Installation and Maintenance Manual for TechnoVector™ wheel aligners*.

3.13.5 Settings > Documents

On the **Settings > Documents** screen, you can specify the data on the car workshop where the wheel aligner resides. These data will be added to printed reports.



Figure 3.74 – Settings > Documents

Parameter	Description
Workshop name	Car workshop name to show in a printed report.
Workshop address	Car workshop address to show in a printed report.
Report message	Message at the bottom of the report.
Logo	Logo image shown in the upper right-hand corner of the document in the printed report. We recommend using images in the *.png* format with transparency or images in other supported graphical formats (*.jpg*, *.jpeg*, *.tiff*, *.bmp*, *.gif*) with white background.
Report additional message title	Title of the additional message added to the end of the printed report.
Report additional message text	Text of the additional message added to the end of the printed report.
Print-out default mode	Print report type: – Standard – shows only the wheel alignment angles. – Extended – includes a standard report and suspension geometry report.
Printed report default view	Specifies the print report view: – **Table** – Print report as a plain table. – 3D – The printed report will include 3D model of a suspension before and after the adjustment.
Do not print colour indicators	Do not include colour indicators next to parameters into the report.[1].
Do not show total order	Do not include time it has taken to complete the order into the report.

[1] Indicators are displayed only for the parameters with specifications in the database.

timespan in the report	
Print out information about the wheel aligner in the report	Include the wheel aligner information into the print report.

3.13.6 Settings > Users

To access these settings, the Administrator privilege level is required.

You can see the detailed description of these settings in *Installation and Maintenance Manual for TechnoVector™ wheel aligners*.

3.13.7 Settings > Wheel Aligner Info

To access these settings, the Administrator privilege level is required.

You can see the detailed description of these settings in *Installation and Maintenance Manual for iDEAL wheel aligners.*

3.13.8 Settings > License

To access these settings, the Administrator privilege level is required.

You can see the detailed description of these settings in *Installation and Maintenance Manual for iDEAL wheel aligners*.

3.13.9 Settings > Extensions

On this screen you can view the extensions enabled in your wheel aligner versions and configure them, if needed. Which extensions are available depends on your wheel aligner modification and on your license type.

Extensions > General extension settings

On this screen, you can configure settings common to several extensions.

Table 3.4 Settings > Extensions > General settings

Parameter	Description
Report photos	Select check boxes corresponding to extensions that you want to allow adding photos to orders: – Companion Application – Web camera
Order Data Completion	When registering a new order, the software can get data on a vehicle by its license number from existing orders and copy that data to the new order. Specify the search sources priority. By default, only the **Local order database** search option is available. The Web Service Hub option is reserved for future use.

License plate recognition	Select the camera that you will use for license plate recognition. Select the **Take a photo and look for license plates upon creating a new order** check box to have a license plate scanned and recognized automatically when a new order is created. In addition, if the software is able to get the vehicle data from the order history, it will fill all appropriate fields of the order automatically.

Extensions > Companion Application

This extension enables you to connect to your wheel aligner from mobile devices and control the measurements and adjustments from there.



Your mobile device must have the TechnoVector Remote Assistant application installed and the mobile device and the wheel aligner must be connected to the same network.

Press **Generate QRCode** and scan the generated code by using the Remote Assistant application to connect to the wheel aligner from your mobile device.

To learn more, see section *3.12.6 Controlling the wheel aligner from mobile devices*.

Extensions > Camera

This extension allows connecting a web or an IP camera to your wheel aligner to use it for license plate recognition, adding camera feed images to orders, and monitoring vehicles while positioning them in front of the wheel aligner.

Table 3.5 – Connecting a camera to a wheel aligner

Property	**Description**
Web Camera Enabled	Enables the extension.
Stream mode	Select the camera type. It can be either a web camera or an ONVIF-compatible IP-camera.
Mirror video stream in the Main menu	Enable to use the camera to monitor vehicles while positioning them in front of the wheel aligner.
Stretch video	Enable to discard the video's original aspect ratio and stretch it to fill the entire screen.
Connection settings	
For web cameras	
Web Camera Name	Select the web camera you want to use.
Web camera format	Select the aspect ratio to apply to the camera feed.
For IP-cameras	
IP address	The IP address to access the camera.
User Name, Password	If needed, specify the user name and the password to access the camera.

IP camera video engine	Select a video codec that you want to use to process the video stream. The extension supports the LAV and VLC codecs.

Depending on how you are planning to use the connected camera, configure the following extensions as well.

To add photos to orders	Enable the appropriate option of the General extension settings. See section *Extensions > General extension settings* above.
To add vehicle license plate numbers to new orders	Enable the appropriate option of the General extension settings. See section *Extensions > General extension settings* above.
To scan license plate numbers and add them to new orders automatically	Enable the appropriate option of the Plate recognition extension. See section *Extensions > Online License Plate recognition* below.

Extensions > Web camera (Legacy)

This extension is obsolete. We do not recommend that you use it. We recommend that you use the Camera extension instead (see above).

This extension allows connecting a web camera to your wheel aligner to use it for license plate recognition, adding camera feed images to orders, and monitoring the vehicle while positioning it in front of the wheel aligner.

Table 3.6 – Connecting a camera to a wheel aligner

Property	Description
Web camera enabled	Enables the extension.
Web camera name	Select the camera to use.
Mirror view in the main menu	Enable to use the camera to monitor the vehicles while positioning them for measuring

Depending on how you are planning to use the connected camera, configure the following extensions as well.

To add photos to orders	Enable the appropriate option of the General extension settings. See section *Extensions > General extension settings* above.
To add vehicle license plate numbers to new orders	Enable the appropriate option of the General extension settings. See section *Extensions > General extension settings* above.
To scan license plate numbers and add them to new orders automatically	Enable the appropriate option of the Plate recognition extension. See section *Extensions > Online License Plate recognition*Extensions > Online License Plate recognition below.

Extensions > TechnoVector Web Service

This extension is reserved for future use.

Extensions > Online License Plate recognition

To use this extension, your wheel aligner must be attached to a license that has this feature enabled.

To use the license plate recognition, the Internet connection is required, and the wheel aligner's PC must have access to web.technovector.com.

The extension enables the wheel aligner to detect and recognize license plate numbers automatically. When creating a new order, it will scan the vehicle for the license plate number and add it to the order automatically. You can also command it to scan the license plate number manually by pressing an appropriate button on the order form.

Extensions > VIN Scanner (Standard)

This extension allows connecting a VIN scanner to your wheel aligner:

1. Connect the VIN scanner to the wheel aligner's PC.
2. On the **Extensions > VIN Scanner** screen, press **Learn**.
3. Scan any VIN code with the scanner. The extension will automatically detect the scanner activity and connect the scanner to the wheel aligner. The **VID** and **PID** text boxes will show the appropriate identifiers of the connected scanner.
4. If you already know the VID and PID of your scanner, you can enter them manually and press **Learn**. The wheel aligner will connect to the scanner with the specified identifier.
5. Press **F3 (Apply)** to save the changes and bind the wheel aligner to the scanner.
6. To configure the wheel aligner to create new orders when a new VIN code is scanned, select the **Create new order, when necessary,** check box.

Extensions > Export Reports

This extension exports reports to an external file and stores them in the specified folder on your wheel aligner PC. This way, you can view reports outside of the wheel aligner software or send them to a customer or to your manager.

Reports can be exported to:

- *.json*
- *.pdf*

Table 3.7 – Exporting reports

Property	Description
Enabled	Enables the extension. The reports will be exported automatically upon completing an order.
Path	Specifies the folder on your wheel aligner PC in which exported reports will be stored. If the specified path does not exist, it will be created.
Save PDF	Select to export the reports to .pdf files. Otherwise, they will be exported to .json only.

3.13.10 Settings > Web Reports

To access these settings, the Administrator privilege level is required.



You can see the detailed description of these settings in *Installation and Maintenance Manual for iDEAL wheel aligners*.

4 Maintenance

To make sure that your iDEAL wheel aligner operates as expected, perform its maintenance regularly. The maintenance includes:

Cleaning

- Remove dust and dirt from the wheel aligner when necessary.
- To clean the wire connectors of the wheel aligner, use the rubbing alcohol.
- Wipe pivot pins of the targets, portable camera units (if your wheel aligner modification comes with any), and wheel adapters with petrol and a soft cloth.



Dirt and dust on target surface, target pins, and wheel adapters, as well as them being damaged can cause critical errors during the measurements.

- Apply greasing to guideways of tension screws and bushing of wheel adapters periodically.

Calibration

- We recommend that you perform the full calibration procedure of the wheel aligner semi-annually.
- We also recommend that you perform the calibration each time the temperature in the working area lowers or rises 8-10°C.
- If the wheel aligner has been hit or dropped or got any other type of damage that could have deformed its elements, perform the full calibration.
- Before calibrating check the device components visually and clean them with a soft cloth.

For detailed instructions on how to perform the calibration, please see *Installation and Maintenance Manual for iDEAL wheel aligners*.

5 Minor repairment

Minor repairs and after-sales service should be performed by the manufacturer's service department at the request of a client.

The following services are available:

- starting-up and adjustment works (at the request of a client, special contract is required), including assembling the device after its transportation, calibrating the device, checking if the work place complies with the requirements specified in the installation manual, and doing demo work for training customers;
- 24-month warranty;

After-sales and out-of-warranty service at the request of a customer or according to an additional contract.

6 Storage

After receiving the device verify that the set includes all the components.

The device can be stored in heated or unheated premises.

When storing the device in heated premises, the following requirements must be complied with: temperature from +5°C to +40°C, relative humidity up to 70% at a temperature of 25°C. A short increase of relative humidity up to 80% is permissible.

When storing the device in unheated premises, the following requirements must be complied with:

- temperature from -30°C to +30°C,
- relative humidity up to 80% at a temperature of 15°C.

A short increase of relative humidity up to 98% is permissible.

The average shelf-life of the device in heated premises is 5 years, in unheated premises – 0.5 year.

7 Transportation

Transportation of the device should be carried out in special package in enclosed means of transportation (enclosed freight cars, enclosed car bodies, holds, hermetically sealed compartments of aircraft).

When transported, crates with the devices should be rigidly fastened to the means of transportation.

Rules of cargo handling should be followed according to the signs on the box: Caution, Fragile, This Side Up, Do Not Turn Over, Keep Away From Water.

When the device is transported short distances, it is allowed to transport it without special package in enclosed means of transportation, but it is required to take measures not to damage it.

The device should be transported under the following conditions: the ambient temperature range of –40°C to +40°C and the relative humidity is up to 95% at a temperature of 35°C.

8 Installation

The primary installation of the device is made under a separate contract by the manufacturer service center or by a consumer; following the manufacturer's requirements is strongly recommended.

The installation is carried out according to the document *Installation and Maintenance Manual for iDEAL Wheel Aligners*.

The device works with a 4-post lift or repair pit, compliance with the horizontality requirements is needed.

Posts of the lift, other equipment, columns in the shop and other objects should not prevent you from having access to the wheels and other adjustable elements of the vehicle.

The difference in level of front turntables and rear platforms must not exceed the sizes indicated in the picture.

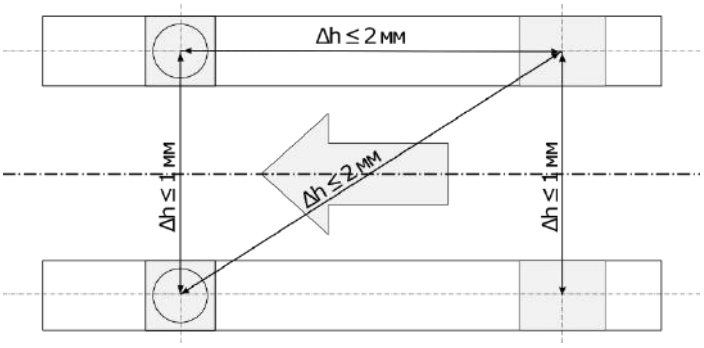


Figure 8.1 – Turntable platforms dimensions and alignment

If it is impossible to level the lift or pit according to the requirements specified above, we recommend switching on the program option Take Measurements relative to the Vehicle Plane, this will minimize errors.

The device should be installed so that the PC monitor can be seen by the technician who can be near any wheel or under the vehicle while performing wheel alignment. The recommended device location is shown below:

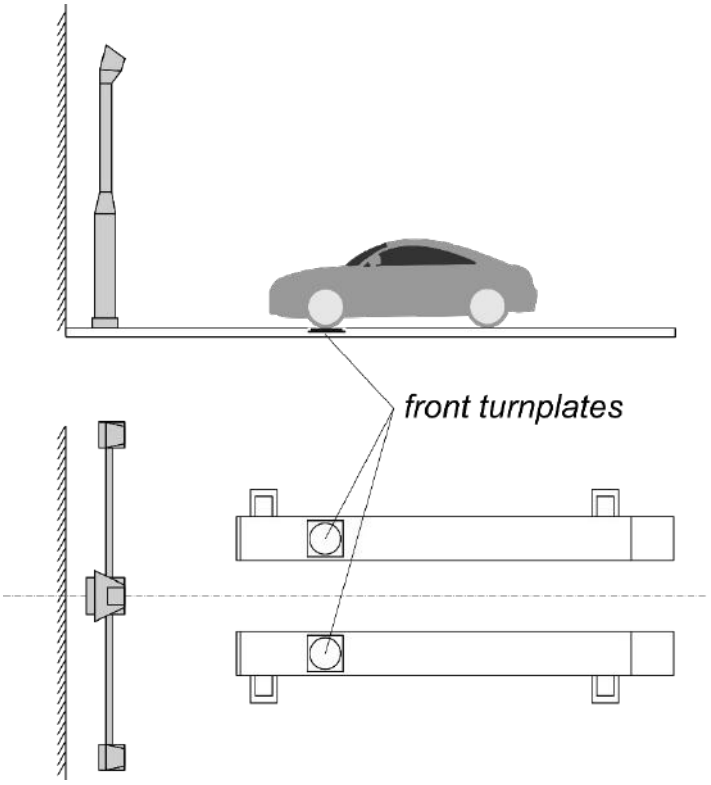


Figure 8.2 – Placing turntable platforms

Checking and setting level difference of the wheel platforms should be made before operating the device at a new workplace and also at time-from-time rechecking of the platforms; the periodicity of this procedure should be determined by a consumer due to constructive instability of the used platforms.

Checking level difference of the platforms can be made by the manufacturer's service department.

Computer cabinet is supplied assembled. Recommended positions for the power supply unit, monitor and other necessary elements are specified in the attachments.

We recommend connecting the monitor and electronic unit with a multiple socket and a voltage stabilizer.

9 OEM Warranty

The manufacturer guarantees that the device meets all the relevant machinery regulations, is free of material and manufacturing defects, and remains operational throughout its warranty period if its safety, operation, storage, and transportation requirements are complied with.

For the requirements, please see the appropriate sections of this manual.

Warranty Period

9.1.1 The device, with the exception of components listed below, is warranted against defects for a period of **24 months** from the date of supply as it is specified in the shipping documents.

9.1.2 Devices of the KIT* configuration are warranted against defects, provided that during assembly, installation and operation of such devices, all technical requirements were complied with. For instance:

– The proper grounding was provided, and the device was connected to the power supply source properly;

– The voltage of the power supply source was stable and complied with the technical specifications.

9.1.3 The following device components are covered under a separate warranty[1]:

Cameras	2 years
Cables	1 year
Power supply battery	1 year
Membrane keyboard	6 months
Wheel adaptors	1 year
Turn plates	1 year
Steering wheel holder and brake lock	1 year

9.1.4 The warranty for the PC, monitor, and other office devices supplied with the device is provided by their respective manufacturers. If a defect occurs with these devices, the Customer should apply a warranty claim to the manufacturer or the device manufacturer's agent.

You can find the necessary contact information in the documents supplied with the devices.

9.1.5 Any complains concerning the device's supply must be filed within 30 days after the device has been delivered to the customer or the dealer.

The Warranty is provided under the following conditions

– The device has been used in conditions that meet the safety, operation, maintenance, storing and transportation requirements that the device's operating guide specifies.

– All the regulations that the device operating guide and installation manual specify have been complied with.

– No third-party components have been used to repair or replace the device's original components.

– The original design of the device has not been modified.

– A consignment notes or any other legal document confirming the purchase of the device from the manufacturer, or its agent can be provided.

[1] Which components are supplied depends on the device version and modification.

Warranty Claims

Throughout the warranty period, the manufacturer is obliged to remove any defects detected in the device design or function free of charge. To apply for a warranty repair, submit a claim. It must specify the following:

- device owner;
- device serial number;
- defect description and how it affects the device operation;
- conditions under which the defect has been detected.

To submit a claim, please contact the iDEAL aligner service center. NW Equipment 406-755-0805

Getting Warranty Service

9.4.1 The warranty service can be performed in the Manufacturer's service center upon receiving the defective components, or, by mutual consent, at the device's installation location by an authorized service technician.

9.4.2 The set of equipment to be to delivered for repair must be preliminary confirmed by the Manufacturer's service department.

9.4.3 The defective components must be packaged and delivered to the service provider according to the instructions provided by the Manufacturer.

9.4.4 Travel expenses of the authorized service technician are to be paid by the Customer.

9.4.5 Any defect discovered in the device and covered by the warranty will be fixed free of charge by the manufacturer's authorized service technician. Time required for fixing a defect and other terms of fixing the defects can be negotiated.

9.4.6 While the Customer's equipment is being repaired, no rental equipment will be provided.

9.4.7 The warranty does not cover expenses on transporting the repaired equipment or replacement components to the Customer.

9.4.8 If a device component is replaced under warranty, a replacement item becomes the property of the Customer. A defective item becomes the property of the Manufacturer.

9.4.9 Components replaced on a device that is in warranty will be warranted for the duration of the device's original warranty or for 6 months, starting from the installation date, whichever is longer.

Components replaced on a device whose warranty has expired will be warranted for 6 months starting from their installation date.

9.4.10 If a warranty repair exceeds 5 weekdays, the warranty period is to be extended accordingly.

9.4.11 This warranty extends only to the original end-user purchaser of the device and is not transferrable to anyone who purchase, leases, or otherwise obtains the device from the end-user purchaser, either voluntarily or by operation of law.

The Warranty Does Not Cover

9.5.1 Defects caused by:

- normal wear and tear;
- mechanical damage;
- violating safety, operating maintenance, transportation regulations that the device operating guide specifies;
- service performed by third-party service centres not authorized to do so by the manufacturer.

9.5.2 Regular maintenance that is a part of normal device operating, as the device's operating guide specifies;

9.5.3 Accessories and components that are not supplied with the device;

9.5.4 Maintenance, repair, or replacement of the equipment that is not covered by the Manufacturer's warranty;

9.5.5 Refunds for direct and indirect loss caused by defective equipment. Indirect loss will include, without limitation, loss of use, loss of profits, interruption, or loss of business, or other economic loss;

9.5.6 Refunds for extra expenses or damage caused by the incompatibility of the device with the means of transportation, power source or other equipment;

9.5.7 Refunds for direct or indirect damage caused by using third-party equipment, supplies, or services not authorized by the Manufacturer;

9.5.8 Any issues caused by:

- Installing any software not intended for the device's operation on the device's PC;
- Device's PC being infected with computer viruses, malware, ransomware, or any other malicious software.

The Manufacture or its authorized agent reserves the right to judge whether a repair is covered by the warranty.

Any discrepancies are to be resolved according to the local warranty regulations.

The Warranty is Not Provided, if

- Buying the device from the manufacturer or its agent cannot be confirmed.
- The device has been supplied with no identification plate or its plate has been damaged or misplaced.
- The device serial number has been misplaced or is invalid.
- The device has been damaged because its safety, operational, maintenance, transportation, or storing requirements and regulations have been violated.
- Any unauthorized modifications have been introduced into the device design or function.
- The manufacturer's seals have been damaged or removed from the device, or unauthorized access to internal device function has been performed.
- The device has been connected to a power supply that does not meet the device specifications.
- In case of natural disasters, fires, transportation accidents, or any other emergencies caused by natural or technological causes, or in case of theft or damage caused by third parties.

10 iDEAL Aligner Service Center Contact info

Northwest Equipment

122 East Reserve Dr

Kalispell, MT 59901

Phone **406-755-0805**

Email **4info@nwequipmentsales.com**

Hours **8am-5pm Mon-Fri**

Appendix 1. Scope of supply

Article	Quantity, pieces
1 Accessories	
1.1 Wheel adapter (clamps)	4
1.2 Steering wheel holder	1
1.3 Brake holder	1
1.4 Turntable	2
1.5 Remote control	1
2 Computer cabinet set – type V, T, P, L	
2.1 Cabinet: stationary or mobile	1
2.2 Monitor	1
2.3 PC	1
2.4 Mouse	1
2.5 Keyboard	1
2.6 Embedded or standalone speakers	1
2.7 Power supply unit	1
2.8 Printer	1
3 Camera pillars – type H	2
4 Video cameras – depending on the modification	
12 mm, 1.3 Mpix 25 mm, 2.5 Mpix 16 mm, 5 Mpix 9 mm, 1.3 Mpix 12 mm, 5Mpix 8 mm, 5Mpix	2–4
5 Camera cables	2–7
6 Network adapter	1
7 Targets – depending on the modification	4–8
8 Probe target (option)	1

Appendix 2. Wheel Alignment Reference

Here you will find descriptions of the parameters that can be measured by the wheel aligner.

Toe

Toe is the difference of measurements taken at the front and rear wheel rim points in a horizontal plane. If the measurement taken at the front points is less than the measurement taken at the rear points (that is the wheels point towards the vehicle centreline), then the wheels are said to have toe-in, conversely – the wheels are said to have toe-out.

Before taking measurements, it is necessary to make sure there is no wheel rim run-out. An incorrect toe setting affects the directional stability and controllability in a negative way.

Toe can be measured in linear and angular measures depending on the type of the equipment used.

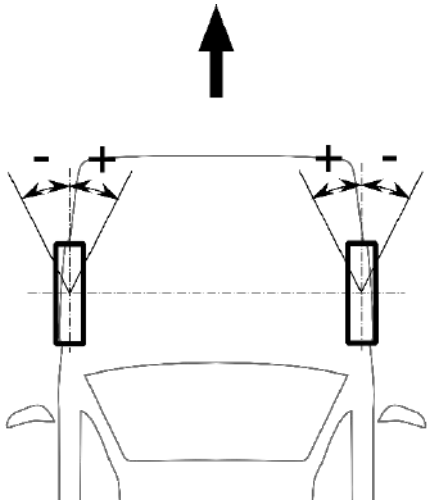


Figure 1 – Measuring toe

Toe-Out-On-Turns

Toe-Out-On-Turns is the difference of outer and inner wheel turn angles measured from the vehicle centreline.

The steering linkage is designed so that the inner wheel can turn through a smaller radius (a bigger turning angle), to reduce wheel slip.

There must be zero difference in angles when the steering is turned to the left and to the right or the difference must be within the tolerance range specified by the manufacturer (angle A).

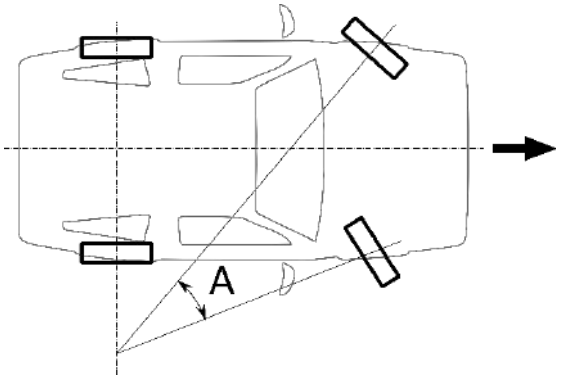


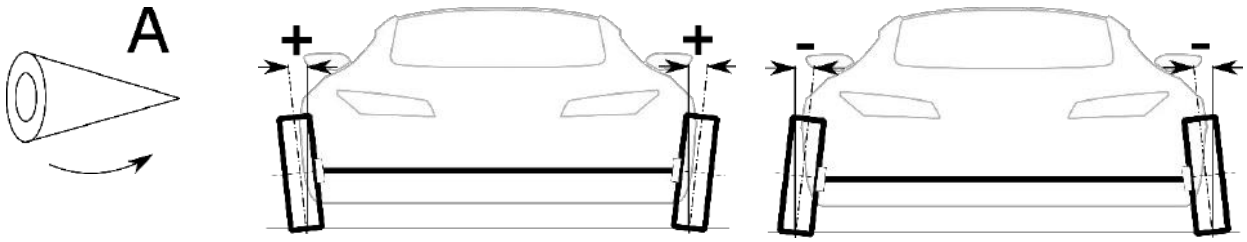
Figure 2 – Measuring toe-out-on-turns

Camber

If a wheel leans away from the vehicle, camber is positive (*b*), if wheels lean towards the vehicle camber is negative (*c*), when viewed from the front to the rear of the vehicle.

Camber effect can be examined by the example of a rolling cone (A) (rolling stabilization). The wheels which have a positive camber tend to roll from the vehicle centreline; the wheels which have a negative camber tend to roll towards the centreline.

Camber is measured in degrees with the wheels in the straight-ahead position.



a) ***b)*** ***c)***

Figure 3 – Measuring camber

SAI/KPI and Included Angle

SAI/KPI is measured from the vertical towards the vehicle centreline (A).

Many suspension systems do not have a kingpin, and in this case, we can speak about an imaginary KPI, replaced by the axis which passes through the ball joint centres.

Adding together the camber angle and SAI/KPI angle gives the included angle. Camber angle and SAI/KPI angle axes intersect at some point. If the lines intersect below the road surface, the dimension C is a positive scrub radius, if the lines intersect above the road surface, the scrub radius is negative.

Small scrub radius stabilizes the steering. On vehicles with diagonal split brake circuits negative scrub radius stabilizes the steering when the braking forces are unbalanced on the steerable wheels.

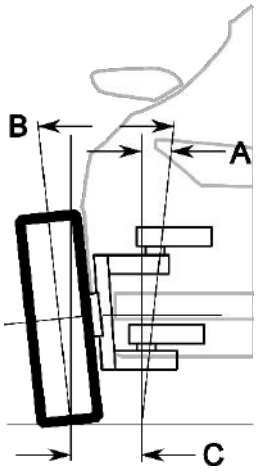


Figure 4 – Measuring SAI/KPI

Caster

The caster angle is measured from the vertical as viewed from the side of the vehicle.

It affects the directional stability of the steering.

The caster angle is usually set up positive to provide self-cantering of the steering wheel.

Lock Angle

Lock angle is the angle of the inner and outer wheels on left-hand or right-hand lock relative to the straight-ahead position.

The inner wheel swing angle is much bigger than the outer wheel swing angle (A).

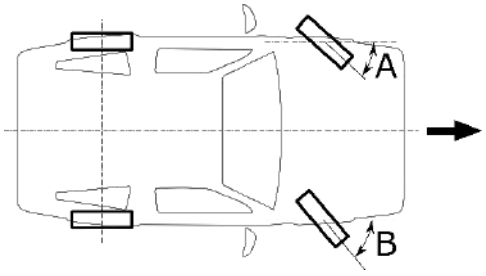


Figure 5 – Inner and outer swing angle

Axis of Symmetry and Thrust Axis Deviation

Axis of symmetry is the line connecting the centres of the front and rear axles (A).

Incorrect toe setting of the rear and front wheels may cause the deviation of the vehicle travel from the centreline.

Symmetry breakdown is known as the thrust axis deviation.

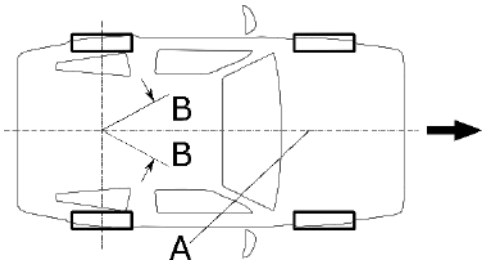


Figure 6 – Axis of symmetry

Wheel Setback

Wheel set-back (X) is measured at the wheels of one axle. It can be measured in linear and angular measures.

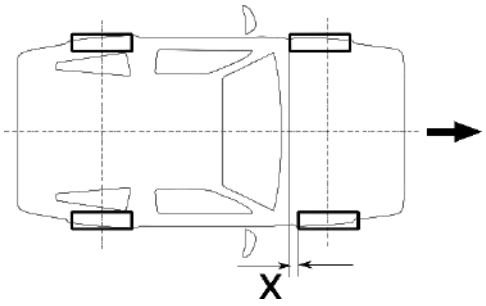


Figure 7 – Measuring wheel setback

Thrust Line and Thrust Angle

Thrust Line for motor car is determined by the position of rear wheels of a car. Thrust Line is formed by the bisector of toe of the rear left and rear right wheel. The angle between the thrust line and the vehicle centreline is Thrust Angle.

The Thrust Angle is positive if the Thrust Line is deflected to the right from the vehicle centreline.

Axle Setback

Axle Setback is the angle between the perpendicular to the line that connects the centres of the left and right wheels and the longitudinal line of the vehicle.

Axle Setback is positive if the left wheel is shifted forwards relative to the right wheel.

Parallelism and scrub angle

Mutual alignment of axles is crucial for **trucks**.

Adjacent axles form a **tandem**. For each axle there is a line called a **thrust line**. It is formed by a bisector of left and right toes. The angle between a thrust line and the vehicle centreline is a **thrust angle**.

For a tandem, the angle between its thrust lines is a **tandem scrub angle**. This is the major parameter for tandem adjustment. Its recommended value is **0°0'**.

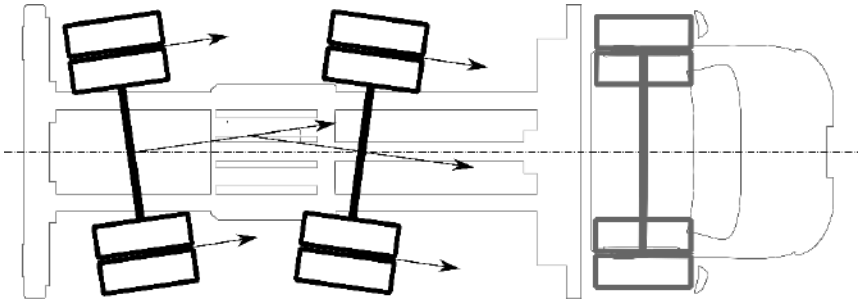


Figure 8 – Tandem scrub angle

The thrust angle is positive if the axle's thrust line is turned clockwise relative to the vehicle centerline.

Scrub angle is positive if the tandem's rear axle's thrust line is turned clockwise relative to the tandem's front axle's thrust line.

Another crucial parameter is called **parallelism**. If you draw a line through the centres of wheels of tandem's each axle, the angle that is formed by these two lines defines the **axle parallelism**.

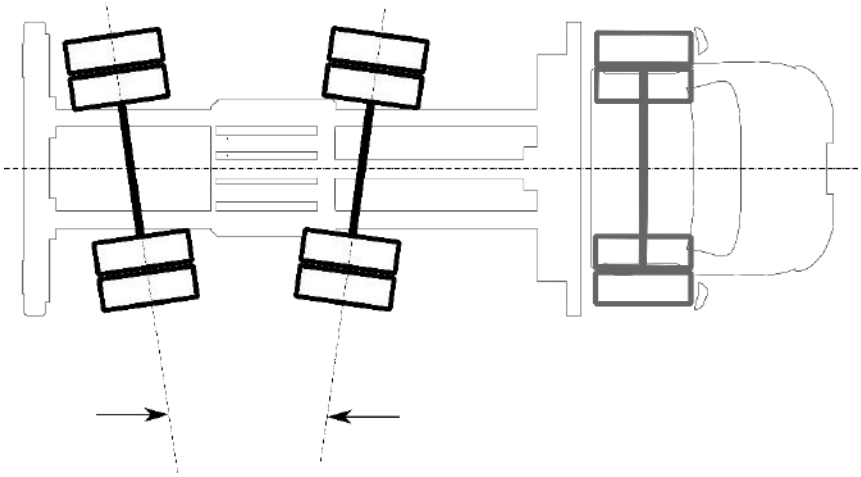


Figure 9 – Parallelism

However, because the axle's travel direction is the thrust line, for the sake of accuracy you should choose the scrub angle as a reference point when performing the alignment.

Ride Height and Load Positioning

Some vehicle manufacturers require to perform alignments with the vehicle laden in a certain way.

The load must be positioned on the front (A) and rear (B) seats and in the trunk (C), depending on the vehicle model.

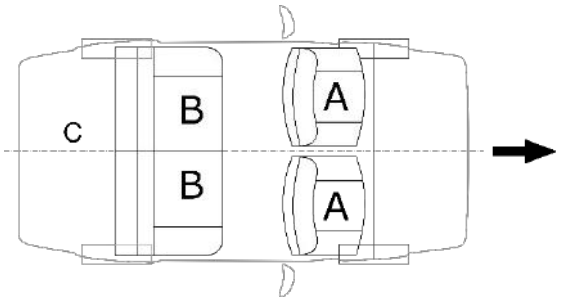


Figure 10 – Load positioning

Tire Wear

Incorrect wheel alignment causes quick tire wear. Tire wear peculiarities caused by incorrect toe setting are shown in figure 11: excessive toe-out causes feathering (A) and wear on the inside shoulder of the tire (B).

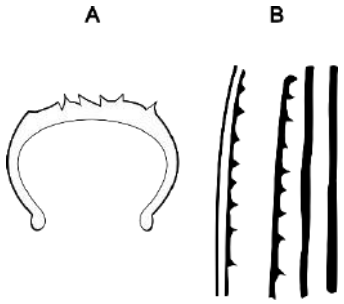


Figure 11 – Tire wear

Adjustment

Typical adjustment procedure

1. Check:
   a. Tire size and tire pressure.
   b. Suspension spring condition (vehicle visibly level).
   c. The steering mechanism and linkage for excessive free play.
   d. Wheel bearing adjustment.
   e. Wheel run-out (buckled rims must be replaced).
2. Load the vehicle according to its vendor's guidelines.
3. Bounce the vehicle on suspension with the handbrake off.
4. Set the steering mechanism in the centre position.

Adjustment types

1. **Toe** – toe adjustment can be usually performed by changing the length of the track rod after loosening the lock-nut and the clamp (figure 12). The track rod end rotation must be equal on both sides of the vehicle.

2. **Caster** is adjustable by changing the length of the tie rod (figure 13) or changing the thickness of shims under the wishbone mounting (figure 14).

3. **Camber** – in most cases camber is adjustable by:

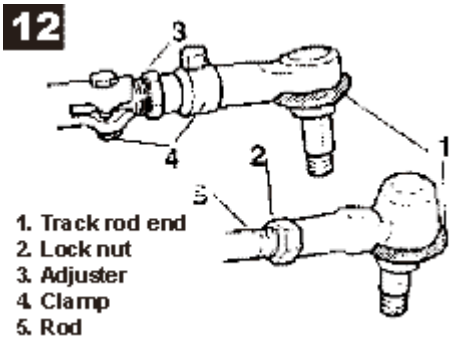
   a. changing the position of the top of the McPherson strut

   b. changing the thickness of shims under the wishbone mounting (figure 14)

   c. changing the ball joint position on the wishbone (figure 15, A)

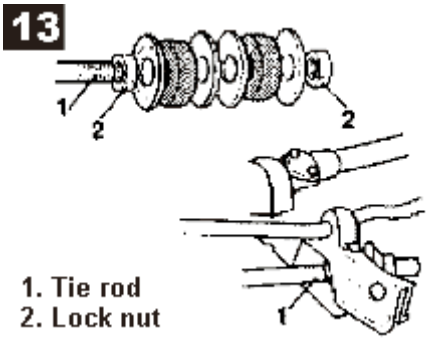
   d. adjusting the cam at the bottom of the strut (figure 15, B).

12



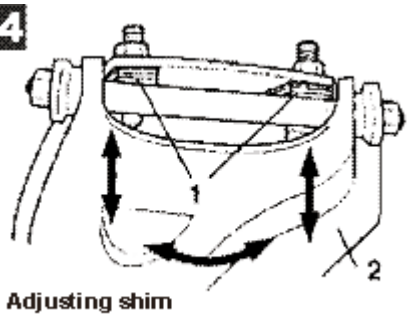
1. Track rod end
2. Lock nut
3. Adjuster
4. Clamp
5. Rod

13



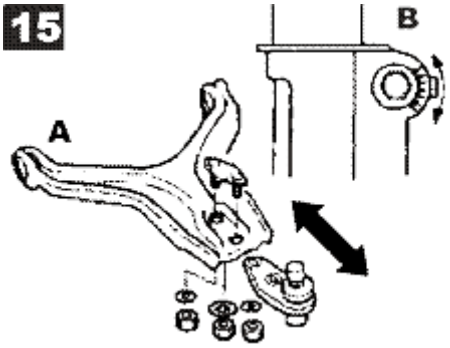
1. Tie rod
2. Lock nut

14



1. Adjusting shim
2. Wishbone

15



Appendix 3. Frequently Asked Questions

Vector Software

Question	Answer
Why is the **After** column empty in the Report?	The **After** column will be filled after the second measurement only (**F3 (Repeat measurement)** in the Report mode). This happens because the alignment values are calculated during the adjustment approximately and cannot be considered reliable.
Can I view the images available for the selected vehicle model after the adjustment has started?	Yes, you can. To do this, click  in the upper left corner of the screen and view the images in the resulting popup window. To close the window and return to your current task, click anywhere outside the window. If this widget is not available in your wheel aligner modification, select **View Images** from the main menu of the wheel aligner software. To return to the Adjustment mode, press **F4**.
My vehicle model is not in the database. What should I do?	Check the version of the vehicle database installed on your computer. To do this, select Information from the **Main** menu and locate the database version in the table. Check if there is a database update available at our website technovector.com and install the update. If the latest database version available does not have the model you need, you can add the model and set its wheel alignment values manually. See the Custom Models section above.
How can I add a custom vehicle to the database?	On the Model selection screen, click **Custom Models** and then click **Add Custom Model**. On the resulting Custom Model screen, enter the manufacturer name, model name, and wheel alignment values. Press **F2 (Save)** to save data.
How can I find a vehicle in the database?	On the **Model selection** screen, press **F1 (Search)**. On the resulting **Search** screen, type the model name or part of it in the **Search** field. The screen will show all the models that match the typed text.
Can I use various compensation methods for various vehicles without re-adjusting the software settings?	Yes, you can. During the compensation, to change the current compensation mode, press **F1 (Change Compensation Mode)**, select the desired compensation type, and press **F2 (Select)**.
Can I perform the rolling compensation for all wheels and then the	Yes, you can. Enable the **Settings > Main > Allow partial jacking recompensation** setting. This way, you will be able to perform the jacking compensation without discarding the rolling compensation results.

jacking compensation for a single wheel?	
How can I view suspension geometry measurements?	To do this, enable the **Settings > Main > Enable Suspension Geometry Measurement** setting. You will be able to view the suspension geometry in the Report.

Wheel Alignment

Question	Answer
What are the major indicators that show that it is necessary to check the wheel alignment?	Checking the wheel alignment is necessary: – After the following chassis repairs: o Track rod replacement o Ball joint replacement o Idler arm replacement o Steering reduction gearbox replacement o Suspension arm replacement o Silent block and spring replacement (must be re-checked every 2000-3000 km) – After adjusting the vehicle clearance – If the vehicle pulls to the left of right when driving forward or if the steering wheel is off-centre – Erratic steering – Dull or slow steering – Stiff steering – Pulling or drifting when braking, given that the brakes are in order – Rim or suspension deformations, for example, caused by hitting an obstacle – Excessive tire wear – If the right and left turning radius are not the same or if the wheels hit arch lines when turning – If the steering wheel is not returning to the centre after the turn – After buying a used vehicle or after running in a new vehicle
Why is the steering wheel of-centre when driving forward?	This can be caused by any of the following: – Steering free play. When driving, the steering free play can cause the steering wheel to tilt. – The vehicle's rear axle is not aligned properly. This can happen if only the vehicle's front axle has been aligned. – High rear cross camber. Especially, if one wheel has a positive camber, and another one - a negative camber. – Difference between the front and rear tire pressure is too high. – Hidden chassis faults that were not discovered before the wheel alignment adjustment. **Note**: If in addition to the steering free play, the vehicle pulls to either side, first fix the pulling, and then settle the proper steering wheel position.
The wheel alignment has	– Tire non-uniformity (for instance, conicity). Typically, it is caused

been adjusted correctly. However, the vehicle is still pulling one direction or another. Why does this happen?	by manufacturing defects and can happen even with new tires. – To check this, you can swap the left and right front wheels. If the vehicle will pull to another direction, you know it is the tires that cause the pull. – Swap the wheels in various combination until you find the one that does not cause the pull. – If the tires have a designated rotation direction (usually, marked by an arrow), adjust their position on the rim accordingly. – Excessive tire imbalance. – Deformed rims. – Deformed axles or incorrect wheel alignment. This can happen if only the front axle's wheel alignment has been adjusted. To adjust the wheel alignment properly, both the front and rear axles must be adjusted. – Hidden chassis defects that have not been discovered before the wheel alignment has been performed.
Before the wheel alignment adjustment, there were no pull to either side, but there was the excessive tire wear. After the adjustment, the vehicle has started pulling. Why is this happening?	Most like, this is caused by tires (see the item above). The pulling caused by the defected tires was compensated by the pulling caused by an incorrect wheel alignment, so the vehicle was driving straight. After the wheel alignment has been adjusted, there is nothing to compensate the pulling caused by the defected tires.
There is no pull and there is no excessive tire wear, but the steering is stiff. What can be the reason of this?	– Either the ball joints, or track rods are tight. They may loosen a bit over time. – The idler arm of the steering reduction gear box is too tight. This can be fixed by adjusting them manually. – Incorrect wheel alignment. – The actual rim offset value does not match the one recommended by the manufacturer. You can find the recommended rim offset value (ET) stampeded on the rim. – Tire pressure is low.
There has been no accidents and the vehicle has not been subdued to a chassis repair. Why has the vehicle's wheel alignment changed?	This can happen because of any the following: – As the vehicle is aging, its springs and silent blocks are wearing out and sagging. This affects the vehicle's clearance, that in its turn, affects its wheel alignment. – Micro gaps in suspension pivot connections can affect the wheel alignment significantly.

LIMITED WARRANTY

Structural Warranty:

The following parts and structural components carry a five-year warranty:

Columns	Arms	Uprights	Swivel Pins
Legs	Carriages	Overhead Beam	
Tracks	Cross Rails	Top Rail Beam	

Limited One-Year Warranty:

Tuxedo Distributors, LLC (iDEAL) offers a limited one-year warranty to the original purchaser of Lifts and Wheel Service equipment in the United States and Canada. Tuxedo will replace, without charge, any part found defective in materials or workmanship under normal use, for a period of one year after purchase. The purchaser is responsible for all shipping charges. This warranty does not apply to equipment that has been improperly installed or altered or that has not been operated or maintained according to specifications.

2 Other Limitations:

This warranty does not cover:

1. Parts needed for normal maintenance
2. Wear parts, including but not limited to cables, slider blocks, chains, rubber pads and pulleys
3. Replacement of lift and tire changer cylinders after the first 30 days. A seal kit and installation instructions will be sent for repairs thereafter.
4. On-site labor

Upon receipt, the customer must visually inspect the equipment for any potential freight damage before signing clear on the shipping receipt. Freight damage is not considered a warranty issue and therefore must be noted for any potential recovery with the shipping company.

The customer is required to notify Tuxedo of any missing parts within 72 hours. Timely notification must be received to be covered under warranty.

Tuxedo will replace any defective part under warranty at no charge as soon as such parts become available from the manufacturer. No guarantee is given as to the immediate availability of replacement parts.

Tuxedo reserves the right to make improvements and/or design changes to its lifts without any obligation to previously sold, assembled, or fabricated equipment.

There is no other express warranty on the Tuxedo lifts and this warranty is exclusive of and in lieu of all other warranties, expressed or implied, including all warranties of merchantability and fitness for a particular purpose.

To the fullest extent allowed by law, Tuxedo shall not be liable for loss of use, cost of cover, lost profits, inconvenience, lost time, commercial loss or other incidental or consequential damages.

This Limited Warranty is granted to the original purchaser only and is not transferable or assignable.

Some states do not allow exclusion or limitation of consequential damages or how long an implied warranty lasts, so the above limitations and exclusions may not apply. This warranty gives you specific legal rights and you may have other rights, which may vary from state to state.

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