

Technical Bulletin



Model(s)	Year	Eng. Code	Trans. Code	VIN Range From	VIN Range To
Jetta Sedan	2011-2013	All	All	All	All
Passat, Beetle	2012-2013	All	All	All	All

Condition

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Four Wheel Alignment Overview

This Technical Bulletin provides an overview for performing vehicle four Wheel Alignment and information on improving vehicle pull/drift using selective tire placement. The information provided is based on the Hunter alignment equipment and the Hunter GSP9700 balancer with StraightTrak. The general information provided in the bulletin, such as alignment terminologies, warranty information and Vehicle drift/pull diagnosis is not dependent on the alignment equipment and still applies with the use of other alignment equipment.

The following topics are addressed in this bulletin:

1. Alignment Terminologies
2. Toe adjustment –Steering Wheel Off Center (SWOC)
3. Camber adjustment
4. Caster measurement
5. Selective tire placement to improve vehicle pull/drift due to road crown.
6. Warranty

Technical Background

The information provided in this bulletin is intended to assist technicians in obtaining the correct alignment results and maximize the use of the alignment and tire balancer equipment. Vehicle alignment should always be performed base on the information published in the service manual.



Note:

A copy of the alignment before and after measurements must be filed with the Repair Order. If a Volkswagen Technical Assistance (VTA) ticket was opened, the alignment before and after measurement should be attached before the VTA is closed.

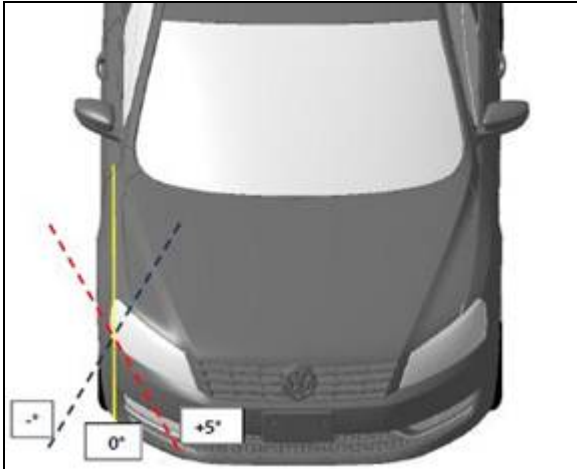
Production Solution

Not applicable.



Service

1. Alignment terminologies



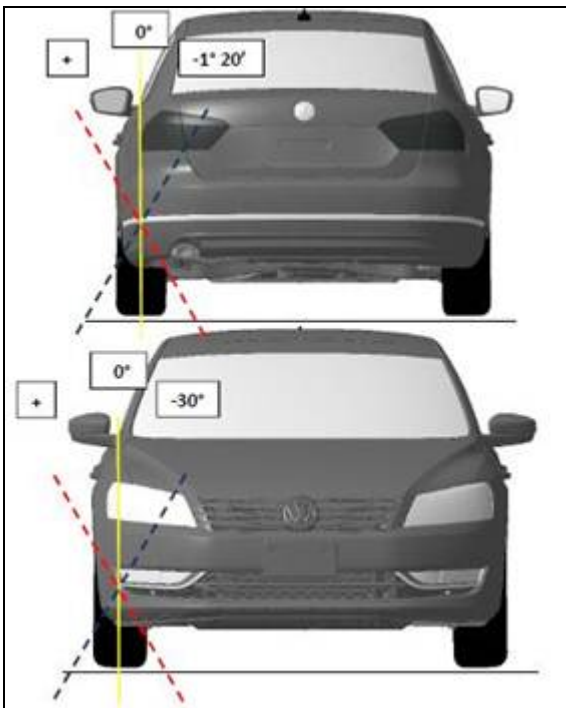
TOE - The amount the tires point inwards or outwards when viewing the car from above.

Figure 1

Positive toe (red line) or Toe-in: The tires point inwards towards the center of the vehicle.

Negative toe (blue line) or Toe-out: The tires point outwards away from the center of the vehicle

Figure 1

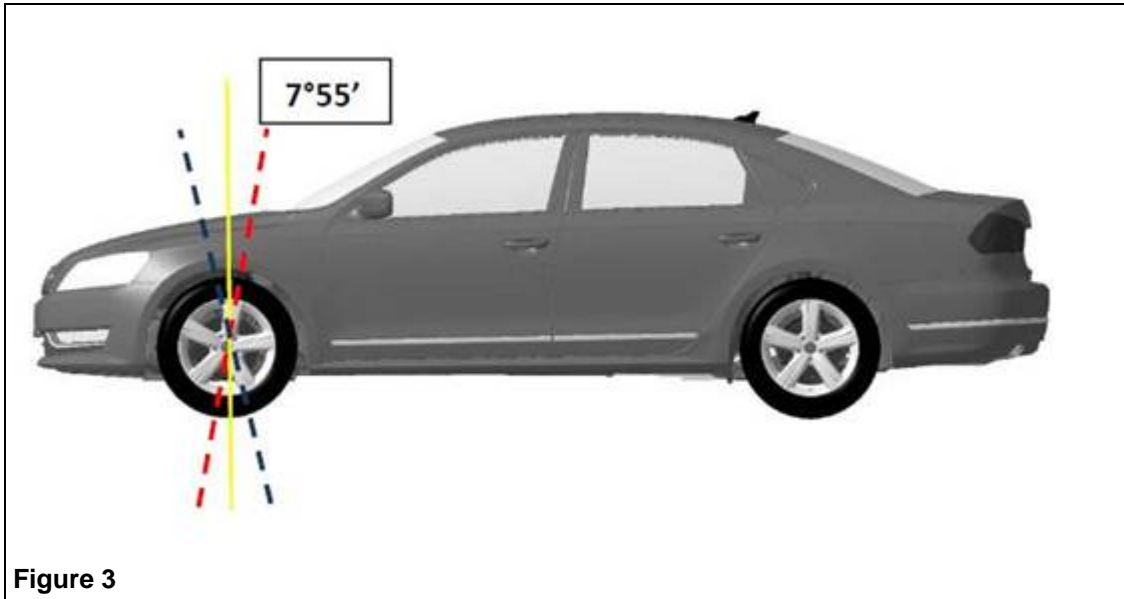


CAMBER - Angle between the vertical axis of the wheel and the vertical axis of the vehicle when viewed from the front or rear.

Positive (red line): The upper sidewall of the tire is tilted outwards away from the center of the vehicle.

Negative (blue line): The upper sidewall of the tire is tilted towards the center of the vehicle.

Figure 2



CASTER - When viewing a car from the side, the angle of the vehicle's steering axis is defined by drawing a line through the upper and lower ball joints (for a double wishbone front suspension), or through the strut tower mount and the lower ball joint.

Positive (red line): The line leans towards the rear of the car.

Negative (blue line): The line leans towards the front of the car.



Tip:

For additional information on wheel alignment see Self Study Program (SSP) 860103 – Wheel Alignment – Basics.



2. Toe adjustment – Steering Wheel Off Center (SWOC)

Front and rear toe adjustment procedures are located in the repair manual under, Repair Manual > Chassis > Suspension, Wheel, Steering > 44 Wheels, Tires, Wheel Alignment > General Information.

When performing wheel alignment, the steering column must be adjusted to the center tilt position. This is due to steering wheel off set of up to 1.2 degrees from center tilt position of the steering column to the full up or the full down tilt position. See illustration 4 & 5 below.



Tip:

The tools shown in figure 4 & 5 were used to demonstrate the steering wheel off set. These are not dealer required tools.



Steering wheel in the fully up tilt position and off set to the right.

Figure 4



Steering wheel in the fully down tilt position and off set to the left.

Figure 5



Tip:

For a video demonstration of steering wheel off set, go to: [VWWebsource](#) > [Select your view: After sales](#) > [Quick Tips](#) > [Quick Tips for Technicians](#) > [Chassis](#).



Note:

DO NOT remove the steering wheel from the steering column to correct steering wheel off center. If it has been determined that the steering wheel is off center with the steering in the center tilt position, an alignment should be performed and the toe adjusted to correct the steering position.

3. Camber adjustment

Camber adjustments should be made based on the information in the repair manual.



Note:

If the sub-frame bolts are loosened / removed to adjust camber, the bolts MUST be replaced with new bolts. Sub-frame bolts are torque to yield and should never be re-used after they are loosened.

4. Caster Measurement

Caster is not an adjustable angle for the models addressed in this bulletin.

1. When performing alignment using the Hunter equipment, after the initial "Before" measurements are displayed, additional steps are required to read the correct caster measurement. Without these additional steps, the equipment may display caster measurements that are out of specification. Please follow the steps below to obtain the correct caster measurements.



When the initial "Before" measurements are displayed, scroll down to make additional measurements.

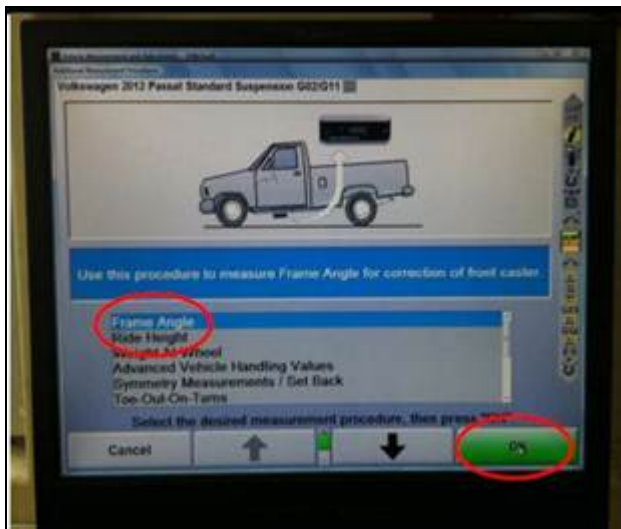
Figure 6

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Press K3 to select > Make Additional Measurement.

Figure 7



Scroll down to select > Frame Angle > Press K4 to select OK.

Figure 8



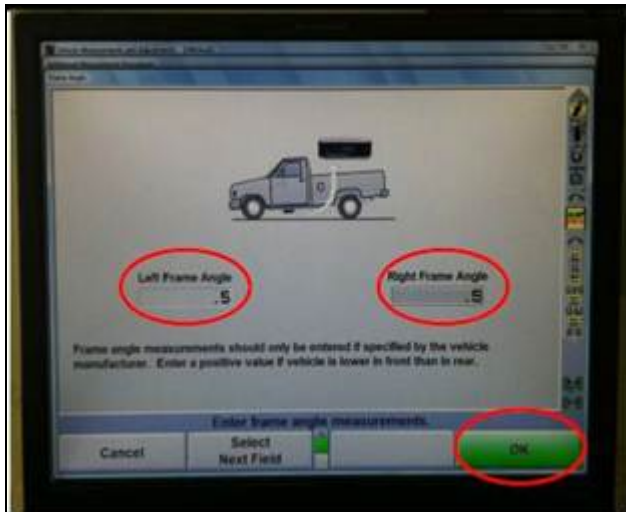
Measure the vehicle frame angle at the door sills using a digital level (accelerometer).

 **Tip:**

The frame angle for the car in figure 9 measures 0.9°, where the rear is higher than the front. The nominal frame angle is 0.4° by design and must be subtracted from the measured frame angle.

For example $0.9^\circ - 0.4^\circ = 0.5^\circ$

Figure 9



Enter the angles in the left and right frame angle fields > press K4 to select OK.

The caster measurement will now read correct. Please note that cross caster measurement will remain the same.

Figure 10

 **Tip:**

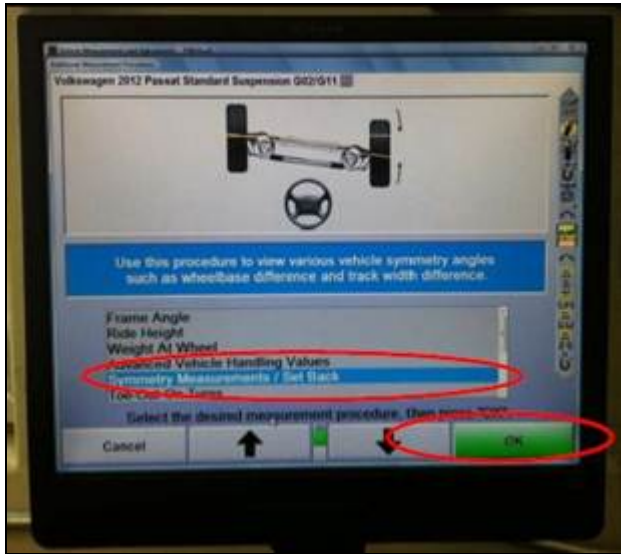
If the tool to measure frame angle is not available, measure the vehicle ride height (Standing height), and if within specification per the repair manual, enter 0.4° for the left and right frame angle.

Vehicle ride height and symmetry measurement/Set back are very important when diagnosing vehicle suspension or drifting/pulling concerns. To include these measurement in the alignment summary select K3 > Make Additional Measurement and scroll down to select these measurements.

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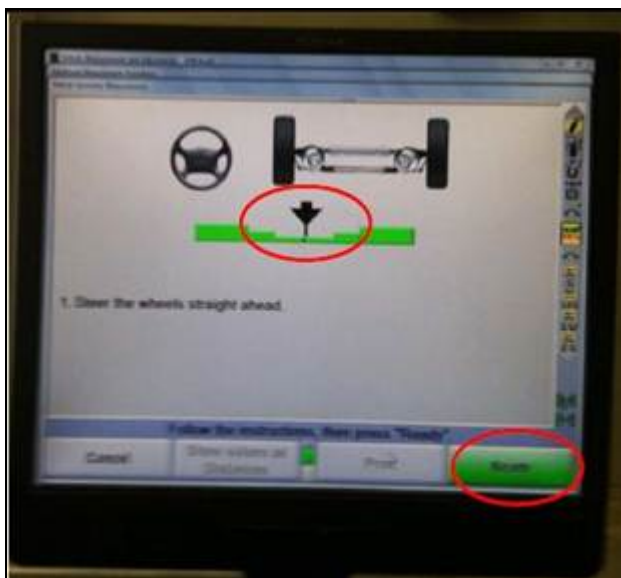


Axle symmetry measurements/ set back are displayed in angles. For easier understanding it is best to have the measurements displayed in distances. Follow the procedures below to measure axle symmetry and display the measurements in distances.



After selecting "Make Additional Measurements", scroll down and select > Symmetry Measurements/ Set Back > Press K4 for OK.

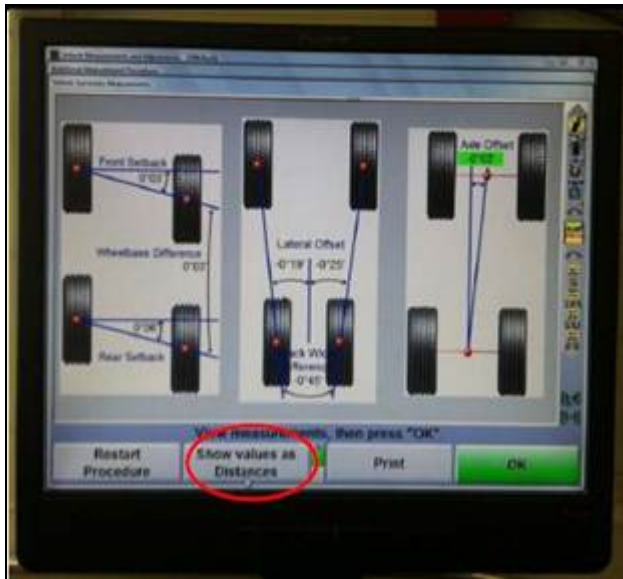
Figure 11



Center the front wheels as shown on the monitor. > Press K4 for Ready.

Figure 12

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The axle symmetry/ set back will be displayed in angles. To show angles as Distances > Press K2.

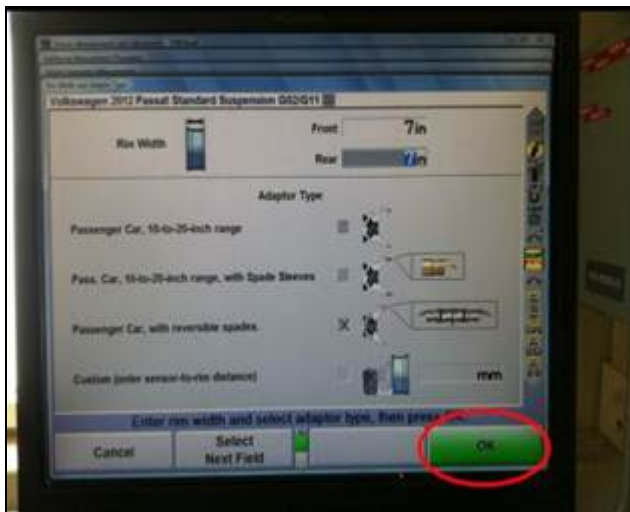
Enter the Rim Width

16" = 6.5"

17" = 7"

18" = 8"

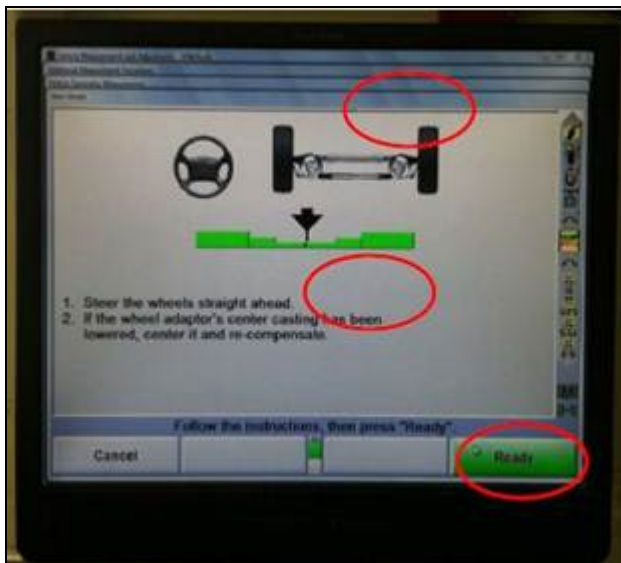
Figure 13



Ensure that the correct box is checked depending on the type of wheel clamp spade that is used > Press K4 for OK.

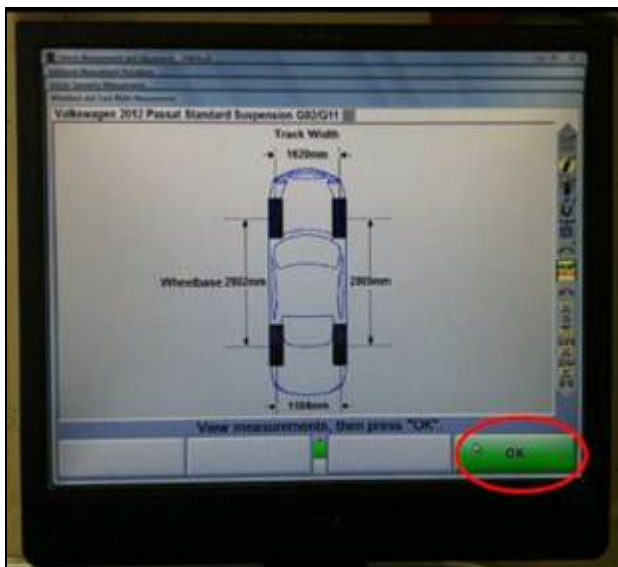
Figure 14

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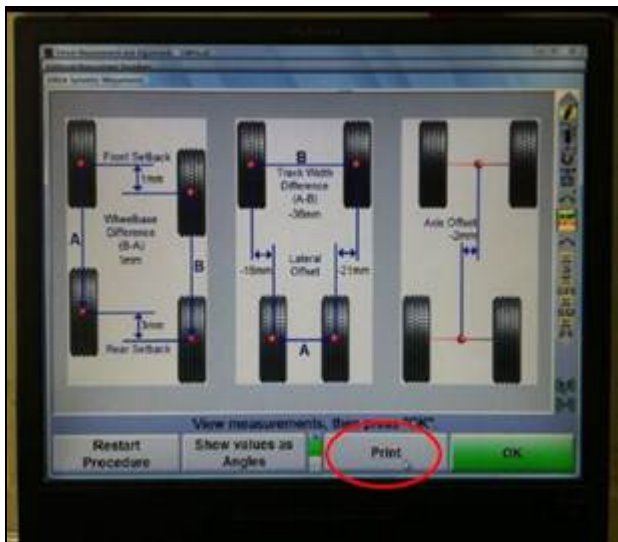
Steer the wheels straight ahead as instructed > Press K4 for Ready.

Figure 15



Track and wheelbase screen is displayed > Press K4 for OK.

Figure 16



The axle symmetry measurement/ set back will now display in distances. Press K3 to print the alignment summary page.

Figure 17

5. Selective tire placement to improve vehicle drift due to road crown

Vehicle pull/drift diagnosis



Note:

It is normal for a vehicle to drift to the right if the steering wheel is released while driving. Road crown will have the most significant effect on the time it takes for a vehicle to drift out of its lane. Always test drive the vehicle to determine that the vehicle drift is significant before making any repairs.

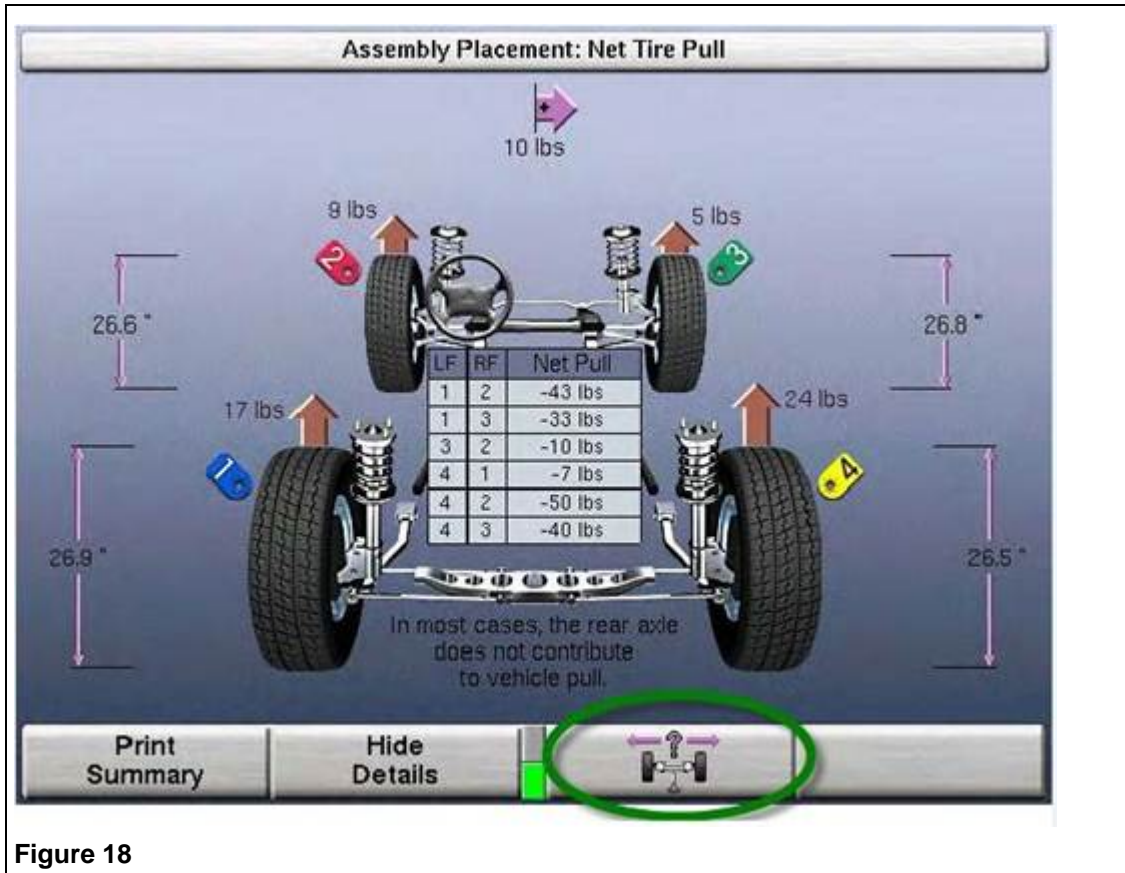
If it has been determined that a vehicle has a significant drift and the alignment measurements are within specification, the time it takes for the vehicle to drift out of the driving lane can sometimes be improved by relocating the tires on the vehicle. The Hunter GSP9700 StraightTrak feature can be used to improve vehicle drift by suggesting that the tires be placed at specific locations on the vehicle. See figure 18 below.



Tip

For details of utilizing this feature, please reference the Hunter GSP9700 operation instructions. A copy of the document is located in Service Net under Workshop Equipment > Instruction Books > Hunter GSP9700 Road Force Wheel Balancer Operating Instructions.

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When the suggested tire placements are displayed, illustration 18, select the combination that will best suit the vehicle driving conditions and then test drive the vehicle to check for improvement.

Tip:

The highest net pull is not always the ideal placement for the tires. A high net pull could cause the vehicle to start pulling in the opposite direction.

It is always best to select the tire placement that will place a tire with high Road Force Variation (RFV) to the rear of the vehicle. For example, in illustration 18 the tire placement to achieve -7 lbs net pull to the left will put tire # 4 on the left front of the vehicle. This may cause the customer to complain of vibration.

Note:

If the vehicle alignment is within specification and you are unable to improve the vehicle drift using selective tire placement, open a VTA ticket and contact the Technical Helpline at 877-678-2389.

If the vehicle alignment is within specification, DO NOT attempt to improve the vehicle drift by shifting the vehicle sub frame to optimize the alignment measurements. That process will have no significant effect on the vehicle drift.

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Warranty



Note:

Please refer to the policy and procedure book for coverage.

PID 4485 should be used for all claims related to vehicle pulling/drifted or steering wheel off center. If alignment is required due to parts replacement, the claim should be filed under the PID for the causal part. DO NOT use PID 4485 to file claims for physical defects to steering components.

To determine if this procedure is covered under Warranty, always refer to the Warranty Policies and Procedures Manual ¹⁾					
Model(s)	Year(s)	Eng. Code(s)	Trans. Code(s)	VIN Range From	VIN Range To
Passat	2012 -2013	All	All	All	All
Jetta	2011 - 2013	All	All	All	All
Beetle	2012 - 2013	All	All	All	All
SAGA Coding					
Claim Type:	9 – 10				
Service Number:	Damage Code	HST		Damage Location (Depends on Service No.)	
4485	0011	--		Use applicable when indicated in ElsaWeb (L/R)	
Parts Manufacturer	Passat				TX2 ²⁾
	Jetta Sedan, Beetle				3ME ²⁾
Labor Operation ³⁾ : Remove and Install 4 Wheels.			44052099 = 30 TU		
Labor Operation ³⁾ : Perform road force balance (Front & Rear axle).			44059499 = 70 TU		

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Labor Operation ³⁾: Modify Front & Rear Axle measurements. <u>Includes</u> <ul style="list-style-type: none"> • Modify Front Toe Adjustment (left and right side) • Modify Rear Toe Adjustment (left and right side) • Modify Front Camber Adjustment (left and right side) • Modify Rear Camber Adjustment (left and right side) 		44851699 = 90 TU
Causal Part:		Select labor operation 44851699
Diagnostic Time ⁴⁾		
GFF Time expenditure	01500000 = 00 TU max.	NO
Road Test	01210002 01210004	YES
Technical Diagnosis	0132xxxx = 00 TU max.	NO
Claim Comment: Input "As per Technical Bulletin 2031087" in comment section of Warranty Claim.		
<p>¹⁾ Vehicle may be outside any Warranty in which case this Technical Bulletin is informational only</p> <p>²⁾ Code per warranty vendor code policy.</p> <p>³⁾ Labor Time Units (TUs) are subject to change with ELSA updates.</p> <p>⁴⁾ Documentation required per Warranty Policies and Procedures Manual.</p>		

Required Parts and Tools

No special parts required.

Tool Description	Tool No:
Alignment Equipment	VAS 6292 or Equivalent
Tire Balancer	VAS 6230A or Equivalent

Additional Information

All part and service references provided in this Technical Bulletin are subject to change and/or removal. Always check with your Parts Dept. and Repair Manuals for the latest information.