



# Technical Bulletin

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Model(s)	Year	Eng. Code	Trans. Code	VIN Range From	VIN Range To
Passat	2013-2014	All	All	All	All

## Condition

**44 13 05** October 24, 2013 **2031087** Supersedes T.B. V441304 dated June 27, 2013 to add model year 2014 and to remove model year 2012 along with models Jetta, Jetta Hybrid, Beetle Sedan and Beetle Convertible applicability.

### Four Wheel Alignment and Vehicle Drift-Pull Overview

This Technical Bulletin provides an overview for performing vehicle four Wheel Alignment, and information on improving vehicle drift/pull using selective tire placement. The information provided is based on the Hunter alignment equipment, Hunter GSP9700 with StraightTrak® (VAS 6230x ) and John Bean RFV2000 with OptiLine (VAS 6311A) diagnostic balancer. The alignment information provided in this bulletin is not limited to the Hunter alignment equipment, and still applies with the use of other Volkswagen approved alignment equipment. The diagnostic procedure for selective tire placement, to improve vehicle drift/pull, will require the use of one of the diagnostic balancers previously mentioned.

**The Service Information in This Technical Service Bulletin is divided into four (4) Sections:**

**Section 1: Alignment overview**

**Section 2: Pre-Delivery Inspection (PDI), vehicle drift/pull concerns.**

**Section 3: Customer concerns for vehicle drift/pull**

**Section 4: Using Volkswagen approved diagnostic balancers to address vehicle drift/pull**

**The following topics are addressed in this bulletin:**

1. Alignment Terminologies
2. Toe adjustment
3. Camber adjustment
4. Caster measurement
5. Selective tire placement to improve vehicle drift/pull.

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## 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 based on the information published in the service manual.



**Note:**

**The repair procedures outlined in this bulletin, to address vehicle drift/pull will be covered ONLY ONCE under warranty, within the first 3 Months/3000 miles of the warranty in service date.**



**Note:**

**Email a scanned copy of the before and after alignment measurements to [VWGoA.Chassis@vw.com](mailto:VWGoA.Chassis@vw.com), and file the printed copy with the Repair Order. If a Volkswagen Technical Assistance (VTA) ticket was opened, the alignment before and after measurements should be attached, before the VTA is closed. This is a requirement for all alignment check or repairs performed under warranty.**

Email must include the following information:

- VIN
- Repair Order (RO) Number
- Mileage (from RO)
- Dealer Code

The alignment data must be a legible scanned copy of the original print or screen capture (picture). The recommended formats are PDF or JPEG.

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Below are examples of acceptable attachments:

[Redacted]		Customer [Redacted]				
		Vehicle Ident no. [Redacted]	Repair order no. [Redacted]			
		Technician [Redacted]	Date [Redacted]			
License plate no.	First reg. date	Model Volkswagen : Passat : 2012 : Standard Suspension (G02 G11)	Odometer reading: km/miles 8			
Complaints or reason for alignment check						
		<b>Before</b>	<b>Target Data</b>	<b>After</b>		
Rear axle	Camber	left	-1°26'	-1°20' +/-0°30'	-1°14'	
		right	-0°48' *		-1°15'	
		cross	-0°38' *	0°00' +/-0°30'	0°00'	
	Setback		0°00'	-0°07'		
	Toe	left	0°09'	0°05' +/-0°05'	0°01'	
		right	-0°06' *		0°07'	
total		0°03'	0°10' +/-0°10'	0°08'		
Geometrical driving axis		0°08'	0°00' +/-0°20'	-0°03'		
Axle Offset			0°00' +/-0°20'	0°05'		
Front axle	Camber	left	-0°54'	-0°30' +/-0°30'	-0°42'	
		right	-0°17'		-0°25'	
		cross	-0°38' *	0°00' +/-0°30'	-0°17'	
	Caster	left	7°21' *	7°55' +/-0°30'	7°45'	
		right	7°15' *		7°39'	
		cross	0°06'	0°00' +/-0°30'	0°06'	
	SAI	left	13°08'		12°56'	
		right	11°32'		11°41'	
		cross	1°36'	0°00'	1°15'	
	Track differential angle		left	-1°38'	-1°33' +/-0°20'	-1°38'
			right	-1°20'		-1°20'
	Toe	left	-0°05' *	0°05' +/-0°05'	0°04'	
		right	0°10' *		0°04'	
		total	0°05'	0°10' +/-0°10'	0°08'	
	Setback			0°00'	0°08'	
Max steering lock	left steer	left	-38°48'		-38°48'	
		right	31°54'		31°54'	
	right steer	left	32°34'		32°34'	
		right	-39°12'		-39°12'	
Wheelbase Difference				-0°15'		
Track Width Difference				-0°50'		
Lateral Offset	left			-0°30'		
	right			-0°20'		

\* This value is not within specification. Tire wear, handling and safety problems may result.

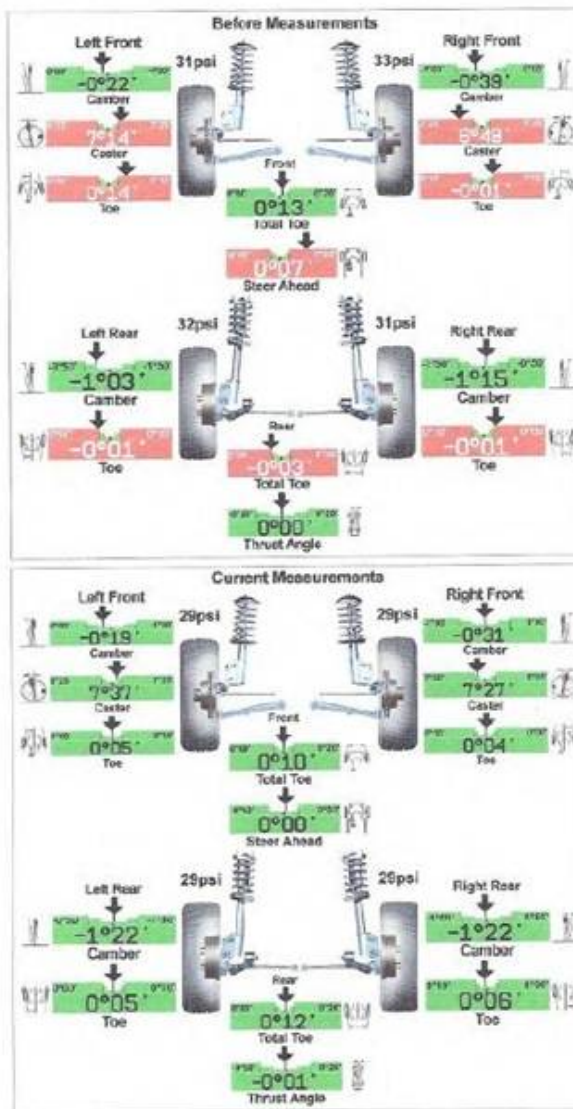
WwAgn: 11.1 8833 USA 2012.0.1 HB40104

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Work Order:  
Last Name:  
Company:  
VIN:  
License:  
Year:  
Technician:  
Mileage:  
Date



## Volkswagen : Passat : 2012 : Standard Suspension (G02 G11)



\* One or more values are not within specification. Tire wear, handling and safety problems may result.

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## Production Solution

Extensive analysis was conducted by Volkswagen for concerns of vehicle drift/pull and it has been determined that this condition is NOT caused by any production issues with the vehicle's steering or suspension systems. The main contributors for these concerns are tire pull and road surface tilt (road crown). Tire pull is a natural condition of radial tire construction and road surfaces are tilted for water drainage. The intent of the information provided in this bulletin is to optimize the straight ahead tracking of the vehicle for customer satisfaction.

## Service

### Section 1. Alignment Overview

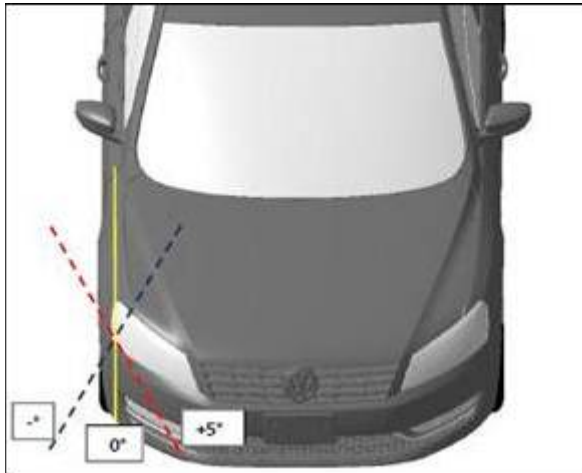


Figure 1

**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

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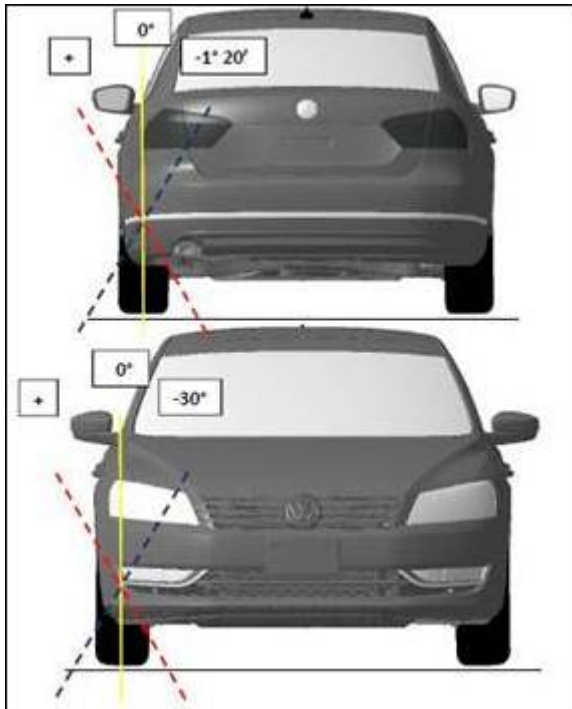


Figure 2

**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.

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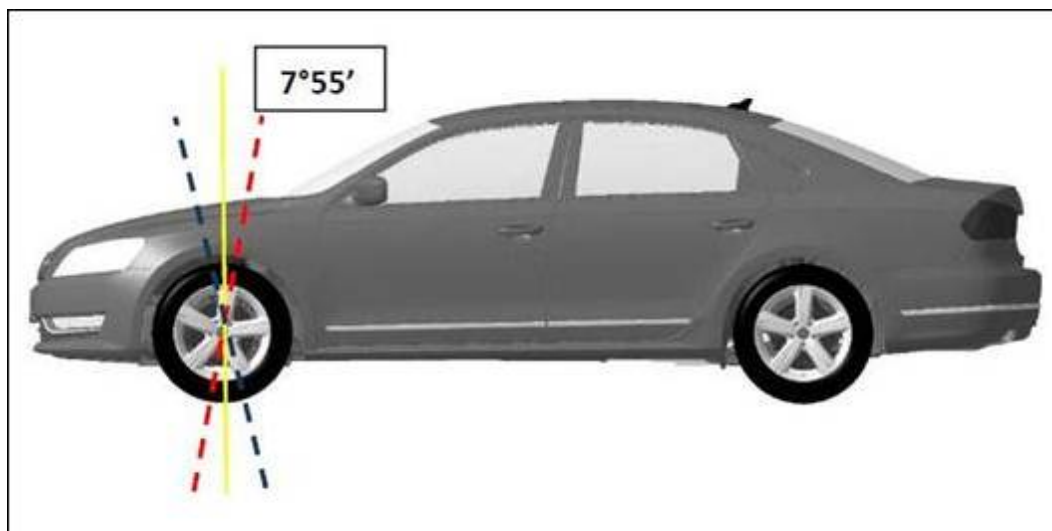


Figure 3

**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.

## Toe adjustment

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.



**Note:**

**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.**

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## Camber adjustment

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



**Note:**

**Front camber is NOT an adjustable angle for normal four wheel alignment. The procedures in the repair manual to adjust camber are for body collision only (See note in repair manual). If the sub-frame bolts are loosened or 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.**

## Caster Measurement

Caster is not an adjustable angle

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 4

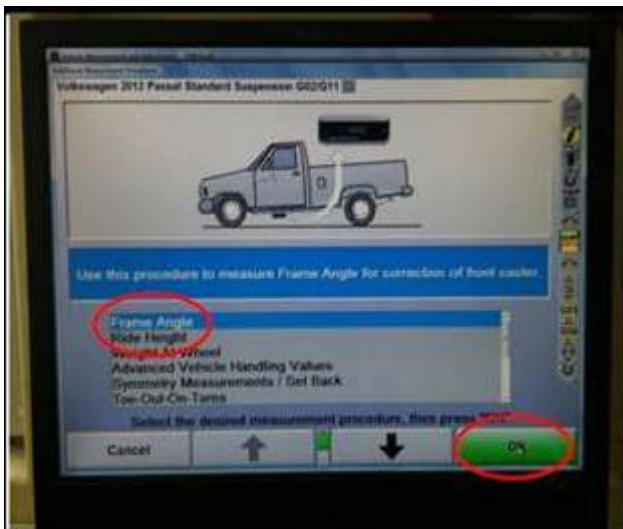


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Press K3 to select > Make Additional Measurement.

Figure 5



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

 **Tip:**

An electronic level (Inclinometer) can be used to measure vehicle frame angle. If a tool 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.

Figure 6

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Measure the vehicle frame angle at the door sills using an electronic level (Inclinometer).

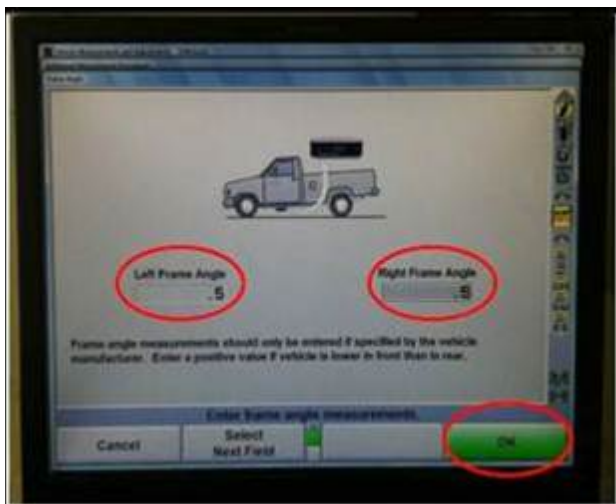


**Tip:**

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 angles.

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

Figure 7



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 8

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.

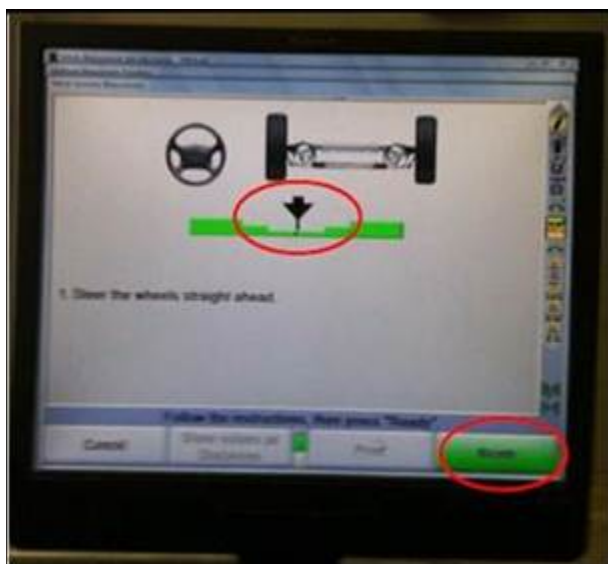
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Axle symmetry measurements/ set back are displayed in angles. For easier understanding it is best to have the measurements displayed in distances. Follow the procedures below to measure axle symmetry and display the measurements in distances.



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

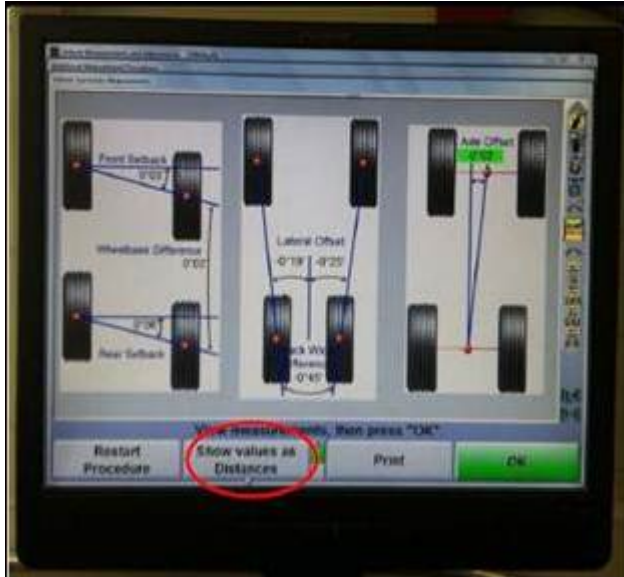
Figure 9



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

Figure 10

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

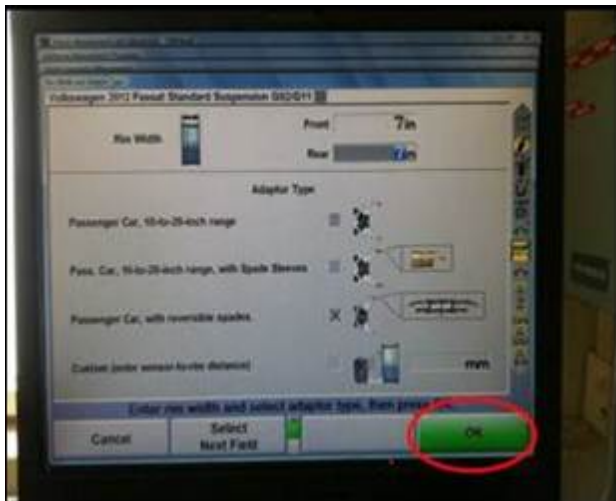
Enter the Rim Width

16" = 6.5"

17" = 7"

18" = 8"

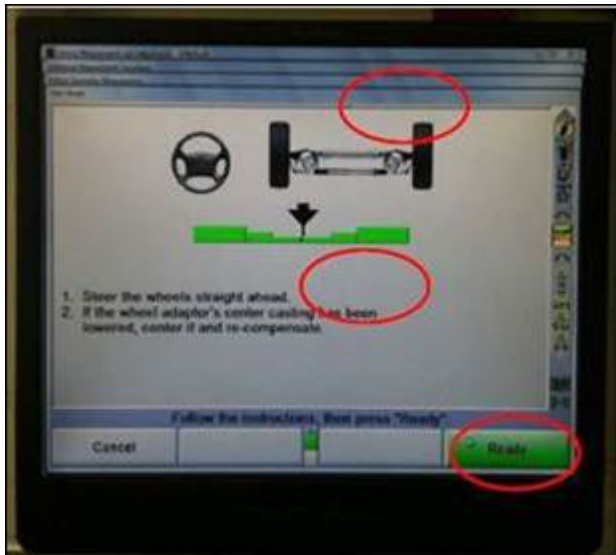
Figure 11



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

Figure 12

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

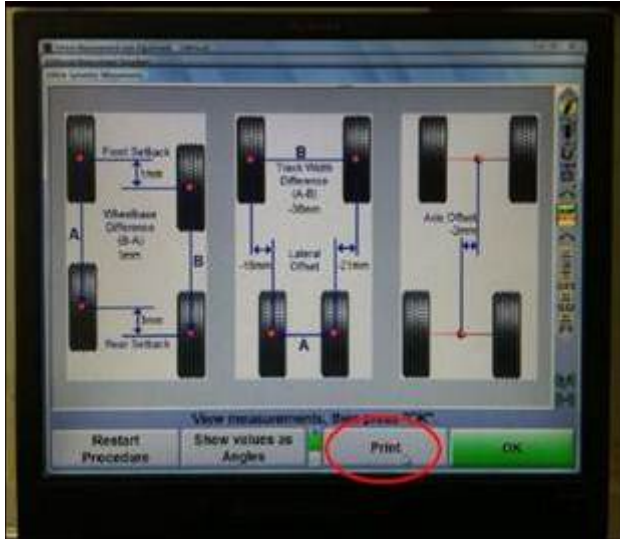
Figure 13



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

Figure 14

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

Figure 15

## **SECTION 2. Pre-Delivery Inspection (PDI), vehicle drift/pull concerns**

If it has been determined that a vehicle has a significant drift/pull on the PDI test drive, test drive a like vehicle on the same route to compare the drift. If the drift is similar, no further repair is necessary. If it has been determined that the drift is excessive compared to the like vehicle, perform an alignment check, and open a Volkswagen Technical Assistance (VTA) ticket, with the alignment measurements attached, and contact the Volkswagen Technical Helpline at 800-678-2389.

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## SECTION 3. Customer concerns for vehicle drift/pull

### Vehicle drift/pull diagnosis



#### Note:

Many conditions related and non-related to a vehicle's suspension and/or tires can cause a vehicle to drift/pull. The tilt of the road surface (Road Crown) will have the most significant effect on the time it takes for a properly aligned vehicle to drift out of its lane. Always test drive the vehicle to determine that the vehicle drift is excessive before making any repairs or adjustments.

For customer concerns of vehicle drift/pull on vehicles that falls within the warrantable repair period, follow the steps below to optimize the vehicle straight ahead tracking performance.

#### Step 1

Test drive the vehicle to determine the drift/pull.

#### Step 2

Perform an alignment check and make the necessary adjustments to bring the adjustable angles within specification.



#### Tip:

As a vehicle suspension settles, the alignment angles may move out of specification. Under normal settling conditions camber, caster & toe variation from the specified upper and lower limits should not cause cross caster and cross camber to exceed  $\pm 30$  minutes ( $\pm 0.5$  degrees) and total toe should not exceed  $\pm 20$  minutes ( $\pm 0.32$  degrees). If the variation is in excess of these values, the change in the suspension may be caused by an outside influence.

#### Step 3

#### Selective tire placement to improve vehicle drift/pull

Use the Hunter GSP9700 Balance with StraightTrak® or John Bean RFV200 with Opti-line® to determine the best tire placement to improve vehicle drift/pull.



#### Note:

**In all cases, alignment check and adjustments MUST be performed before selective tire placement (StraightTrak/Opti-line). If the alignment initial measurements show excess variation from specification the drift/pull concern may be caused by an outside influence such as an accident. In that case this bulletin doesn't apply.**

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**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 800-678-2389.

If the vehicle alignment is within specification, **DO NOT** attempt to optimize the front caster and camber to improve vehicle drift/pull, by shifting the vehicle's sub frame. Shifting the vehicle sub frame will have no significant effect on the vehicle drift/pull.

## Section 4. Using Volkswagen approved diagnostic balancers to address vehicle drift/pull

### Hunter GSP9700 with StraightTrak®



**Tip**

For details of using StraightTrak® on the Hunter GSP9700 please reference the operation manual. A copy of the document is located in Service Net under Workshop Equipment > Instruction Books > Hunter GSP9700 Road Force Wheel Balancer Operating Instructions.

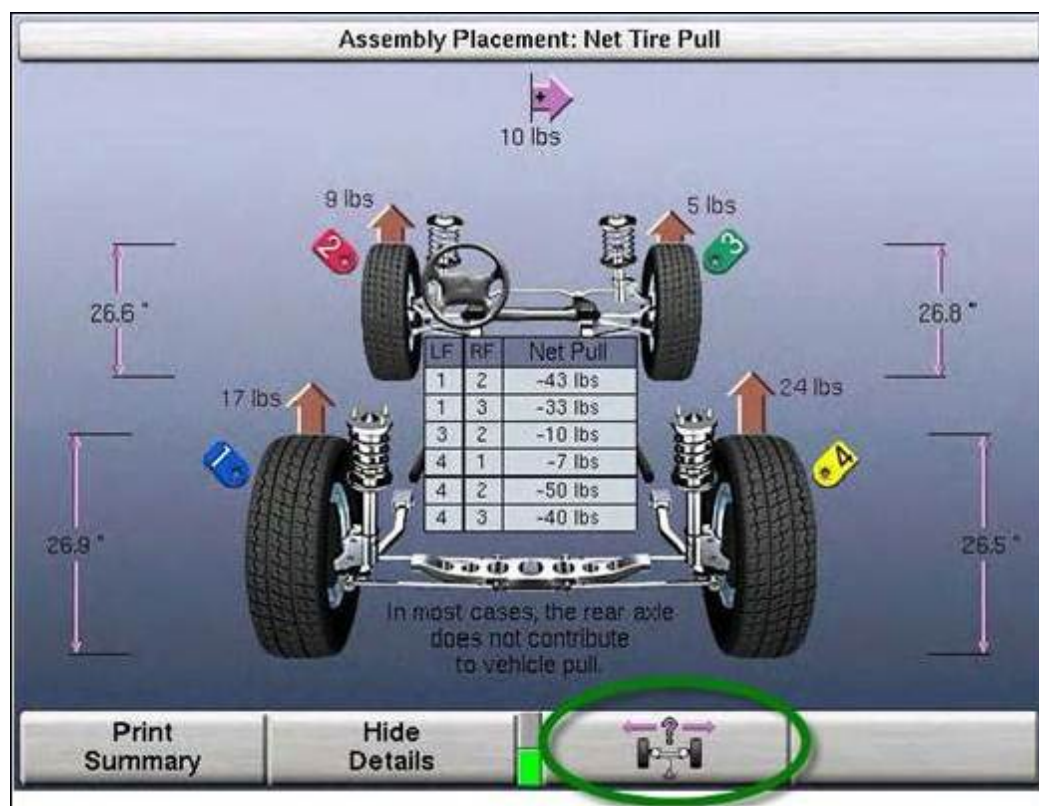


Figure 16



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When the suggested tire placements are displayed (Figure 16), select the combination that will best suit the vehicle driving conditions and then test drive the vehicle to check vehicle drift/pull.



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 figure 16 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.

## John Beam RFV2000 with OptiLine

The information below is a guide on how to use the Opti-line® feature on the John Beam RFV2000 balancer. Please refer to the operation manual for more information about the equipment.

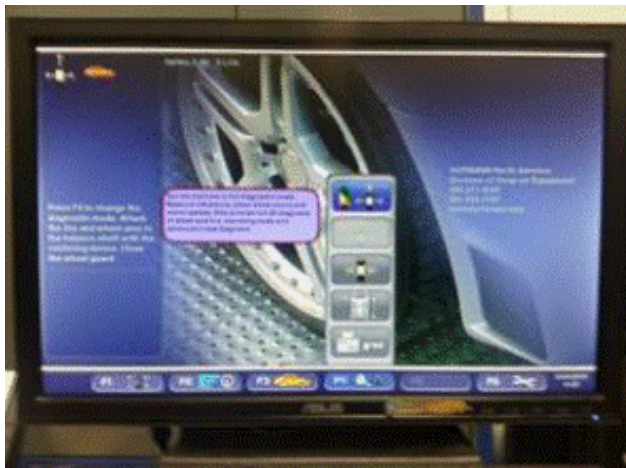


Figure 17

Make sure balancer is setup in 3D Diagnostics mode and that Opti-line® is enabled.



Enabling 3D Diagnostics – From the home screen press F3 and select 3D Diagnostics.

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Figure 18

Enabling Opti-line® – From the home screen press F6 and select settings

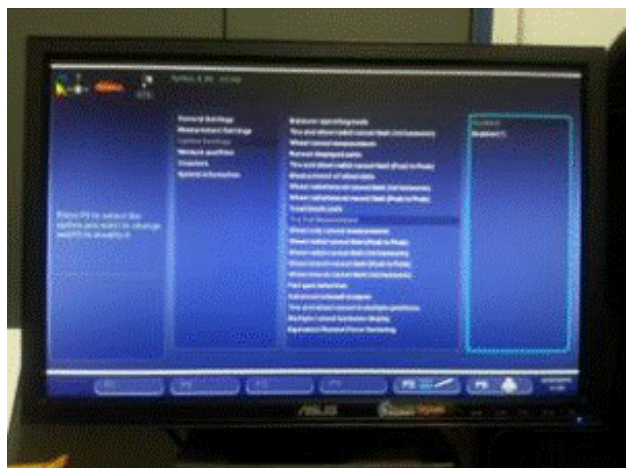


Figure 19

Select -> Optima Settings, -> tire pull measurement -> enable (Figure 19.3).

Return to the Home Screen and press F1 to go into the balance screen, then F3 to go into the optima screen. Press F5 to open the Opti-line® menu and select Enable Opti-line® (only option).

- Label wheels location on the car before removing. For example, LF (Left Front), RF (Right Front), etc.
- Mount the tire on the balancer using the flange plate with stud kit. Please note that in the Opti-line® function the balancer will number the wheels sequentially based on the order mounted.
- Balance each tires and add the tire to the wheel set.

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## Adding tires to wheel set

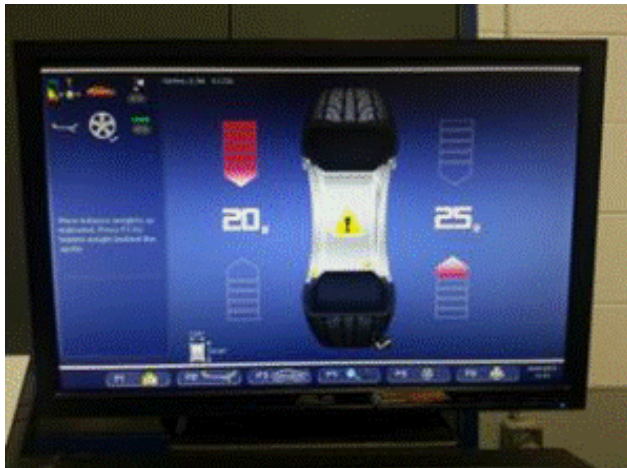


Figure 20

To open Opti-line® from the balance screen press F3 to open the Optima screen.



Figure 21

Press F5 to bring up the Opti-line® menu and select open Opti-line® screen.

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First wheel balanced automatically selected as wheel # 1.

Figure 22



Press F3 to add the tire to the wheel set. Label the wheel # 1 (use chalk or accessory tags provided with the balancer) and repeat the process for the remaining wheels.



**Tip:**

Labeling the wheels is very important for further diagnosis. When the wheel set is completed each wheel should have two (2) labels. The wheel location on the car (LF,RF, LR & RR) and the wheel position in the wheel set (1,2,3,4)

Figure 23

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Figure 24

When all the wheels are entered in the wheel set, press F5 and select "Least Pull".

 **Tip:**

[Take a screen print or screen capture \(picture\) of the recommended wheel placement.](#)

- Install the wheels in the suggested order and test drive the vehicle to check vehicle drift/pull.

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## Warranty



**Note:**

The repair procedures outlined in this bulletin, to address vehicle drift/pull will be covered **ONLY ONCE** under warranty, within the first 3 Months/3000 miles of the warranty in service date.

**PID 4485 should be used for all claims related to alignment or vehicle drifting / pulling. 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 <sup>1)</sup>					
Model(s)	Year(s)	Eng. Code(s)	Trans. Code(s)	VIN Range From	VIN Range To
Passat	2013-2014	All	All	All	All
<b>SAGA Coding</b>					
Claim Type:	Use applicable Claim Type <sup>1)</sup>				
Service Number:	Damage Code	HST	Damage Location (Depends on Service No.)		
4485	0011	--	Use applicable when indicated in ElsaWeb (L/R)		
Parts Manufacturer	Passat				TX6 <sup>2)</sup>
Labor Operation <sup>3)</sup> : Remove and Install 4 Wheels.		44052099 = 30 TU			
Labor Operation <sup>3)</sup> : Perform road force balance (Front & Rear axle).		44059499 = 70 TU			
Labor Operation <sup>3)</sup> : Modify Front & Rear Axle measurements. <u>Includes</u>		44851699 = 90 TU			
<ul style="list-style-type: none"> <li>• Modify Front Toe Adjustment (left and right side)</li> <li>• Modify Rear Toe Adjustment (left and right side)</li> </ul>					

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<ul style="list-style-type: none"> <li>• <b>Modify Front Camber Adjustment (left and right side)</b></li> <li>• <b>Modify Rear Camber Adjustment (left and right side)</b></li> </ul>		
<b>Causal Part: Select labor operation</b>		<b>44851699</b>
<b>Diagnostic Time <sup>4)</sup></b>		
<b>GFF Time expenditure</b>	<b>01500000 = 00 TU max.</b>	<b>NO</b>
<b>Road Test</b>	<b>01210002 = 10 TU</b> <b>01210004 = 10 TU</b>	<b>YES</b>
<b>Technical Diagnosis</b>	<b>01320000 = 00 TU max.</b>	<b>NO</b>
<b>Claim Comment: Input "As per Technical Bulletin 2031087" in comment section of Warranty Claim.</b>		
<sup>1)</sup> Vehicle may be outside any Warranty in which case this Technical Bulletin is informational only <sup>2)</sup> Code per warranty vendor code policy. <sup>3)</sup> Labor Time Units (TUs) are subject to change with ELSA updates. <sup>4)</sup> Documentation required per Warranty Policies and Procedures Manual.		

## Required Parts and Tools

No special parts required.

Tool Description	Tool No:
Alignment Equipment	VAS 6292 or Equivalent
Tire Balancer	VAS 6230A or Equivalent VAS 6311A 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.**