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Current Language:	English	**Last Modified**:	9/13/2019
Other Languages:	NONE	**Author**:	David Horner
Viewed:	551		

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Title: CE Bus Steering Returnability Diagnostics

Applies To: CE Bus w/ Tilt Columns, ESP, and Steering Switch Controls

CHANGE LOG

Please refer to the change log text box below for recent changes to this article:

09/13/2019 - Updated steering wheel part number
09/05/2019 - Added repair instructions and part numbers, updated author for feedback
08/19/2019 - Added production build date break
05/30/2019 - Initial Article Release

DESCRIPTION

This document will guide the user through diagnosing steering wheels not returning to center without assistance on IC CE Buses.

This document only applies to CE buses built during **1/29/2018** thru **6/11/2019** with the following feature codes:

- Tilt Column: **0005708** (Column part number 4095815C91 (Bendix) or 4110141C91 (Wabco))
- ABS with ESP: **0004AZS** (Bendix air system) or **0004JNX** (Wabco hyd. system)
- Steering wheel Switch: **0047DNK** or **0047DNU** or **0047DWC**

SYMPTOM(s)

Diagnostic Trouble Code(s) & Dashboard Indicator Light(s):

There are no fault codes associated with this failure mode.

Customer Observations or Concerns:

The customer may notice that the vehicle may have reduced return-ability without some assistance or the steering wheel may not fully return to "on center position" after a turn without some assistance.

Note: Return-ability definition - The feel and predictability of the steering system's center return. Steering should return towards "on center" smoothly and quickly without any binding.

SPECIAL TOOL(s) / SOFTWARE

Tool Description	Tool Number	Comments	Instructions
Steering Wheel Puller	05-252-01		TL2900050

SERVICE PARTS INFORMATION

Kit Description	Part Number	Quantity Required	Notes
Modified Bare Steering Wheel Kit	2521330C91	1	5mm of material removed from the hub. No cover, wiring or switches

DIAGNOSTIC STEP(s)

WARNING:

Always wear safe eye protection when performing vehicle maintenance. Failure to do so may result in personal injury and / or death.

WARNING:

Park vehicle on a hard, flat surface, turn the engine off, set the parking brake, and block the wheels to prevent the vehicle from moving in either direction. Failure to do so may result in property damage, personal injury, and / or death.

CAUTION:

The return-ability procedure should be performed on a flat paved surface where greater than a full lock turn can be performed safely.

Possible Causes of low return-ability:

- Low Steering Axle Caster
- Binding Kingpins
- Binding Draglink Ends
- Binding Tie Rod Ends
- Binding Steering Gear
- Binding Steering Shaft U-joints/Slip Joint
- Binding Steering Column

Step	Action	Decision
1	**DIAGNOSTIC:** **Determine the vehicles returnability of the steering.** This procedure should be performed on a flat paved surface where greater than a full lock turn can be performed safely. From a full stop, turn the wheel to full lock. Take hands off the steering wheel and start to accelerate gradually, the vehicle should be making a circle. Increase the vehicle speed to no more than 20mph without hands on the wheel. Repeat the test for both left and right turns. **Does the steering return in both directions to within 180 degrees or 1/2 turn of straight before the bus completes two full circles with smooth and predictable steering movement?**	**Yes**. No additional actions are needed **No**. Proceed to step 2.

Step	Action	Decision
2	**DIAGNOSTIC:** **Inspect for clockspring to steering wheel interference.** Remove the steering wheel and remove the clockspring. Without reinstalling the clockspring, install the steering wheel, torque the steering wheel nut to 55-60ft-lbs. With the clockspring removed repeat the return-ability test in step 1. **Does the steering return in both directions to within 180 degrees or 1/2 turn of straight before the bus completes two full circles with smooth and predictable steering movement?**	**Yes.** Proceed to the repair solution below. **No.** Reinstall the clockspring. Check alignment, then diagnose potential binding in the steering gear, kingpins, draglink/tie rod ends, or steering shaft.

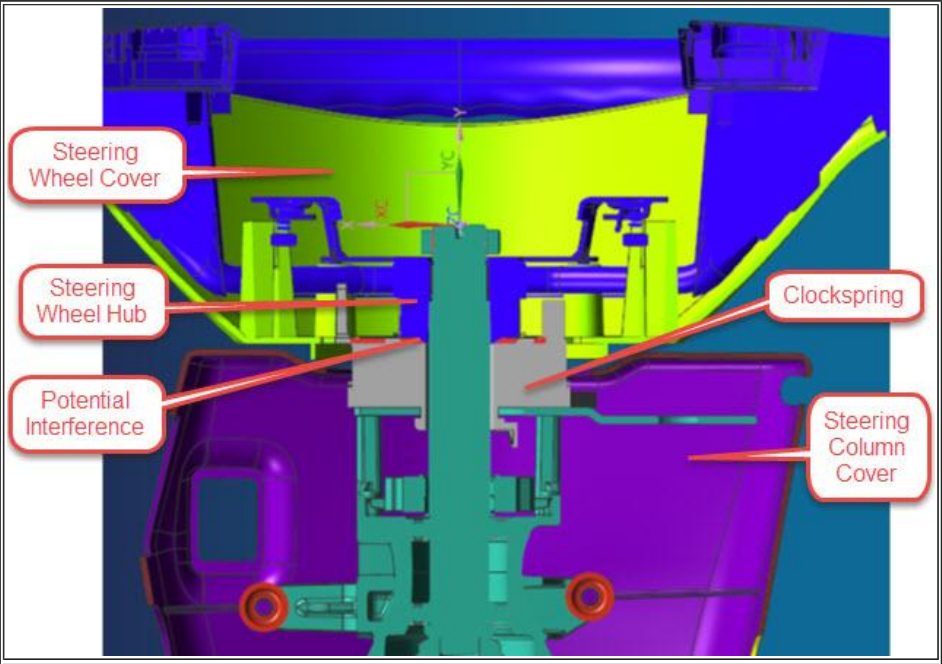

Figure 1: Steering column cut-a-way view

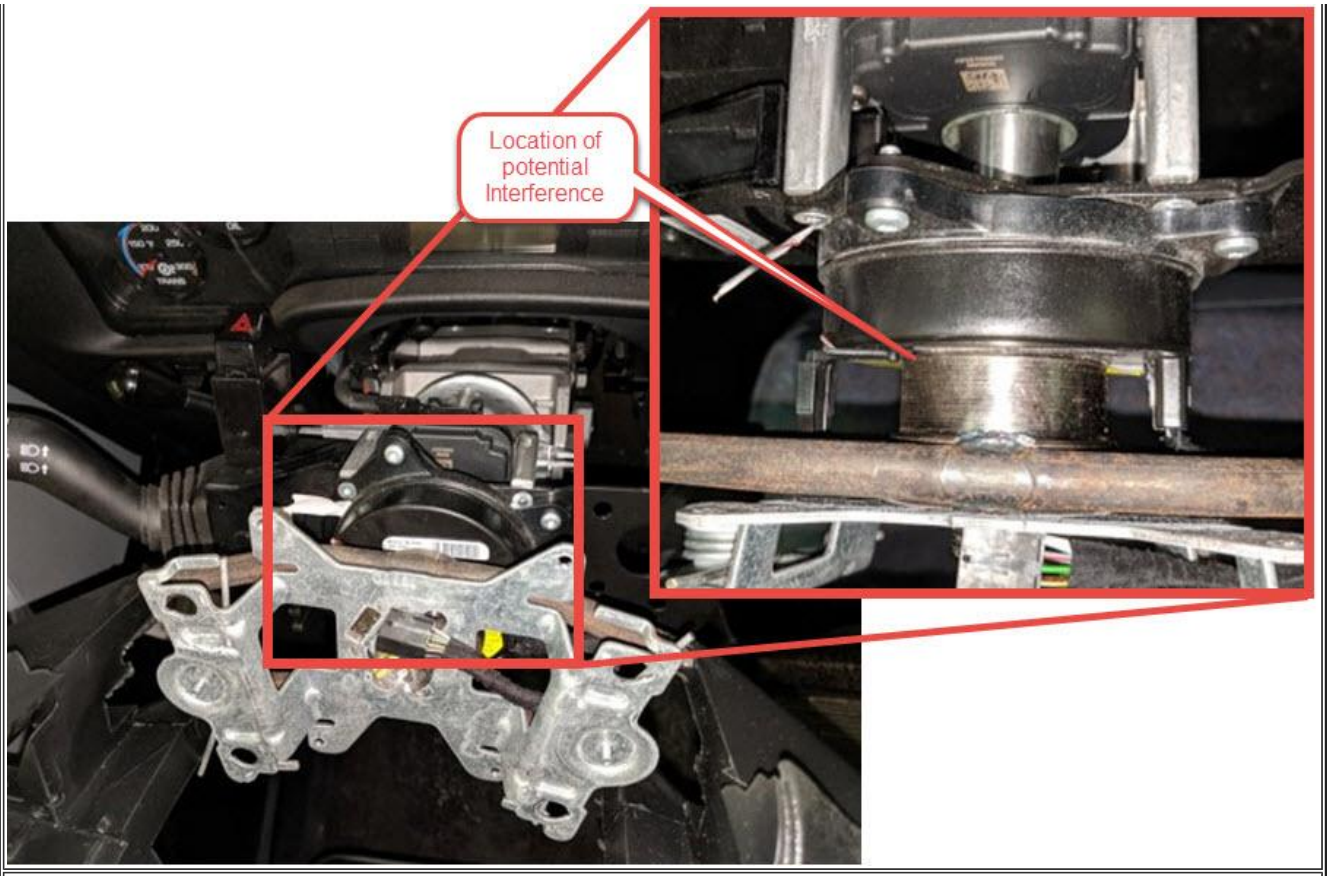

Figure 2: Steering column and steering wheel with covers removed for visual

REPAIR STEP(s)

WARNING:

Park vehicle on a hard, flat surface, turn the engine off, set the parking brake, and block the wheels to prevent the vehicle from moving in either direction. Failure to do so may result in property damage, personal injury, and / or death.

WARNING:

Always wear safe eye protection when performing vehicle maintenance. Failure to do so may result in personal injury and / or death.

WARNING:

If the vehicle must be raised, do not work under the vehicle supported only by jacks. Jacks can slip or fall over, potentially resulting in property damage, personal injury, and / or death.

NOTE: If 2521330C91 is not available in the PDCs please open a Tech Service Case file for a temporay repair solution.

Step 1. Remove original steering wheel, it is to be replaced with part number 2521330C91.

Step 2. Transfer over steering wheel cover, switches, wiring harness, and horn cover retention springs to the new wheel and reinstall the clockspring that was previously removed.

Step 3. Install the new steering wheel and torque the to 55-60 fl-lbs.

Step 4. Validate repair by repeating returnability test in diagnostic step 1.

WARRANTY INFORMATION

Warranty Claim Coding:

Refer to the Warranty Coding Manual for Group and Noun Codes.

Standard Repair Time(s):

Refer to the SRT Manual for Repair Times

OTHER RESOURCES

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