



DATE: 8-18-17

APPLIES TO: This service bulletin applies to 2006 – 2018 model year, K2, K3 and MM model motor home chassis built between August 17, 2006 through March 21, 2017.

CONDITION: Popping noise coming from rear suspension

CORRECTION: Follow torque values, alignment and recommended sequence to bring back to appropriate torque.

LABOR ALLOCATION: 3.0 Hrs.

CLASSIFICATION: V

PARTS NEEDED:

<u>QTY</u>	<u>Part Number</u>	<u>Description</u>
1	S-2599-001	Kit-Service, HTB Clamp Group & Cross Member Fasteners

Kit # S-2599-001 Contains:

<u>QTY</u>	<u>Part Number</u>	<u>Description</u>
2	66174-000	Axle Bracket Bar Pin Clamp Non-Adjustable
2	66274-000	Axle Bracket Bar Pin Clamp Adjustable
4	65737-001	Axle Bracket Shim – 0.093"
2	66027-001	Axle Bracket Fastener Service Kit (Both Sides)
2	66025-002	Cross Member Fastener Service Kit (Both Sides)
1	TSB17-350-001	Instruction Document

GENERAL INSTRUCTIONS:

Thoroughly review entire service bulletin before starting work. If there are questions or concerns with steps defined in this service bulletin, contact Spartan Motors USA, Inc. Customer & Product Support Group.

All applicable industry safety standards must be followed when performing work identified in this procedure.

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STEP-BY-STEP INSTRUCTIONS:

NOTE: Refer to FIG 4-1 through FIG 6-1 for steps 1 through 11

1. Verify the torque box is still centered in the frame by measuring from the inner frame rail to the edge of the torque box (4 locations). Also, inspect the clamping hardware for any worn components.
2. If the torque box is not centered to the frame (within 1/4 inch side-to-side per measurements) then perform alignment procedure per attached 2482-DD4. If the torque box is still centered in the frame then move to step 3.
3. Raise the rear of the chassis up until the rear duals are just off the ground.
4. Loosen axle tower, four 3/4 inch bolts and verify the bolts are black in color. Verify the adjustable clamp has shims and the non-adjustable clamp has zero shims in the axle tower. ****Failure to have the shims in the proper location will result in an improper torque and possible axle shift****. If the hardware is not correct Spartan needs to be contacted to have proper hardware sent out. If the hardware is correct proceed to step 5.
5. Adjust the lateral movement until the axle is centered under the frame rail. Take a pry bar and wedge between the torque box and axle tower (you might need an assistant to push on the outer wheel for complete movement). While moving the axle have an assistant measure from the inner dual rim to the frame and stop axle movement when the axle is centered from side to side (within 1/4 inch).
6. While holding the axle in place with the pry bar have an assistant tension the lower tower bolt to 50-100 lbf-ft. on both sides. Then lightly tension the top tower bolts to 50 lbf-ft. Lower the coach and let the coach come up to ride height. Measure to see if the axle and torque box has stayed centered to the frame. If the axle and torque box has not shifted proceed to step 7.
7. Upon inspection of the assembly inspect for worn bar pin clamps and blocks. If worn parts are identified, please order the service kit above (66025-002 Cross Member Fastener Service Kit (both sides). With the coach at ride height tension the lower axle tower 3/4 inch bolt to 300 lbf-ft. on both sides. After the lower tower bolts are tensioned then torque the top tower bolt to 300 lbf-ft. on both sides.
8. Loosen and re-torque the 5/8 torque box bolts one side at a time to 150-205 lbf-ft. Use the torque sequence in the attached 2482-DD4.

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9. Re-align the air springs and align chassis as needed.
10. After torque sequence and appropriate values have been applied, please mark as torqued by placing a red paint mark across threads, nut and clamp detail surface. Refer to FIG. 3-1.



FIG 3-1

11. After all the above steps have been followed, please verify that all hardware is in place and marked for torque. Once this verification has been completed, test drive unit to validate the complaint has been remedied.

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2482-DD4

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AXLE ALIGNMENT AND ADJUSTMENTS**ALIGNMENT**

Checking and correcting alignment involves performing the following steps in the sequence listed.

STEP A. PREPARING THE VEHICLE

1. Use a work bay with a level surface.
2. Relax the suspension by slowly moving the vehicle back and forth several times in a straight line without using the brakes. This will slacken or loosen the suspension as the vehicle is positioned. End with all wheels positioned straight ahead.
3. **DO NOT** set the parking brake. Chock the front wheels of the vehicle.
4. Verify and maintain the air system at full operating pressure.
5. Verify the vehicle is at the correct ride height. Correct as necessary.
6. Verify all suspension components are in good condition. Repair or replace any worn or damaged suspension components before proceeding with the alignment process.

STEP B. MEASURING TORQUE BOX LATERAL ALIGNMENT (See Figure 7-5)

7. Measure the distance between the left front side of the torque box and the left inside frame rail (A). Record the measurement.
8. Measure the distance between the right front side of the torque box and the right inside frame rail (B). Record the measurement.
9. Measure the distance between the left rear side of the torque box and the left inside frame rail (C). Record the measurement.
10. Measure the distance between the right rear side of the torque box and the right inside frame rail (D). Record the measurement.
11. Calculate the difference between A-B.
12. Calculate the difference between C-D.
13. Calculate the difference between A-C.
- a. If all the calculated differences in steps 11-13 are equal to or less than $\frac{1}{4}$ " then proceed to Step D "Measuring the Lateral Alignment of the Axle."
- b. If any of the calculated differences in steps 11-13 are greater than $\frac{1}{4}$ ", this indicates the box is either offset or rotated. It will be necessary to correct the lateral alignment of the torque box. Proceed to Step C "Correcting Lateral Alignment of the Torque Box."
14. On a vehicle equipped with tandem drive axles, repeat steps 7 thru 13 for the remaining torque box.

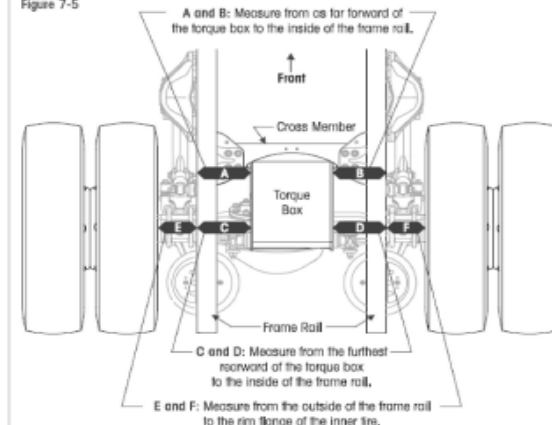
STEP C. CORRECTING TORQUE BOX LATERAL ALIGNMENT (IF NECESSARY)

NOTE This step is only necessary if the torque box lateral alignment needs to be corrected as determined in Step B.

15. Support the frame at ride height.
 16. Disconnect the height control linkage assembly from the height control valve lever. Lower the height control valve lever to exhaust the air in the air springs and deflate the rear suspension.
 17. Loosen the torque box clamp bolts at all four corners of the torque box.
 18. Using a pry bar, center the torque box in the frame rails. Measurements (A and B), (C and D) and (A and C) should be within $\frac{1}{4}$ " of each other. This will center the torque box and ensure parallelism of the torque box to the frame rails.
- IT IS IMPORTANT THAT THE TORQUE BOX CLAMP CONNECTIONS BE TIGHTENED IN THE PROPER SEQUENCE AND HAVE THE PROPER TIGHTENING TORQUE VALUES MAINTAINED. FAILURE TO DO SO CAN RESULT IN THE DEFORMATION OF PARTS, RESULTING IN THE LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.
19. First snug, and then tighten the torque box to cross member clamp bolts in the proper sequence (inboard fasteners first then outboard fasteners), to prevent cross member deformation. See Figure 7-6.
 20. Tighten the locknuts to 150-205 LB-FT.
 21. Hand-tighten the torque box to axle bracket clamp bolts. **DO NOT** apply final tightening torque to the locknuts at this time as further adjustments may be required.
 22. Verify measurements, (A and B), (C and D) and (A and C) should be within $\frac{1}{4}$ " of each other.
 23. On a vehicle equipped with tandem drive axles, repeat steps 17 thru 21 for the remaining torque box on the other axle, only if the lateral alignment of that torque box needs to be corrected as determined in Step B.

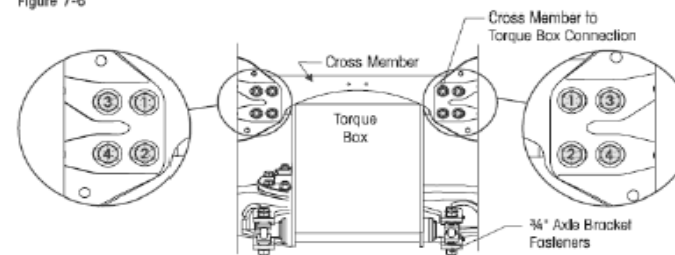
REVISIONS							
REV	DESCRIPTION	AUTH	DATE	DR	CHK	MFG	APVD
A	ADDED TORQUE TABLE: UPDATED SHEET TO SPARTAN STANDARDS: 290-310 LB-FT WAS 150-205 ON NOTE 53 (SHT 3);	6154-1-1	10/21/2009	RES	SJD	RAH	RDI

Figure 7-5



TORQUE	WAS	NEW	UNIT	REMARKS
177 LB-FT	150-205	NUT	[H]	

Figure 7-6



Spartan Chassis, Inc. 1000 Reynolds Rd., Charlotte, MI 48813				
INSTALL - ALIGNMENT HENDRICKSON HTB				
DESIGNER K. HUBERT	DATE 8/1/2009	CHECKED H. RAY	APPROVED K. HUBERT	
SUBJECT 1		DRAWING NUMBER 2482-DD4		REV A
DOCUMENT IS ELECTRONICALLY CONTROLLED. VERIFY KEY PRIOR TO USE.				

FIG 4-1

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STEP G. CORRECTING AXLE THRUST ANGLE (IF NECESSARY)

NOTE The HTB is a parallelogram suspension. When correcting an axle's thrust angle, the shims on both the torque box and longitudinal torque rod must be adjusted in order to maintain parallelism and drive axle pinion angles.

SERVICE HINT When using a trammer bar to measure the rear axle alignment it is important to verify that the front drive axle is within specifications prior to correcting the rear drive axle thrust angle.

40. Support the frame at ride height.

41. Disconnect the height control linkage assembly from the height control valve lever. Lower the height control valve lever to exhaust the air in the air springs and deflate the rear suspension.

42. Loosen the torque box to axle bracket clamp bolts. The bolts may already be loose from step 20. **DO NOT** loosen the torque box to cross member bolts.

EACH AXLE HAS ONE (1) AXLE BRACKET WITH ADJUSTABLE BAR PIN CLAMPS AND FOUR (4) AXLE BRACKET SHIMS, AND ONE (1) AXLE BRACKET WITH NON-ADJUSTABLE BAR PIN CLAMPS. THE BAR PIN CLAMP PAIRS MAY BE CHANGED FROM SIDE TO SIDE BUT CAN NOT BE MIXED. ALL FOUR (4) SHIMS MUST BE USED WITH THE ADJUSTABLE BAR PIN CLAMPS, WHICH ARE THINNER THAN THE NON-ADJUSTABLE BAR PIN CLAMPS. FAILURE TO DO SO CAN RESULT IN THE DEFORMATION OF PARTS, LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.

43. Locate the axle bracket that contains the adjustable bar pin clamps and axle bracket shims. See Figure 7-8.

44. Remove all the axle bracket shims from the axle bracket connection with the adjustable bar pin clamps. **DO NOT** remove adjustable axle bracket bar pin clamps, it is not necessary to remove the adjustable bar pin clamps or the axle bracket connection clamp bolts to perform adjustment.

45. Loosen the longitudinal torque rod fasteners and remove the torque rod shims from both ends of the longitudinal torque rod. **DO NOT** remove the pinion spacer. See Figure 7-9.

46. Adjust the axle in the direction necessary to correct the thrust angle.

47. Fill any gap between the longitudinal torque rod and lower air spring bracket with longitudinal torque rod shims. See Figure 7-9. Longitudinal torque rod shims should only be placed on one side of the axle to adjust the thrust angle. Adding longitudinal torque rod shims to both torque rods will affect the axle pinion angle.

48. Tighten the longitudinal torque rod locknuts to 150-205 LB-FT.

EACH AXLE HAS ONE (1) AXLE BRACKET WITH ADJUSTABLE BAR PIN CLAMPS AND FOUR (4) AXLE BRACKET SHIMS, AND ONE (1) AXLE BRACKET WITH NON-ADJUSTABLE BAR PIN CLAMPS. THE BAR PIN CLAMP PAIRS MAY BE CHANGED FROM SIDE TO SIDE BUT CAN NOT BE MIXED. ALL FOUR (4) SHIMS MUST BE USED WITH THE ADJUSTABLE BAR PIN CLAMPS, WHICH ARE THINNER THAN THE NON-ADJUSTABLE BAR PIN CLAMPS. FAILURE TO DO SO CAN RESULT IN THE DEFORMATION OF PARTS, LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.

49. Fill the gap between the axle bracket and the adjustable bar pin clamps with the axle bracket shims removed in step no. 44. All four axle bracket shims must be re-installed. **DO NOT** force the axle forward or backwards to install the axle bracket shims. The axle bracket shims may be arranged in any order to achieve an easy fit. **EXAMPLE** The axle bracket shim arrangement may end up being three shims in front and one behind the adjustable bar pin clamps, or no shims in front and four behind the adjustable bar pin clamps, etc.

50. Verify measurements (G) and (H) are within the vehicle manufacturer's specifications.

51. Repeat steps 42 thru 50 for the remaining drive axle, only if the thrust angle of that axle needs to be corrected as determined in Step F "Measuring Axle Thrust Angle".

STEP H. FINAL TORQUE AXLE BRACKET CLAMP BOLTS

IT IS IMPORTANT THAT THE TORQUE BOX CLAMP CONNECTIONS BE TIGHTENED IN THE PROPER SEQUENCE AND HAVE THE PROPER TIGHTENING TORQUE VALUES MAINTAINED. FAILURE TO DO SO CAN RESULT IN THE DEFORMATION OF PARTS, RESULTING IN THE LOSS OF CLAMP FORCE, BOLT FAILURE, LOSS OF THE AXLE'S ALIGNMENT, LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE, OR PERSONAL INJURY.

52. Tighten the axle bracket clamp locknuts in the proper sequence. Tighten the lower clamp locknut first, then the upper clamp locknut. See Figure 7-10. Tighten the locknuts to 290-310 LB-FT.

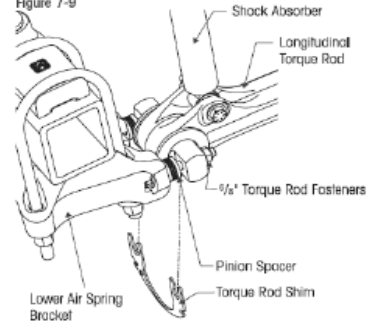
53. Connect the height control lever to the height control valve linkage assembly to inflate the suspension.

54. Remove the frame supports. Verify the ride height is correct.

55. Engage the parking brake.

56. Remove the wheel chocks.

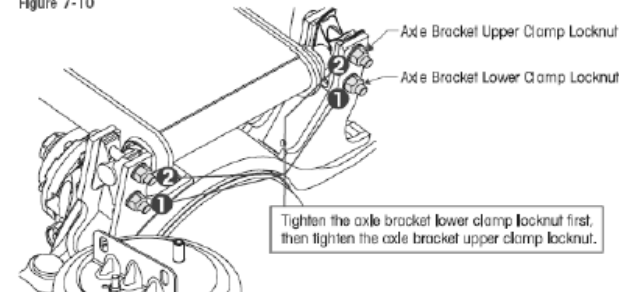
Figure 7-9



REV	DESCRIPTION	REVISIONS					
		AUTH	DATE	DR	CHK	MFG	APVD
-	-	See Sheet 1	-	-	-	-	-

REV	DESCRIPTION	REVISIONS					
		AUTH	DATE	DR	CHK	MFG	APVD
-	-	See Sheet 1	-	-	-	-	-

Figure 7-10



Spartan Chassis, Inc. 1000 Reynolds Rd., Charlotte, MI 48813			
INSTALL - ALIGNMENT HENDRICKSON HTB			
DESIGNER K HUBERT	DRAWN K HUBERT	DATE #9/2009	APPROVED H RAY
MODEL -	SHEET 3	OF 3	APPROVED K HUBERT
2482-DD4			A
DOCUMENT IS ELECTRONICALLY CONTROLLED. VERIFY REV PRIOR TO USE.			

FIG 6-1

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