

NEWMAR CORPORATION WARRANTY DEPARTMENT

TECHNICAL SERVICE BULLETIN																		
DATE ISSUED	MODEL YEAR(S) AFFECTED		MODEL(S) AFFECTED			TSB #												
May 23, 2008	2006 – 2008		All on MM & K2 Chassis w/ IFS			341												
BRAND						TYPE												
All	<input type="checkbox"/>	American Star	<input type="checkbox"/>	Mountain Aire	<input checked="" type="checkbox"/>	All	<input type="checkbox"/>	T T <input type="checkbox"/>										
Cypress	<input type="checkbox"/>	Dutch Star	<input checked="" type="checkbox"/>	Kountry Aire	<input type="checkbox"/>	F W	<input type="checkbox"/>	C A <input type="checkbox"/>										
Northern Star	<input type="checkbox"/>	Kountry Star	<input checked="" type="checkbox"/>	Essex	<input checked="" type="checkbox"/>	D P	<input checked="" type="checkbox"/>	D B <input type="checkbox"/>										
Scottsdale	<input type="checkbox"/>	King Aire	<input type="checkbox"/>	London Aire	<input type="checkbox"/>													
All Star ME	<input checked="" type="checkbox"/>	Ventana	<input type="checkbox"/>															
<table border="0"><tr><td><input type="checkbox"/> Air Conditioning & Heating</td><td><input type="checkbox"/> Electrical Components</td></tr><tr><td><input type="checkbox"/> Appliances & Accessories</td><td><input type="checkbox"/> Exterior Components</td></tr><tr><td><input type="checkbox"/> Cabinets & Furniture</td><td><input type="checkbox"/> Interior Components</td></tr><tr><td><input checked="" type="checkbox"/> Chassis Components</td><td><input type="checkbox"/> Plumbing & Bath Components</td></tr><tr><td><input type="checkbox"/> Construction Components</td><td><input type="checkbox"/> Windows, Awnings, Vents, & Doors</td></tr></table>									<input type="checkbox"/> Air Conditioning & Heating	<input type="checkbox"/> Electrical Components	<input type="checkbox"/> Appliances & Accessories	<input type="checkbox"/> Exterior Components	<input type="checkbox"/> Cabinets & Furniture	<input type="checkbox"/> Interior Components	<input checked="" type="checkbox"/> Chassis Components	<input type="checkbox"/> Plumbing & Bath Components	<input type="checkbox"/> Construction Components	<input type="checkbox"/> Windows, Awnings, Vents, & Doors
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DESCRIPTION OF PROBLEM																		
Steering gear seal leaks fluid.																		
RECOMMENDED SOLUTION																		
<p>Spartan TSB08-260-001 has been released to address a concern with power steering fluid leaks at the steering gear seal. Read and follow the attached manufacturers inspection, diagnosis, and repair procedure completely before performing any repairs to the unit. If you have any questions, contact Spartan Motors directly.</p>																		



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SUBJECT: Steering – Steering Gear

APPLIES TO: Certain Spartan Mountain Master and K-2 Chassis produced for Newmar and Travel Supreme. Equipped with a Hendrickson Independent Front Suspension (IFS). Having a VDM (Vehicle Date of Manufacture) of December 21, 2006 through March 24, 2008.

CONDITION: Steering gear seals leaking fluid.

PLEASE READ THE ENTIRE BULLETIN BEFORE PROCEEDING WITH ANY WORK. CONTACT SPARTAN CHASSIS IF THERE ARE ANY CONCERNS WITH THE PROCEDURES CONTAINED IN THIS DOCUMENT

PART / SERVICE INFORMATION:

Labor Time: 3.0 Hrs.

<u>QTY.</u>	<u>Part Number</u>	<u>Description</u>
1	S-1957-001	Kit – Steering Gear Replacement
As Required	N/A	Hydraulic Fluid AW46 or Equivalent

Kit # S-1957-001 Contains:

<u>QTY.</u>	<u>Part Number</u>	<u>Description</u>
1	68389-001	Steering Gear w/Relief
4	58705-007	Bolt- 7/8-9 X 4.00" Lg. Hex
1	50764-008	Bolt- 3/4 -10 X 5.00" Lg. Hex
12	50764-006	Bolt- 3/4 -10 X 2.00" Lg. Hex
6	22962-007	Washer- 7/8" Flat
4	60266-000	Nut- 7/8"-9 Lock
26	22962-001	Washer-3/4" Flat
13	17700-033	Nut-3/4-10 Lock
2	17800-004	Pin-Cotter

Technical Service Bulletins are intended for use by Professional Technicians only. They are written to guide Professional Technicians in performing service to vehicles of product specific nature in conjunction with industry standards. Professional Technicians are appropriately trained on industry standards and have the tools and equipment to perform procedures safely and properly.



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Kit # S-1957-001 Contains (Continued):

<u>QTY.</u>	<u>Part Number</u>	<u>Description</u>
1	07140200H8Z	Bolt-7/16-14 X 2.00" Lg. Hex Gr.8 Zinc
1	0714LNZ	Nut-7/16-14 Lock Zinc
1	3506	Hose Clamp
10	T-120RO	Cable Tie-15"
1	TSB08-260-001	Document Instructions

STEP-BY-STEP INSTRUCTIONS:

1. Observe all industry safety standards, disconnect any necessary power source(s) and secure vehicle for removing and replacing the steering gear.
2. Jack up front of coach enough to begin taking weight off of front suspension and support at this height with jack stands.

NOTE: Mark position of steering wheel to ensure proper alignment during reassembly.

3. Disconnect driver and passenger side tie rods from suspension steering arms. Discard cotter pins and flat washers retain castle nuts for reuse.
4. Remove pitman arm and tie rods from steering gear output shaft. Discard pinch bolt, washers and nut. Retain pitman arm for reuse.
5. Refer to FIG. 3-1. Locate the driver and passenger side front axle ABS valve assemblies. Leaving hoses, wires and mounting brackets attached to the valves, remove the assemblies from suspension cradle belly plate allowing the valve assemblies, with brackets, to hang. Retain hardware for reuse.
6. Cut cable ties securing plumbing to suspension cradle belly plate.
7. Remove pinch bolt and disconnect steering slip shaft from steering gear input shaft. Discard pinch bolt and nut.
8. Refer to FIG. 6-1. Disconnect hoses from steering gear and plug hose ends. Properly discard clamp on return hose.

NOTE: Is should not be necessary to drain the hydraulic reservoir.

9. Refer to FIG. 5-1. Remove the suspension cradle gusset from front of suspension cradle, retaining suspension cradle gusset for reuse. Discard the bolts, washers and nuts.

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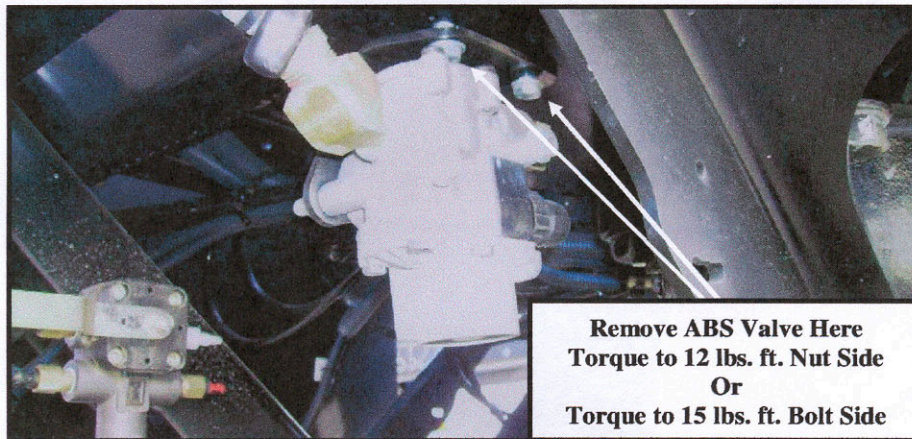
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10. Remove the eight (8) bolts securing the suspension cradle belly plate to suspension cradle. Discard bolts and washers.
11. Refer to FIG. 5-1. Slide suspension cradle belly plate rearward far enough to access all four (4) steering gear mounting bolts.
12. Refer to FIG. 5-1. Remove the passenger side front and rear and driver side rear bolts securing steering gear to the suspension cradle belly plate. Discard bolts and washers.
13. Loosen the remaining steering gear mounting bolt enough to allow the steering gear to pivot around the remaining bolt and align steering gear with vehicle center line.
14. Refer to FIG. 5-1. Pull suspension cradle belly plate out through front of suspension cradle far enough to drop steering gear off of cradle belly plate.
15. Support the steering gear and remove the remaining steering gear mounting bolt. Drop steering gear off the suspension cradle belly plate. Discard the bolt, washer and four (4) nuts from the top side of the cradle belly plate.



ABS VALVE MOUNTING LOCATION

FIG. 3-1

16. Refer to FIG. 6-1. Remove the two (2) fittings from steering gear, making note of which fitting was in which port. Save fittings for reuse, properly discard steering gear.

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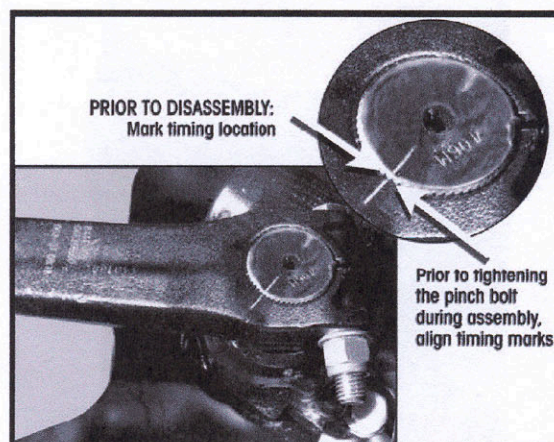
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17. Refer to FIG. 5-1. Carefully raise new steering gear to suspension cradle belly plate. Install one (1) new 7/8 x 4.00" bolt and flat washer through the driver side front hole in steering gear and cradle belly plate. Install new 7/8" locknut onto the new steering gear mounting bolt on top side of cradle belly plate. Snug fastener only at this time (steering gear must be able to pivot around bolt) making sure nut sits inside recess in top side of cradle belly plate.
18. Align steering gear with vehicle center line and push suspension cradle belly plate back into cradle past original mounting position far enough to access all three (3) remaining steering gear mounting bolts.
19. Refer to FIG. 5-1. Align holes in steering gear with holes in cradle belly plate and install the remaining three (3) 7/8 x 4.00" bolts washers and nuts as in step 16. Torque all four (4) bolts to 380-460 lbs. ft.
20. Refer to FIG. 5-1. Slide the cradle belly plate forward into its original mounting position and secure with eight (8) new 3/4 X 2.00" bolts, sixteen (16) new flat washers and eight (8) new 3/4" locknuts. Torque all eight (8) bolts to 270-330 lbs. ft.
21. Refer to FIG. 4-1 & 6-1. Reinstall pitman arm onto steering gear output shaft using one (1) new 3/4 x 5.00" bolt, two (2) new flat washers and one (1) new 3/4" locknut, **ensuring timing mark on pitman arm aligns with timing mark on end of output shaft. Torque Bolt to 270-330 lbs. ft.**



TIMING MARK

FIG. 4-1

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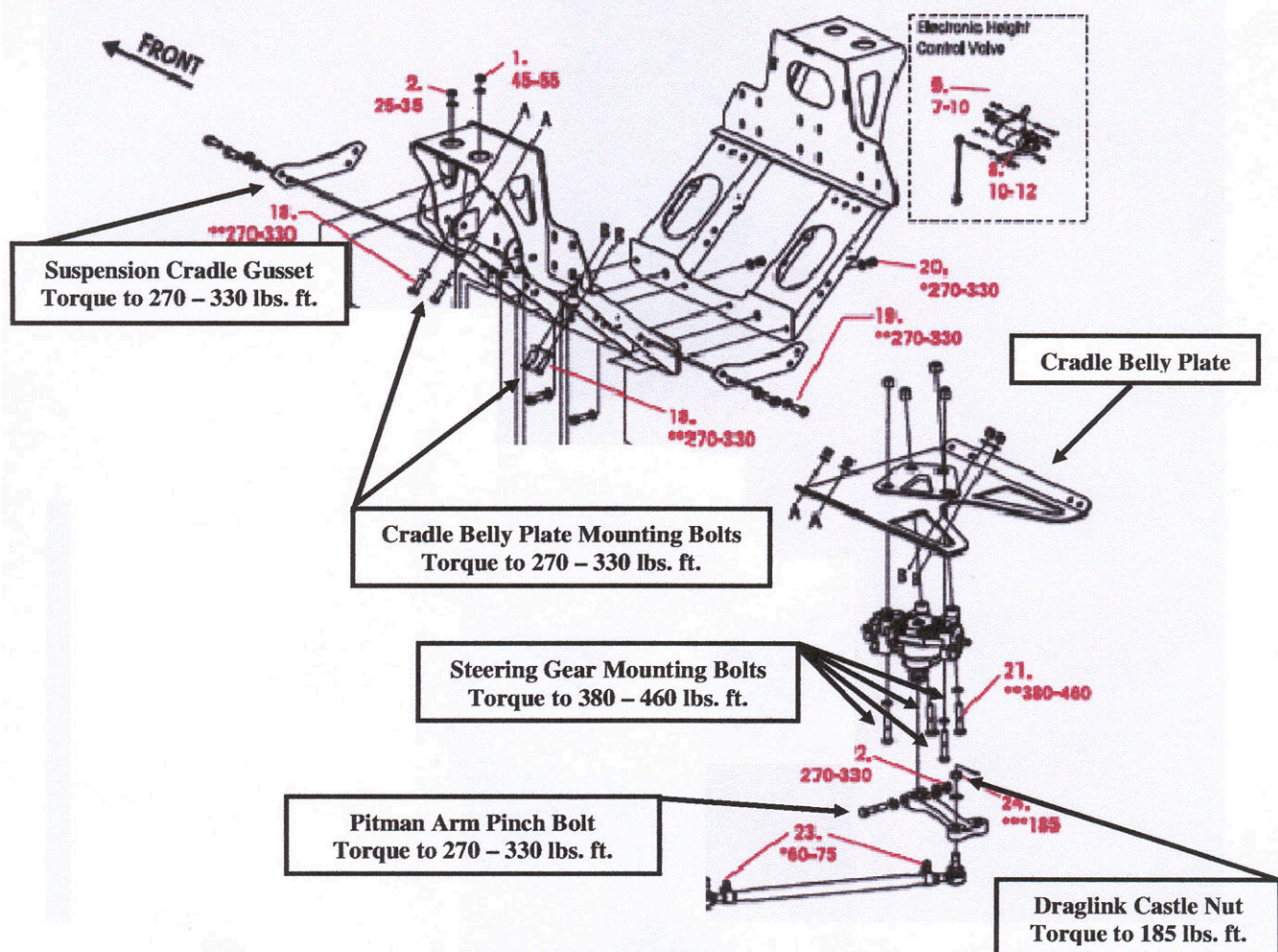
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Hendrickson Recommended
Torque Values Provided In Foot Pounds



SUSPENSION ILLUSTRATION W/ TORQUE SPECIFICATIONS

FIG. 5-1

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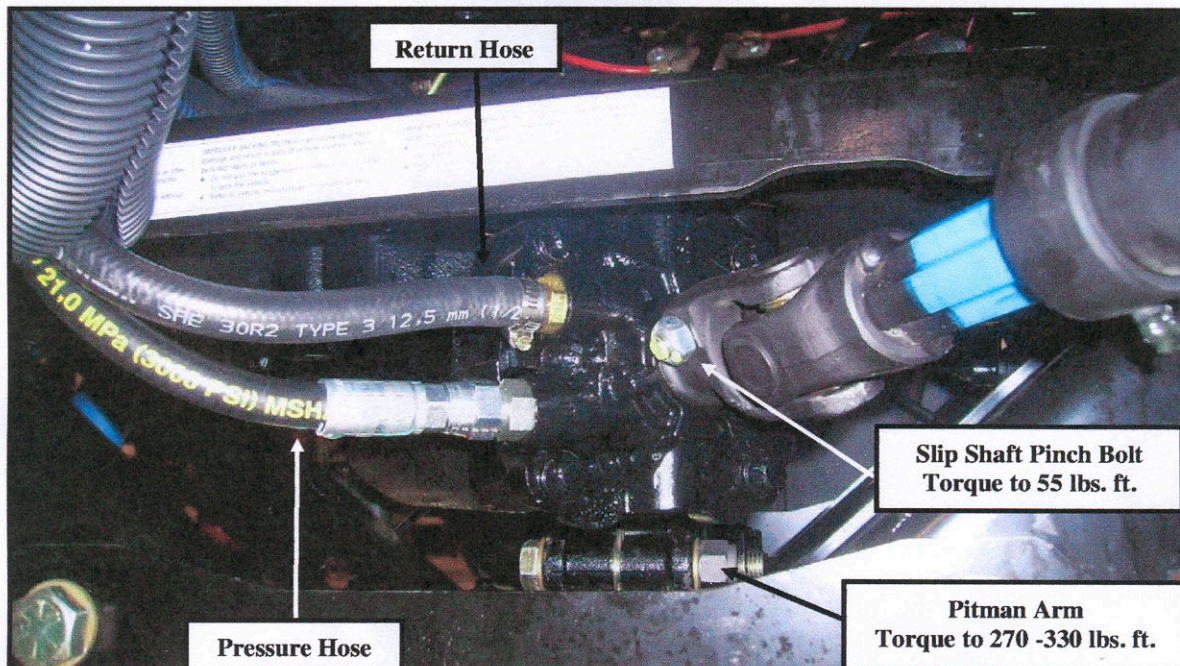
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22. Refer to FIG. 5-1. Reinstall suspension cradle gusset on front of cradle using four (4) new 3/4 x 2.00" bolts, eight (8) new flat washers and four (4) new 3/4" locknuts. Torque all four (4) bolts to 270-330 lbs. ft.
23. Refer to FIG. 3-1. Reattach driver and passenger side front axle ABS valve assemblies to the bottom of the suspension cradle belly plate with original hardware. Torque fasteners to 12 lbs. ft. nut side or 15 lbs. ft. bolt head side.
24. Carefully re-secure plumbing to suspension cradle belly plate using cable ties from kit as needed. Ensure plumbing and hoses are not chaffing or rubbing.
25. Reattach driver and passenger side tie rods to the suspension steering arms reusing the original castle nuts but using new flat washers and new cotter pins. Torque castle nuts to 185 lbs. ft. then rotate to the next hole to install cotter pins and properly bend cotter pins.



STEERING GEAR HOSE PLACEMENT

FIG. 6-1

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26. Refer to FIG. 6-1. Reinstall the JIC flare fitting removed from the original steering gear in step 16 into the "P" (pressure) port of the new steering gear.
 27. Refer to FIG. 6-1. Reinstall the beaded fitting removed from original steering gear in step 16 into return port of new steering gear.
 28. Refer to FIG. 6-1. Reattach steering gear return hose to beaded fitting installed in return port of new steering gear and secure with new hose clamp.
 29. Refer to FIG. 6-1. Reattach steering gear pressure hose to the fitting installed into steering gear pressure port. Secure as needed.
 30. Refer to FIG. 6-1. Reattach steering slip shaft to steering gear input shaft, using new 7/16 X 2.00" bolt and nut. Torque bolt to 55 lbs. ft.
- NOTE: Refer to previous note to ensure the proper indexing of steering wheel.**
31. Check oil level in hydraulic reservoir and top off if necessary.
 32. Reconnect any power source(s) previously disconnected.

INITIAL POPPET SETTING

For this procedure to work correctly, you must have: A new gear or a used gear on which poppet seats have been replaced or reset during gear disassembly procedures.

NOTE: The axle stops and all steering linkage must be set according to vehicle manufacturer's specifications, and the pitman arm must be correctly aligned on the sector shaft for poppets to be set correctly.

1. With the engine at idle and the vehicle unloaded, turn steering wheel to full travel in one direction until axle stop contact is made. Maximum input torque to be applied during this procedure is 40 lb. rim pull on a 20 in. diameter steering wheel.
2. Follow the same procedure while turning the steering wheel in the other direction. The poppets are now positioned to trip and reduce pressure as the steered wheels approach the axle stops in either direction.

FILLING AND AIR BLEEDING THE SYSTEM

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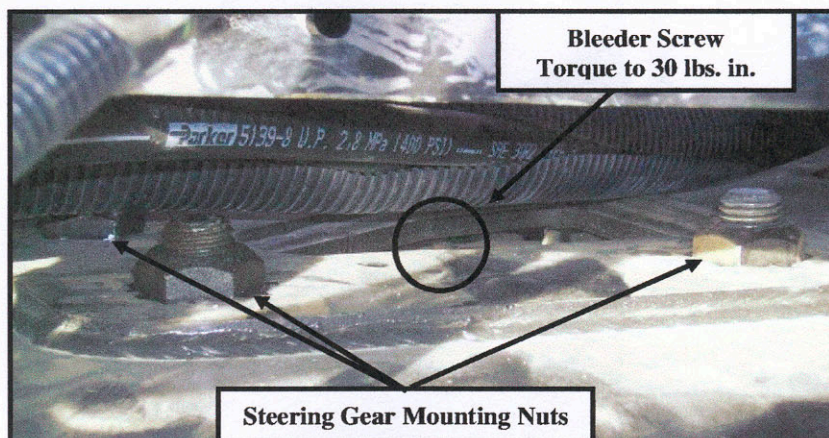
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NOTE: Make sure poppets are set correctly before beginning this procedure. Do not allow the fluid level to drop significantly or run out of the reservoir. This may induce air into the system.

1. Fill the reservoir nearly full. Do not steer. Start and run the engine for 10 seconds, then shut it off. Check and refill the reservoir. Repeat at least three times, checking the reservoir each time.
2. Start the engine and let idle for 2 minutes. Do not steer. Shut off the engine and check the fluid level in the reservoir.
3. Refer to FIG. 8-1. Locate the bleed screw on top of the steering gear. It can be accessed through the hole in the suspension cradle belly plate. Steering gear is **not** self bleeding.

NOTE: Do not turn steering wheel with bleed screw loosened.

4. Refer to FIG. 8-1. With engine idling, steer from full left turn to full right turn several times. Stop steering and loosen the manual bleed screw about one turn using a 5/16" socket or wrench. Allow air and aerated fluid to "bleed out" until only clear fluid is seen. Close the bleed screw, refill the reservoir if required. Repeat three to four times until all the air is discharged. Torque manual bleed screw to 30 lbs. in.
5. Check and refill reservoir as needed.



Steering Gear Bleeder Screw Location

FIG. 8-1

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