

## Reference Material

This technical publication covers Hendrickson Truck Suspensions' recommended procedures for our parts/products. Other components play a major role in overall performance and Hendrickson recommends you follow the specific OEM's recommendation for care and maintenance. Some recommended procedures have been developed by The Technology & Maintenance Council (TMC) and Hendrickson supports these recommendations. We have compiled a list of these below.

### TMC

To obtain copies of the following RP's, video's, or charts, contact TMC at:

TMC/ATA  
2200 Mill Road  
Alexandria, VA 22314

Phone: 703-838-1763  
website: [tmc.truckline.com](http://tmc.truckline.com)  
online ordering: [www.truckline.com/store](http://www.truckline.com/store)

### Important References

TMC RP 214B	Tire/Wheel End Balance and Runout
TMC RP 216	Radial Tire Conditions Analysis Guide
TMC RP 219A	Radial Tire Wear Conditions and Causes
TMC RP 222A	User's Guide To Wheels and Rims
TMC RP 230	Tire Test Procedures for Tread wear, Serviceability, and Fuel Economy
TMC RP 514	Pre-Alignment Inspection
TMC RP 618	Wheel Bearing Adjustment Procedure
TMC RP 620B	Front End Alignment Steering Geometry
TMC RP 708A	Trailer Axle Alignment
TMC RP 642	Guidelines For Total Vehicle Alignment
TMC RP 644	Wheel End Conditions Analysis Guide
TMC RP 645	Tie Rod End Inspection and Maintenance Procedure

### Video

TMC T0326	Wheel End Maintenance
TMC T0372	Tire Pre-Trip Inspection Guidelines

### Other

TMC T0400	Wheel bearing Adjustment Procedure Wall Chart
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# AIRTEK for Volvo Vehicles

## FRONT AIR MODULE SUSPENSION ALIGNMENT SPECIFICATION

CAMBER <sup>1</sup>	DESIGN SPECIFICATION	RANGE	
		MINIMUM	MAXIMUM
LEFT	0.0° ± 1.0°	-1.0°	+1.0°
RIGHT	-0.25° ± 1.0°	-1.25°	+0.75°
CROSS	+0.25° ± 1.0°	-0.75°	+1.25°

### CAMBER NOTES:

<sup>1</sup>The camber angle is not adjustable. Do not bend axle or otherwise try to adjust camber. If found out of specification, notify Hendrickson Tech Services for further information.

CASTER <sup>1,2</sup>	DESIGN SPECIFICATION	RANGE	
		MINIMUM	MAXIMUM
LEFT	3.75° ± 1.0°	+2.75°	+4.75°
RIGHT	3.75° ± 1.0°	+2.75°	+4.75°
CROSS <sup>3</sup>	0.0° ± 1.5°	-1.5°	+1.5°

### CASTER NOTES:

- <sup>1</sup> Caster is determined with the vehicle at specified ride height for air suspension or at rated load for mechanical suspension systems. It is critical that the vehicle front and rear ride height is within specifications prior to performing a caster measurement or adjustment. See Hendrickson ride height specifications and procedure.
- <sup>2</sup> In most cases actual vehicle caster is defined with the frame rails at zero slope. Refer to the vehicle manufacturer's specifications for correct frame rail slope. (Both the alignment surface and the vehicle's frame rails should be level during execution of alignment procedures). For vehicles with a positive frame rake (higher in rear) add the frame slope (in degrees) to the caster reading to determine true vehicle caster.
- <sup>3</sup> **The cross caster angle is not adjustable** – Do not bend axle or otherwise try to adjust cross caster. If found out of specifications notify Hendrickson Tech Services for further information. Changes to caster can be attained by using caster shims as provided by the vehicle manufacturer or chassis and body manufacturer. Caster shims must match, side to side, to reduce uneven loading to the suspension components. **The use of two different angle caster shims will not correct cross caster.**
- <sup>4</sup> **Example of caster adjustment:** 2.5° RH/3° LH, would require one, 1.0 shim on each side to increase caster and achieve 3.50° RH/4.00° LH, that is in specification. **DO NOT** attempt to use uneven shims.

### Hendrickson recommends following TMC<sup>2</sup> practices:

	DESIGN SPECIFICATION <sup>1</sup>	RANGE	
		MINIMUM	MAXIMUM
TOTAL TOE <sup>2</sup>	1/16" ± 1/32" (0.06" ± 0.03")	1/32" (0.03")	3/32" (0.09")

### TOE-IN NOTES:

- <sup>1</sup> Toe-in is to be set and adjusted in the normal vehicle unladed configuration. Actual vehicle curb weight on the ground. Toe should be checked at the tires front and rear tread center, at a distance above ground equal to the tire's rolling radius.
- <sup>2</sup> In most instances total toe is set by the vehicle manufacturer or body builder. Consult the vehicle manufacturer for specifications.

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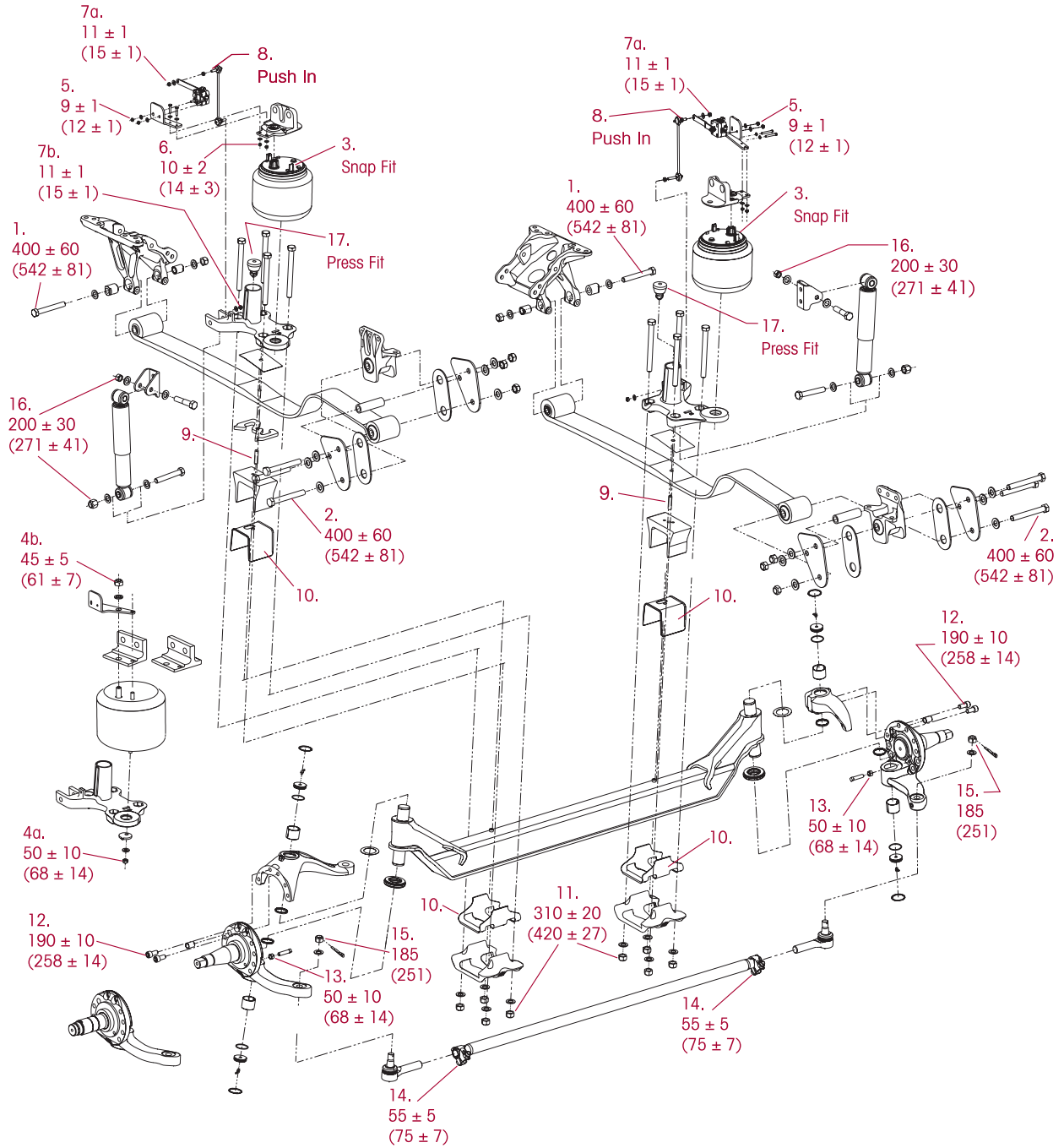
## TROUBLE SHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Worn or damaged king pins and king pin bushings.	Dirt in system-contaminated lubricant	Polish and inspect king pin, replace bushings and seals, then follow specified lubrication procedures
	Incorrect lubricant	Lubricate axle with specified lubricant
	Axle not lubricated at scheduled frequency	Lubricate axle at scheduled frequency
	Incorrect lubrication procedures	Use correct lubrication procedures
	Lubrication interval not compatible with operating conditions	Change lubrication interval to match operating conditions
	Worn or missing seals	Replace worn or missing seals
Vibration or shimmy of front axle during operation	Ride height out of adjustment	Adjust ride height to specification
	Caster is out of adjustment	Adjust caster
	Wheels and/or tires out of balance	Balance or replaces wheels and/or tires
	Engine mount broken	Replace engine mount
	Worn shock absorbers	Replace shock absorbers
	Incorrect wheel bearing adjustment	Adjust wheel bearing to correct specifications
Excessive wear on tires or uneven tire tread wear	Tires have incorrect air pressure	Adjust the pressure to manufacturer's specification
	Tires out of balance	Balance or replace tires
	Incorrect tandem axle alignment	Align tandem axles
	Incorrect toe setting	Adjust toe-in to manufacturer's specification
	Incorrect steering arm geometry	Repair steering system as necessary
	Excessive wheel bearing end play	Check specified wheel nut torque, replace worn or damaged wheel bearings
	Worn king pin bushings	Replace king pin bushings
Vehicle is hard to steer	Incorrect wheel bearing adjustment	Adjust wheel bearing to correct specifications
	Low pressure in the power steering system	Repair power steering system
	Steering linkage needs lubrication	Lubricate steering linkage
	Steering knuckles are binding	Replace king pin bushings. Grease if out of specification or damaged.
	Incorrect steering arm geometry	Repair steering system as necessary
	Thrust bearing will not take grease	Replace thrust bearing
	Caster out of adjustment	Set proper ride height then adjust caster as necessary
	Tie rod ends binding	Replace tie rod ends
Worn thrust bearing	Replace thrust bearing	

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## TROUBLE SHOOTING GUIDE

CONDITION	POSSIBLE CAUSE	CORRECTION
Tie rod ends are worn and require replacement	Tie rod ends need lubrication	Lubricate tie rod ends. Make sure lubrication schedule is followed.
	Severe operating conditions	Increase frequency of inspection and lubrication intervals
	Damaged boot on tie rod end	Replace tie rod end
Bent or broken cross tube, tie rod end ball stud or tie rod end  NOTE: Damaged components require replacement	Pump/gear relief valve pressure setting exceeds system specifications	Adjust power steering system to manufacturer's specified pressure
	Steering gear poppets improperly set or malfunctioning	Check for proper operation or adjust poppets to OEM specifications
	Axle stops improperly set	Set axle stops to OEM specifications
	Severe duty cycle service	Increase frequency of inspection and lubrication intervals
Worn or broken steering ball stud	Drag link fasteners tightened past specified torque	Tighten drag link fasteners to the specified torque
	Lack of lubrication or incorrect lubricant	Lubricate linkage with specified lubricant
	Power steering stops out of adjustment	Adjust steering stops to OEM specifications
Suspension has harsh or bumpy ride	Air spring not inflated	Check air supply to air spring, repair as necessary
	Air spring ride height out of specification	Adjust ride height to proper specification
	Broken or worn leaf spring	Replace leaf spring
	Front suspension overloaded	Redistribute steer axle load
	Suspension is underloaded	Redistribute load to provide more weight on front axle
Restricted steering radius	Steering stops not adjusted correctly	Adjust steering stops to achieve correct wheel cut
Vehicle leans	Ride height incorrect	Adjust ride height to specification
	Air spring(s) are not inflated	Repair source of air pressure loss
	Suspension is not torqued correctly at installation	Perform AIRTEK spring hanger retorque procedure. See Torque Specification Section of this publication
	Leaf spring broken	Replace leaf spring
	Excessive weight bias	Install Z spacer or install dual height control valves
Vehicle wanders	Caster out of adjustment	Set proper ride height, then adjust caster as necessary
	Incorrect toe setting	Adjust toe to specification
	Fifth wheel not greased	Grease fifth wheel
	Air in the power steering system	Remove air from the power steering system
	Rear ride height out of adjustment	Adjust ride height to specification
	Front ride height out of adjustment	Adjust ride height to specification



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HENDRICKSON RECOMMENDED TORQUE SPECIFICATIONS						
NO.	COMPONENT	QUANTITY	SIZE	TORQUE		
				FT./LBS.	Nm	
Frame Fasteners Furnished & Installed by Truck Manufacturer***						
1	Front Frame Hanger to Front Spring Eye, Tighten at the Bolt Head	2	M20	400 ± 60	542 ± 81	
2	Shackle Bracket to Shackle, Tighten at the Bolt Head	6	M20	400 ± 60	542 ± 81	
3	Air Spring 12.5K lb. Capacity	None	Self Locking	Snap Fit		
4	Air Spring 13.2/14.6K lb. Capacity	a. To Top Spring Pad	1	M12	50 ± 10	68 ± 14
		b. To Height Control Valve Bracket and Air Spring Bracket	2	M20	45 ± 5	61 ± 7
5	Dual Height Control Valve to Height Control Valve Bracket	2	M6	9 ± 1	12 ± 1	
	Single Height Control Valve to Height Control Valve Bracket****	2	¼"	9 ± 1	12 ± 1	
6	Height Control Valve Bracket to Upper Air Spring Bracket	2	M6	10 ± 2	14 ± 3	
7	Linkage	a. To Top Spring Pad	1	M8	11 ± 1	15 ± 1
		b. HCV Linkage Arm	1	M8	11 ± 1	15 ± 1
8	Height Control Valve Leveling Arm to Linkage	None	Grommet	Push In		
9	Spring Center Alignment Dowel Pin	1	½"	Loose Fit		
10	Axle Wrap Liners For Clamp Group	None	Formed	Snap Fit		
<p><b>⚠ WARNING</b> DO NOT ASSEMBLE CLAMP GROUP WITHOUT DELRIN LINERS. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.</p> <p><b>⚠ WARNING</b> INSURE CLAMP GROUP IS ALIGNED PROPERLY PRIOR TO TIGHTENING HARDWARE. FAILURE TO DO SO CAN CAUSE LOSS OF VEHICLE CONTROL, PROPERTY DAMAGE OR PERSONAL INJURY.</p>						
11	Clamp Group Hardware*	4 Per Side	M20	310 ± 20	420 ± 27	
12	Knuckle Attachment Bolt (Socket Head Cap Screw)*	2 <sup>1</sup>	⅝"	190 ± 10	258 ± 14	
13	Knuckle/Axle Wheel Stop Bolt*	1 Per Side	½" Jam Nut	50 ± 10	68 ± 14	
14	Main Tie Rod Assembly / W Tie Rod Ends	2	⅝"	55 ± 5	75 ± 7	
		2	⅞" (Nut)	185**	251	
15	Drag Link	Nuts	⅞" Castle	185**	251	
16	Shocks Eyebolts	4	M16	200 ± 30	271 ± 41	
17	Rubber Axle Stop	2	--	Press Fit		
<p>• Frame mount hardware in most cases huck style fasteners supplied by the OEM.</p> <p><b>NOTES:</b></p> <p>* Quantity listed on a per-side basis.</p> <p>** Torque to 185 ft. lbs., advance nut to next hex face to install cotter pin. Do not back off nut for cotter pin installation.</p> <p>*** Torque values listed above apply only if Hendrickson supplied fasteners are used. If non-Hendrickson fasteners are used, follow torque specifications listed in vehicle manufacturer's service manual.</p> <p>**** For vehicles built prior to 03/05.</p>						