

**Uniform Inspection and Communication Standards
for
STEERING AND SUSPENSION, WHEEL
ALIGNMENT, AND WHEELS AND TIRES**

January 2002



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Motorist Assurance Program (MAP)

Overview

The Motorist Assurance Program is the consumer outreach effort of the Automotive Maintenance and Repair Association, Inc. (AMRA). Participation in the Motorist Assurance Program is drawn from retailers, suppliers, independent repair facilities, vehicle manufacturers and industry associations.

Our organization's mission is to strengthen the relationship between the consumer and the auto repair industry. We produce materials that give motorists the information and encouragement to take greater responsibility for their vehicles—through proper, manufacturer-recommended, maintenance. We encourage participating service and repair shops (including franchisees and dealers) to adopt (1) a Pledge of Assurance to their Customers and (2) the Motorist Assurance Program Standards of Service. All participating service providers have agreed to subscribe to this Pledge and to adhere to the promulgated Standards of Service demonstrating to their customers that they are serious about customer satisfaction.

These Standards of Service require that an inspection of the vehicle's (problem) system be made and the results communicated to the customer according to industry standards. Given that the industry did not have such standards, the Motorist Assurance Program successfully promulgated industry inspection communication standards in 1994-95 for the following systems: Exhaust, Brakes, ABS, Steering and Suspension, Engine Maintenance and Performance, HVAC, Electrical Systems, and Drive Train and Transmissions. Further, revisions to all of these inspection communication standards are continually re-published. Participating shops utilize these Uniform Inspection & Communication Standards as part of the inspection process and for communicating their findings to their customers.

The Motorist Assurance Program continues to work cooperatively and proactively with government agencies and consumer groups toward solutions that both benefit the customer and are mutually acceptable to both regulators and industry. We maintain the belief that industry must retain control over how we conduct our business, and we must be viewed as part of the solution and not part of the problem. Meetings with state and other government officials (and their representatives), concerned with auto repair and/or consumer protection, are conducted. Feedback from these sessions is brought back to the association, and the program adjusted as needed.

Overview *(continued)*

To assure auto repair customers recourse if they were not satisfied with a repair transaction, the Motorist Assurance Program offers mediation and arbitration through the Better Business Bureau and other non-profit organizations. MAP conducted pilot programs in twelve states before announcing the program nationally in October, 1998. During the pilots, participating repair shops demonstrated their adherence to the Pledge and Standards and agreed to follow the UICS in communicating the results of their inspection to their customers. To put some “teeth” in the program, an accreditation requirement for shops was initiated. The requirements are stringent, and a self-policing method has been incorporated which includes the “mystery shopping” of outlets.

We welcome you to join us as we continue our outreach... with your support, both the automotive repair industry and your customers will reap the benefits. Please visit MAP at our Internet site www.motorist.org or contact us at:

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Overview of Service Requirements and Suggestions

It is MAP policy that all exhaust, brake, steering, suspension, wheel alignment, drive-line, engine performance and maintenance, and heating, ventilation and air conditioning, and electrical services be offered and performed under the standards and procedures specified in these sections.

Before any service is performed on a vehicle, an inspection of the appropriate system must be performed. The results of this inspection must be explained to the customer and documented on an inspection form. The condition of the vehicle and its components will indicate what services/part replacements may be “Required” or “Suggested”. In addition, suggestions may be made to satisfy the requests expressed by the customer.

When a component is suggested or required to be repaired or replaced, the decision to repair or replace must be made in the customer’s best interest, and at his or her choice given the options available.

This section lists the various parts and conditions that indicate a required or suggested service or part replacement. Although this list is extensive, it is not fully inclusive. In addition to this list, a technician may make a suggestion. However, any suggestions must be based on substantial and informed experience, or the vehicle manufacturer’s recommended service interval and must be documented.

Some conditions indicate that service or part replacement is required because the part in question is no longer providing the function for which it is intended, does not meet a vehicle manufacturer’s design specification or is missing.

- **Example:** An exhaust pipe has corroded severely and has a hole in it through which exhaust gases are leaking. Replacement of the exhaust pipe in this case is required due to functional failure.
- **Example:** A brake rotor has been worn to the point where it measures less than the vehicle manufacturer’s discard specifications. Replacement of the rotor is required because it does not meet design specifications.

Some conditions indicate that a service or part replacement is suggested because the part is close to the end of its useful life or addresses a customer’s need, convenience or request. If a customer’s vehicle has one of these conditions, the procedure may be only to suggest service.

- **Example:** An exhaust pipe is rusted, corroded or weak, but no leaks are present. In this case, the exhaust pipe has not failed. However, there is evidence that the pipe may need replacement in the near future. Replacement of the pipe may be suggested for the customer’s convenience in avoiding a future problem.

Overview of Service Requirements and Suggestions *(continued)*

- **Example:** The customer desires improved ride and/or handling, but the vehicle's shocks or struts have not failed. In this case, replacement may be suggested to satisfy the customer's wishes. In this case, replacement of the shocks or struts may not be sold as a requirement.

A customer, of course, has the choice of whether or not a shop will service his or her vehicle. He or she may decide not to follow some of your suggestions. When a repair is *required*, a MAP shop must refuse partial service on that system if, in the judgment of the service provider, proceeding with the work could create or continue an unsafe condition. When a procedure states that required or suggested repair or replacement is recommended, the customer must be informed of the generally acceptable repair/replacement options whether or not performed by the shop.

When presenting *suggested* repairs to the customer, you must present the facts, allowing the customer to draw their own conclusions and make an informed decision about how to proceed.

The following reasons may be used for required and suggested services. These codes are shown in the "Code" column of the MAP Uniform Inspection & Communications Standards that follow:

Reasons to <i>Require</i> Repair or Replacement	Reasons to <i>Suggest</i> Repair or Replacement
<p>A - Part no longer performs intended purpose</p> <p>B - Part does not meet a design specification (regardless of performance)</p> <p>C - Part is missing</p>	<p>1 – Part is close to the end of its useful life (just above discard specifications, or weak; failure likely to occur soon, etc.)</p> <p>2 - To address a customer need, convenience, or request (to stiffen ride, enhance performance, eliminate noise, etc.)</p> <p>3 - To comply with maintenance recommended by the vehicle's Original Equipment Manufacturer (OEM)</p> <p>4 – Technician's recommendation based on substantial and informed experience</p>
<p>NOTE: When a repair is <i>required</i>, the shop must refuse partial service to the system in question, if the repair creates or continues an unsafe condition.</p>	<p>NOTE: Suggested services are <i>always</i> optional. When presenting suggested repairs to the customer, you must present the facts, allowing the customer to draw their own conclusions and make an informed decision about how to proceed.</p>

Steering and Suspension

Service Procedures Required and Suggested for Proper Vehicle Operation

Steering and suspension are complex systems made up of a variety of interdependent components. For proper vehicle handling, ride, and tire wear, a thorough inspection is required whenever suspension work is being performed.

Conditions listed assume that the problem has been isolated to the specific component by proper testing procedures.

NOTE: When replacing steering and/or suspension components which may affect an alignment angle, you are required to check and adjust alignment as needed. Refer to the OEM specifications.

CAUTION: Do not use ride height altering or load compensating components, such as variable rate springs and coil over shocks, on vehicles with height or load sensing proportioning valve-equipped braking systems, unless these components are original equipment.

Active Suspension Control Modules

See Control Modules.

Air Bags

See Air Springs.

Air Ride Control Modules

See Control Modules.

Air Ride Suspension

NOTE: Depending on the air suspension design, there are some aftermarket products available to eliminate the air ride suspension on certain vehicles. If the system has been eliminated with one of these products, then no service is suggested or required.

Air Ride Suspension Torsion Springs (Counter Balancing)

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Broken	A	Require replacement.
Missing	C	Require replacement.

Air Ride Tubes

Condition	Code	Procedure
Application incorrect	B	Require replacement.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connected incorrectly	A	Require repair.
Insufficient clamping force, allowing hose to leak	A	Require repair or replacement.
Leaking	A	Require repair or replacement.
Melted	1	Suggest repair or replacement.
Missing	C	Require replacement.

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Air Ride Tubes *(continued)*

Condition	Code	Procedure
Protective sleeves damaged	2	Suggest replacement of sleeves.
Protective sleeves missing	C	Require replacement of sleeves.
Restricted, affecting performance	A	Require repair or replacement.
Restricted, not affecting performance	2	Suggest repair or replacement.
Routed incorrectly (where failure is likely to occur)	B	Require repair or replacement.
Safety clip missing	C	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Type incorrect	1	Suggest repair or replacement.

Air Shocks and Air Struts

NOTE: This section covers the air spring portion of the air shock or strut. For damping portion of shock or strut conditions and procedures, refer to the *Shock Absorbers, Strut Cartridges, and Strut Assemblies* section.

Condition	Code	Procedure
Inner fabric of air bag damaged	A	Require replacement.
Leaking	A	Require repair or replacement.
Outer covering of air bag is cracked to the extent that inner fabric of air bag is visible	1	Suggest replacement.

Air Spring Valves

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Blocked	A	Require repair or replacement.
Connector bent	A	Require repair or replacement.
Connector broken	A	Require replacement.
Connector loose	A	Require repair or replacement.
Inoperative	A	Require repair or replacement.
Leaking	A	Require repair or replacement.
Restricted	A	Require repair or replacement.

Air Springs

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Collar cracked	A	Require replacement.
End cap cracked	A	Require replacement.
Inner fabric of bag damaged	A	Require replacement.
Leaking	A	Require repair or replacement.
Outer covering of air bag is cracked to the extent that inner fabric of air bag is visible	1	Suggest replacement.
Piston cracked	A	Require replacement.

Air Suspension Control Valves

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.

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Air Suspension Control Valves *(continued)*

Condition	Code	Procedure
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require replacement. See note below.
NOTE: Determine cause and correct prior to replacement of part.		
Connector missing	C	Require replacement.
Leaking	B	Require repair or replacement.
Output incorrect	B	Require replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Wire lead burned	A	Require repair or replacement.

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Air Suspension Control Valves *(continued)*

Condition	Code	Procedure
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Air Suspension Driers

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Contaminated, affecting performance	A	Require replacement.
Dessicant bag deteriorated	A	Require replacement. Further inspection required. See note below.
NOTE: Inspect system to determine effects of dessicant bag deterioration.		
Leaking	A	Require replacement.
Restricted	A	Require repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Tubing connection leaking	A	Require repair or replacement.

Ball Joints

Before requiring or suggesting ball joint replacement, the approved OEM procedure must be used to measure ball joint wear. The measurement(s) obtained, along with the vehicle manufacturer's specifications, must be noted on the inspection report. Some states require that these measurements also appear on the invoice.

NOTE: The term "perceptible movement," defined as any visible movement in any direction, has been the industry standard for determining the need for replacement of follower (non-load carrying) ball joints. Some vehicle manufacturers are now publishing specifications for follower ball joints that were previously diagnosed by the "perceptible movement" standard. Before requiring or suggesting any parts be replaced based on "perceptible movement," consult your repair manual to determine if OEM specifications exist.

You are not required to replace ball joints in axle sets. However, when replacing a ball joint due to wear exceeding manufacturer's specification, you may suggest replacement of the other ball joint if its measurement shows it is close to the end of its useful life, for preventive maintenance.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Further inspection required. See note below.
NOTE: If greaseable, grease ball joint. If problem persists or joint is non-greaseable, require replacement.		
Grease boot cracked	2	Suggest replacement. See note below.
NOTE: Cracked grease boot will allow contaminants to enter the ball joint and will accelerate wear.		

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Ball Joints *(continued)*

Condition	Code	Procedure
Grease boot missing	C	Require replacement. See note below.
NOTE: Lack of grease boot will allow contaminants to enter the ball joint and will accelerate wear.		
Grease boot torn	A	Require replacement. See note below.
NOTE: Torn grease boot will allow contaminants to enter the ball joint and will accelerate wear.		
Grease fitting broken	A	Require replacement of grease fitting. See note below.
NOTE: Some vehicles come from the factory with broken fittings. No service is suggested or required on these vehicles.		
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Greaseable ball joint will not take grease	2	Suggest replacement of grease fitting. See note below.
NOTE: If the greaseable ball joint still will not take grease after replacing the grease fitting, suggest replacement of ball joint.		
Nut on ball joint loose	A	Require repair or replacement. See note below.
NOTE: Check for bent stud or damaged taper hole.		
Pre-load adjustment incorrect	B	Require repair or replacement.
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Threads damaged	A	Require repair or replacement.

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Ball Joints *(continued)*

Condition	Code	Procedure
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Bushings

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require repair or replacement.
Deteriorated, affecting performance	A	Require repair or replacement. See note below.
NOTE: If condition is caused by oil-soaking, further inspection is required to determine source of oil.		
Distorted, affecting performance	A	Require repair or replacement.
Leaking (fluid-filled type)	A	Require replacement.
Missing	C	Require replacement.

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Bushings *(continued)*

Condition	Code	Procedure
Noisy	2	Further inspection required. See note and caution below.
NOTE: If noise isolated to bushing, suggest repair or replacement.		
CAUTION: Use only approved lubricant on rubber bushings. Petroleum-based lubricants may damage rubber bushings.		
Oil-soaked, affecting performance	A	Require replacement. See note below.
NOTE: Further inspection required to determine source of oil.		
Rubber separating from internal metal sleeve on bonded bushing	A	Require replacement.
Seized	A	Require replacement.
Shifted (out of position)	B	Require repair or replacement.
Split	A	Require replacement.
Surface cracking (weather-checked)		No service suggested or required.

Center Links

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.

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Center Links *(continued)*

Condition	Code	Procedure
Binding	A	Further inspection required. See note below. NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.
Grease boot cracked	A	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Cracked grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease boot missing	C	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease boot torn	A	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	C	Require replacement. See note below. NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease seal will allow contaminants to enter the joint and will accelerate wear.
Grease seal torn	A	Require replacement. See note below. NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease seal will allow contaminants to enter the joint and will accelerate wear.

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Center Links *(continued)*

Condition	Code	Procedure
Greaseable center link will not take grease	2	Suggest replacement of grease fitting. See note below.
NOTE: If greaseable center link still will not take grease after replacing the grease fitting, suggest replacement of center link.		
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud loose in taper hole	A	Require repair or replacement. See note below.
NOTE: Check for damaged taper hole.		
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		

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Center Links *(continued)*

Condition	Code	Procedure
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Compressors

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector bent	A	Require repair or replacement.
Connector broken	A	Require replacement.
Connector loose	A	Require repair or replacement.
Does not build pressure	A	Require replacement.
Excessive run time	B	Require replacement.
Inoperative	A	Require replacement. See note below.
NOTE: Inoperative includes intermittent operation or out of OEM specification.		
Leaking	A	Require repair or replacement.
Missing	C	Require replacement.

continues on following page

Compressors *(continued)*

Condition	Code	Procedure
Noisy (abnormal)	2	Suggest replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Control Arm Shafts

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.

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Control Arm Shafts *(continued)*

Condition	Code	Procedure
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Shaft bushing surface undersized (worn)	B	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Control Arms

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Ball joint hole oversized (loose interference or press fit)	B	Further inspection required. See note below.
NOTE: If oversized ball joint is available, require replacement of ball joint. If oversized ball joint is not available, require replacement of control arm.		
Bent	B	Require replacement.
Bushing hole oversized	B	Require replacement.

continues on following page

Control Arms *(continued)*

Condition	Code	Procedure
Corroded, affecting structural integrity	A	Require replacement.
Holes distorted	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Control Modules

Condition	Code	Procedure
Application incorrect	B	Require replacement.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector melted	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Connector missing	A	Require repair.
Contaminated	A	Require repair or replacement. See note below.
NOTE: Determine source of contamination, such as engine coolant, fuel, metal particles, or water. Require repair or replacement.		

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Control Modules *(continued)*

Condition	Code	Procedure
Inoperative	B	Require repair or replacement. Further inspection required. See note below.
NOTE: Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.		
Leaking	A	Require repair or replacement.
Malfunctioning	A	Require replacement. See note below.
NOTE: Includes inoperative, intermittent operation, failure to perform all functions, out of OEM specification, or out of range.		
Missing	C	Require replacement.
Terminal broken	A	Require repair or replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Wire lead conductors exposed	B	Require repair or replacement.

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Control Modules *(continued)*

Condition	Code	Procedure
Wire lead corroded	A	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Drag Links

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Binding	A	Further inspection required. See note below.
NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.		
Grease boot cracked	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Cracked grease boot will allow contaminants to enter the joint and will accelerate wear.		
Grease boot missing	C	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease boot will allow contaminants to enter the joint and will accelerate wear.		

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Drag Links *(continued)*

Condition	Code	Procedure
Grease boot torn	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease boot will allow contaminants to enter the joint and will accelerate wear.		
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	C	Require replacement. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease seal will allow contaminants to enter the joint and will accelerate wear.		
Grease seal torn	A	Require replacement. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease seal will allow contaminants to enter the joint and will accelerate wear.		
Greaseable center link will not take grease	2	Suggest replacement of grease fitting. See note below.
NOTE: If greaseable center link still will not take grease after replacing the grease fitting, suggest replacement of center link.		
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		

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Drag Links *(continued)*

Condition	Code	Procedure
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud loose in taper hole	A	Require repair or replacement. See note below.
NOTE: Check for damaged taper hole.		
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Electric Power Steering Pumps

See Power Steering Pumps.

Electronic Ride Control Shocks and Struts

NOTE: This section covers the electronic damping control portion of the electronic shock or strut. For damping portion of shock or strut conditions and procedures, refer to the *Shock Absorbers, Strut Cartridges, and Strut Assemblies* section.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector bent	A	Require repair or replacement.
Connector broken	A	Require repair or replacement.
Connector loose	A	Require repair or replacement.
Electronic valve control inoperative	A	Require replacement. See note below.
NOTE: It is acceptable to replace with a non-electronically controlled unit, where available.		
Terminal bent	A	Require repair or replacement.
Terminal broken	A	Require repair or replacement.
Terminal corroded	A	Require repair or replacement.
Terminal loose	A	Require repair or replacement.

Flex Couplers

See Steering Couplers.

Height Sensors

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require replacement. See note below.
NOTE: Determine cause and correct prior to replacement of part.		
Connector missing	C	Require replacement.
Dust boot missing	C	Require replacement of boot. See note below.
NOTE: If boot is not available separately, suggest replacement of sensor (reason code 2). This condition can lead to damage of the sliding magnet, which, in turn, causes premature sensor failure.		
Dust boot split	A	Require replacement of boot. See note below.
NOTE: If boot is not available separately, suggest replacement of sensor (reason code 2). This condition can lead to damage of the sliding magnet, which, in turn, causes premature sensor failure.		
Dust boot torn	A	Require replacement of boot. See note below.
NOTE: If boot is not available separately, suggest replacement of sensor (reason code 2). This condition can lead to damage of the sliding magnet, which, in turn, causes premature sensor failure.		

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Height Sensors *(continued)*

Condition	Code	Procedure
Housing cracked	A	Require replacement.
Lead routing incorrect	B	Require rerouting according to vehicle manufacturer's specifications.
Loose	B	Require adjustment to vehicle manufacturer's specifications.
Missing	C	Require replacement.
Output signal incorrect	A	Require repair or replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Hydraulic Hoses

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Blistered	B	Require replacement.
Fitting threads damaged	A	Require repair or replacement.
Fitting threads stripped (threads missing)	A	Require replacement.
Inner fabric (webbing) cut	B	Require replacement.
Leaking	A	Require replacement.
Missing	C	Require replacement.
Outer covering is cracked to the extent that inner fabric of hose is visible	B	Require replacement.
Restricted	A	Require replacement.
Routed incorrectly (where failure is likely to occur)	B	Require repair or replacement.
Secured incorrectly	B	Require repair.

Hydraulic Power Steering Pumps

See Power Steering Pumps.

Hydraulic Suspension Hoses

See Hydraulic Hoses.

Hydraulic Suspension Pumps

See Suspension (Hydraulic) Pumps.

Idler Arms

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Further inspection required. See note below.
NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.		
Grease boot cracked	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of idler arm (reason code 2). Cracked grease boot will allow contaminants to enter joint and will accelerate wear.		

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Idler Arms *(continued)*

Condition	Code	Procedure
Grease boot missing	C	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of idler arm (reason code 2). Lack of grease boot will allow contaminants to enter joint and will accelerate wear.		
Grease boot torn	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of idler arm (reason code 2). Torn grease boot will allow contaminants to enter joint and will accelerate wear.		
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	C	Require replacement of seal. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of idler arm (reason code 2). Missing grease seal will allow contaminants to enter joint and will accelerate wear.		
Grease seal torn	A	Require replacement of seal. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of idler arm (reason code 2). Torn grease seal will allow contaminants to enter joint and will accelerate wear.		
Greaseable joint will not take grease	2	Suggest replacement of grease fitting. See note below.
NOTE: If greaseable joint will not take grease after replacing the grease fitting, suggest replacement of idler arm.		
Looseness at frame bracket end	B	Require repair or replacement. See notes below.
NOTE: If manufacturer's procedures and specifications exist, use those procedures and specifications; otherwise, use an approved inspection method such as the dry park check.		
NOTE: Looseness is defined as movement that creates excessive toe change.		

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Idler Arms *(continued)*

Condition	Code	Procedure
Looseness at link end (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Looseness at link end that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Mounted out of position (center link not parallel)	B	Require repositioning.
Nut on stud loose	A	Require repair or replacement. See note below.
NOTE: Check for bent stud or damaged taper hole.		
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		
Threads damaged	A	Require repair or replacement.

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Idler Arms *(continued)*

Condition	Code	Procedure
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Intermediate Shaft U-Joints

See Steering Couplers.

King Pins

You are not required to replace king pins in axle sets. However, when replacing a king pin due to wear exceeding manufacturer's specifications, you may suggest replacement of the other king pin on the axle if its measurement shows it is close to the end of its useful life.

Condition	Code	Procedure
Bearing balls pitted	A	Require replacement.
Bearing balls worn	A	Require replacement.
Bearing races pitted	A	Require replacement.
Bearing races worn	A	Require replacement.
Bearing rollers pitted	A	Require replacement.
Bearing rollers worn	A	Require replacement.
Bearing seal bent	2	Suggest replacement of seal or bearing.
Bearing seal missing	C	Require replacement of seal if available separately or bearing and seal together.

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King Pins *(continued)*

Condition	Code	Procedure
Bearing seal torn	A	Require replacement of seal if available separately or bearing and seal together.
Binding	A	Require repair or replacement of affected parts.
End caps missing	C	Require replacement of missing part, if available; otherwise, replace king pin.
End play exceeds specifications	B	Require repair.
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting will not seal	A	Require replacement of grease fitting.
Locating pins missing	C	Require replacement of missing part, if available; otherwise, replace king pin.
Looseness exceeds manufacturer's specifications	B	Require replacement of worn parts.
Seized	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Will not take grease	2	Suggest replacement of grease fitting. See note below.

NOTE: If king pin will not take grease after replacement of grease fitting, suggest replacement of king pin.

Modules

See Control Modules.

Pitman Arms

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Binding	A	Further inspection required. See note below.
NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.		
Grease boot cracked	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of pitman arm (reason code 2). Cracked grease boot will allow contaminants to enter joint and will accelerate wear.		
Grease boot missing	C	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of pitman arm (reason code 2). Lack of grease boot will allow contaminants to enter joint and will accelerate wear.		
Grease boot torn	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of pitman arm (reason code 2). Torn grease boot will allow contaminants to enter joint and will accelerate wear.		
Grease fitting broken	A	Require replacement grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.

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Pitman Arms *(continued)*

Condition	Code	Procedure
Grease seal missing	C	Require replacement of seal. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of pitman arm (reason code 2). Lack of grease seal will allow contaminants to enter joint and will accelerate wear.		
Grease seal torn	A	Require replacement of seal. See note below.
NOTE: If seal is not available as a separate component, suggest replacement of pitman arm (reason code 2). Torn grease seal will allow contaminants to enter joint and will accelerate wear.		
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Nut on stud loose	A	Require repair or replacement. See note below.
NOTE: Check for bent stud or damaged taper hole.		
Seized	A	Require replacement.
Splines damaged	A	Require repair or replacement.
Splines stripped (splines missing)	A	Require replacement.

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Pitman Arms *(continued)*

Condition	Code	Procedure
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud loose in taper hole	A	Require repair or replacement. See note below.
NOTE: Check for damaged taper hole.		
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		

Power Steering (Hydraulic) Belts

Condition	Code	Procedure
Alignment incorrect	B	Further inspection required. See note below.
NOTE: Determine cause of incorrect alignment and require repair.		
Cracked	1	Suggest replacement.
Frayed	1	Suggest replacement.
Missing	C	Require replacement.
Noisy	2	Further inspection required. See note below.
NOTE: Determine cause of noise and suggest repair.		

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Power Steering (Hydraulic) Belts *(continued)*

Condition	Code	Procedure
Plies separated	A	Require replacement.
Serpentine belt routed incorrectly	B	Require repair.
Tension out of specification	B	Require adjustment or replacement.
Worn beyond adjustment range	B	Require replacement.
Worn so it contacts bottom of pulley	A	Require replacement.

Power Steering Coolers

Condition	Code	Procedure
Air flow obstruction	A	Require repair.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connection leaking	A	Require repair or replacement.
Contaminated	A	Require repair or replacement.
Corroded	1	Suggest repair or replacement.
Fins damaged, affecting performance	A	Require repair or replacement.
Fins damaged, not affecting performance		No service suggested or required.

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Power Steering Coolers *(continued)*

Condition	Code	Procedure
Internal restrictions	B	Require repair or replacement.
Leaking	A	Require repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require repair or replacement.
Tubes damaged, affecting performance	A	Require repair or replacement.
Tubes damaged, not affecting performance		No service suggested or required.

Power Steering Fluid

Condition	Code	Procedure
Fluid at or beyond service interval	3	Suggest fluid change.
Fluid contaminated, for example, fluid other than power steering fluid present	B	Require flushing and refilling of the system. See note below.
NOTE: Determine and correct source of contamination. OEM specifications for fluid type must be followed.		
Fluid level incorrect	B	Require adjustment of fluid level.
Fluid type incorrect	B	Require flushing and refilling with correct fluid.

Power Steering Hoses

See Hydraulic Hoses.

Power Steering Lines (Steel)

CAUTION: When replacing steel power steering lines, be sure to use a replacement product that meets or exceeds OEM specifications.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Corroded, affecting structural integrity	A	Require replacement.
Fitting incorrect (for example, compression fitting)	B	Require replacement.
Flare type incorrect	B	Require repair or replacement.
Leaking	A	Require repair or replacement.
Line material incorrect (copper, etc.)	B	Require replacement.
Restricted	A	Require replacement.
Routed incorrectly (where failure is likely to occur)	B	Require repair or replacement.
Rust-pitted, not affecting structural integrity	1	Suggest replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Power Steering Pumps

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require repair or replacement.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require replacement. See note below.
NOTE: Determine cause and correct prior to replacement of part.		
Connector missing	C	Require replacement.
Leaking	A	Require repair or replacement.
Pump output out of manufacturer's specifications	A	Require repair or replacement..
Pulley bent	A	Require repair or replacement of pulley.
Pulley missing	C	Require replacement of pulley.
Noisy	2	Suggest repair or replacement.
Remote reservoir leaking	A	Require replacement of reservoir,

continues on following page

Power Steering Pumps *(continued)*

Condition	Code	Procedure
Reservoir cap broken	A	Require replacement of cap.
Reservoir cap missing	C	Require replacement of cap.
Seized	A	Require replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Radius Arms

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Corroded, affecting structural integrity	A	Require replacement.
Holes distorted	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Relay Rods

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.

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Relay Rods *(continued)*

Condition	Code	Procedure
Binding	A	Further inspection required. See note below. NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.
Grease boot cracked	A	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Cracked grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease boot missing	C	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease boot torn	A	Require replacement of boot. See note below. NOTE: If boot is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	C	Require replacement of sea;. See note below. NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Lack of grease seal will allow contaminants to enter the joint and will accelerate wear.
Grease seal torn	A	Require replacement of seal;. See note below. NOTE: If seal is not available as a separate component, suggest replacement of center link (reason code 2). Torn grease seal will allow contaminants to enter the joint and will accelerate wear.

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Relay Rods *(continued)*

Condition	Code	Procedure
Greaseable center link will not take grease	2	Suggest replacement of grease fitting. See note below.
NOTE: If greaseable center link still will not take grease after replacing the grease fitting, suggest replacement of center link.		
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud loose in taper hole	A	Require repair or replacement. See note below.
NOTE: Check for damaged taper hole.		
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		

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Relay Rods *(continued)*

Condition	Code	Procedure
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Relays

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Housing broken	A	Require replacement.
Housing cracked	2	Suggest replacement.
Inoperative	A	Require replacement. See note below.
NOTE: Inoperative includes intermittent operation or out of OEM specification.		
Missing	C	Require replacement.
Terminal broken	A	Require repair or replacement.

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Relays *(continued)*

Condition	Code	Procedure
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.

Sensors

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector broken	A	Require repair or replacement.

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Sensors *(continued)*

Condition	Code	Procedure
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Connector missing	C	Require replacement.
Inoperative	A	Require repair or replacement. See note below.
NOTE: Inoperative includes intermittent operation or out of specification.		
Leaking (vacuum/fluid/air)	A	Require replacement.
Out of adjustment	B	Further inspection required. See note below.
NOTE: Follow OEM recommended adjustment procedures. Repair or replace if out of specification.		
Terminal broken	A	Require repair or replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement.

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Sensors *(continued)*

Condition	Code	Procedure
Threads stripped (threads missing)	A	Require replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Shock Absorbers, Strut Cartridges, and Strut Assemblies

You are not required to replace shocks or struts in axle sets. However, when replacing a shock or strut due to the conditions that follow, you may suggest replacement of the other shock or strut on the same axle for improved performance or preventive maintenance.

- part is close to the end of its useful life
- to extend tire life
- to balance ride and handling
- to improve stopping distance

When replacing steering and/or suspension components which may affect an alignment angle, you are required to check and adjust alignment as needed. Refer to the OEM specifications.

Under no circumstances should a technician bend struts or strut housings.

A vehicle's load-carrying and handling abilities are limited by its suspension, tires, brakes, and driveline. Installing coil over shocks or any other load assist device does not increase the vehicle's load capacity. See the vehicle owner's manual for more details.

NOTE: If vehicle is equipped with original equipment coil over shocks, apply the conditions for coil springs from the *Springs: Coil, Leaf, and Torsion Bar* section of the Steering and Suspension guidelines. If the vehicle is equipped with add-on coil over shocks, you may suggest replacing the shocks with standard shocks for any spring-related condition.

Shock Absorbers, Strut Cartridges, and Strut Assemblies *(continued)*

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require replacement.
Body dented	A	Further inspection required. See note below.
NOTE: Require replacement of units where dents restrict shock or strut piston rod movement. If dents don't restrict movement, no service is suggested or required. Especially critical on mono-tube shocks.		
Body punctured	A	Require replacement.
Brake hose bracket bent	B	Require repair or replacement.
Brake hose bracket missing	C	Require replacement.
Brake hose bracket threads damaged	A	Require repair or replacement.
Brake hose bracket threads stripped (threads missing)	C	Require replacement.
Compression bumper missing	C	Require replacement of compression bumper.
Compression bumper split	1	Suggest replacement of compression bumper.
Damping (none)	A	Require replacement.

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Shock Absorbers, Strut Cartridges, and Strut Assemblies *(continued)*

Condition	Code	Procedure
Dust boot (bellows) split	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of shock or strut (reason code 2). This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.		
Dust boot (bellows) missing	C	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of shock or strut (reason code 2). This condition can lead to damage of the piston rod, which causes piston rod seal wear.		
Dust boot (bellows) torn	A	Require replacement of boot. See note below.
NOTE: If boot is not available as a separate component, suggest replacement of shock or strut (reason code 2). This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.		
Dust shield broken	2	Suggest replacement. See note below.
NOTE: This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.		
Dust shield missing	2	Suggest replacement. See note below.
NOTE: This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.		
Gland nut (strut housing cap) is not removable using appropriate tool	A	Require replacement of nut and/or housing. See note below.
NOTE: Only required if replacing cartridge.		
Gland nut (strut housing cap) threads damaged	A	Require repair or replacement of nut.
Gland nut (strut housing cap) threads stripped (threads missing)	A	Require replacement of nut.
Housing dented	A	Further inspection required. See note below.
NOTE: Require replacement of units where dents restrict shock or strut piston rod movement. If dents don't restrict movement, no service is suggested or required. Especially critical on mono-tube shocks.		

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Shock Absorbers, Strut Cartridges, and Strut Assemblies *(continued)*

Condition	Code	Procedure
Housing punctured	A	Require replacement.
Jounce bumper missing	C	Require replacement of jounce bumper.
Jounce bumper split	1	Suggest replacement of jounce bumper.
Leaking oil, enough for fluid to be running down the body	A	Require replacement. See caution below.
CAUTION: If the strut cartridge has been replaced previously, the oil on the strut housing may be filler oil. The technician must identify the source of the oil.		
Noisy	2	Further inspection required. See note below.
NOTE: If noise is isolated to shock or strut, suggest replacement.		
Piston rod bent	A	Require replacement.
Piston rod broken	A	Require replacement.
Piston rod has surface defect	2	Suggest replacement.
Piston rod threads damaged	A	Require repair or replacement.
Piston rod threads stripped (threads missing)	A	Require replacement.
Seized	A	Require replacement.
Shock missing	C	Require replacement.
Strut housing bent	A	Require replacement.
Strut housing cap (gland nut) is not removable using appropriate tool	A	Require replacement of nut and/or housing. See note below.
NOTE: Only required if replacing cartridge.		
Strut housing cap (gland nut) threads damaged	A	Require repair or replacement of nut.
Strut housing cap (gland nut) threads stripped (threads missing)	A	Require replacement of nut.

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Shock Absorbers, Strut Cartridges, and Strut Assemblies *(continued)*

Condition	Code	Procedure
Strut housing severely corroded, affecting structural integrity	A	Require replacement.
Strut housing threads damaged	A	Require repair or replacement.
Strut housing threads stripped (threads missing)	A	Require replacement.
Tire cupping	A	Further inspection required. See note below

NOTE: Although shocks or struts may have contributed to tire cupping, an inspection is needed of the entire suspension system. If the shock or strut is found to be contributing to the tire cupping, require replacement.

Spindles

See Steering Knuckles.

Springs: Coil, Leaf, and Torsion Bar

When springs are replaced, it is suggested, but not required, that both springs on an axle be replaced to maintain equal height from side to side and to provide a balanced ride and proper handling.

When variable rate springs are installed in place of conventional coil springs, they must be installed in axle sets to ensure proper handling, uniform ride, and proper chassis height.

Erroneous height measurements may result from: improper tire inflation, non-standard tire or wheel size, and heavy load in vehicle or trunk.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.

continues on following page

Springs: Coil, Leaf, and Torsion Bar *(continued)*

Condition	Code	Procedure
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Broken (all springs except secondary leave(s) on multi-leaf springs)	A	Require replacement.
Coil clash		Further inspection required. See note below. NOTE: Require ride height check and inspection of strike out (jounce) bumper. If vehicle is within manufacturer's height specifications, no service is suggested or required.
Coil spring insulator deteriorated	2	Suggest replacement of insulator.
Coil spring insulator missing	C	Require replacement of insulator.
Coil spring insulator split	2	Suggest replacement of insulator.
Coil spring plastic coating deteriorated - rust present	A	Refer to manufacturer's service requirements. See note below. NOTE: Some manufacturers require replacement under these conditions.
Composite spring damaged		Further inspection required. See note below. NOTE: Check vehicle ride height. If ride height is OK, no service is suggested or required.
Cracked (all springs except composite leaf and secondary leave(s) on multi-leaf springs)	A	Require replacement.
Installed incorrectly	B	Require repair.
Leaf spring insulators missing	C	Require replacement of insulators.
Secondary leaf on multi-leaf spring broken	1	Suggest repair or replacement
Secondary leaf on multi-leaf spring cracked	1	Suggest repair or replacement

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Springs: Coil, Leaf, and Torsion Bar *(continued)*

Condition	Code	Procedure
Torsion bar adjuster bent	A	Require repair or replacement of adjuster. See note below.
NOTE: Only required if ride height needs to be adjusted.		
Torsion bar adjuster seized	A	Require repair or replacement of adjuster. See note below.
NOTE: Only required if ride height needs to be adjusted.		
Torsion bar adjuster threads damaged	A	Require repair or replacement of part with damaged threads. See note below.
NOTE: Only required if ride height needs to be adjusted.		
Torsion bar adjuster threads stripped (threads missing)	A	Require replacement of part with stripped threads.
Vehicle suspension height not within OEM specifications	B	Require adjustment or replacement.

Steering Arms

See Steering Knuckles.

Steering Couplers

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Flex coupler binding	A	Require repair or replacement of coupler.
Flex coupler loose	A	Require repair or replacement of coupler.
Flex coupler missing parts	A	Require repair or replacement of coupler.
Flex coupler soft/spongy	A	Require replacement of coupler.
Flex coupler torn	A	Require replacement of coupler.
Steering coupler shield cracked	2	Suggest replacement.
Steering coupler shield missing	C	Require replacement.
Steering coupler shield torn	2	Suggest replacement.
U-joint binding	A	Require repair or replacement of joint.
U-joint loose	A	Require repair or replacement of joint.

Steering Dampers

The following procedures are only required if the vehicle was originally equipped from the factory with a steering damper. If the steering damper is an add-on unit, then the unit may be removed (and not replaced), based on customer's informed decision.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require replacement.
Damper body dented	A	Further inspection required. See noted below. NOTE: Require replacement of units where dents restrict damper piston rod movement. If dents don't restrict movement, no service is suggested or required. Especially critical on mono-tube dampers.
Damper body punctured	A	Require replacement.
Damping (none)	A	Require replacement.
Dust boot (bellows) missing	C	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of steering damper (reason code 2). This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.
Dust boot (bellows) split	A	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of steering damper (reason code 2). This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.

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Steering Dampers *(continued)*

Condition	Code	Procedure
Dust shield broken	2	Suggest replacement. See note below, NOTE: This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.
Dust shield missing	2	Suggest replacement. See note below. NOTE: This condition can lead to damage of the piston rod, which, in turn, causes premature piston rod seal wear.
Leaking oil, enough for fluid to be running down the body	A	Require replacement.
Loose	A	Require repair or replacement.
Missing	C	Require replacement.
Noise	2	Further inspection required. See note below. NOTE: If noise is isolated to damper, suggest replacement.
Piston rod bent	A	Require replacement.
Piston rod broken	A	Require replacement.
Piston rod has surface defect	2	Suggest replacement.
Piston rod threads stripped (threads missing), affecting performance	A	Require replacement. See note below. NOTE: Only required if condition affects structural integrity or if unit needs to be serviced.
Piston rod threads damaged	A	Require repair or replacement.
Seized	A	Require replacement.

Steering Gears (except Rack and Pinion)

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require repair or replacement
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require replacement. See note below.
NOTE: Determine cause and correct prior to replacement of part.		
Connector missing	C	Require replacement.
Fluid contaminated	B	Require flushing and refilling of the system. See note below.
NOTE: Determine and correct source of contamination. OEM specifications must be followed for fluid type.		
Gasket leaking	A	Require repair or replacement of gasket.
Housing leaking	A	Require replacement.
Hydraulic fittings leaking	A	Require repair or replacement of fittings.
Inadequate power assist	A	Further inspection required. See note below.
NOTE: If steering gear is source of inadequate assist, require repair or replacement.		
Lash exceeds manufacturer's specifications	B	Require repair or replacement.

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Steering Gears (except Rack and Pinion) *(continued)*

Condition	Code	Procedure
Malfunctioning	A	Require repair or replacement. See note below.
NOTE: Includes inoperative, intermittent operation, failure to perform all functions, out of OEM specification, or out of range.		
Seal leaking	A	Require repair or replacement of seal and/or mating part.
Splines damaged	A	Require repair or replacement of splines.
Splines stripped	A	Require replacement of splines.
Steering coupler shield cracked	2	Suggest replacement.
Steering coupler shield missing	C	Require replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement of part with damaged threads.
Threads stripped (threads missing)	A	Require replacement of part with stripped threads.

continues on following page

Steering Gears (except Rack and Pinion) (continued)

Condition	Code	Procedure
Unequal power assist	A	Require repair or replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Steering Gears: Rack and Pinion

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Balance tube blocked	A	Require repair or replacement of balance tube.
Balance tube missing	C	Require replacement of balance tube.
Balance tube restricted	A	Require repair or replacement of balance tube.
Bellows boot clamp missing	C	Require replacement of clamp.
Bellows boot cracked (not through)	2	Suggest replacement of bellows boot.
Bellows boot missing	C	Require replacement of bellows boot.
Bellows boot not sealing	A	Require repair or replacement of bellows boot.
Bellows boot torn	A	Require replacement of bellows boot.

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Steering Gears: Rack and Pinion *(continued)*

Condition	Code	Procedure
Bellows boot twisted (from toe adjustment)	B	Require repair.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require replacement. See note below.
NOTE: Determine cause and correct prior to replacement of part.		
Connector missing	C	Require replacement.
Fitting leaking	A	Require repair or replacement.
Fitting missing	A	Require replacement of fitting.
Fitting threads damaged	A	Require repair or replacement of part with damaged threads.
Fitting threads stripped (threads missing)	A	Require replacement of part with stripped threads.
Fluid contaminated	B	Require flushing and refilling of the system. See note below.
NOTE: Determine and correct source of contamination. Follow OE specifications for fluid type.		
Gasket leaking	A	Require repair or replacement.
Housing cracked, affecting structural integrity	B	Require replacement.
Housing leaking	A	Require replacement.
Inadequate power assist	A	Further inspection required. See note below.
NOTE: If steering gear is source of inadequate assist, require repair or replacement.		
Lash exceeds manufacturer's specifications	B	Require repair or replacement.

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Steering Gears: Rack and Pinion *(continued)*

Condition	Code	Procedure
Malfunctioning	A	Require repair or replacement. See note below.
NOTE: Includes inoperative, intermittent operation, failure to perform all functions, out of OEM specification, or out of range.		
Seal leaking	A	Require repair or replacement.
Splines damaged	A	Require repair or replacement.
Splines stripped (splines missing)	A	Require replacement.
Steel line blocked	A	Require repair or replacement of line.
Steel line leaking	A	Require repair or replacement of line.
Steel line missing	C	Require replacement of line.
Steel line restricted	A	Require repair or replacement of line.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Threads damaged	A	Require repair or replacement of part with damaged threads.

continues on following page

Steering Gears: Rack and Pinion *(continued)*

Condition	Code	Procedure
Threads stripped (threads missing)	A	Require replacement of part with stripped threads.
Unequal power assist	A	Require repair or replacement.
Wire lead burned	A	Require repair or replacement.
Wire lead conductors exposed	B	Require repair or replacement.
Wire lead open	A	Require repair or replacement.
Wire lead shorted	A	Require repair or replacement.

Steering Knuckles

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Broken	A	Require replacement.
Pinch bolt bent	B	Require replacement.
Pinch bolt incorrect	B	Require replacement with bolt that meets OEM design.

continues on following page

Steering Knuckles *(continued)*

Condition	Code	Procedure
Pinch bolt loose	B	Require repair.
Pinch bolt missing	C	Require replacement.
Pinch bolt tabs deformed (gap closer together than allowed by OEM specification, typically minimum .032” gap before clamping)	B	Require replacement. See note below.
NOTE: Steering knuckle deformation can cause pinch bolt breakage.		
Race seat area undersized	B	Require replacement.
Scored	A	Require repair or replacement.
Taper hole elongated	A	Require replacement. See note below.
NOTE: Check for damaged stud.		
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Strike Out Bumpers

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.

continues on following page

Strike Out Bumpers *(continued)*

Condition	Code	Procedure
Missing	C	Require replacement.
Split	1	Suggest replacement.

Strut Bearing Plate Assemblies

NOTE: When the following guidelines indicate replacement of bearing, only the bearing should be replaced if it is available separately; otherwise, replace the bearing plate assembly.

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Axial or radial movement exceeds vehicle manufacturer's specifications	B	Require replacement.
Bearing binding	A	Require replacement of bearing.
Bearing missing	C	Require replacement of bearing.
Bearing seized	A	Require replacement of bearing.
Bent	B	Require replacement.
Corroded, affecting structural integrity	A	Require replacement.
Holes distorted	A	Require replacement.
Missing	C	Require replacement.

continues on following page

Strut Bearing Plate Assemblies *(continued)*

Condition	Code	Procedure
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Strut Rods

Condition	Code	Procedure
Adjusting nut seized	A	Require repair or replacement. See note below.
NOTE: Only required if an alignment is being performed and adjustment of the strut in question is required .		
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Attaching (mating) hole oversized	A	Require repair or replacement of bracket or frame.
Attaching point on bracket or frame corroded, affecting structural integrity	A	Require repair of bracket or frame.
Bent	A	Require replacement.
Mating (attaching) hole oversized	A	Require repair or replacement of bracket or frame.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Suspension (Hydraulic) Pumps

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Binding	A	Require repair or replacement.
Fluid at or beyond service interval	3	Suggest fluid change.
Fluid contaminated	B	Require flushing and refilling of the system. See note below.
NOTE: Determine and correct source of contamination. OEM specifications must be followed for fluid type.		
Fluid level incorrect	B	Require adjustment of fluid level.
Leaking	A	Require repair or replacement.
Pump output out of manufacturer's specifications	A	Require repair or replacement..
Pulley bent	A	Require repair or replacement of pulley.
Pulley missing	C	Require replacement of pulley.
Noisy	2	Suggest repair or replacement.
Remote reservoir leaking	A	Require replacement of reservoir,
Reservoir cap broken	A	Require replacement of cap.
Reservoir cap missing	C	Require replacement of cap.

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Suspension (Hydraulic) Pumps *(continued)*

Condition	Code	Procedure
Seized	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Sway Bar Links

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Attaching (mating) hole distorted	A	Require repair or replacement of bracket or control arm.
Ball and socket has looseness (perceptible vertical movement)	1	Suggest replacement. See note and caution below.

NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method.

CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.

continues on following page

Sway Bar Links *(continued)*

Condition	Code	Procedure
Ball and socket has looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Bent	B	Require replacement.
Broken	A	Require replacement.
Bushing cracked	A	Require replacement.
Bushing deteriorated, affecting performance	A	Require repair or replacement. See note below.
NOTE: If condition is caused by oil-soaking, further inspection is required to determine source of oil.		
Bushing distorted, affecting performance	A	Require repair or replacement.
Bushing missing	C	Require replacement.
Bushing oil-soaked, affecting performance	A	Require replacement. See note below.
NOTE: Further inspection required to determine source of oil.		
Bushing split	A	Require replacement.
Bushing shows surface cracking (weather-checked)		No service suggested or required.
Corroded, affecting structural integrity	A	Require replacement.
Grease boot cracked	2	Suggest replacement. See note below.
NOTE: Cracked grease boot will allow contaminants to enter the joint and will accelerate wear.		

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Sway Bar Links *(continued)*

Condition	Code	Procedure
Grease boot missing	C	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of sway bar link (reason code 2). Lack of grease boot will allow contaminants to enter the joint and will accelerate wear.
Grease boot torn	A	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of sway bar link (reason code 2). Torn grease boot will allow contaminants to enter the joint and will accelerate wear.
Mating (attaching) hole distorted	A	Require repair or replacement of bracket or control arm.
Missing	C	Require replacement.
Nut on stud loose	A	Require repair. See note below. NOTE: Check for bent stud or damaged mating hole.
Stud bent	B	Require replacement. See note below. NOTE: Check for damaged mating hole.
Stud broken	A	Require replacement. See note below. NOTE: Check for damaged mating hole.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below. NOTE: Check for damaged mating hole.

Sway Bar Mounting Bushings

See Bushings.

Sway Bars

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	B	Require replacement.
Broken	A	Require replacement.
Sway bar corroded at point of attachment to frame bushing	A	Require repair or replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Switches

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Binding, affecting performance	A	Require repair or replacement.
Binding, not affecting performance	2	Suggest repair or replacement.
Broken	A	Require repair or replacement.
Burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Burned, not affecting performance	2	Suggest repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Cracked, affecting performance	A	Require repair or replacement.
Cracked, not affecting performance	1	Suggest repair or replacement.
Leaking	A	Require repair or replacement.
Malfunctioning	A	Require repair or replacement. See note below.
NOTE: Includes inoperative, intermittent operation, or failure to perform all functions.		
Melted, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Melted, not affecting performance	2	Suggest repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		

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Switches *(continued)*

Condition	Code	Procedure
Missing	C	Require replacement.
Out of adjustment	B	Require repair or replacement.
Terminal broken	A	Require repair or replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Won't return	A	Require repair or replacement.
Worn	1	Suggest replacement.

Tie Rod Ends (Inner and Outer)

Condition	Code	Procedure
Adjusting sleeve bent	B	Require replacement of sleeve.
Adjusting sleeve clamps out of position	B	Require repair.
Adjusting sleeve corroded, affecting structural integrity	A	Require replacement of sleeve.
Adjusting sleeve missing	C	Require replacement of sleeve.
Adjusting sleeve seized	A	Require repair or replacement. See note below.
NOTE: Only required if toe needs to be adjusted.		
Adjusting sleeve threads damaged	A	Require repair or replacement of sleeve.
Adjusting sleeve threads stripped (threads missing)	A	Require replacement of sleeve.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Bent	A	Require replacement.
Binding	A	Further inspection required. See note below.
NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, require replacement.		
Grease boot cracked	2	Suggest replacement of boot. See note below.
NOTE: If boot is not available separately, suggest replacement of tie rod end (reason code 2). Cracked grease boot will allow contaminants to enter joint and will accelerate wear.		

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Tie Rod Ends (Inner and Outer) *(continued)*

Condition	Code	Procedure
Grease boot missing	C	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of tie rod end (reason code 2). Lack of grease boot will allow contaminants to enter joint and will accelerate wear.
Grease boot torn	A	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of tie rod end (reason code 2). Torn grease boot will allow contaminants to enter joint and will accelerate wear.
Grease fitting broken	A	Require replacement of grease fitting.
Grease fitting missing	C	Require replacement of grease fitting.
Grease fitting won't seal	A	Require replacement of grease fitting.
Grease seal missing	C	Require replacement of seal. See note below. NOTE: If seal is not available separately, suggest replacement of tie rod end (reason code 2). Lack of grease seal will allow contaminants to enter joint and will accelerate wear.
Grease seal torn	A	Required replacement of seal. See note below. NOTE: If seal is not available separately, suggest replacement of tie rod end (reason code 2). Torn grease seal will allow contaminants to enter joint and will accelerate wear.
Greaseable tie rod end won't take grease	2	Suggest replacement of grease fitting. See note below. NOTE: If greaseable tie rod end will not take grease after replacing the grease fitting, suggest replacement of tie rod end.
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below. NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check. CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.
Looseness exceeds manufacturer's specifications	B	Require replacement.

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Tie Rod Ends (Inner and Outer) (continued)

Condition	Code	Procedure
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Noisy	2	Further inspection required. See note below.
NOTE: If greaseable, grease joint. If problem persists or joint is non-greaseable, suggest replacement.		
Nut on stud loose	A	Require repair or replacement of nut. See note below.
NOTE: Check for bent stud or damaged taper hole.		
Seized	A	Require replacement
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged taper hole.		

Torsion Springs

See Air Ride Suspension Torsion Springs.

Track Bar Bushings

See Bushings.

Track Bars

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Attaching (mating) hole distorted	A	Require repair or replacement of bracket or frame.
Bent	B	Require replacement.
Corroded, affecting structural integrity	A	Require replacement.
Grease boot cracked	2	Suggest replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of tie rod end (reason code 2). Cracked grease boot will allow contaminants to enter joint and will accelerate wear.
Grease boot missing	C	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of track bar (reason code 2). Lack of grease boot will allow contaminants to enter joint and will accelerate wear.
Grease boot torn	A	Require replacement of boot. See note below. NOTE: If boot is not available separately, suggest replacement of track bar (reason code 2). Torn grease boot will allow contaminants to enter joint and will accelerate wear.
Holes distorted	A	Require replacement.

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Track Bars *(continued)*

Condition	Code	Procedure
Looseness (perceptible horizontal movement)	1	Suggest replacement. See note below.
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Looseness that is excessive	B	Require replacement. See notes and caution below.
NOTE: Excessive looseness is defined as being significant enough to affect vehicle handling or structural integrity.		
NOTE: If manufacturer's procedures for inspection exist, use those procedures; otherwise, use an approved inspection method such as the dry park check.		
CAUTION: Do not use pliers or pry bar to check ball and socket movement. Use only moderate hand pressure.		
Mating (attaching) hole distorted	A	Require repair or replacement of bracket or frame.
Nut on stud loose	A	Require repair or replacement of nut. See note below.
NOTE: Check for bent stud or damaged mating hole.		
Seized	A	Require replacement.
Stud bent	B	Require replacement. See note below.
NOTE: Check for damaged mating hole.		
Stud broken	A	Require replacement. See note below.
NOTE: Check for damaged mating hole.		
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement. See note below.
NOTE: Check for damaged mating hole.		
Wear exceeds manufacturer's specifications	B	Require replacement.

Trailing Arm Bushings

See Bushings.

Trailing Arms

Condition	Code	Procedure
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware corroded, affecting structural integrity	A	Require replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Ball joint hole oversized (loose interference or press fit)	B	Further inspection required. See note below.
NOTE: If oversized ball joint is available, require replacement of ball joint. If oversized ball joint is not available, require replacement of control arm.		
Bent	B	Require replacement.
Bushing hole oversized	B	Require replacement.
Corroded, affecting structural integrity	A	Require replacement.
Holes distorted	A	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped (threads missing)	A	Require replacement.

Warning Lamps

Condition	Code	Procedure
Bulb burned out	A	Require replacement.
Warning light does not come on during bulb check		Further inspection required to determine cause.
Warning light flashes		Further inspection required to determine cause.
Warning light is intermittent		Further inspection required to determine cause.
Warning light stays on after initial bulb check		Further inspection required to determine cause.

Wheel Bearings, Races, and Seals

NOTE: When replacing or repacking wheel bearings, grease seal replacement is required. You are not required to replace these components in axle sets. Determine the need to replace based upon the individual component conditions that follow.

Condition	Code	Procedure
Axle seal on drive axle leaking	A	Require replacement of seal and inspection of axle, bearing, housing, and vent tube.
Bearing end-play exceeds specifications	B	Require adjustment of bearing, if possible. If proper adjustment cannot be obtained, require replacement of bearing and race assembly.
Bearing rollers, balls or races are worn, pitted, or feel rough when rotated as an assembly	B	Require replacement of bearing and race assembly.

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Wheel Bearings, Races, and Seals *(continued)*

Condition	Code	Procedure
Seal leaking	A	Require replacement of seal and inspection of bearings. See note below.
NOTE: Require inspection of mating and sealing surface and repair or replace as necessary. Check vent. A plugged vent may force fluid past the seal.		
Seal missing	C	Require replacement.
Spindle worn	B	Require replacement of spindle and bearings.

Wiring Harnesses and Connectors

Condition	Code	Procedure
Application incorrect	B	Require repair or replacement.
Attaching hardware broken	A	Require repair or replacement of hardware.
Attaching hardware missing	C	Require replacement of hardware.
Attaching hardware not functioning	A	Require repair or replacement of hardware.
Attaching hardware threads damaged	A	Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing)	A	Require replacement of hardware.
Connector broken	A	Require repair or replacement.
Connector (Weatherpack type) leaking	A	Require repair or replacement.
Connector melted	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Connector missing	C	Require replacement.

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Wiring Harnesses and Connectors *(continued)*

Condition	Code	Procedure
Insulation damaged, conductors exposed	A	Require repair or replacement.
Insulation damaged, conductors not exposed	1	Suggest repair or replacement.
Open	A	Require repair or replacement.
Protective shield (conduit) melted	2	Suggest repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Protective shield (conduit) missing	C	Require repair or replacement.
Resistance (voltage drop) out of specification	A	Require repair or replacement.
Routed incorrectly	B	Require repair.
Secured incorrectly	B	Require repair.
Shorted	A	Require repair or replacement.
Terminal broken	A	Require repair or replacement.
Terminal burned, affecting performance	A	Require repair or replacement. See note below.
NOTE: Determine cause and correct prior to repair or replacement of part.		
Terminal burned, not affecting performance	2	Suggest repair or replacement.
Terminal corroded, affecting performance	A	Require repair or replacement.
Terminal corroded, not affecting performance	2	Suggest repair or replacement.
Terminal loose, affecting performance	B	Require repair or replacement.

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Wiring Harnesses and Connectors *(continued)*

Condition	Code	Procedure
Terminal loose, not affecting performance	1	Suggest repair or replacement.
Voltage drop out of specification	A	Require repair or replacement.

Wheel Alignment

Service Procedures Required and Suggested for Proper Vehicle Operation

Wheel Alignment

Wheel alignment is defined as the measurement, analysis, and adjustment of steering and suspension angles to conform to manufacturer specifications. These angles usually include, but are not limited to: caster, camber, toe, and thrust angle. Where these angles are not adjustable and not in specification, component replacement or correction kits may be required. Errors in set-back and steering axis inclination (SAI) are often attributable to failed or damaged components and must be corrected prior to performing an alignment.

Failure to replace or correct suggested parts or service may prevent a proper alignment.

Before performing an alignment check, inspect and verify the following:

- Tire pressure and size
- Vehicle loading
- Ride height
- Steering and suspension parts

Only if the inspection reveals that all the above are within published specifications, a wheel alignment check and a proper wheel alignment, if needed, may be performed.

CAUTION: Under no circumstances should a technician bend or heat any steering or suspension component, unless specified by the vehicle manufacturer. All measurements and specifications must be noted on the inspection report.

Condition	Code	Procedure
Beyond manufacturer's service interval	3	Suggest alignment check.
Dog tracking, shown to be caused by faulty alignment	2	Suggest repair.
Drift, shown to be caused by faulty alignment	A	Require alignment.
Lead, shown to be caused by faulty alignment	A	Require alignment.
Outside manufacturer's specifications	B	Require repair.

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Wheel Alignment *(continued)*

Condition	Code	Procedure
Part has been changed, affecting alignment	A	Require alignment check.
Pull, shown to be caused by faulty alignment	A	Require alignment.
Steering wheel off-center	2	Suggest alignment.
Tire wear, shown to be caused by faulty alignment	A	Require alignment.
Wander, shown to be caused by faulty alignment	A	Require alignment.

Wheels and Tires

Service Procedures Required and Suggested for Proper Vehicle Operation

Tires

WARNING: These guidelines do not apply to split rims.

Some vehicle manufacturers restrict replacement of tires to specific brands, types, or sizes.

High pressure temporary compact spare tires should not be used with any other rims or wheels, nor should standard tires, snow tires, wheel covers, or trim rings be used with high pressure compact spare rims or wheels.

Attempting to mount a tire of one diameter on a wheel of a different diameter or flange type may result in serious injury or death.

Only specially trained persons should de-mount or mount tires. Explosions of tire and wheel assembly can result from improper mounting, possibly causing serious injury or death.

Consult the vehicle owner's manual or vehicle placard for correct size, speed rating, designation, and cold inflation pressure of the original tires. Do not exceed the maximum load or inflation capacity of the tire specified by the Tire and Rim Association

When replacing tires, it is suggested that the replacement tires match or exceed the OEM speed rating designation. If tires of different speed rating designations are mixed on the same vehicle, the tires may vary in handling characteristics. Do not mix different speed rating designations on the same axle.

Do not mix radials with non-radial tires on the same axle, as this may affect vehicle handling and stability. If radial tires and bias or bias-belted ply tires are mixed on the same vehicle, the radials must be on the rear. High-pressure temporary compact spare tires are exempt from this rule.

Do not mix size or type (all season, performance, mud and snow) of tires on the same axle.

If any flammable emergency tire inflation product has been used on a tire, consult inflation product manufacturer's product information label for tire deflation procedures to avoid possible serious injury or death.

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Tires *(continued)*

NOTE: In some vehicles, changing the tire diameter from factory-equipped size can affect driveability, as well as the performance of ABS and other vehicle systems. Consult the vehicle manufacturer's specifications.

Condition	Code	Procedure
Air pressure incorrect	B	Require repair.
Bead broken	A	Require replacement.
Bead leaking, caused by tire	A	Require repair or replacement.
Bead wire/cord exposed	A	Require replacement.
Cord or belt material exposed	A	Require replacement.
Cord ply separations	A	Require replacement.
Directional/asymmetrical tires mounted incorrectly	B	Require remounting and/or repositioning.
Irregular tread wear, affecting performance	2	Suggest replacement. See note below.
NOTE: Determine and correct cause of irregular tire wear.		
Load ratings less than OEM specifications	B	Require replacement.
Mixed tread types (all season, performance, mud and snow) on same axle	A	Require replacement.
Number of punctures exceeds manufacturer's limit	B	Require replacement.
Out of balance	B	Require rebalance of tire/wheel assembly.
Ply separation	A	Require replacement.
Pull or lead, caused by tire	A	Require repair or replacement.

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Tires *(continued)*

Condition	Code	Procedure
Radial and bias or bias-belted ply tires on same axle	B	Require repair or replacement.
Radials are on the front and not on the rear	B	Require repair or replacement. See note below.
NOTE: If radials and bias or bias-belted ply tires are on the same vehicle, the radials must be on the rear axle, except for high-pressure temporary spares.		
Run flat damage	A	Require replacement.
Shoulder cut	A	Require replacement.
Shoulder puncture	A	Require replacement.
Shoulder with plug	A	Require replacement.
Sidewall bulge	A	Require replacement.
Sidewall cut	A	Require replacement.
Sidewall indentation		No service required or suggested.
Sidewall puncture	A	Require replacement.
Sidewall with plug	A	Require replacement.
Speed rating designations different on same axle	2	Suggest rotation or replacement.
Tire and wheel assembly has excessive run-out	B	Require repair or replacement of appropriate part. See note below.
NOTE: Excessive is defined as enough to contribute to performance problems. Match mounting may correct run-out. If not, require replacement of appropriate part. Refer to manufacturer's specifications.		

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Tires *(continued)*

Condition	Code	Procedure
Tires with excessive diameter difference on an all-wheel drive vehicle or four-wheel drive vehicle	B	Require replacement. See note below.
NOTE: Excessive diameter difference is defined as exceeding manufacturer's specifications or, if no manufacturer's specifications exist, with more than 1/4" diameter difference.		
Tires with excessive diameter difference on the same side of a dual-wheel application	B	Require replacement. See note below.
NOTE: Excessive diameter difference is defined as exceeding manufacturer's specifications or, if no manufacturer's specifications exist, with more than 1/4" diameter difference.		
Tread area puncture larger in diameter than manufacturer's specifications	B	Require replacement.
Tread missing pieces (chunking), exposing cord	A	Require replacement.
Tread missing pieces (chunking), not exposing cord	1	Suggest replacement.
Tread separations	A	Require replacement.
Tube in tubeless tire	3	Suggest removal of tube. See note below.
NOTE: Most manufacturers do not recommend tubes in tubeless tires. Inspect tire and wheel assembly to determine the reason for a tube in tubeless tire. Recommendation for repair or replacement should be based upon condition of tires and/or wheel listed in these guidelines.		
Weather-checking		No service required or suggested.
Worn to tread wear indicators	B	Require replacement.

Valve Stems

NOTE: Most tire manufacturers suggest replacement of the valve stem anytime a new tire is installed.

Condition	Code	Procedure
Bent	1	Suggest replacement.
Broken	A	Require replacement.
Cut, but not leaking	1	Suggest replacement.
Deteriorated (cracking, dry rot)	1	Suggest replacement.
Leaking	A	Require repair or replacement.
Missing	C	Require replacement.
Threads damaged	A	Require repair or replacement.
Threads stripped	A	Require replacement.
Valve cap missing	C	Require replacement of cap.
Weather-checking	1	Suggest replacement.
Won't take air	A	Require repair or replacement.

Wheel Attachment Hardware

For conditions noted below, also check condition of wheel stud holes.

CAUTION: Proper lug nut torque is essential. Follow recommended torque specifications and tightening sequence. DO NOT lubricate threads unless specified by the vehicle manufacturer.

Condition	Code	Procedure
Bent	A	Require replacement.
Broken	A	Require replacement. See note below.
NOTE: Some manufacturers require replacement of all studs on that wheel if two or more studs or nuts on the same wheel are broken or missing.		
Locking lug nut locking groove damaged	A	Require replacement.
Loose	B	Require repair or replacement of affected component.
Lug nut installed backward	B	Require repair or replacement.
Lug nut mating surface distorted	A	Require replacement of nut.
Lug nut mating type incorrect	B	Require replacement of nut.
Lug nut missing	C	Require replacement.
Lug nut rounded	A	Require replacement of nut. See note below.
NOTE: Only required if removing wheel.		
Lug nut seized	A	Require replacement of nut. See note below.
NOTE: Only required if removing wheel.		
Stud incorrect	B	Require replacement of stud.
Stud missing	C	Require replacement.
Threads damaged	A	Require repair or replacement of component with damaged threads.
Threads stripped	A	Require replacement of component with stripped threads.

Wheels (Rims)

WARNING: Mounting a regular tire on a high-pressure compact spare wheel is not permitted. Attempting to mount a tire of one diameter on a wheel of a different diameter or flange type may result in serious injury or death. If the wheel identification stamp is not legible, or cannot be found, do not use the wheel until the size and type have been properly identified. Wheels of different diameter, offset, or width cannot be mixed on the same axle. Bead seat tapers cannot be interchanged.

Condition	Code	Procedure
Bead leaking, caused by wheel	A	Require repair or replacement. See caution below.
CAUTION: Do not attempt to correct a bent rim.		
Bent hub mounting surface	A	Require replacement.
Bent rim, causing vibration	2	Suggest replacement. See caution below.
CAUTION: Do not attempt to correct a bent rim.		
Broken	A	Require replacement.
Cast wheel porous, causing a leak	A	Require repair or replacement.
Clip-on balance weight is incorrect type for rim flange	2	Suggest replacement of weight.
Corrosion, affecting structural integrity	A	Require replacement.
Corrosion build-up on wheel mounting surface	A	Require repair.
Cracked	A	Require replacement.
Directional/asymmetrical wheels mounted incorrectly	B	Require remounting and/or repositioning.
Load capacity less than OEM specifications	B	Require replacement.
Mating surface distorted	A	Require replacement.
Offset mismatched on same axle	B	Require replacement.

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Wheels (Rims) *(continued)*

Condition	Code	Procedure
Rivets leaking	A	Require replacement.
Run-out beyond OEM specs	B	Require replacement. See note below.
NOTE: Some wire-spoke wheels may be repaired.		
Stud holes elongated	A	Require replacement. See note below.
NOTE: Inspect wheel attaching hardware for damage.		
Welded or brazed repair	2	Suggest replacement.
Welds leaking	A	Require replacement.
Wheel centering (pilot) hole incorrect	B	Require replacement.

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