

# **\* DRIVETRAIN SYSTEMS UNIFORM INSPECTION GUIDELINES \***

1991 Mazda Miata

## GENERAL INFORMATION

Drivetrain/Transmission Motorist Assurance Program  
Standards For Automotive Repair

All Makes and Models

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## **INTRODUCTION TO MOTORIST ASSURANCE PROGRAM (MAP)**

### **OVERVIEW OF MOTORIST ASSURANCE PROGRAM**

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, and Electrical Systems. Further, revisions to all of these inspection were recently published. Further, revisions to all of these inspection communication standards are continually republished. In addition to these, standards for Drive Train and Transmissions have recently been promulgated. 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.

To assure auto repair customers recourse if they were not satisfied with a repair transaction, the Motorist Assurance Program offers mediation and arbitration through MAP/BBB-CARE 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](http://www.motorist.org) or contact us at:

1444 I Street, NW Suite 700  
Washington, DC 20005  
Phone (202) 712-9042 Fax (202) 216-9646  
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## **MAP UNIFORM INSPECTION GENERAL GUIDELINES**

### **OVERVIEW OF SERVICE REQUIREMENTS & 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.

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 Require Repair or Replacement

- A - Part no longer performs intended purpose
- B - Part does not meet a design specification (regardless of performance)
- C - Part is missing

NOTE: When a repair is required, the shop must refuse partial service to the system in question, if the repair creates or continues an unsafe condition.

#### Reasons to Suggest Repair or Replacement

- 1 - Part is close to the end of its useful life (just above discard specifications, or weak; failure likely to occur soon, etc.)
- 2 - To address a customer need, convenience, or request (to stiffen ride, enhance performance, eliminate noise, etc.)
- 3 - To comply with maintenance recommended by the vehicle's Original Equipment Manufacturer (OEM)
- 4 - Technician's recommendation based on substantial and informed experience

NOTE: Suggested services are always 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.

## **DRIVE/POWER TRAIN ASSEMBLIES**

### **SERVICE PROCEDURES REQUIRED AND SUGGESTED FOR PROPER VEHICLE OPERATION**

NOTE: Whenever transmission or drivetrain service is performed that affects the suspension alignment, for example, removing the engine cradle, it is required that the alignment be checked and corrected if necessary.

## AUTOMATIC TRANSMISSION/TRANSAXLE ASSEMBLIES

### AUTOMATIC TRANSMISSION/TRANSAXLE ASSEMBLY INSPECTION

Condition	Code	Procedure
Any internal component failure that requires removal of the assembly from the vehicle for service. (1) .....	A .....	(2) Require repair or replacement of the automatic transmission/transaxle assembly.
(1) - It is Required that the torque converter and all other failure related components be inspected for cause and condition.		
(2) - For components not requiring removal of the assembly, refer to the component listing in this document.		

## DIFFERENTIAL AND FINAL DRIVE ASSEMBLIES

NOTE: Does not include half shafts.

### DIFFERENTIAL AND FINAL DRIVE ASSEMBLY INSPECTION

Condition	Code	Procedure
Any internal component failure that requires removal of the assembly from the vehicle for service. (1) .....	A ...	Require repair or replacement of the differential assembly.
(1) - For components not requiring removal of the assembly, refer to the component listing in this document.		

## MANUAL TRANSMISSION/TRANSAXLE ASSEMBLIES

### MANUAL TRANSMISSION/TRANSAXLE ASSEMBLY INSPECTION

Condition	Code	Procedure
Any internal component failure that requires removal of the assembly from the vehicle for service. (1) .....	A ...	Require repair or replacement of the manual transmission/transaxle assembly.
(1) - For components not requiring removal of the assembly,		

refer to the component listing in this document.

## TRANSFER CASE ASSEMBLIES

### TRANSFER CASE ASSEMBLY INSPECTION

Condition	Code	Procedure
Any internal component failure that requires removal of the assembly from the vehicle for service. (1) .....	A ...	Require repair or replacement of the transfer case differential assembly.

(1) - For components not requiring removal of the assembly, refer to the component listing in this document.

## DRIVE TRAIN/COMPONENTS

The conditions listed for the components included in this section assume that the problem has been isolated to the specific component through proper testing.

### ACTUATORS (ELECTRICAL)

#### ACTUATOR (ELECTRICAL) INSPECTION

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.
Connector broken .....	A ..	Require repair or replacement.
Connector (Weatherpack type) leaking .....	A ..	Require repair or replacement.
Connector melted, affecting performance ..	A .....	(1) Require repair or replacement.
Connector melted, not affecting performance ..	2 .....	(1) Suggest repair or replacement.
Connector missing .....	C .....	Require replacement.
Inoperative .....	A .....	(2) Require replacement.
Missing .....	C .....	Require replacement.
Noisy .....	2 ..	Suggest repair or replacement.
Out of adjustment .....	B ..	Require repair or replacement.
Terminal broken .....	A ..	Require repair or replacement.
Terminal burned, affecting performance .....	A .....	(1) Require repair or replacement.
Terminal burned, not affecting performance ..	1 .....	(1) Suggest repair or

					replacement.
Terminal corroded, affecting performance	..	A	..	Require repair or replacement.	
Terminal corroded, not affecting performance	..	1	..	Suggest repair or replacement.	
Terminal loose, affecting performance	.....	B	..	Require repair or replacement.	
Terminal loose, not affecting performance	..	1	..	Suggest repair or replacement.	

- (1) - Determine cause and correct prior to repair or replacement of part.  
(2) - Inoperative includes intermittent operation or out of OEM specification.

## ACTUATORS (VACUUM)

### ACTUATOR (VACUUM) INSPECTION

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.
Connector broken	.....	A	..	Require repair or replacement.
Connector (Weatherpack type) leaking	.....	A	..	Require repair or replacement.
Connector melted, affecting performance	..	A	.....	(1) Require repair or replacement.
Connector melted, not affecting performance	..	2	.....	(1) Suggest repair or replacement.
Connector missing	.....	C	.....	Require replacement.
Inoperative	.....	A	.....	(2) Require replacement.
Leaking (vacuum)	.....	A	..	Require repair or replacement.
Linkage bent, affecting performance	.....	A	...	Require repair or replacement of linkage.
Linkage bent, not affecting performance	..	2	...	Suggest repair or replacement of linkage.
Linkage binding, affecting performance	.....	A	...	Require repair or replacement of linkage.
Linkage binding, not affecting performance	..	1	...	Suggest repair or replacement of linkage.
Linkage broken		A		Require repair or replacement of linkage.
Linkage loose, affecting performance	.....	A	...	Require repair or replacement of linkage.
Linkage loose, not affecting performance	..	1	...	Suggest repair or replacement of linkage.



Linkage missing .....	C	.....	Require replacement.
Linkage noisy .....	2	..	Suggest repair or replacement.
Missing .....	C	.....	Require replacement.
Noisy .....	2	..	Suggest repair or replacement.
Out of adjustment .....	A	..	Require repair or replacement.
Terminal burned, affecting performance .....	A	.....	(1) Require repair or replacement.
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.

(1) - Determine cause and correct prior to repair or replacement of part.  
(2) - Inoperative includes intermittent operation or out of OEM specification.

## AXLES

### AXLE INSPECTION

Condition	Code	Procedure
Bent .....	A	..... Require replacement.
Broken .....	A	..... Require replacement.
End play exceeds specifications .....	B	.. Require repair or replacement.
Flange bent .....	A	..... Require replacement.
Flange threads stripped ..	A	.. Require repair or replacement.
Twisted .....	A	..... Require replacement.
Worn, affecting performance .....	A	..... Require replacement.

## BEARINGS AND RACES

NOTE: When replacing or repacking 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.

### BEARING AND RACE INSPECTION

Condition	Code	Procedure
Bearing end-play exceeds specifications .....	B	.. Require adjustment of bearing, if possible. If proper adjustment cannot be obtained, require replacement of bearing assembly.
Bearing rollers, balls or races are worn, pitted, or		

feel rough when rotated as an assembly .....	B	..	Require replacement of bearing assembly.
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## BELL CRANKS

### BELL CRANK INSPECTION

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.
Bent .....	A	.. Require repair or replacement.
Broken .....	A	.. Require repair or replacement.
Cracked .....	A	.. Require repair or replacement.
Missing .....	C	..... Require replacement.
Worn, affecting performance .....	A	.. Require repair or replacement.

## BELL HOUSINGS

See HOUSINGS (BELL, CASE, TAIL (EXTENSION) AND AUXILIARY) .

## BUSHINGS (EXTERNAL)

### BUSHING (EXTERNAL) INSPECTION

Condition	Code	Procedure
Attaching hardware bent .....	B	... Require repair or replacement of bent part if available; otherwise, replace bushing.
Attaching hardware broken .....	A	... Require replacement of broken part if available; otherwise, replace bushing.
Attaching hardware corroded, affecting structural integrity ...	A	. Require replacement of corroded part if available; otherwise, replace bushing.
Attaching hardware incorrect .....	A	..... Require replacement of incorrect part if available; otherwise, replace bushing.
Attaching hardware loose .....	A	... Require repair or replacement of loose part if available; otherwise, replace bushing.
Attaching hardware missing .....	C	.. Require replacement of missing part if available; otherwise, replace bushing.

Attaching hardware threads damaged .....	A	...	Require repair or replacement of part with damaged threads if available; otherwise, replace bushing.
Attaching hardware threads stripped (threads missing) .....	A	.....	Require replacement of part with stripped threads if available; otherwise, replace bushing.
Binding .....	A	..	Require repair or replacement.
Contaminated .....	1	.....	Suggest replacement.
Deteriorated, affecting performance .....	A	..	Require repair or replacement.
Distorted, affecting performance .....	A	..	Require repair or replacement.
Missing .....	A	.....	Require replacement.
Noisy .....	2	.....	(1) Further inspection required.
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.
Worn, affecting performance .....	A	..	Require repair or replacement.
Worn close to the end of its useful life .....	1	.....	Suggest replacement.

(1) - If noise isolated to bushing, suggest repair or replacement.

CAUTION: Use only approved lubricant on rubber bushings.  
Petroleum-based lubricants may damage rubber bushings.

## CABLES (SPEEDOMETER)

### CABLE (SPEEDOMETER) INSPECTION

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.
Bent .....	A	.. Require repair or replacement.
Binding .....	A	.. Require repair or replacement.
Bracket bent, affecting performance .....	A	.. Require repair or replacement.
Bracket bent, not affecting performance ..	..	..... No service suggested or

					required.
Bracket broken, affecting performance .....	A	.....	Require replacement.		
Bracket broken, not affecting performance ..	..	.....	No service suggested or required.		
Bracket corroded, affecting performance ..	A	..	Require repair or replacement.		
Bracket corroded, not affecting performance ..	2	..	Suggest repair or replacement.		
Bracket cracked, affecting performance .....	A	..	Require repair or replacement.		
Bracket cracked, not affecting performance ..	1	..	Suggest repair or replacement.		
Bracket loose, affecting performance .....	A	..	Require repair or replacement.		
Bracket loose, not affecting performance ..	1	..	Suggest repair or replacement.		
Bracket missing .....	C	.....	Require replacement.		
Broken .....	A	.....	Require replacement.		
Cracked .....	A	..	Require repair or replacement.		
Disconnected .....	A	..	Require repair or replacement.		
Kinked .....	A	..	Require repair or replacement.		
Melted .....	A	.....	(1) Require repair or replacement.		
Missing .....	C	.....	Require replacement.		
Noisy .....	2	..	Suggest repair or replacement.		
Routed incorrectly .....	2	.....	Suggest repair.		
Seized .....	A	..	Require repair or replacement.		

(1) - Determine cause and correct prior to repair or replacement of part.

## CABLES (TV, DETENT AND SHIFT)

### CABLE (TV, DETENT AND SHIFT) INSPECTION

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.
Bent .....	A	.. Require repair or replacement.
Binding .....	A	.. Require repair or replacement.
Bracket bent, affecting performance .....	A	.. Require repair or replacement.
Bracket bent, not affecting performance ..	..	..... No service suggested or required.
Bracket broken, affecting performance .....	A	..... Require replacement.
Bracket broken, not affecting performance ..	..	..... No service suggested or required.
Bracket corroded, affecting performance ..	A	.. Require repair or replacement.

Bracket corroded, not affecting performance ..	2	..	Suggest repair or replacement.
Bracket cracked, affecting performance .....	A	..	Require repair or replacement.
Bracket cracked, not affecting performance ..	1	..	Suggest repair or replacement.
Bracket loose, affecting performance .....	A	..	Require repair or replacement.
Bracket loose, not affecting performance ..	1	..	Suggest repair or replacement.
Bracket missing .....	C	.....	Require replacement.
Broken .....	A	.....	Require replacement.
Cracked .....	A	..	Require repair or replacement.
Disconnected .....	A	..	Require repair or replacement.
Frayed .....	A	.....	Require replacement.
Kinked .....	A	..	Require repair or replacement.
Melted .....	A	.....	(1) Require repair or replacement.
Missing .....	C	.....	Require replacement.
Noisy .....	2	..	Suggest repair or replacement.
Out of adjustment .....	B	.....	(2) Require repair or replacement.
Routed incorrectly .....	2	.....	Suggest repair.
Seized .....	A	..	Require repair or replacement.
Self-adjuster inoperative .....	A	..	Require repair or replacement of self-adjuster.
Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.

(1) - Determine cause and correct prior to repair or replacement of part.

(2) - Cable replacement is required if it cannot be adjusted within specifications.

## CARRIER BEARINGS

See INTERMEDIATE SHAFT SUPPORT BEARINGS.

## CLUTCH CABLES AND CABLE HOUSINGS

### CLUTCH CABLE AND CABLE HOUSING INSPECTION

Condition	Code	Procedure
Broken .....	A	..... Require replacement.
Cable bent .....	A	..... Require replacement.
Cable binding .....	A	.. Require repair or replacement.
Cable mounting loose ....	B	.. Require repair or replacement.
Cable out of adjustment .	B	.. Require repair or replacement.
Frayed .....	B	..... Require replacement.
Housing heat-damaged ....	1	..... Suggest replacement.
Missing .....	C	..... Require replacement.
Noisy .....	2	.. Suggest repair or replacement.
Seized .....	A	..... Require replacement.
Threads damaged .....	A	.. Require repair or replacement.
Threads stripped (threads missing) .....	A	..... Require replacement.
Worn, affecting performance .....	A	..... Require replacement.

## CLUTCH DISCS (MANUAL TRANSMISSION)

### CLUTCH DISC (MANUAL TRANSMISSION) INSPECTION

Condition	Code	Procedure
Backing plate cracked ...	A	Require replacement.
Broken .....	A	Require replacement.
Contaminated with oil ...	A	Require replacement.
Damper cushion broken ...	A	Require replacement.
Damper cushion collapsed .....	A	Require replacement.
Damper spring collapsed .	A	Require replacement.
Damper spring missing ..	C	(1) Require replacement.
Friction material cracked through .....	B	Require replacement.
Friction material flaking or chunking .....	B	Require replacement.
Friction material surface cracking .....	B	No service suggested or required.
Grooved .....	B	No service suggested or required unless the pressure plate or flywheel is being resurfaced or replaced. In this case, replacement of clutch disc is required.
Ridged .....	B	No service suggested or required unless the pressure plate or flywheel is being resurfaced or replaced. In this case, replacement of clutch disc is required.
Splines worn, affecting performance .....	A	Require replacement.
Warped .....	A	Require replacement.
Wear exceeds specifications (where applicable) .....	B	Require replacement.
Worn close to the end of its useful life .....	1	Suggest replacement.
Worn, affecting performance .....	A	Require replacement.
(1) - Not all clutch discs have springs in all spring chambers on the disc.		

## CLUTCH FORKS

### CLUTCH FORK INSPECTION

Condition	Code	Procedure
Bent .....	B	Require replacement.
Broken .....	A	Require repair or replacement.
Cracked .....	B	Require repair or replacement.
Worn close to the end of its useful life .....	1	Suggest replacement.
Worn, affecting performance .....	A	Require replacement.

## CLUTCH LINKAGES (MECHANICAL)

See LINKAGES (EXTERNAL) .

## CLUTCH MASTER CYLINDERS

### CLUTCH MASTER CYLINDER INSPECTION

Condition	Code	Procedure
Cover gasket distorted ..	A ....	Require replacement of cover gasket.
Cover gasket gummy .....	A ....	Require replacement of cover gasket.
Cylinder leaking fluid from rear of bore .....	A ..	Require repair or replacement.
Cylinder leaking fluid internally .....	A .....	Require replacement.
Dust boot missing .....	C .....	Require replacement of dust boot.
Dust boot punctured .....	A .....	Require replacement of dust boot.
Dust boot torn .....	A .....	Require replacement of dust boot.
Fluid level incorrect ...	B .	Require fluid level adjustment.
Housing damaged, affecting performance .....	A ..	Require repair or replacement.
Master cylinder has residue in reservoir (make parallel w/brakes when they are done) ....	2 .....	(1) Further inspection required.
Threads damaged .....	A .....	Require repair replacement
Threads stripped (threads missing) .....	A .....	Require replacement.
(1) - DO NOT replace master cylinder unless it exhibits conditions listed for replacement. You may suggest fluid change according to OEM service intervals.		

## CLUTCH PEDALS

### CLUTCH PEDAL INSPECTION

Condition	Code	Procedure
Bent, affecting performance .....	A ..	Require repair or replacement.
Broken .....	A ..	Require repair or replacement.
Pedal pad missing .....	C .....	Require replacement of pedal pad.
Pivot bushings worn, affecting performance ..	A ....	Require replacement of pivot bushings.

## CLUTCH PIVOTS

### CLUTCH PIVOT INSPECTION

Condition	Code	Procedure
Bent .....	A .....	Require replacement.
Broken .....	A ..	Require repair or replacement.
Cracked .....	A ..	Require repair or replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.
Worn close to the end of its useful life .....	1 .....	Suggest replacement.
Worn, affecting performance .....	A .....	Require replacement.

## CLUTCH PRESSURE PLATES

See PRESSURE PLATES.

## CLUTCH RELEASE BEARINGS

### CLUTCH RELEASE BEARING INSPECTION

Condition	Code	Procedure
Collar broken .....	A .....	Require replacement.
Cracked .....	A .....	Require replacement.
Rough when rotated as an assembly .....	B .....	Require replacement.
Seized .....	A .....	Require replacement.
Wear exceeds specifications .....	B .....	Require replacement.
Worn close to the end of its useful life .....	1 .....	Suggest replacement.
Worn, affecting performance .....	A .....	Require replacement.

## CLUTCH SLAVE CYLINDERS (CONCENTRIC)

### CLUTCH SLAVE CYLINDER (CONCENTRIC) INSPECTION

Condition	Code	Procedure
Bearing rough when rotated as an assembly .....	B .....	Require replacement.
Bearing seized .....	A .....	Require replacement.
Bleeder pipe leaks .....	A ..	Require repair or replacement.
Carrier assembly worn, affecting performance ..	A .....	Require replacement.
Collar broken .....	A .....	Require replacement.
Cracked .....	A .....	Require replacement.
Housing leaks .....	A .....	Require replacement.
Inoperative .....	A .....	Require replacement.
Release binding .....	A .....	Require replacement.
Spring broken .....	A .....	Require replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.
Worn, affecting performance .....	A .....	Require replacement.



## CLUTCH SLAVE CYLINDERS (CONVENTIONAL OR EXTERNAL)

### CLUTCH SLAVE CYLINDER (CONVENTIONAL OR EXTERNAL) INSPECTION

Condition	Code	Procedure
Binding .....	A ..	Require repair or replacement.
Bleeder port damaged (not repairable) .....	A .....	(1) Require replacement.
Bleeder port damaged (repairable) .....	A .....	(1) Require repair.
Bleeder screw broken off in slave cylinder .....	A .....	(1) Require replacement.
Bleeder screw seized ....	A .....	(2) Require replacement.
Bore corroded (pitted) ..	B .....	Require replacement.
Bore grooved .....	A .....	Require replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

- (1) - Only required if the hydraulic system must be opened.  
(2) - Seized is defined as a bleeder screw that cannot be removed after a practical attempt at removing it has been made.

## COMPANION FLANGES

See YOKES AND SLIP YOKES.

## CONNECTORS

See WIRING HARNESSSES AND CONNECTORS.

## COOLER BYPASS VALVES

### COOLER BYPASS VALVE INSPECTION

Condition	Code	Procedure
Inoperative .....	A .....	Require replacement.
Installed incorrectly ...	A .....	Require repair.
Leaking .....	A ..	Require repair or replacement.
Restricted .....	A ..	Require repair or replacement.

## COOLER LINES

### COOLER LINE INSPECTION

Condition	Code	Procedure
Abrasion damage, affecting structural integrity ...	A ..	Require repair or replacement.
Abrasion damage, not affecting structural integrity .....	.. .....	No service suggested or required.
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.
Clamp corroded, not reusable .....	1	.....	Suggest replacement.
Connected incorrectly ...	A	.....	Require repair.
Corroded, affecting structural integrity ...	A	.....	Require replacement.
Corroded, not affecting structural integrity ...	..	.....	No service suggested or required.
Cracked .....	A	..	Require repair or replacement.
Fitting type incorrect (such as compression fitting) .....	B	.....	Require replacement.
Flange leaking .....	A	..	Require repair or replacement.
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.
Outer covering damaged to the extent that the inner fabric is visible .....	A	.....	Require replacement.
Protective sleeves damaged .....	2	.	Suggest replacement of sleeves.
Protective sleeves missing .....	C	.	Require replacement of sleeves.
Restricted, affecting performance .....	A	..	Require repair or replacement.
Routed incorrectly .....	2	.....	Require repair.
Swollen .....	1	.....	Suggest replacement.
Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.
Type incorrect .....	1	..	Suggest repair or replacement.

## COOLERS

See TRANSMISSION COOLERS.

## CV JOINTS

### CV JOINT INSPECTION

Condition	Code	Procedure
Bearing, bushing or seal surface worn, affecting performance .....	A	.. Require repair or replacement.
Boot clamp broken .....	A	... Require repair or replacement of clamp.
Boot clamp loose .....	A	... Require repair or replacement of clamp.
Boot clamp missing .....	C	... Require repair or replacement of clamp.
Boot leaking .....	A	. Require replacement of CV boot.
Boot surface cracked,		

not leaking .....	2	.	Suggest replacement of CV boot.
Cage broken .....	A	...	Require repair or replacement of CV joint.
Housing damaged to the extent that it no longer performs its intended function .....	A	.....	(1) Require repair or replacement of CV joint.
Housing worn to the extent that it no longer performs its intended function ..	A	.....	(1) Require repair or replacement of CV joint.
Holes elongated .....	A	.....	Require replacement.
Internal parts binding ..	A	..	Require repair or replacement.
Internal parts worn .....	A	..	Require repair or replacement.
Lubricant missing .....	C	...	Require cleaning, inspection, and repacking of CV joint.
Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.
(1) - Housing assembly may appear blue in color from normal manufacturing process of heat-treating the housing.			

## DIP STICK TUBES

### DIP STICK TUBE INSPECTION

Condition	Code	Procedure
Broken .....	A ..	Require repair or replacement.
Checkball missing .....	C ..	Suggest repair or replacement.
Cracked .....	A ..	Require repair or replacement.
Hold down bracket broken .....	A ..	Require repair or replacement.
Hold down bracket missing .....	C .....	Require replacement.
Leaking .....	A ..	Require repair or replacement.
Missing .....	C .....	Require replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

## DIP STICKS (FLUID LEVEL INDICATORS)

### DIP STICK (FLUID LEVEL INDICATOR) INSPECTION

Condition	Code	Procedure
Application incorrect ...	B .....	Require replacement.
Broken .....	A .....	Require replacement.
Compressed .....	A ..	Require repair or replacement.
Missing .....	C .....	Require replacement.
Modified .....	A .....	Require replacement.
Stretched .....	A ..	Require repair or replacement.

## DOWEL PINS, GUIDES AND PILOT HOLES

### DOWEL PIN, GUIDE AND PILOT HOLE INSPECTION

Condition	Code	Procedure
Application incorrect ...	B ..	Require repair or replacement.
Cracked .....	A ..	Require repair or replacement.
Distorted .....	A ..	Require repair or replacement.
Missing .....	C .....	Require replacement.
Positioned incorrectly ..	B ..	Require repair or replacement.
Stepped .....	A ..	Require repair or replacement.
Worn to the extent that it no longer performs its intended function .....	A ..	Require repair or replacement.

## DRIVE SHAFT FLANGES

See COMPANION FLANGES.

## DRIVE SHAFTS AND HALF SHAFTS

### DRIVE SHAFT AND HALF SHAFT INSPECTION

Condition	Code	Procedure
Balance weight missing ..	C ..	Require repair or replacement.
Bearing cap bore distorted .....	A ..	Require repair or replacement.
Bent .....	A .....	Require replacement.
Bolt holes elongated ....	A ..	Require repair or replacement.
Bushing or seal surface worn, affecting performance .....	A ..	Require repair or replacement.
Leaking through soft yoke plug .....	A ...	Require repair or replacement of soft yoke plug.
Out of balance .....	A ..	Require repair or replacement.
Retainer strap bent .....	A .....	Require replacement of retainer strap.
Slip yoke broken .....	A .....	Require replacement.
Splines worn, affecting performance .....	A .....	Require replacement.
Splines worn close to the end of their useful life .....	1 .....	Suggest replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.
U-bolt damaged, affecting performance .....	A .	Require replacement of U-bolts.
Yoke damaged, affecting performance .....	A ..	Require repair or replacement.

## DUST BOOTS

NOTE: Does not include CV boots.

### DUST BOOT INSPECTION

Condition	Code	Procedure
Cracked, not leaking ....	1 .....	Suggest replacement.
Missing .....	C .....	Require replacement.
Leaking .....	A ..	Require repair or replacement.

Torn ..... A ..... Require replacement.

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## ENGINE MOUNTS

See MOUNTS (ENGINE, TRANSAXLE AND TRANSMISSION) .

## EXCITER RINGS

See TOOTHED RINGS (TONE WHEELS) .

## FILLER TUBES

See DIP STICK TUBES.

## FILTERS AND SCREENS

### FILTER AND SCREEN INSPECTION

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Condition	Code	Procedure
At service interval .....	3 .....	Suggest replacement.
Bent .....	A ..	Require repair or replacement.
Exceeding service interval .....	3 .....	Suggest replacement.
Missing .....	C .....	Require replacement.
Near service interval ...	3 .....	Suggest replacement.
Restricted .....	A .....	(1) Require repair or replacement.
Torn .....	A .....	Require replacement.
Worn, affecting performance (metal or nylon screen type) .....	A ..	Require repair or replacement.

(1) - Further inspection may be required to determine the source of restriction or contamination.

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## FLANGES

See COMPANION FLANGES.

## FLEX PLATES

### FLEX PLATE INSPECTION

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Condition	Code	Procedure
Bent, affecting performance .....	A .....	Require replacement.
Bent, not affecting performance .....	.. .....	No service suggested or required.
Bolt or stud holes elongated .....	B .....	Require replacement.
Broken .....	A .....	Require replacement.
Cracked .....	A .....	Require replacement.
Ring gear worn close to the end of its useful life .....	1 .....	Suggest replacement.
Ring gear worn to the extent that it no longer		

performs its intended function .....	A .....	Require replacement.
Weights missing .....	A .....	Require replacement.

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## FLUID LEVEL INDICATORS

See DIP STICKS (FLUID LEVEL INDICATORS) .

## FLUIDS AND LUBRICANTS

### FLUID AND LUBRICANT INSPECTION

Condition	Code	Procedure
Application incorrect ...	B .....	(1) Require replacement.
At service interval .....	3 .....	Suggest replacement.
Beyond service interval .	3 .....	Suggest replacement.
Burned .....	.. .....	(2) Further inspection required.
Contaminated, for example, fluid other than hydraulic fluid present .....	A or B ....	(3) (4) Require service.
Exceeding service interval .....	3 .....	Suggest replacement.
Hydraulic fluid incorrect .....	B .....	(5) Require service.
Level incorrect .....	B .....	Require correction of fluid level.
Near service interval ...	3 .....	Suggest replacement.
Rubber master cylinder cover gasket distorted and gummy .....	A .....	(3) Require service.
Varnished .....	.. .....	(6) Further inspection required.

- (1) - Determine and correct cause.
  - (2) - Fluid that is burned indicates a serious problem. Determine and correct the cause.
  - (3) - If a fluid other than hydraulic fluid is present in the hydraulic system which DOES affect the rubber parts, the required service is to: 1) remove all components having rubber parts from the system, 2) flush lines with denatured alcohol or hydraulic cleaner, 3) repair or replace all components having rubber parts, and 4) bleed and flush with correct hydraulic fluid. (Code A)
  - (4) - If a fluid other than hydraulic fluid is present in the hydraulic system which DOES NOT affect the rubber parts, the required service is to flush and fill with the correct hydraulic fluid. (Code B)
  - (5) - If a fluid other than specification hydraulic fluid is present in the hydraulic system, the required service is to flush and fill with the correct hydraulic fluid.
  - (6) - Fluid that is varnished may indicate a serious problem. Determine and correct the cause.
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## FLYWHEELS

NOTE: Clutch disc replacement does not necessitate flywheel reconditioning, unless other conditions justify the reason to do so.

## FLYWHEEL INSPECTION

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.
Cracked (other than mounting area) .....	A .....	(1) Require resurfacing or replacement.
Cracks in mounting area .	B .....	Require replacement.
Hard spots .....	B ..	Require repair or replacement.
Ring gear broken .....	A .....	Require replacement of ring gear.
Ring gear teeth worn, affecting performance ..	A .....	Require replacement of ring gear.
Runout exceeds specifications .....	B ..	Require repair or replacement.
Scored .....	B ..	Require repair or replacement.
Surface cracks after resurfacing to manufacturer's minimum specifications .....	B .....	Require replacement.
Wear exceeds specifications .....	B .....	Require replacement.
Worn close to the end of its useful life .....	1 .....	Suggest replacement.
Worn, affecting performance .....	A ..	Require repair or replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.
(1) - Some manufacturers allow slight surface cracking in the friction surface.		

## FORCE MOTORS

See ACTUATORS (ELECTRICAL) .

## GUIDES

See DOWEL PINS, GUIDES AND PILOT HOLES .

## HALF SHAFTS

See DRIVE SHAFTS AND HALF SHAFTS .

## HOSES, LINES AND TUBES

### HOSE, LINE AND TUBE INSPECTION

Condition	Code	Procedure
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Application incorrect ...	B	.....	Require replacement.
Connected incorrectly ...	A	.....	Require repair.
Corroded, not reusable ..	1	.....	Suggest replacement.
Cracked .....	A	.....	Require replacement.
Dry-rotted .....	1	..	Suggest repair or replacement.
Hard .....	1	..	Suggest repair or replacement.
Inner fabric (webbing) damaged .....	A	.....	Require replacement.
Insufficient clamping force, allowing hose to leak .....	A	..	Require repair or replacement.
Leaking .....	A	..	Require repair or replacement.
Maintenance intervals ...	3	.....	Suggest replacement.
Melted .....	1	..	Suggest repair or replacement.
Missing .....	C	.....	Require replacement.
Outer covering damaged ..	1	.....	Suggest replacement.
Outer covering damaged to the extent that the inner fabric is visible .....	A	.....	Require replacement.
Protective sleeves damaged .....	2	.	Suggest replacement of sleeves.
Protective sleeves missing .....	2	.	Suggest replacement of sleeves.
Restricted, affecting performance .....	A	..	Require repair or replacement.
Restricted, not affecting performance .....	2	..	Suggest repair or replacement.
Routed incorrectly .....	2	.....	Suggest replacement.
Safety clip missing .....	C	.....	Require replacement.
Spongy .....	1	..	Suggest repair or replacement.
Stripped .....	A	.....	Require replacement.
Swollen .....	B	.....	Require replacement.
Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.
Type incorrect .....	1	..	Suggest repair or replacement.

## HOUSINGS (BELL, CASE, TAIL (EXTENSION) AND AUXILIARY)

### HOUSING (BELL, CASE, TAIL (EXTENSION) AND AUXILIARY) INSPECTION

Condition	Code	Procedure
Bearing race loose in bore .....	A	.. Require repair or replacement.
Broken, affecting performance .....	A	.. Require repair or replacement.
Cracked .....	A	.. Require repair or replacement.
Dowel pin holes worn, affecting performance ..	A	..... (1) Require repair or replacement.
Machined surfaces damaged, affecting performance ..	A	.. Require repair or replacement.
Threads damaged .....	A	.. Require repair or replacement.
Threads stripped (threads missing) .....	A	..... Require replacement.
Worn, affecting performance .....	A	.. Require repair or replacement.

(1) - See DOWEL PINS, GUIDES AND PILOT HOLES.



## INTERMEDIATE SHAFT SUPPORT BEARINGS

### INTERMEDIATE SHAFT SUPPORT BEARING INSPECTION

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.
Bearing rollers, balls or races are worn, pitted, noisy, or feel rough when rotated as an assembly .	A ..	Require replacement of bearing assembly.
Bracket bent, affecting performance .....	A ..	Require repair or replacement.
Bracket bent, not affecting performance ..	.. ..	No service suggested or required.
Bracket broken, affecting performance .....	A .....	Require replacement.
Bracket broken, not affecting performance ..	.. ..	No service suggested or required.
Bracket corroded, affecting performance ..	A ..	Require repair or replacement.
Bracket corroded, not affecting performance ..	2 ..	Suggest repair or replacement.
Bracket cracked, affecting performance .....	A ..	Require repair or replacement.
Bracket cracked, not affecting performance ..	1 ..	Suggest repair or replacement.
Bracket holes elongated, affecting performance ..	A ..	Require repair or replacement.
Bracket holes elongated, not affecting performances) .....	.. ..	No service suggested or required.
Bracket loose, affecting performance .....	A ..	Require repair or replacement.
Bracket loose, not affecting performance ..	1 ..	Suggest repair or replacement.
Bracket missing .....	C .....	Require replacement.
Cracked .....	.. ..	Require replacement.
Rough (brinelling, spalling) .....	A .....	Require replacement.
Rubber deteriorated, affecting performance ..	A .....	Require replacement.
Seized .....	A .....	Require replacement.

## KEY INTERLOCK SYSTEMS

See

SHIFT INTERLOCK SYSTEMS (SELECTOR AND KEY INTERLOCK SYSTEMS) .

## LIMITED SLIPS

See DIFFERENTIAL AND FINAL DRIVE ASSEMBLIES.

## LINES

See HOSES, LINES AND TUBES.

## LINKAGES (EXTERNAL)

### LINKAGE (EXTERNAL) INSPECTION

Condition	Code	Procedure
Components missing .....	C ..	Require replacement of missing components.
Linkage bent, affecting performance .....	A ...	Require repair or replacement of linkage.
Linkage bent, not affecting performance ..	2 ...	Suggest repair or replacement of linkage.
Linkage binding, affecting performance .....	A ...	Require repair or replacement of linkage.
Linkage binding, not affecting performance ..	1 ...	Suggest repair or replacement of linkage.
Linkage broken .....	A ...	Require repair or replacement of linkage.
Linkage loose, affecting performance .....	A ...	Require repair or replacement of linkage.
Linkage loose, not affecting performance ..	1 ...	Suggest repair or replacement of linkage.
Linkage missing .....	C .....	Require replacement.
Linkage noisy .....	2 ..	Suggest repair or replacement.
Out of adjustment .....	B ..	Require repair or replacement.
Worn to the extent that it no longer performs its intended function .....	A ..	Require repair or replacement.

## LOCKING HUB ASSEMBLIES

### LOCKING HUB ASSEMBLY INSPECTION

Condition	Code	Procedure
Inoperative .....	A .....	(1) Require repair or replacement.
Loose .....	A ..	Require repair or replacement.
Seized in any position ..	A ..	Require repair or replacement.

(1) - Inoperative includes intermittent operation.

## LOCKING HUB CONTROL KNOBS

### LOCKING HUB CONTROL KNOB INSPECTION

Condition	Code	Procedure
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Damaged, affecting performance .....	A .....	Require replacement.
Missing .....	C .....	Require replacement.
Worn, affecting performance .....	A .....	Require replacement.

## LUBRICANTS

See FLUIDS AND LUBRICANTS.

## METAL-CLAD SEALS

See SEALS.

## METALASTIC JOINTS

See RUBBER JOINTS (METALASTIC) .

## MODULATOR PINS

### MODULATOR PIN INSPECTION

Condition	Code	Procedure
Application incorrect ...	B .....	Require replacement.
Missing .....	C .....	Require replacement.

## MODULATORS

### MODULATOR INSPECTION

Condition	Code	Procedure
Bent, affecting performance .....	A .....	Require replacement.
Contaminated (water, fuel, etc.) .....	A .....	(1) Require replacement.
Housing cracked .....	A .....	Require replacement.
Inoperative .....	A .....	(2) Require replacement.
Leaking fluid externally .....	A ..	Require repair or replacement.
Leaking fluid internally .....	A .....	Require replacement.
Leaking vacuum .....	A .....	Require replacement.
Nipple broken .....	A .....	Require replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

- (1) - Further inspection is required to determine the cause of the contamination.
- (2) - Inoperative includes intermittent operation or out of OEM specification.

## MOUNTS (ENGINE, TRANSAXLE AND TRANSMISSION)

### MOUNT (ENGINE, TRANSAXLE AND TRANSMISSION) INSPECTION

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.
Broken .....	A .....	Require replacement.
Leaking (hydraulic mount) .....	A .....	Require replacement.
Mounting hole worn, affecting performance ..	A .....	Require replacement.
Mounting hole worn, not affecting performance ..	.. ..	No service suggested or required.
Rubber deteriorated, affecting performance ..	A .....	Require replacement.
Rubber deteriorated, not affecting performance ..	.. ..	No service suggested or required.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

## ODOMETER DRIVES (MECHANICAL)

See SPEEDOMETER/ODOMETER DRIVES (MECHANICAL) .

## ODOMETER HEADS (MECHANICAL)

See SPEEDOMETER/ODOMETER HEADS (MECHANICAL) .

## OIL PANS

See TRANSMISSION PANS .

## PANS

See TRANSMISSION PANS .

## PILOT HOLES

See DOWEL PINS, GUIDES AND PILOT HOLES .

## PRESSURE PLATES

### PRESSURE PLATE INSPECTION

Condition	Code	Procedure
Balance weight missing ..	C .....	Require replacement.
Broken .....	A .....	Require replacement.
Contact surface distorted .....	B .....	Require replacement.
Cracks .....	B .....	Require replacement.
Fingers bent .....	A .....	Require replacement.
Hard spots .....	B .....	Require replacement.

Scored .....	B	.....	Require replacement.
Spring rate less than specifications .....	B	.....	Require replacement.
Worn, affecting performance .....	A	.....	Require replacement.
Worn beyond specifications .....	B	.....	Require replacement.
Worn close to the end of its useful life .....	1	.....	Suggest replacement.

## PRESSURE SWITCHES

See SWITCHES.

## RACES

See BEARINGS AND RACES.

## RUBBER JOINTS (METALASTIC)

These joints may be found on half and/or drive shafts. They are usually found on European vehicles featuring a three-lug drive flange. They may be equipped with a centering ball or pin.

### RUBBER JOINT (METALASTIC) INSPECTION

Condition	Code	Procedure
Drive flange bent .....	A	..... Require repair or replacement.
Drive flange damaged, affecting performance ..	A	..... Require replacement.
Rubber drive joint cracked .....	2	..... Suggest replacement.
Rubber drive joint damaged, affecting performance .....	A	..... Require replacement.
Rubber drive joint split between mounting holes .	A	..... Require replacement.
Rubber drive joint torn at mounting holes .....	A	..... Require replacement.
Rubber drive joint weather-cracked .....	..	..... No service suggested or required.

## SCREENS

See FILTERS AND SCREENS.

## SEALS

### SEAL INSPECTION

Condition	Code	Procedure
Leaking .....	A	..... (1) Require repair or replacement.

(1) - Require inspection of mating and sealing surface and repair or replace as necessary. Check vent. A plugged

vent may force fluid past the seal.

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## SEALS (METAL-CLAD)

See SEALS.

## SELECTOR INTERLOCK SYSTEMS

See

SHIFT INTERLOCK SYSTEMS (SELECTOR AND KEY INTERLOCK SYSTEMS) .

## SERVOS

See ACTUATORS (VACUUM) .

## SHIFT INTERLOCK SYSTEMS (SELECTOR AND KEY INTERLOCK SYSTEMS)

See:

ACTUATORS (ELECTRICAL)

CABLES

LINKAGES (EXTERNAL)

SWITCHES

## SENSORS

### SENSOR INSPECTION

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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.
Connector broken .....	A ..	Require repair or replacement.
Connector (Weatherpack type) leaking .....	A ..	Require repair or replacement.
Connector melted .....	A .....	(1) Require repair or replacement.
Connector missing .....	C .....	Require replacement.
Inoperative .....	A .....	(2) Require repair or replacement.
Leaking (vacuum/fluid/air) .....	A .....	Require replacement.
Out of adjustment .....	B .....	(3) Further inspection required.
Terminal broken .....	A ..	Require repair or replacement.
Terminal burned, affecting performance .....	A .....	(1) Require repair or replacement.
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.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Inoperative includes intermittent operation or out of specification.
- (3) - Follow OEM recommended adjustment procedures. Repair or replace if out of specification.

## SIDE COVERS

See TRANSMISSION PANS.

## SLIP YOKES

See YOKES AND SLIP YOKES.

## SOLENOIDS

See:  
 ACTUATORS (ELECTRICAL)  
 ACTUATORS (VACUUM)

## SPEED SENSORS (ELECTRONIC WHEEL AND VEHICLE)

### SPEED SENSOR (ELECTRONIC WHEEL AND VEHICLE) INSPECTION

Condition	Code	Procedure
Air gap incorrect .....	B	(1) Require adjustment or replacement.
Attaching hardware missing .....	C	Require replacement of hardware.
Attaching hardware threads damaged .....	A	... Require repair or replacement of hardware.
Attaching hardware threads stripped (threads missing) .....	A	... Require repair or replacement of hardware.
Connector broken .....	A	.. Require repair or replacement.
Connector (Weatherpack type) leaking .....	A	.. Require repair or replacement.
Connector melted .....	A	(2) Require repair or replacement.
Connector missing .....	C	Require replacement.
Contaminated .....	A	(3) Require repair or replacement.
Inoperative .....	B	(4) Require repair or replacement. Further inspection required.
Leaking .....	A	.. Require repair or replacement.
Loose .....	A	.. Require repair or replacement.
Missing .....	C	Require replacement.
Resistance out of		

specification .....	B	..	Require repair or replacement.
Sensor housing cracked ..	2	.....	Suggest replacement.
Terminal broken .....	A	..	Require repair or replacement.
Terminal burned, affecting performance .....	A	.....	(2) Require repair or replacement.
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.
Wire lead corroded .....	A	..	Require repair or replacement.
Wire lead misrouted .....	B	....	Require re-routing according to vehicle manufacturer's specifications.
Wire lead open .....	A	..	Require repair or replacement.
Wire lead shorted .....	A	..	Require repair or replacement.

- (1) - If a sensor is not adjustable, further inspection is required to identify and correct cause.
- (2) - Determine cause and correct prior to repair or replacement of part.
- (3) - Determine source of contamination, such as metal particles or water. Require repair or replacement.
- (4) - Inoperative includes intermittent operation or out of OEM specification. Some components may be serviceable; check for accepted cleaning procedure.

## SPEEDOMETER-DRIVEN GEAR HOUSINGS

See SPEEDOMETER/ODOMETER DRIVES (MECHANICAL) .

## SPEEDOMETER/ODOMETER DRIVES (MECHANICAL)

### SPEEDOMETER/ODOMETER DRIVE (MECHANICAL) INSPECTION

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.
Inoperative .....	A	..... (1) Require replacement.
Leaking .....	A	.. Require repair or replacement.
Missing .....	C	..... Require replacement.
Teeth broken .....	A	.. Require repair or replacement.



Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.
Worn close to the end of its useful life .....	1	.....	Suggest replacement.
Worn, affecting performance .....	A	.....	Require replacement.

(1) - Inoperative includes intermittent operation.

## SPEEDOMETER/ODOMETER HEADS (MECHANICAL)

### SPEEDOMETER/ODOMETER HEAD (MECHANICAL) INSPECTION

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.
Lens broken .....	A	..... (1) Require repair or replacement.
Lens cloudy .....	2	..... (1) Suggest repair or replacement.
Lens missing .....	C	..... (1) Require repair or replacement.
Malfunctioning .....	A	..... (2) Require repair or replacement.
Noisy .....	2	.. Suggest repair or replacement.
Threads damaged .....	A	.. Require repair or replacement.
Threads stripped (threads missing) .....	A	..... Require replacement.

(1) - If lens is available as a separate part, require replacement of lens only.

(2) - Includes inoperative, intermittent operation, failure to perform all functions, out of OEM specification, or out of range.

## SPEEDOMETERS AND ODOMETERS (ELECTRONIC)

### SPEEDOMETER AND ODOMETER (ELECTRONIC) INSPECTION

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.
Connector broken .....	A	.. Require repair or replacement.
Connector (Weatherpack		

type) leaking .....	A	..	Require repair or replacement.
Connector melted .....	A	.....	(1) Require repair or replacement.
Connector missing .....	C	.....	Require replacement.
Leaking .....	A	.....	Require replacement.
Lens broken .....	A	.....	(2) Require repair or replacement.
Lens cloudy .....	2	.....	(2) Suggest repair or replacement.
Lens missing .....	C	.....	(2) Require repair or replacement.
Malfunctioning .....	A	.....	(3) Require repair or replacement.
Mechanical head noisy ...	2	..	Suggest repair or replacement.
Terminal broken .....	A	..	Require repair or replacement.
Terminal burned, affecting performance .....	A	.....	(1) Require repair or replacement.
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.

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - If lens is available as a separate part, require replacement of lens only.
- (3) - Includes inoperative, intermittent operation, failure to perform all functions, out of OEM specification, or out of range.

## SWITCHES

### SWITCH INSPECTION

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	..... (1) Require repair or replacement.
Burned, not affecting performance .....	2	..... (1) Suggest repair or

					replacement.
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	.....	(2) Require repair or replacement.		
Melted, affecting performance .....	A	.....	(1) Require repair or replacement.		
Melted, not affecting performance .....	2	.....	(1) Suggest repair or replacement.		
Missing .....	C	.....	Require replacement.		
Out of adjustment .....	B	..	Require repair or replacement.		
Terminal broken .....	A	..	Require repair or replacement.		
Terminal burned, affecting performance .....	A	.....	(1) Require repair or replacement.		
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.		

- (1) - Determine cause and correct prior to repair or replacement of part.
- (2) - Includes inoperative, intermittent operation, or failure to perform all functions.

## TONE WHEELS

See TOOTHED RINGS (TONE WHEELS).

## TOOTHED RINGS (TONE WHEELS)

If the toothed ring requires replacement and cannot be replaced as a separate component, replace the assembly of which the ring is a part.

### TOOTHED RING (TONE WHEEL) INSPECTION

Condition	Code	Procedure
Alignment incorrect .....	B	.. Require repair or replacement.
Bent .....	B	..... Require replacement.
Contaminated, affecting performance .....	A	.... Require repair. Identify and correct cause.
Cracked .....	B	..... Require replacement.
Loose .....	A	.... Require replacement of worn parts.
Missing .....	C	..... Require replacement.
Number of teeth		

incorrect .....	B	.....	Require replacement.
Teeth broken .....	A	.....	Require replacement.
Teeth damaged, affecting performance .....	A	.....	Require replacement.

## TORQUE CONVERTERS

### TORQUE CONVERTER INSPECTION

Condition	Code	Procedure
Converter clutch lock-up operation is faulty ....	A	..... Require replacement.
Cover shell damaged, affecting performance ..	A	..... Require replacement.
Does not meet stall speed specification .....	B	..... Require replacement.
End play exceeds specifications .....	B	..... Require replacement.
Hub broken .....	A	..... Require replacement.
Hub cracked .....	A	..... Require replacement.
Internal component failure .....	A	..... Require replacement.
Leaking .....	A	.. Require repair or replacement.
Pilot broken .....	A	..... Require replacement.
Pilot worn, affecting performance .....	A	..... Require replacement.
Threads damaged .....	A	.. Require repair or replacement.
Threads stripped (threads missing) .....	A	..... Require replacement.
Weights missing .....	C	..... Require replacement.

## TRANSAXLE MOUNTS

See MOUNTS (ENGINE, TRANSAXLE AND TRANSMISSION) .

## TRANSDUCERS (TRANSMISSION)

See SENSORS .

## TRANSMISSION COOLERS

### TRANSMISSION COOLER INSPECTION

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.
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.
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.

## TRANSMISSION MOUNTS

See MOUNTS (ENGINE, TRANSAXLE AND TRANSMISSION) .

## TRANSMISSION PANS

### TRANSMISSION PAN INSPECTION

Condition	Code	Procedure
Bent, interfering with filter or other internal components .....	A	.. Require repair or replacement.
Leaking .....	A	.. Require repair or replacement.

## TRANSMISSION RANGE INDICATORS (PRNDL)

### TRANSMISSION RANGE INDICATOR (PRNDL) INSPECTION

Condition	Code	Procedure
Binding .....	A	.. Require repair or replacement.
Broken .....	A	.. Require repair or replacement.
Components missing .....	C	.. Require replacement of missing components.
Loose, affecting performance .....	A	.. Require repair or replacement.
Out of adjustment .....	A	..... Require repair.
Worn, affecting performance .....	A	.. Require repair or replacement.

## TUBES

See HOSES, LINES AND TUBES.

## UNIVERSAL JOINTS (CARDON OR CROSS TYPE)

### UNIVERSAL JOINT (CARDON OR CROSS TYPE) INSPECTION

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.
Bearing cap distorted ...	B	.....	Require replacement.
Binding .....	A	.....	Require replacement.
Cross (trunion) worn, affecting performance ..	A	.....	Require replacement.
Double cardon centering ball damaged .....	A	.....	Require replacement.
Double cardon centering ball worn, affecting performance .....	A	.....	Require replacement.
Double cardon centering spring broken .....	A	.....	Require replacement.
Double cardon centering spring missing .....	C	.....	Require replacement.
Double cardon centering spring weak .....	A	.....	Require replacement.
End cap seal cracked ....	2	.....	Suggest replacement.
End cap seal missing ....	C	....	Require replacement of seal.
Grease fitting broken ...	A	.....	(1) Require replacement of grease fitting.
Grease fitting missing ..	C	.....	(2) Require replacement of grease fitting.
Rust-colored powder around end cap seals .....	A	.....	Require replacement.
Threads damaged .....	A	..	Require repair or replacement.
Threads stripped (threads missing) .....	A	.....	Require replacement.
Worn, affecting performance .....	A	.....	Require replacement.
(1) - A broken grease fitting does not require replacement of the U-Joint.			
(2) - A missing grease fitting does not require replacement of the U-Joint.			

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## VACUUM CONTROLS

See ACTUATORS (VACUUM) .

## VACUUM HOSES

See HOSES, LINES AND TUBES .

## VACUUM MOTORS

See ACTUATORS (VACUUM) .

## VACUUM-OPERATED SWITCHES

See SWITCHES .

## VEHICLE SPEED SENSORS

See SPEED SENSORS (ELECTRONIC WHEEL AND VEHICLE) .

## VENTS

## VENT INSPECTION

Condition	Code	Procedure
Broken .....	A .....	Require replacement.
Missing .....	C .....	Require replacement.
Plugged .....	A .....	(1) Require repair or replacement.

(1) - A plugged vent may force fluid past the seal.

## VIBRATION DAMPERS

### VIBRATION DAMPER INSPECTION

Condition	Code	Procedure
Broken .....	A .....	Require replacement.
Missing .....	C .....	Require replacement.
Out of position .....	B ..	Require repair or replacement.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

## WHEEL ATTACHMENT HARDWARE

**NOTE:** For conditions noted below, also check conditions 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.

### WHEEL ATTACHMENT HARDWARE INSPECTION

Condition	Code	Procedure
Bent .....	A .....	Require replacement.
Broken .....	A .....	(1) Require replacement.
Loose .....	B ...	Require repair or replacement of affected component.
Lug nut installed backward .....	B ..	Require repair or replacement.
Lug nut mating surface dished .....	A .....	Require replacement of nut.
Lug nut mating type incorrect .....	B .....	Require replacement of nut.
Lug nut rounded .....	A .	(2) Require replacement of nut.
Lug nut seized .....	A .	(2) Require replacement of nut.
Stud incorrect .....	B ....	Require replacement of stud.
Threads damaged .....	A ..	Require repair or replacement.
Threads stripped (threads missing) .....	A .....	Require replacement.

(1) - 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.

(2) - Only required if removing wheel.

## WHEEL SPEED SENSORS

See SPEED SENSORS (ELECTRONIC WHEEL AND VEHICLE) .

## WIRING HARNESSES AND CONNECTORS

### WIRING HARNESS AND CONNECTOR INSPECTION

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.
Connector broken .....	A ..	Require repair or replacement.
Connector (Weatherpack type) leaking .....	A ..	Require repair or replacement.
Connector melted .....	A .....	(1) Require repair or replacement.
Connector missing .....	C .....	Require replacement.
Insulation damaged, conductors exposed .....	A ..	Require repair or replacement.
Insulation damaged, conductors not exposed .	1 .....	Suggest replacement.
Open .....	A ..	Require repair or replacement.
Protective shield (conduit) melted .....	2 .....	(1) Suggest repair or replacement.
Protective shield (conduit) missing .....	2 ..	Suggest 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 .....	(1) Require repair or replacement.
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.
Transmission connector leaking .....	.. .....	See TRANSMISSION ASSEMBLY.
Voltage drop out of specification .....	A ..	Require repair or replacement.

(1) - Determine cause and correct prior to repair or replacement of part.



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## YOKES AND SLIP YOKES

### YOKE AND SLIP YOKE INSPECTION

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Condition	Code	Procedure
Bearing cap bore distorted .....	A	.. Require repair or replacement.
Bent .....	A	..... Require replacement.
Bolt holes elongated ....	A	.. Require repair or replacement.
Bushing or seal surface worn, affecting performance .....	A	.. Require repair or replacement.
Leaking through soft yoke plug .....	A	... Require repair or replacement of soft yoke plug.
Retainer strap bent .....	A	..... Require replacement of retainer strap.
Slip yoke broken .....	A	..... Require replacement.
Splines worn, affecting performance .....	A	..... Require replacement.
Splines worn close to the end of their useful life .....	1	..... Suggest replacement.
Threads damaged .....	A	.. Require repair or replacement.
Threads stripped (threads missing) .....	A	..... Require replacement.
U-bolt damaged, affecting performance .....	A	..... Require replacement of U-bolts.
Yoke damaged, affecting performance .....	A	.. Require repair or replacement.

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