* ENGINE SYSTEMS UNIFORM INSPECTION GUIDELINES *

Article Text

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For Volkswagen Technical Site
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Saturday, March 18, 2000 10:06PM

ARTICLE BEGINNING

GENERAL INFORMATION
Engine Maintenance & Performance
Uniform Inspection Guidelines

All Makes & Models

Last Updated: December, 1994

MAP UNIFORM INSPECTION GENERAL GUIDELINES

OVERVIEW OF MOTORIST ASSURANCE PROGRAM

The Motorist Assurance Program (MAP) 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.

The Motorist Assurance Program was established as an industry-wide effort to address concerns raised by regulators, the media and consumers questioning our ethics and methods of doing business. The automotive repair industry had been bombarded by months of negative stories in the media and scrutiny from state and federal regulators who focused on how the need for repairs is determined. MAP was formed as an industry response to this issue.

Our 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 responsibility for their vehicles - through proper, manufacturer-recommended, maintenance. We encourage participatinf service and repair shops (including franchisees and dealers) to adopt a Pledge to their Customers and the Motorist Assurance Program developed Standards of Service. All participating service providers have agreed to subscribe to this Pledge and to adhere to the promulgated Standards of Service which demonstrates 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 according to industry guidelines. After learning that neither the car manufacturers nor any other source had complete guidelines, leading industry organizations, along with other industry participants banded together to address this challenging task. During the past two and a half years, they successfully developed industry inspection guidelines for the following systems: Exhaust, Brakes, ABS, Steering and Suspension, Engine Maintenance and Performance, HVAC, and Electrical systems. Guidelines for Drive Train and Transmision are currently being promulgated. Revisions to the inspection guidelines for Exhaust, Brakes/ABS and Steering and Suspension Systems, which were issued two years ago, are now being published for implementation beginning spring 1997. Participating shops utilize these Uniform Inspection Guidelines as part of the inspection process and for communicating their findings

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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 concerned with auto repair and/or consumer protection are conducted. Feedback from these representatives are brought back to members, 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 arbitration through MAP/BBB-CARE in cooperation with the Council of Better Business Bureaus and individual participating Bureaus. MAP "piloted" in Indianapolis and Pittsburgh during spring, 1996 - and publicized "roll-outs" in New Jersey, Detroit (MI), Chicago (IL) and Richmond (VA) were conducted. To put some "teeth" in the program, and 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. In addition, a committee of service providers had been working diligently developing standards for newspaper, television and Internet advertising.

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.hunter.com/map.htm or contact us at:

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Washington, D.C. 20006
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OVERVIEW OF SERVICE REQUIREMENTS & SUGGESTIONS

It is MAP policy that all exhaust, brake, ABS, steering and suspension, wheel alignment, tires and wheels, driveline, engine performance and maintenance and heating, ventilation and air conditioning services be offered and performed under the guidelines 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 needs expressed by the customer.

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

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recommended service interval.

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 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 to address a customer's need, convenience or request. If a customer's vehicle has one of these conditions, the procedure may only be 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 customer declines to authorize a service or repair indicated in the MAP Uniform Inspection Guidelines as "required," a MAP shop may refuse service on that system, if proceeding with the work could create or continue an unsafe or unsatisfactory condition.

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

ENGINE PERFORMANCE & MAINTENANCE

ENGINE: MISCELLANEOUS

ENGINE OIL
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Condition	Procedure
Contaminated	Require replacement of oil and filter. See NOTE: (1) below.
High level	Determine source of incorrect level and suggest correction.
Low level	
Maintenance intervals	Suggest replacement to comply with vehicles OEM recommended service intervals.

NOTE: (1) Determine source of contamination, i.e., engine coolant, fuel, metal particles, when changing oil.

ENGINE OIL FILTER/CANISTER

Condition	Procedure
Contaminated	Require replacement of oil and filter. See NOTE: (1) below.
Damaged	Suggest replacement. Furtherinspection required. See NOTE: (2) below.
Leaking	Require repair or replacement.
Maintenance intervals	Suggest replacement to comply with vehicles OEM recommended service intervals.

NOTE: (1) Determine cause of contamination, i.e., engine coolant, fuel, metal particles, when changing oil.
(2) Determine cause, i.e., broken motor mount.

ENGINE GASKETS/SEALS

Condition	Procedure
Leaking	Tighten or suggest replacement as necessary.

ENGINE OIL DRAIN PLUG/GASKET

Condition	Procedure
Leaking	Require repair or replacement.
Damagend threads	Require repair or replacement.

NOTE: Some OEMs require replacement of drain plug gasket. Inspect

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threads in oil pan for damage.

ENGINE OIL WARNING LIGHTS

Condition	Procedure
Light not on during bulb check	Further inspection required. See NOTE: below.
Light stays on or intermittent while engine is running	Further inspection required. See NOTE: below.

NOTE: Light may indicate problem with contaminated oil, level, pressure, temperature or problem with circuit.

ENGINE OIL PRESSURE GAUGE

Condition	Procedure
Inoperative	Further inspection required. See note.
Indicates out of range	Further inspection required. See note.

NOTE: Gauge may indicate problem with contaminated oil, level, pressure, temperature or problem with gauge.

OIL PRESSURE SENDING UNIT

Condition	Procedure
Leaking	Require replacement.
Connector or terminal bent, broken, or loose	Require repair or replacement.
Inoperative/inaccurate	Require repair or replacement.

POWER STEERING FLUID

Condition	Procedure
See Steering and Suspension Uniform Inspection Guidelines	

TIMING BELT

Condition	Procedure

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Missing	Require replacement. See note.
Damaged	Suggest replacement. See note.
Maintenance intervals	Suggest replacement to comply with vehicle OEM recommended service intervals.
Oil soaked	Suggest replacement. Further inspection required.
Improper adjustment/ noisy	Suggest adjustment. See note.

NOTE: Inspect belt tensioners, pulleys and cover.

TIMING BELT TENSIONERS

Condition	Procedure
Missing	Require replacement.
Noisy	Suggest replacement.
Damaged	Require replacement.
Improper adjustment	Adjust to OEM specifications.

MOTOR MOUNTS

Condition	Procedure
Broken	Require replacement.
Oil soaked (rubber mount)	Suggest replacement.
Leaking (hydraulic mount)	Require replacement.
Missing or broken fasteners	Require repair or replacement of fasteners

TORQUE STRUT

Condition	Procedure
Worn or damaged bushings	Requirement replacement.
Damaged or missing fasteners	Require repair or replacement of fasteners.

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Leaking	Suggest replacement.
Missing	Require replacement

INDICATOR LIGHTS & GUAGES (TEMPERATURE, BRAKE, ENGINE OIL, CHARGING)

Condition - Lights	Procedure
Light doesn't come on during bulb check	
Fail to function properly during test mode	Further inspection required. See note.
On constantly or intermittently	

NOTE: See service manual for further information.

Condition - Guages	Procedure
Inoperative	Further inspection required.
Indicating out of manufacturer's recommended range	See note.

NOTE: See service manual for further information.

DIP STICKS/TUBES

Condition	Procedure
Missing	Require replacement.
Incorrect application	Require replacement.
Modified	Suggest replacement.
Broken/damaged	Suggest replacement.
Leaking	Suggest repair or replacement.

COOLERS (TRANSMISSION) EXTERNAL; ENGINE OIL; POWER STEERING

Condition	Procedure
Leaking	Require repair or replacement.
Damaged fins, tubes or fittings	Suggest repair or replacement.
Internal restrictions	Require repair or replacement.

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Missing/by-passed	Further inspection required.
Air flow restriction	Suggest repair.
Missing, damaged, deteriorated mounting hardware and bushings	Require repair or replacement of hardware and/or bushings.

ENGINE COOLING SYSTEM

RADIATOR & RADIATOR CAP

Condition - Radiator	Procedure
Leaking	Require repair or replacement.
Damaged fins, tubes or fittings	Suggest repair or replacement.
Internal restrictions	Require repair or replacement.
Air flow restriction	Suggest repair.
Missing, damaged, deteriorated mounting hardware and bushings	Require repair or replacement of hardware and/or bushings.
Leaking internal trans cooler	Require repair or replacement.
Corroded	Suggest repair or replacement.

Condition - Radiator Cap	Procedure
Missing	Require replacement.
Fails to maintain proper pressure	Require replacement.
Damaged/bent or corroded	Suggest replacement.
Missing gaskets/seals	Require replacement.
Coolant recovery check valve inoperative	Require replacement.
Improper application	Require replacement.

THERMOSTAT/HOUSING

Condition	Procedure
Improper installation	Require repair or replacement.
Missing/damaged/corroded thermostat	Require replacement of

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	thermostat
Improper application	Require replacement.
Inoperative	Require replacement.
Damaged/corroded housing	Suggest replacement of housing.

COOLANT HOSES/TUBES (RADIATOR, BY-PASS, HEATER, RECOVERY TANK)

Condition	Procedure
Leaking	Require repair or replacement.
Britlle, hard, cracked, corroded, spongy, soft, oil soaked, collapsed, swollen, non-automotive	Suggest repair or replacement.
Improper routing	Suggest repair or replacement.
Restricted	Suggest repair or replacement.
Missing/damaged protective sleeves	Suggest replacement of sleeves.
Maintenance intervals	Suggest replacement to comply with vehicle's OEM recommended service intervals.

CLAMPS

Condition	Procedure
Missing/damaged	Require replacement.
Loose	Require repair or replacement.
Corroded	Suggest replacement.

NOTE: Be sure to inspect hoses for deterioration.

COOLANT RECOVERY TANK/CAP

Condition	Procedure
Missing	Require replacement.
Leaking	Require repair or replacement.
Damaged	Suggest repair or replacement.

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Missing, damaged mounting hardware	Suggest repair or replacement of hardware.

COOLANT

Condition	Procedure
Contaminated	Require replacement. Further inspection required. See NOTE: (1).
Low level	Require filling to proper level. See NOTE: (2).
Improper mixture/type	Require correction or replacement.
Improper acidity (pH)	Suggest correction or replacement.
Maintenance intervals	Suggest replacement. See NOTE: (3).

NOTE: (1) Determine source of contamination and suggest correction prior to coolant replacement.
(2) Determine source of incorrect level and suggest repair.
(3) The system should be drained and/or flushed and refilled with correct coolant according to OEM Recommended Service Interval and procedure.

WATER PUMP

Condition	Procedure
Leaking, damaged	Require replacement.
Noisy	Suggest replacement.
Inoperative	Require replacement.
Broken, missing fasteners	Require replacement of fasteners.

SHROUD/BAFFLES/DEFLECTORS

Condition	Procedure
Missing/damaged	Require replacement.
Missing/damaged mounting hardware	Require replacement of hardware.

RADIATOR FAN BLADE & FAN CLUTCH

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Condition - Fan Blade	Procedure
Damaged	Require replacement.
Loose	Require repair or replacement.

Condition - Fan Clutch	Procedure
Seized	Require replacement.
Noisy/worn bearing	Suggest replacement.
Leaking	Suggest replacement.
Slips (insufficient fan speed)	Require replacement.
Damaged	Suggest replacement.
Loose fasteners	Require repair or replacement of fasteners.

NOTE: Some lateral movement, measured at the fan blade tip, is normal.

RADIATOR FAN MOTOR

Condition	Procedure
Vibration/noisy	Suggest replacement.
Intermittent/inoperative	Require replacement. See note.
Missing	Require replacement.
Missing, damaged mounting hardware	Require replacement of hardware.

NOTE: Check fan motor/controls.

RADIATOR FAN MOTOR RELAY/MODULE & FAN MOTOR RESISTOR

Condition - Fan Motor Relay/Module	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Intermittent/inoperative	Require replacement.
Missing, damaged mounting hardware	Require replacement of hardware.

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Condition - Fan Motor Resistor	Procedure
Leaking	Require repair or replacement.
Contaminated/corroded	Suggest repair or replacement.
Intermittent/inoperative	Require replacement.
Damaged	Suggest replacement.

ACCESSORY BELTS

Condition	Procedure
Missing	Require replacement.
Improper tension	Require adjustment or repair.
Improper alignment	Further inspection required. See note.
Damaged	Require replacement.
Noisy	Suggest replacement.

NOTE: Check alignment of pulleys and proper belt installation.

ACCESSORY PULLEYS & TENSIONERS

Condition - Pulleys	Procedure
Damaged	Require replacement.
Improper alignment	Require repair.
Missing, damaged mounting hardware	Require repair or replacement of hardware.

Condition - Tensioners	Procedure
Missing	Require replacement
Noisy	Suggest replacement.
Damaged	Suggest replacement.
Improper adjustment	Require adjustment or repair.

GASKETS

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Condition	Procedure
Leaking	Tighten or suggest replacement as necessary.

HEATER CORE

Condition	Procedure
Leaking	Require repair or replacement.
Damaged fins, tubes, fittings	Suggest repair or replacement.
Internal restrictions	Suggest repair or replacement.
Missing/by-passed	Suggest repair or replacement.
Air flow restriction	Suggest repair or replacement.
Missing, damaged deteriorated mounting hardware/bushing	Suggest repair or replacement of hardware/bushing
Corroded	Suggest repair or replacement.

HEATER CONTROL VALVE

Condition	Procedure
Missing/by-passed	Suggest repair or replacement.
Leaking	Require replacement.
Inoperative	Suggest replacement.
Damaged valve/bracket	Suggest repair or replacement of valve/bracket

ENGINE COOLING PASSAGES

Condition	Procedure
External/internal leak	Require repair or replacement.
Restricted cooling passage	Require repair.

CASTING CORE/EXPANSION PLUGS

Condition	Procedure

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Leaking	Require replacement.
Improper type	Suggest replacement.

AIR INDUCTION SYSTEM

AIR DUCT/TUBES

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest repair or replacement.
Leaking	Require repair or replacement.

AIR FILTER HOUSING/GASKETS

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest repair or replacement.
Leaking	Require repair or replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

AIR FILTER ELEMENT

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Restricted	Suggest replacement.
Maintenance intervals	Suggest replacement to comply with vehicle's OEM recommended service intervals.

PCV BREATHER ELEMENT

Condition	Procedure
Missing	Require replacement.

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Damaged	Suggest replacement.
Restricted	Suggest replacement.
Maintenance intervals	Suggest replacement to comply with vehicle's OEM recommended service intervals.

THERMOSTATIC AIR DOOR ASSEMBLY

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require repair or replacement.

SUPER CHARGER

Condition	Procedure
Inoperative	Require repair or replacement.
Noisy	Suggest repair or replacement.

TURBO CHARGER

Condition	Procedure
Missing	Require repair or replacement.
Damaged	Suggest repair or replacement.
Leaking	Require repair or replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

WASTE GATE/CONTROL MECHANISM & CONTROL SOLENOID

Condition - Control Mechanism	Procedure
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Leaking	Require repair or replacement.

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Condition - Control Solenoid	Procedure
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Leaking	Require repair or replacement.

NOTE: Inoperative includes intermittent operation or out of OEM specification.

IDLE AIR CONTROL (IAC)

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Damaged	Suggest replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

NOTE: Inoperative includes intermittent operation or out of OEM specifications. Some components may be serviceable; check for accepted cleaning procedure.

CHARGE AIR COOLER "INTERCOOLER" (CAC)

Condition	Procedure
Missing	Require replacement.
Leaking	Require repair or replacement
Damaged	Suggest repair or replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

INTAKE AIR TEMP SENSOR (IAT)

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement. Further inspection

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³ required. See NOTE: below.
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Restricted	Require repair or replacement. See NOTE: below.

NOTE: Refer to accepted service procedure.

CARBURETOR/CHOKE (SEE NOTE:)

Condition	Procedure
Improper operation	Require repair or replacement.
Missing, damaged, binding mounting hardware and other components	Require repair or replacement.

NOTE: Proper operation of a carburetor includes the ability to control fuel mixtures during all phases of driving operation to comply with all federal and local emission standards. Adjustments are to be considered repairs.

THROTTLE BODY

Condition	Procedure
Leaking	Require repair or replacement.
Restricted/contaminated	Require repair. See NOTE: below.
Damaged	Require repair or replacement.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

VACUUM HOSES/TUBES

Condition	Procedure
Missing	Require replacement.
Leaking/restricted	Require repair or replacement.

EARLY FUEL EVAPORATION (EFE)

Condition	Procedure
Refer to Early Fuel Evaporation Heater/Grid.	

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POWERTRAIN CONTROL MODULE (PCM)

Condition	Procedure
Inoperative	Require repair or replacement.
Damaged	Suggest repair or replacement.

SENSORS/ACTUATORS DEFINITIONS

NOTE: The conditions and procedures apply to, but are not limited to the following list of components (SAE J1930 Terminology).

SENSORS/ACTUATORS DEFINITIONS

Sensor	Abbreviation
02 Sensor	02S
Intake Air Temperature Sensor	IAT
Manifold Absolute Pressure Sensor	MAP
Engine Coolant Temperature Sensor	ECT
Barometric Pressure Sensor	BARO
Crankshaft Position Sensor	CKP
Throttle Positon Sensor	TPS
Camshaft Position Sensor	CMP
Park Neutral Position	PNP
Clutch Pedal Position Switch	CPP
Wide Open Throttle Switch	WOT Switch
Exhaust Gas Recirculation Valve Position Sensor	EGR Valve Position Sensor
Mass Air Flow Sensor	MAF
Volume Air Flow Sensor	VAF
Power Steering Pressure Sensor	PSP
Vehicle Speed Sensor	VSS
Fan Control Sensor	FS
Knock Sensor	KS
Air Conditioning Cycling Switch	AC
Exhaust Gas Recirculating Temperature Sensor	EGRT
Transmission Range Switch	TR Switch

Actuators	Abbreviation
Idle Speed Control Actuator	ISC
Idle Air Control	IAC
Exhaust Gas Recirculation Solenoid	EGR Solenoid
Vacuum Regulator Solenoid	...
Mix Control Solenoid	MC Solenoid
Torque Converter Clutch	TCC
Fuel Injector	...

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  Evaporative Emission Canister Purge Valve  ......  EVAP
  Secondary Air Injection By-Pass  ................  Air By-Pass
  Secondary Air Injection Diverter  ...............  Air Diverter
  Waste Gate Control Solenoid  ....................  ...
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TUBES, HOSES, CLAMPS & GROMMETS

Condition	Procedure
Missing	Require replacement.
Damaged	Require repair or replacement.
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.

ORIFICE

Condition	Procedure
Missing	Require replacement.
Restricted	Require repair or replacement.
Maintenance intervals	Suggest replacement to comply with vehicle's OEM recommended service intervals.

OIL SEPARATOR/FILTER

Condition	Procedure
Missing	Require replacement.
Restricted	Require repair or replacement.
Damaged	Suggest repair or replacement.
Maintenance intervals	Suggest replacement to comply with vehicle's OEM recommended service intervals.

IGNITION SYSTEM

BATTERY

Condition	Procedure
Refer to Starting/Charging System information.	

BATTERY CABLES/WIRES/CONNECTORS (SEE NOTE:)

Condition	Procedure

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Damaged	³ Suggest repair or replacement.
Corroded	³ Suggest repair or replacement.
High resistance	³ Require repair or replacement.
Loose	³ Require repair or replacement.
Missing, damaged, deteriorated mounting hardware	³ Require repair or replacement. ³

NOTE: Cable/wires includes all wires and terminals connected to the battery.

BATTERY TRAY/HOLD DOWN HARDWARE

Condition	³ Procedure
Missing	³ Require replacement.
Damaged/corroded	³ Suggest repair or replacement. See NOTE: ³ below.

NOTE: If battery tray/hold down hardware no longer performs intended purpose, reauire repair or replacement.

FUSIBLE LINK

Condition	³ Procedure
Damaged	³ Suggest repair or replacement.
Open	³ Require replacement.

IGNITION SWITCH

Condition	³ Procedure
Damaged	³ Suggest replacement.
Inoperable/intermittent	³ Require replacement.

PARK NEUTRAL SWITCH (PNP)

Condition	³ Procedure
Inoperable/intermittent	³ Require replacement.

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Damaged	Suggest repair or replacement
Loose	Suggest repair or replacement.

BALLAST RESISTOR/RESISTOR WIRE

Condition	Procedure
Inoperable	Require replacement.
Damaged	Suggest replacement.

IGNITION COIL(S)

Condition	Procedure
Damaged	Suggest replacement.
Arcing	Require replacement.
Out of specification	Require replacement.
Leaking oil	Require replacement.
Damaged/missing mounting hardware	Require repair or replacement of hardware.
Distorted	Further inspection required. See NOTE: below.

NOTE: Distortion may be the result of overheating; coil should be tested.

IGNITION CONTROL MODULE (ICM)

Condition	Procedure
Damaged	Suggest replacement.
Inoperative	Require replacement. See NOTE: below.

NOTE: Inoperative includes intermittent operation or out of OEM specification.

PICK-UPS (INCLUDES MAGENTIC, HAL EFFECT, OPTICAL)

Condition	Procedure

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Damaged	Suggest replacement.
Out of specification	Require replacement.
Oil soaked	Further inspection required. See NOTE: below.
Inoperative	Require replacement. See NOTE: below.

NOTE: Inoperative includes intermittent operation or out of OEM specification. Refer to OEM recommended service procedures.

STATOR/RELUCTOR

Condition	Procedure
Damaged	Require replacement.

CRANK SENSOR (CKP)

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Damaged	Suggest replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

NOTE: Inoperative includes intermittent operation or out of OEM specifications.

CAM SENSOR (CMP)

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Damaged	Suggest replacement.
Missing/damaged mounting hardware	Require repair or replacement of hardware.

NOTE: Inoperative includes intermittent operation or out of OEM

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specifications.

IGNITION HARNESS (PRIMARY)

Condition	Procedure
Damaged	Suggest repair or replacement.
Mis-routed	Suggest repair.
Open fusible link	Require replacement.
Shorted/open	Require repair or replacement.
Connector terminal problem (bent, broken, corroded or loose)	Require repair or replacement.
Excessive resistance	Require repair or replacement.
Poor ground	Require repair.

DISTRIBUTOR

Condition	Procedure
Bent shaft, worn bushings and/or cam lobe	Further inspection required. See NOTE: below.
Damaged	Suggest repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.
Worn gear	Suggest replacement of gear.
Broken gear	Require replacement of gear.
Oil soaked	Further inspection required. See NOTE: below.

NOTE: Refer to OEM recommended service procedures.

DISTRIBUTOR CAP

Condition	Procedure
Damaged	Suggest replacement.
Corroded/eroded terminals	Suggest replacement.

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Burned/carbon tracked/arcing	Require replacement.
Missing carbon button	Require replacement.
Loose	Suggest repair or replacement.

DISTRIBUTOR ROTOR

Condition	Procedure
Damaged	Suggest replacement.
Corroded/eroded	Require replacement.
Loose	Suggest repair or replacement.
Missing, damaged hold down fastener	Require repair or replacement of fastener
Burned/carbon tracked	Require replacement.

IGNITION WIRES/BOOTS/TERMINAL (SECONDARY - SEE NOTE: (1))

Condition	Procedure
Damaged	Suggest repair or replacement.
Oil soaked	Suggest replacement.
Open/shorted	Require repair or replacement.
Mis-routed	Suggest repair. See NOTE: (2).
Missing/damaged mounting	Suggest repair or replacement of hardware. See NOTE: (2).
Loose terminal	Suggest repair or replacement.
Corroded	Suggest repair or replacement.
High/Low resistance	Require repair or replacement.

NOTE: (1) It is not required to replace ignition wires in sets. However, you may suggest replacement of the entire secondary wire set for preventive maintenance.

(2) Proper routing, hardware, heat shields, etc. are intended to prevent premature failure of secondary ignition components.

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SPARK PLUGS (SEE NOTE: (1))

Condition	Procedure
Damaged	Require replacement.
Shorted	Require replacement.
Fouled	Require repair or replacement. See NOTE: (2).
Maintenance interval	Suggest replacement. See NOTE: (3).
Eroded electrode	Suggest replacement.
Incorrect gap	Require repair or replacement.

NOTE: (1) It is not required to replace spark plugs in sets. However, you may suggest replacement of the other plugs for preventive maintenance.
(2) Determine cause of fouling and suggest repair.
(3) Suggest replacement to comply with vehicle's OEM recommended service intervals.

DISTRIBUTOR ADVANCE/RETARD (MECHANICAL/VACUUM)

Condition	Procedure
Damaged	Suggest repair or replacement.
Inoperative	Require repair or replacement.
Out of specification	Require repair or replacement.

ELECTRONIC SPARK CONTROL MODULE

Condition	Procedure
Damaged	Suggest replacement.
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.

NOTE: Inoperative includes intermittent operation, out of OEM specifications.

GAS CAP

Condition	Procedure

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Missing	Require replacement.
Leaking	Require replacement.
Damaged	Suggest replacement.

FUEL FILLER NECK/HOSES/CLAMPS/RESTRICTOR

Condition	Procedure
Missing	Require replacement.
Leaking	Require repair or replacement.
Damaged	Suggest repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.

FUEL TANK/CELL

Condition	Procedure
Leaking	Require repair or replacement.
Loose baffles	Require repair or replacement.
Damaged	Suggest repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.
Contaminated	Suggest repair. Further inspection required. See NOTE: below.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

FUEL LEVEL SENDER

Condition	Procedure
Inoperative	Suggest repair or replacement.
Leaking	Require repair or replacement.
Damaged	Suggest repair or replacement.

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For Volkswagen Technical Site

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FUEL PUMP (IN TANK/EXTERNAL - ELECTRICAL OR MECHANICAL)

Condition	Procedure
Inoperative	Require repair or replacement.
Noisy	Suggest replacement.
Leaking	Require repair or replacement.
Damaged	Suggest repair or replacement.
Missing, damaged mounting hardware	Requires repair or replacement of hardware

ELECTRIC FUEL PUMP CONTROL CIRCUIT

Condition	Procedure
See Electrical Uniform Inspection Guidelines.	

LIQUID VAPOR SEPARATOR

Condition	Procedure
Missing	Require replacement.
Leaking	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require repair or replacement

ROLL-OVER VALVE

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require replacement.
Leaking	Require replacement.

INERTIA FUEL SHUT OFF SWITCH

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Article Text (p. 30)

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Condition	Procedure
Inoperative	Require repair or replacement.
Missing	Require replacement.
Damaged	Suggest replacement.

FUEL LINES/CLAMPS/O-RINGS/CONNECTORS (SEE NOTE)

Condition	Procedure
Missing	Require replacement.
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.
Routed incorrectly	Suggest repair.
Damaged	Suggest repair or replacement.

NOTE: When replacing fuel lines/hoses, replace with products that meet(s) or exceed(s) OEM design specifications.

FUEL FILTER & IN-TANK FUEL STRAINER

Condition - External Filter	Procedure
Missing	Require replacement.
Restricted/contaminated	Require replacement.
Leaking	Require repair or replacement.
Damaged	Suggest replacement.
Maintenance interval	Suggest replacement to comply with OEM recommended service interval.
Missing, damaged mounting hardware	Suggest repair. Further inspection required.

Condition - In-Tank	Procedure
Missing	Require replacement.
Damaged	Require replacement.
Restricted	Require repair or replacement.

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Article Text (p. 31)

1993 Volkswagen EuroVan

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Saturday, March 18, 2000 10:07PM

FUEL ACCUMULATOR/DAMPENER

Condition	Procedure
Inoperative	Require replacement.
Leaking	Require replacement.
Damaged	Suggest replacement.

FUEL PRESSURE REGULATOR

Condition	Procedure
Inoperative	Require repair or replacement.
Leaking	Require repair or replacement.
Damaged	Suggest replacement.
Restricted/contaminated	Suggest repair. Further inspection required. See NOTE: below.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

FUEL RAIL

Condition	Procedure
Restricted	Require repair or replacement.
Leaking	Require repair or replacement.
Damaged	Suggest replacement.

FUEL DISTRIBUTOR

Condition	Procedure
Inoperative	Require repair or replacement. Further inspection required. See NOTE: below.
Out of specification	Require repair or replacement.
Leaking	Requires repair or replacement.

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Damaged	Suggest replacement.
Restricted/contaminated	Suggest repair. Further inspection required. See NOTE: below.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

FUEL/COLD START INJECTORS (SEE NOTE: (1))

Condition	Procedure
Inoperative	Require repair or replacement. Further inspection required. See NOTE: (2) below.
Damaged	Suggest repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.
Leaking	Require repair or replacement.

NOTE: (1) It is not required to replace injectors in sets. However, you may suggest replacement of all injectors for preventive maintenance.
(2) Inoperative included intermittent operations out of OEM specifications. Some components may be serviceable; check for accepted cleaning procedure.

THROTTLE BODY

Condition	Procedure
Leaking	Require repair or replacement.
Restricted/contaminated	Require repair. See NOTE: below.
Damaged	Require repair or replacement.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

CARBURETOR/CHOKE

Condition	Procedure
Improper air/fuel control	Require repair or replacement.
Missing, damaged hardware	Require repair or replacement of

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	hardware.
Leaking	Require repair or replacement.
Contaminated	Require repair or replacement. Further inspection required. See NOTE: below.
Improper mechanical operation	Require repair or replacement.

NOTE: Some components may be serviceable; check for accepted cleaning procedure.

EARLY FUEL EVAPORATION VALVE (HEAT RISER ASSEMBLY)

Condition	Procedure
Inoperative, binding	Require repair or replacement.
Leaking exhaust	Require repair or replacement.
Noisy	Suggest repair or replacement.

EARLY FUEL EVAPORATION, HEATER/GRID (EFE)

Condition	Procedure
Inoperative	Require repair or replacement.
Restricted	Require repair or replacement.
Damaged	Suggest repair or replacement.

EXHAUST GAS RECIRCULATION SYSTEM (EGR)

EGR VALVE

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement.
Leaking	Require repair or replacement.
Restricted passage	Require repair or replacement.
Damaged	Suggest repair or replacement.
Maintenance interval	Suggest repair or replacement to comply with

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³ OEM recommended service intervals.

EGR PIPE/PLATE/COOLER

Condition	Procedure
Missing	Require replacement.
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.
Damaged	Suggest repair or replacement.

EGR CONTROLS (ELECTRICAL/VACUUM)

Condition	Procedure
Missing	Require replacement.
Inoperative	Require repair or replacement.
Damaged	Suggest repair or replacement.
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.

EGR INTAKE/EXHAUST MANIFOLD PASSAGES

Condition	Procedure
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.

AIR INJECTION SYSTEM

AIR PUMP

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require repair or replacement.

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Noisy	Suggest repair or replacement.

AIR PUMP BELT

Condition	Procedure
Missing	Require replacement.
Improper tension	Require adjustment or repair.
Improper alignment	Further inspection required. See NOTE: below.
Damaged	Require replacement.
Noisy	Suggest replacement.

AIR CONTROL VALVE (DIVERTER/BY-PASS)

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Inoperative	Require repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.

ASPIRATOR, CHECK/DECEL VALVE

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Inoperative	Require repair or replacement.
Missing, damaged mounting hardware	Require repair or replacement of hardware.

AIR MAIFOLD/PIPE

Condition	Procedure
Missing	Require replacement.

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Damaged	Suggest repair or replacement.
Restricted	Require repair or replacement.
Leaking	Require repair or replacement.
Missing, damaged mounting hardware	Suggest repair or replacement of hardware.

CONTROL SOLENOID

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Inoperative	Require replacement.

EVAPORATIVE SYSTEMS

EVAPORATIVE EMISSION CANISTER (EVAP)

Condition	Procedure
Damaged	Suggest replacement.
Missing	Require replacement.
Leaking	Require replacement.
Saturated	Require replacement.
Inoperative	Require repair or replacement.

EVAPORATIVE EMISSION CANISTER FILTER (EVAP FILTER)

Condition	Procedure
Missing	Require replacement.
Restricted	Suggest replacement.
Maintenance interval	Suggest repair or replacement to comply with OEM recommended service interval.

HOSES/CLAMPS/TUBES

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Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Leaking	Require repair or replacement.
Restricted	Require repair or replacement.

EVAPORATIVE EMISSION CANISTER PURGE VALVE (ELECTRICAL/VACUUM)

Condition	Procedure
Missing	Require replacement.
Damaged	Suggest replacement.
Inoperative	Require replacement.
Leaking	Require replacement.

GAS CAP

Condition	Procedure
Missing	Require replacement.
Leaking	Require replacement.
Damaged	Suggest replacement.

LIQUID/VAPOR SEPARATOR

Condition	Procedure
Missing	Require replacement.
Leaking	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require repair or replacement.

ROLL OVER VALVE

Condition	Procedure

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Missing	Require replacement.
Damaged	Suggest repair or replacement.
Inoperative	Require replacement.
Leaking	Require replacement.

TRANSMISSION & CLUTCH RELATED INSPECTION INFORMATION

AUTOMATIC TRANSMISSION FILTER

Condition	Procedure
Contaminated	Require replacement of fluid and filter.
Maintenance intervals	Suggest replacement to comply with OEM recommended service intervals.

TRANSMISSION FLUID

Condition	Procedure
See * TRANSMISSION UNIFORM INSPECTION GUIDELINES *. (1)	

(1) - TRANSMISSION UNIFORM INSPECTION GUIDELINES article is not available at this time.

CLUTCH FLUID

Condition	Procedure
See * TRANSMISSION UNIFORM INSPECTION GUIDELINES *. (1)	

(1) - TRANSMISSION UNIFORM INSPECTION GUIDELINES article is not available at this time.

END OF ARTICLE