Bendix
Electronics

BENDIX SINGLE POINT ELECTRONIC FUEL INJECTION SYSTEM

APPLICATION: SKODA 135 G i

SERVICE MANUAL

SKODA

The following notes have been compiled from information and text provided by

Skocar Inc Markham Ontario Canada
AZNP Mlada Boleslav Czechoslovakia
Sun Electric U.K. LTD Kings Lynn.

SKODA 135RiC

Vehicle differences between 135 RiC and carburettor 136 vehicles.

ENGINE.

This engine has the same basic construction as the 136 but differs in the following ways.

Lower compression ratio of 8.8 : 1 which is achieved by using alternative pistons with a small bowl in the head of the piston.

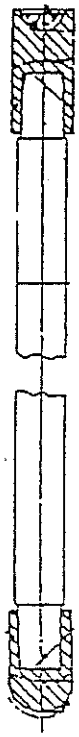
This lower compression along with tight emission controls reduces the power and torque to

Power at 5000 rpm is 41 KW
Torque at 3500 rpm is 92 Nm

The engine is able to run on 91 octane fuel

PUSH RODS.

Internal engine differences include bimetal push rods for the inlet valves to give improved control of expansion to enable cold starting to minus 40 degrees centigrade whilst still providing the correct inlet valve opening at normal running temperature.



The inlet push rods consist of an alloy main tube with steel inserts at both ends.

The correct valve clearances at

20 degrees centigrade

Inlet valves	0.25mm
Exhaust valves	0.20mm

ALTERNATOR PULLEY

The alternator pulley is a diameter of 65mm which is smaller than on other Rapids so as to provide a charging voltage at idle, as this is imperative for the correct function of the fuel system.

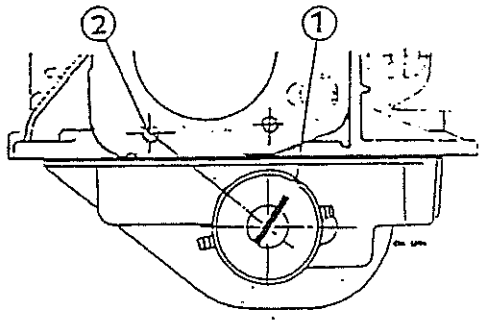
As a result of the pulley change the drive belt is of a serrated design to go round the small pulley diameter.

DISTRIBUTOR.

The distributors only function is to direct the spark to the correct cylinder and therefore consists of only a rotating shaft with no advance system.

Type number 443 213 204 720

Distributor timing involves positioning the crankshaft at top dead center, compression stroke of number one cylinder.

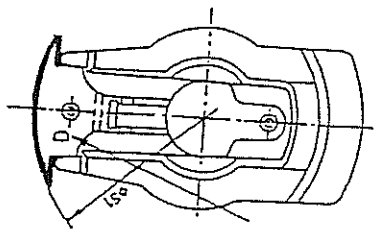


Align the rotor with drill mark on the distributor and ensure these are at right angles with the cylinder head bolt as shown in the diagram.

ROTOR.

The rotor has a long distribution contact face to take into account the different ignition timing.

Rotor type number 443 930 233 350 D



Resistance 5KOhms +- 20%

--- PLUG LEADS.

Type Ripaults SU267P

Fitted with Tesla OK 82-5 and OK 35-5 connectors.

Care should be taken when removing plug leads to only pull the connector.
Do not remove the ends.

Cable resistance 15KOhm per metre +-20%
Connectors 5KOhm +-20%

SPARK PLUGS.

Bosch F7DC or KLG FC52LS or Champion C281YC

Plug gap 0.70mm to Max 0.90mm

IGNITION UNIT.

Combined ignition control amplifier and high tension unit.

Type number RENIX - BENDIX S100 620 005

FLYWHEEL.

The flywheel has 40 holes drilled in the periphery to provide the control unit with information on the speed of the engine and position of the crankshaft.

The Position of top dead center is identifed by the two 'missed' holes.

The rotation of the flywheel is detected by a magnetic sensor mounted on the bellhousing in a special aperture.

MANIFOLDS.

Both manifolds differ from 136 type.
The inlet manifold differs due the throttle body injector mounting and with both mixture and coolant temperature sensors.
The exhaust manifold has an intermediate section with the Lamdba sensor mounting and a spherical joint to the catalytic conveter.
Removal of the lamdba sensor must be carried out with the engine hot.

AIR CLEANER.

The air cleaner body differs but the element remains unaltered from the 136 type.

FUEL SYSTEM.

The fuel supply and pump remains as for the Favorit.
The mechanical pump supplies fuel to a small reservoir with an excess fuel return to the fuel tank via an additional pipe connection on the filler neck.

The fuel tank breather system remains unaltered except that the outlet is connected to carbon canister ventilation system.

ACCELERATOR CABLE.

The accelerator cable is unaltered but the system of adjustment is.

Bring the engine to normal running temperature (oil 70 degrees Centigrade) and with the engine running at idle, 900+50 RPM adjust the cable to ensure a clearance of a maximum 0.3mm.

TRANSMISSION.

Axle Ratio 4.22 : 1

Transmission case modifed in production to incorporate the requisite hole and mounting for the engine speed sensor. The internals, except the final drive remain as for 136.

BATTERY.

Either 42Ahr or 50Ahr fitted.
For the United Kingdom 42Ahr is sufficient. If the vehicle is to be subjected to extreme cold then a 50Ahr battery should be fitted.

WIRING.

The main wiring harness remains unaltered. Supplementary wires are incorporated into an additional loom which utilises existing connectors and additional power and earth connections.

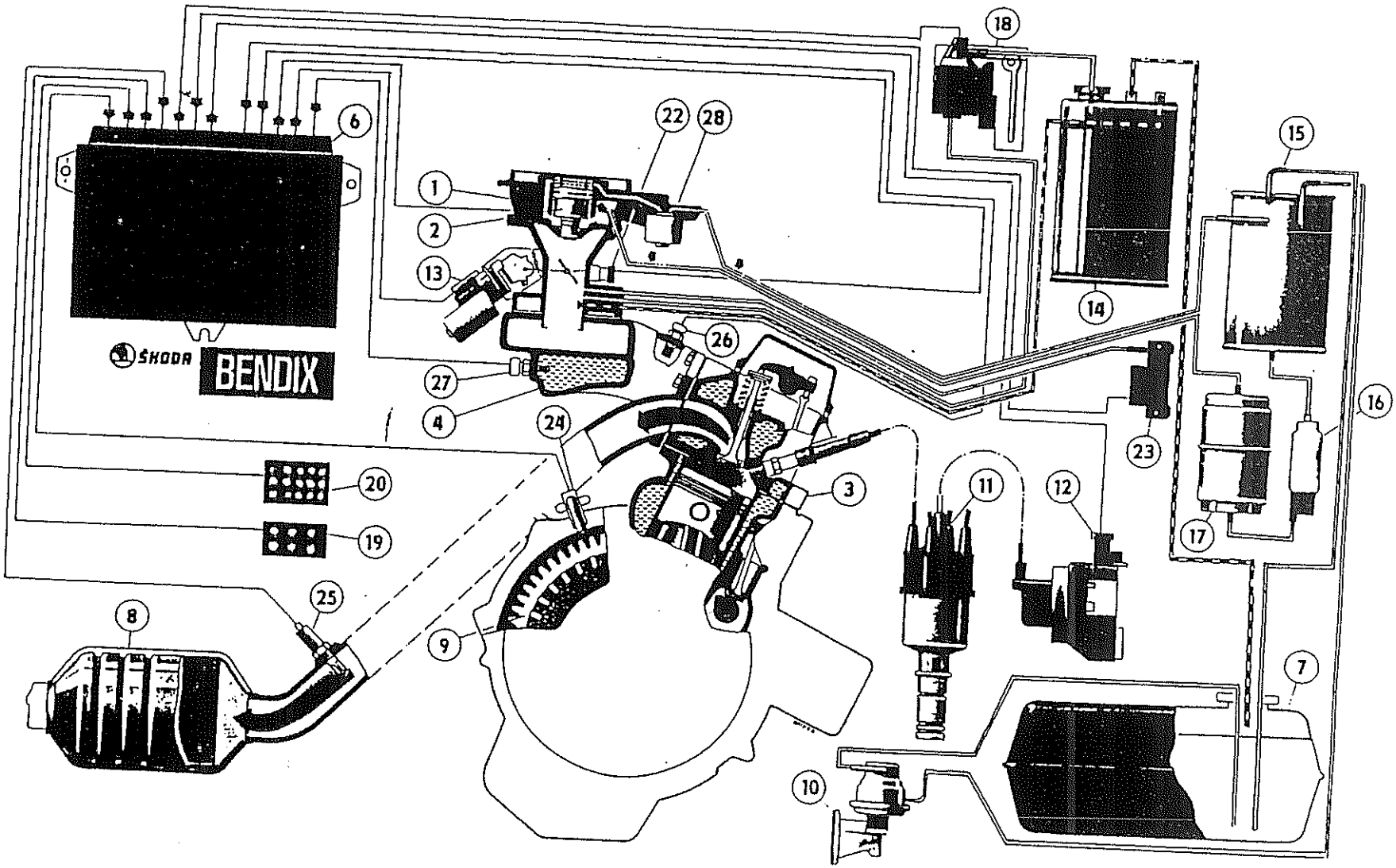
The connections to the coil 15 and 1 and 15a at the starter are plugged into the supplementary loom. Additional connections are made to the main starter battery supply terminal.

An additional earth strap is fitted between the transmission housing and the battery connection to the body.

ADDITIONAL TORQUE SETTINGS.
ENGINE.

Inlet manifold	Nut	M8	24-6 Nm
Injector throttle body	Nut	M8	10+5 Nm
Temperature sender Mixture		M14x1.5	25+-5 Nm
Temperature sender coolant		M12x1.5	15+5 Nm
Exhaust system			
Intermediate section	Nut	M10	30-5 Nm
Spherical joint	Nut	M12	40+10 Nm
Lambda sender		M18x1.5	30+-3 Nm

Only remove Lambda sender when the engine is hot.



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BENDIX SINGLE POINT ELECTRONIC FUEL INJECTION SYSTEM

APPLICATION : SKODA 135 GLi

SERVICE MANUAL

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SHOP

1. INTRODUCTION

This document gives a description of the Bendix throttle body electronic fuel injection system and of the operations needed to install, check and service such a system.

Part 2 gives general informations on the system and on the test equipment and special tools.

Part 3 to part 7 contains the list of operations to perform in order to verify the whole system functionnality. This can be used as a check list, either for test at the end of production line, or during periodical services of the vehicle.

If any failure occurs during these tests, part 8 gives a routine to guide the user to find the faulty component and fix the problem.

Part 9 deals with the installation and removal procedures of the system components.

The components adjustement operations are described in part 10.

Part 11 gives informations on system services and Part 12 on maintenance operations time.

2. GENERAL INFORMATION

2.1. System description

The Bendix Electronic throttle Body Fuel Injection System is a single point injection system.

The injector is located within the throttle body, is controlled by the Electronic Control Unit (E.C.U.) and injects fuel from above the throttle plate.

2.1.1. Electronic Control Unit

Electronic fuel control, which the FENIX I ECU handles, is analogous to a conventional carburetor system. A carburetor system measures the air mass entering the engine by means of a pressure drop through a venturi and meters fuel accordingly. The problem with a carburetor system is that it compensates very poorly for changing operating conditions of the engine, wear of components, component to component variation due to manufacturing tolerances, and has limited calibration flexibility. This lack of compensation is not conducive to meeting the strict emission, fuel economy, and functional requirements of todays automobiles.

The FENIX I Fuel ECU measures air mass by means of a Speed-Density system and again meters fuel accordingly. The Speed-Density system measures the Manifold Absolute Pressure, the engine speed, the air charge temperature and through a volumetric efficiency table pped inside the FENIX I calculates the mass of air entering the engine. Fuel is metered into the engine through an Electronic Fuel Injector which is capable of very precise control.

One other input to the FENIX I ECU is coolant temperature which allows for modification of the basic air mass calculation to improve overall function and control.

The last part of the fuel control system is an oxygen sensor which measures the amount of excess oxygen in the exhaust gas. This input to the FENIX I ECU is the reference point (a stoiciometric A/F ratio) by which the control system can trim for various changes and control to a precise A/F ratio.

The ignition timing is also controlled through a spark advance table mapped inside the ECU.

The ECU also controls fuel delivery system, engine idle speed and fuel evaporative system.

The Electronic Control Unit is located on the rear panel, behind the left rear passenger seat.

2.1.2. System sensors

The sensors give the inputs to the ECU :

- Air temperature sensor,
- Coolant temperature sensor,
- Magnetic sensor,
- Throttle position sensor,
- Oxygen sensor,
- Manifold absolute pressure sensor,
- Closed throttle switch,
- Battery voltage,
- Ignition switch.

2.1.2.1. Air temperature sensor

It is located in the intake manifold.

It provides to the ECU informations on the air/fuel mixture temperature in the intake manifold, to generate density changes compensation.