Technical Service Training

Technicians Information

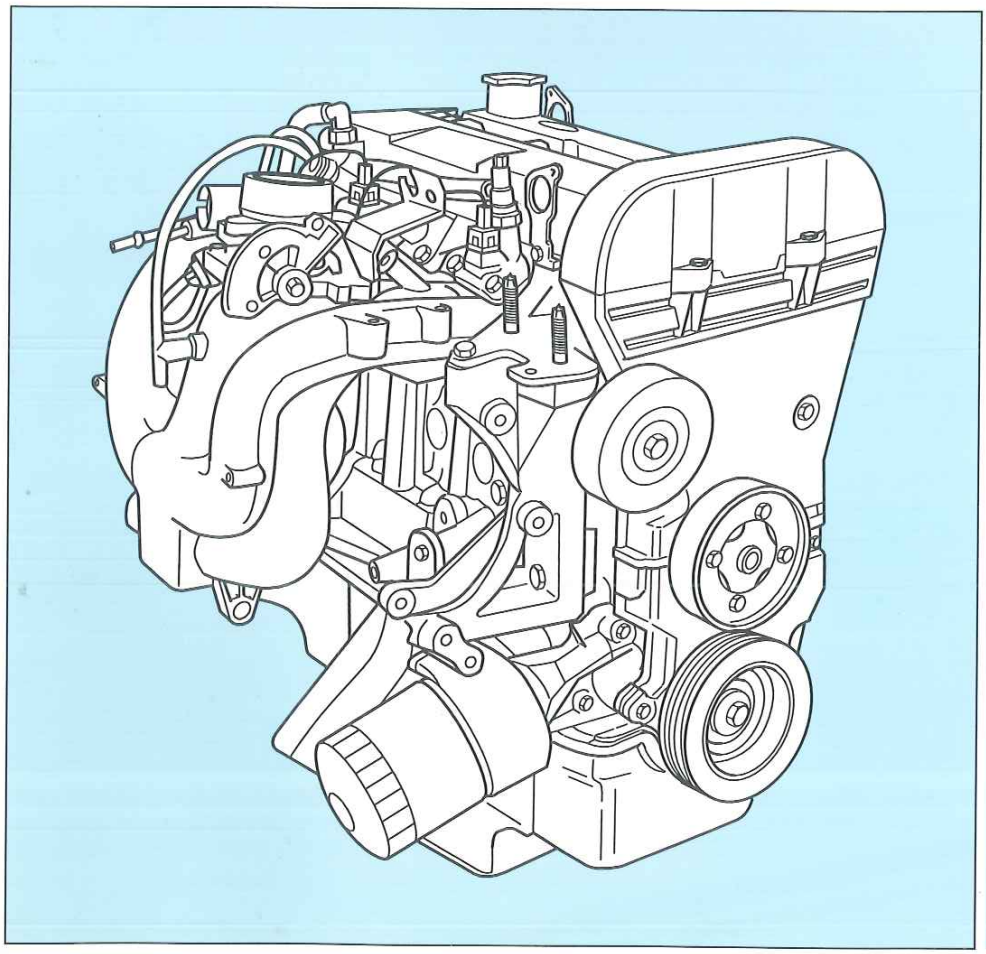
CG 7471 GB 11/92

New Product Introduction

00/209

Ford Mondeo

1.6/1.8 and
2.0 DOHC 16V Zeta Engine



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The Ford Mondeo sees the introduction of three further 16-valve engines (Ford code: Zeta) on the market. The 1.8 litre DOHC 16V engine (77 kW/105 HP and 96 kW/130 HP) already installed in the Fiesta and Escort/Orion is joined by a further 1.8 litre engine with higher power output. A 1.6 litre and a 2.0 litre version will also be available. The Mondeo will therefore be offered with four-valve technology petrol engines.

This New Product Introduction Brochure describes **- based on the brochure 00/204 -** all new features and modifications compared to the existing 1.8 DOHC 16V Zeta engine.

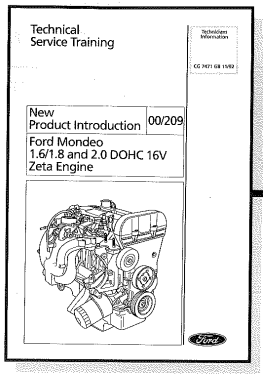
The colours used in coloured illustrations indicating the scope of modification have the following significance:

- New
- Modified

Special functions may be depicted in this brochure by colours which have been shown previously or by other colours. The meaning of the colours is explained in such instances on the pages concerned.

Please remember that our Technical Service Training literature has been prepared solely for FORD DEALER TRAINING PURPOSES.
Repair and service operations **must** always be carried out according to instructions and specifications in the workshop literature.
Please make extensive use of the training courses offered by the Ford Care Institute in order to gain extensive knowledge in both theory and practice.

Training Literature



00/204 "1.8 DOHC 16V Engine", CG 7455

Additional Ford Mondeo
New Product Introduction Brochure:

00/218 "Ford Mondeo", CG 7485

00/208 Ford Mondeo "Body", CG 7470

00/210 Ford Mondeo "MTX 75 Transmission and 4x4 Drive", CG 7472

00/211 Ford Mondeo "Chassis", CG 7473

00/212 Ford Mondeo "Antilock Braking System ABS and Traction Control System TCS", CG 7474

00/213 Ford Mondeo "Vehicle Electrics and Electronics", CG 7475

00/214 Ford Mondeo "Automatic Transmission CD4E", CG 7481

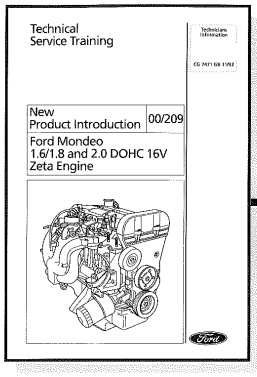
00/215 Ford Mondeo "1.8 Turbo Diesel Engine with Intercooler", CG 7482

Video Film "Product Introduction"
Ford Mondeo, CG 7483

Video Film "Product Training"
Ford Mondeo, CG 7484

ST/135/84

Workshop Literature



Service Microfiche:
- Ford Mondeo, Section 21
- Ford Mondeo, Section 22
- Ford Mondeo, Section 23
- Ford Mondeo, Section 24
- Ford Mondeo, Section 25
- Ford Mondeo, Section 29

New Vehicle System Test Manual for Fuel Injection Engines

Parts Microfiche:
- Ford Mondeo
- Engine

ST/135/85

Modifications/New Features

The three 16-valve engines of the Mondeo with a capacity of 1.6/1.8 and 2.0 litre are based on the well known 1.8 l DOHC 16V Zeta engine range.

All engines have the same external dimensions and use a common crankshaft. Having the same stroke, the different displacements are thus derived from the cylinder bore diameters. TO MONDEO

All modified and new components are described in detail in the sections "ENGINE COMPONENTS" and "ENGINE MANAGEMENT". Important modifications/new features are listed:

- Installation position of the engines tilted forward by 8°.
- New intake system with a vertically arranged throttle housing, a plastic inlet manifold as well as resonators for additional intake noise suppression.
- Modified exhaust manifold with two-piece exhaust downpipe.
- New oil pan, modified oil pump and pick-up pipe, oil cooler (NOT FITTED) for 2.0 l engines, sensor for engine oil level indication (2.0 l engine with auxilliary warning system), new oil dipstick position.
- Modified engine mounting with hydraulic engine mount on the engine end and rubber-elastic mounts on the transmission end. Additional torque restrictors to reduce noise and vibration, secured to transmission and subframe (see brochure 00/211 "Chassis").

Technology
Engine

- Transverse mounted DOHC 16V Zeta engines in three different capacities:
  - 1.6 DOHC 16V engine at 66 kW (90 HP) (DIN)
  - 1.8 DOHC 16V engine at 85 kW (115 HP) (DIN)
  - 2.0 DOHC 16V engine at 108 kW (130 HP) (DIN)
- Compact, roof-shaped combustion chamber with spark plug in centre position
- Hydraulic tappets

Engine Management

- EEC IV engine management with integrated fully electronic ignition system EDIS-4
- EDIS-4 Diagnostic Monitor (EDM)
- Sequential Electronic Fuel Injection (SEFI)
- Air mass measurement

Emission Control

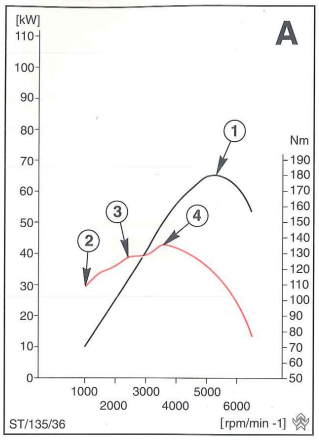
- 83 US Emission Regulation /01 01 93 91/441 EEC
- HEGO of controlled three-way catalytic converter
- Electronically controlled pulse air system
- Electronically controlled exhaust gas recirculation (EGR)
- Evaporative emission control system (EVAP)

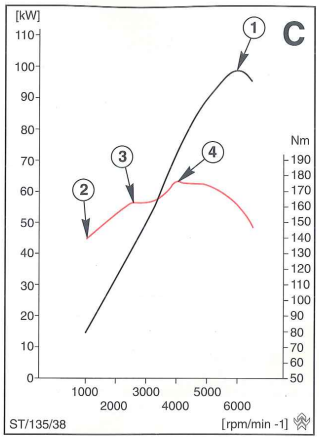
Diagnosis

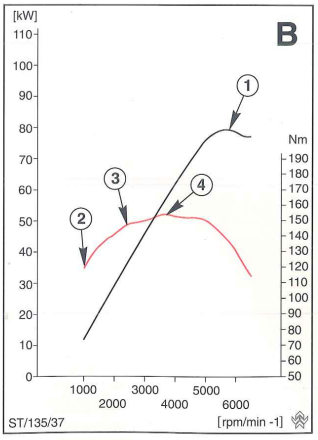
- Serial interface for **F**ord **D**iagnostic **S**ystem FDS 2000

Engine	1.6 l	1.8 l	2.0 l
Bore (mm):	76.0	80.6	84.8
Stroke (mm):	88.0	88.0	88.0
Displacement (cm^3):	1597	1796	1988
Engine management:		EEC IV/SEFI	
Emission regulation:		83 US	
Fuel:		Premium RON 95 unleaded	
Engine build code:	L1F	RKA	NGA
Max. power (EEC*):	65 kW	82 kW	100 kW
at:	5250 rpm	5750 rpm	6000 rpm
Max. torque (EEC):	135 Nm	153 Nm	175 Nm
at:	3500 rpm	3750 rpm	4000 rpm
Max. power (DIN):	66 kW (90 HP)	85 kW (115 HP)	100 kW (136 HP)
at:	5250 rpm	5750 rpm	6000 rpm
Max. torque (DIN):	138 Nm	158 Nm	180 Nm
at:	3500 rpm	3750 rpm	4000 rpm
Compression ratio:	10.3 : 1	10.0 : 1	10.0 : 1
Engine speed limitation at:	7100 rpm	7100 rpm	7100 rpm

* **EEC = European Economic Community**



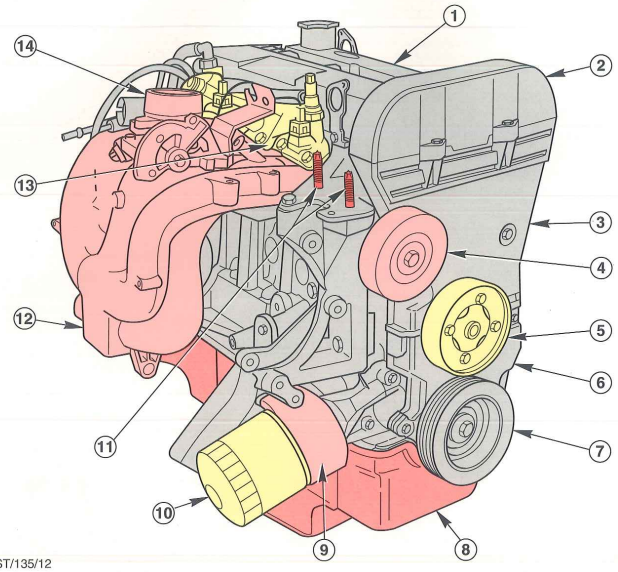




A **1.6 DOHC 16V Zeta**
B **1.8 DOHC 16V Zeta**
C **2.0 DOHC 16V Zeta**

1 Power curve (EEC norm)
2 Torque curve (EEC norm)
3 First torque peak (continuous torque)
4 Second torque peak (max. torque)

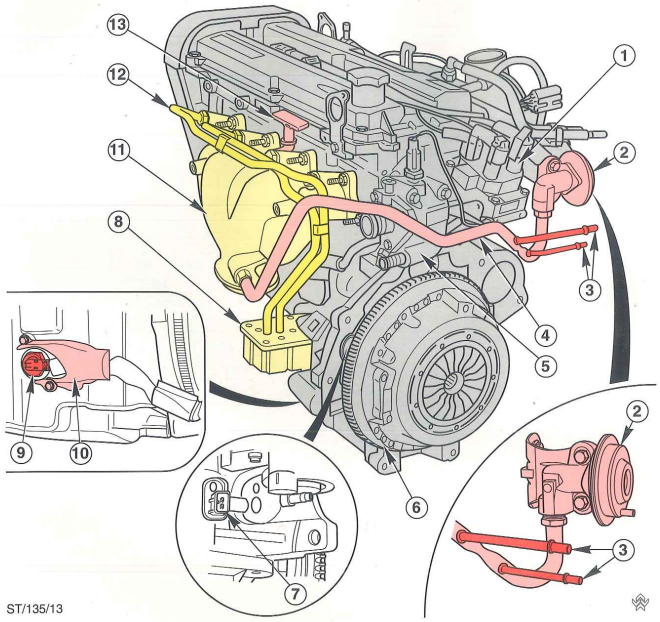
Inlet Side



ST/135/12

1 Camshaft cover
2 Upper timing cover
3 Middle timing cover
4 Idler pulley
5 Water pump pulley
6 Lower timing cover
7 Crankshaft pulley/damper assembly
8 Oil pan
9 Oil cooler (2.0 DOHC 16V only) Not Fitted
10 Oil filter
11 Stud bolt for engine mounting
12 Inlet manifold
13 Fuel rail with fuel injectors and pressure regulator
14 Throttle housing

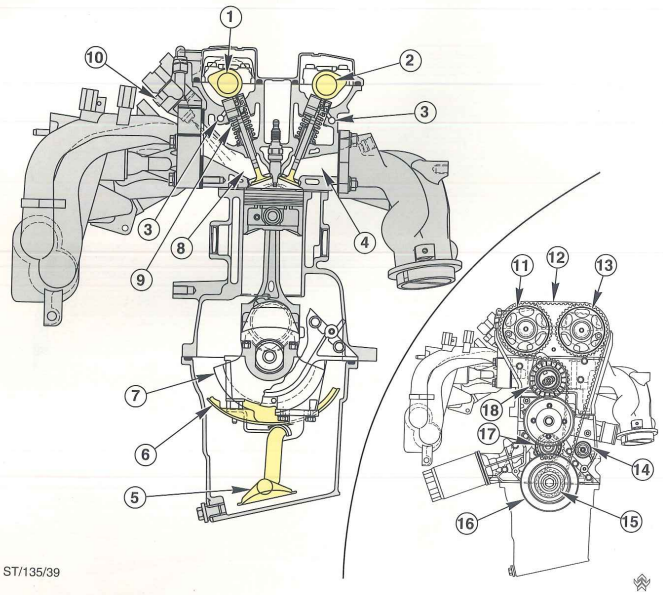
Exhaust Side



ST/135/13

1 DIS coil
2 EGR valve
3 Hose connections for delta pressure feedback electronic system (DPFE)
4 EGR tube
5 Thermostat housing
6 Flywheel
7 CPS sensor
8 Pulse air filter housing with integrated valves
9 Oil level indication sensor
10 Sensor cover
11 Exhaust manifold
12 Pulse air system
13 Oil dipstick

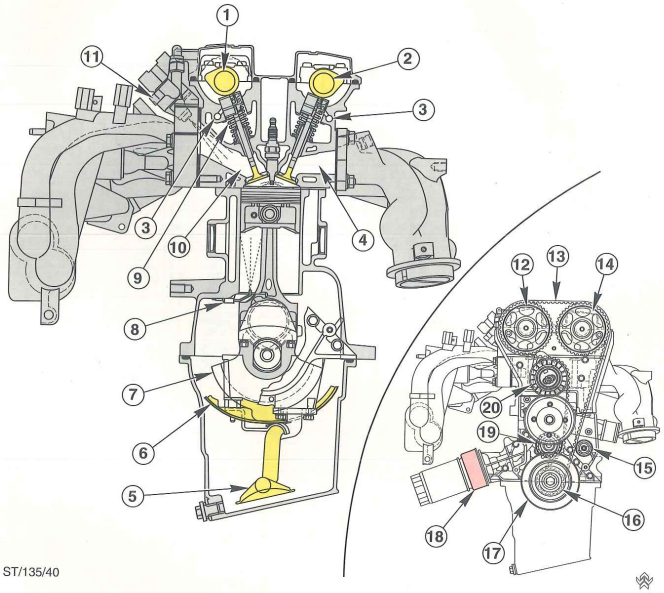
1.6 DOHC 16V Zeta



ST/135/39

1 Inlet camshaft
2 Exhaust camshaft
3 Oil galleries
4 Exhaust port
5 Oil pick-up pipe
6 Oil baffle plate
7 Crankshaft
8 Inlet port
9 Valve assembly
10 Fuel injector
11 Inlet camshaft sprocket
12 Timing belt
13 Exhaust camshaft sprocket
14 Timing belt guide pulley
15 Crankshaft sprocket
16 Crankshaft pulley/ damper assembly
17 Timing belt guide pulley
18 Timing belt tensioner

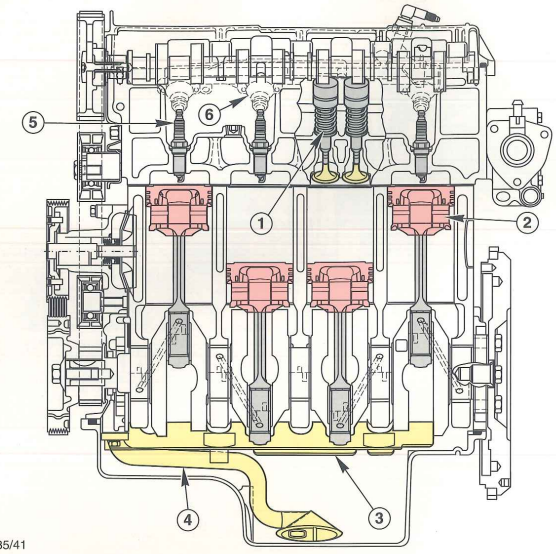
1.8 and 2.0 DOHC 16V Zeta



ST/135/40

1 Inlet camshaft
2 Exhaust camshaft
3 Oil galleries
4 Exhaust port
5 Oil pick-up pipe
6 Oil baffle plate
7 Crankshaft
8 Oil spray tubes (only 2.0 litre engine)
9 Valve assembly
10 Inlet port
11 Fuel injector
12 Inlet camshaft sprocket
13 Timing belt
14 Exhaust camshaft sprocket
15 Timing belt guide pulley
16 Crankshaft sprocket
17 Crankshaft pulley/ damper assembly
18 Oil cooler (only 2.0 litre engine) NOT FITTED
19 Timing belt guide pulley
20 Timing belt tensioner

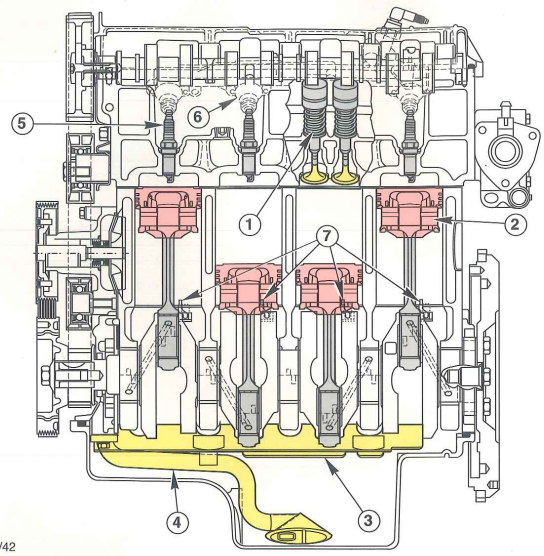
1.6 DOHC 16V Zeta



ST/135/41

1 Valve assembly
2 Piston
3 Oil baffle plate
4 Oil pick-up pipe
5 Spark plug
6 Fuel injector

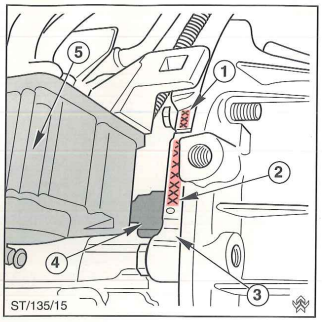
1.8 and 2.0 DOHC 16V Zeta



ST/135/42

1 Valve assembly
2 Piston
3 Oil baffle plate
4 Oil pick-up pipe
5 Spark plug
6 Fuel injector
7 Oil spray tubes (only 2.0 litre engine)

- The three-digit engine build code and the engine serial number (consisting of 2 letters and 5 numbers) is located at the rear of the engine block above the mount for the CPS sensor.



1 Engine build code
2 Engine serial number
3 Engine flange
4 CPS sensor
5 Filter housing (pulse air system)

Engine Build Code

1.6 DOHC 16V engine:	**L1F**
1.8 DOHC 16V engine:	**RKA**
2.0 DOHC 16V engine:	**NGA**

Code Breakdown

1st letter:	Displacement L = 1.6 litre R = 1.8 litre N = 2.0 litre
2nd letter:	Power Output
3rd letter:	Model and Emission Regulation

- The engine capacity specifications can be identified from a sticker located on the upper timing belt cover (Identification code: 1.6/1.8 or 2.0).

Service Intervals

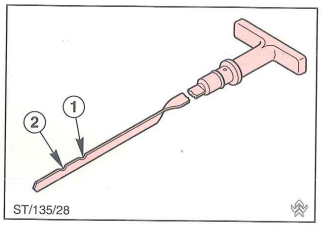
- First service at **1,500 miles** free of charge
- Interim service (maintenance with engine oil and filter change) every **10,000 miles** or not later than 12 months from date of registration or previous service.
- Standard service every **30,000 miles** or not later than 12 months from interim or previous service.

Engine Oil Change

- The engine oil and filter should be changed every **10,000 miles**.
- Engine oil: Ford Super engine oil
  Specification: API/SG/CD
  Filling capacity with filter: 4.25 litre
  without filter: 3.75 litre

Note: Do not overfill engine.

- Marks on dipstick:
  - MAX = 3.75 litre (in oil pan)
  - MIN = 3.0 litre (in oil pan)



1 "MAX" mark
2 "MIN" mark

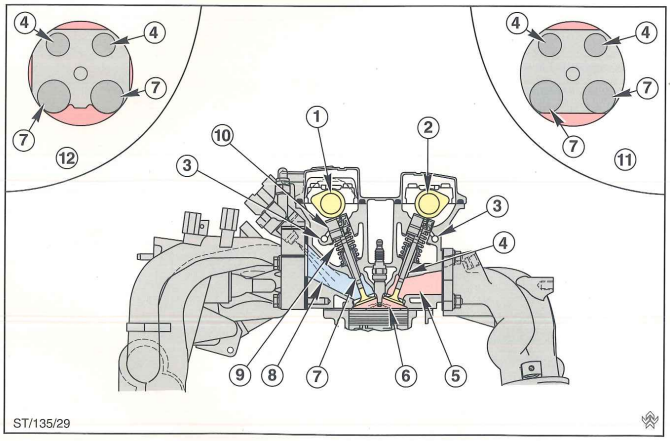
CYLINDER HEAD AND VALVE TRAIN

Valves and Combustion Chamber

- Valve head diameters (inlet/exhaust):

1.6 DOHC 16V	1.8 DOHC 16V	2.0 DOHC 16V
26.0/24.5 mm	32.0/28.0 mm	32.0/28.0 mm

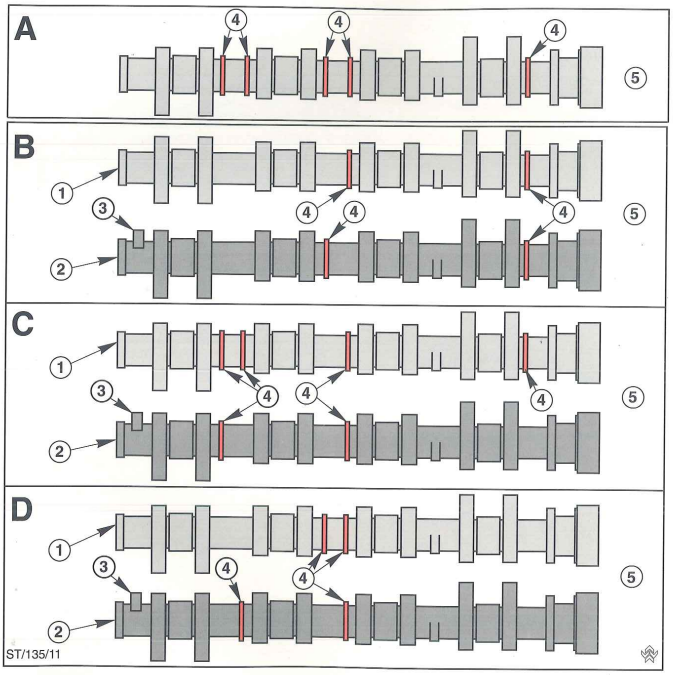
- Valve stem diameter of inlet and exhaust valve for all engines: 6.0 mm.
- The hydraulic tappets remain unchanged (diameter: 28.4 mm).
- The compact, roof-shaped combustion chambers of the three engines differ in size due to the different cylinder bore dimensions. The 1.8 and 2.0 DOHC 16V Zeta engines have an "open" combustion chamber. In the 1.6 DOHC 16V Zeta engine a masked area on the inlet valves provides improved flow and swirl motion. This became necessary on these engines in order to meet the demands of emission legislation.



Intake air
Exhaust gases
1 Inlet camshaft
2 Exhaust camshaft
3 Oil galleries
4 Exhaust valve
5 Exhaust port
6 Roof-shaped combustion chamber
7 Inlet valve
8 Inlet port
9 Valve spring
10 Hydraulic tappet
11 Open combustion chamber (1.8 and 2.0 DOHC 16V engine)
12 Masked combustion chamber (1.6 DOHC 16V engine)

Camshaft Identification

- The camshafts of the three engines differ by slightly modified valve timing and are identified by the different locations of the cast rings on the camshaft stem.

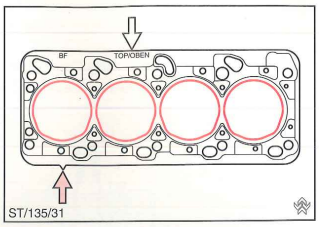


A = All possible cast ring positions shown
B = 1.6 DOHC 16V Zeta
C = 1.8 DOHC 16V Zeta
D = 2.0 DOHC 16V Zeta

1 Exhaust camshaft
2 Inlet camshaft
3 Reference lobe for CID sensor
4 Cast rings
5 Camshaft - drive end

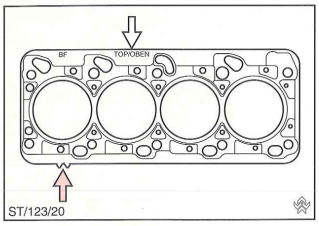
Cylinder Head Gasket

- Cylinder head gaskets are identified by having 1, 2 or 3 teeth. They are also marked "TOP" for correct assembly.



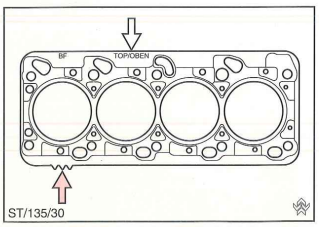
1.6 DOHC 16V Zeta

- Cylinder bore: 76.0 mm
- Identification: 1 tooth



1.8 DOHC 16V Zeta

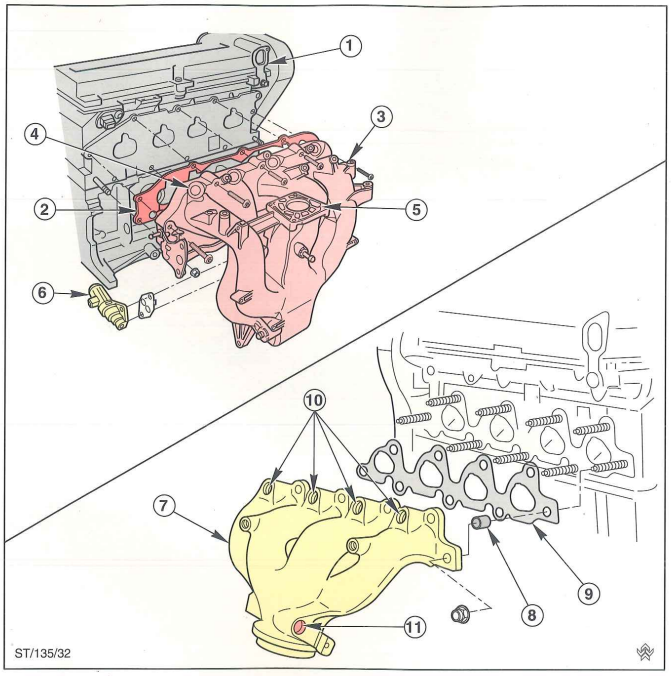
- Cylinder bore: 80.6 mm
- Identification: 2 teeth



2.0 DOHC 16V Zeta

- Cylinder bore: 84.8 mm
- Identification: 3 teeth

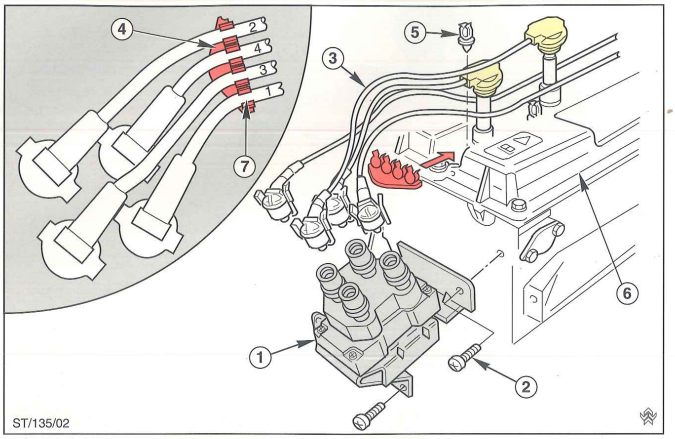
CYLINDER HEAD COMPONENTS



1 Camshaft cover
2 Inlet manifold gasket
3 Plastic inlet manifold with air chamber
4 Location for injector/fuel rail
5 Mounting flange for throttle housing
6 Idle speed control valve (ISC)
7 Exhaust manifold
8 Guide sleeve
9 Exhaust manifold gasket
10 Connections for pulse air pipes
11 Connection for EGR tube

DIS Coil

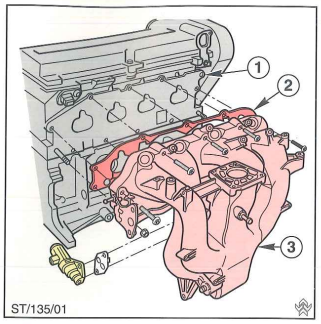
- The holder for the HT leads has been modified.



1 DIS coil
2 Retaining screws
3 HT lead
4 Holder for HT lead
5 Clips for HT leads
6 Camshaft cover
7 Correct arrangement of HT leads

Inlet Side

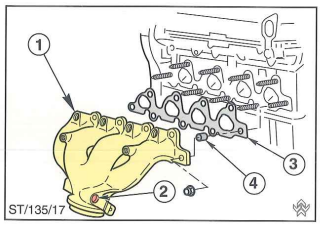
- The plastic inlet manifold is secured with a gasket directly on the cylinder head.

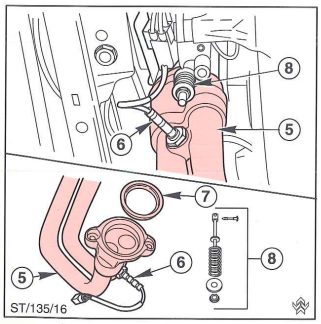


1 Cylinder head
2 Gasket
3 Plastic inlet manifold

Exhaust Side

- The exhaust manifold has a new design. In addition to the pipes for the pulse air system, is also connects with the EGR tube.
- The exhaust manifold of the 2.0 l engine is divided internally (cylinder pairs 1-4 and 2-3).
- On all engines, the manifold is bolted to a twin downpipe.



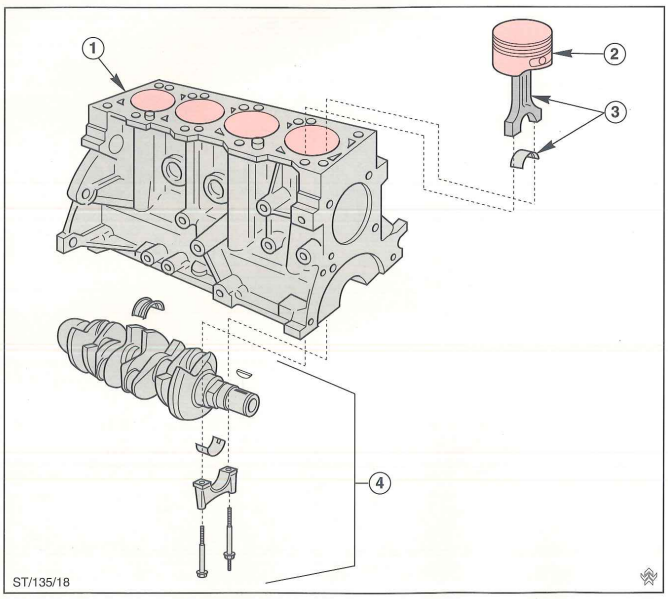


1 Exhaust manifold
2 Location for EGR tube
3 Gasket
4 Guide sleeve
5 Twin downpipe
6 HEGO sensor
7 Exhaust pipe to manifold seal
8 Exhaust pipe/manifold flexible coupling

ENGINE BLOCK AND CRANKGEAR

The different displacement capacities of the 1.6/1.8 and 2.0 DOHC 16V Zeta engines in the Mondeo result from the different cylinder bore diameters.

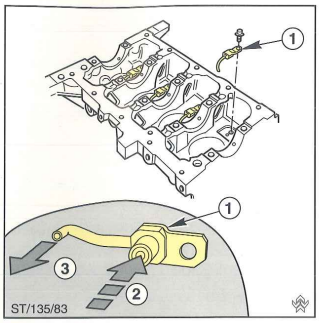
1 Engine blocks with cylinder bores of the standard classes 1 to 3 are used.
2 Piston diameter, piston weight, lower compression ring and oil scraper ring differ.
3 **Common** connecting rod, connecting rod bearing shell and big-end bearing cap for all engines.
4 **Common** crankshaft, main bearing shells and main bearing caps for all engines.



Oil Spray Tubes

- The 2.0 DOHC 16V Zeta engine uses oil spray tubes for additional piston cooling.

1 Oil spray tube
2 Valve opens against spring force at a specified oil pressure
3 Oil spray

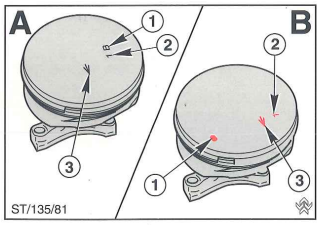


Pistons

- In line with the 3 standard classes of the cylinder bores for each engine version there are also 3 standard grades for the pistons.

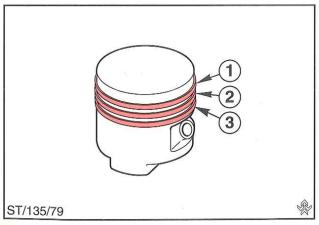
Identification

1 Classification of piston pin bore (Capital letters **A**, **B** or **C** for 1.6/1.8 litre engines, coloured marks in **red**, **white** or **blue** for 2.0 litre engine)
2 Piston grade
3 Installation direction (engine front)



A 1.6 and 1.8 DOHC 16V Zeta engine
B 2.0 DOHC 16V Zeta engine

1 Upper compression ring:
Ring thickness **common** for all engines.
2 Lower compressing ring:
Ring thickness **different**
3 Oil scraper ring:
Ring thickness **different**



(See Service Microfiche, Section 21)

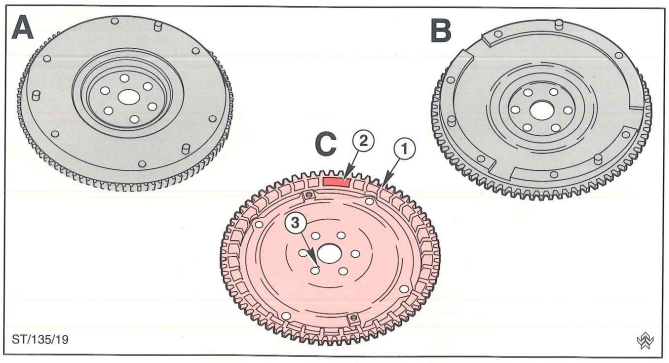
Flywheel

- Flat flywheel for 1.6 and 1.8 DOHC 16V Zeta engines with MTX 75 transmission.
  Diameter: 220 mm
- Dished flywheel for 2.0 DOHC 16V Zeta engines with MTX 75 transmission.
  Diameter: 240 mm

Note: The flywheel fastening bolts must not be re-used.

Drive Plate - Automatic Transmission CD4E

- A sensor ring made of steel plate is welded to the torque converter drive plate for the crankshaft position/speed sensor (CPS) with 36-1 rectangular window pattern. The crankshaft position 90° before TDC is marked by the wide window (missing steel plate web).
- The correct installation position is fixed by a recess at one of the disc securing holes.



A Flat flywheel
B Dished flywheel
C Drive plate for automatic transmission CD4E

1 36-1 sensor ring
2 90° before TDC position
3 Recess for installation position

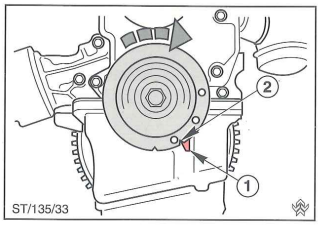
CAMSHAFT DRIVE

- The camshaft drive with a 25.4 mm wide timing belt is the same as previous Zeta engines.
- No return spring is fitted on the timing belt tensioner during production. This spring must be installed when replacing the timing belt during service work.
- **The timing belt must be renewed every 60,000 miles (90.000 km).**

TDC Mark

1 TDC mark on oil pan

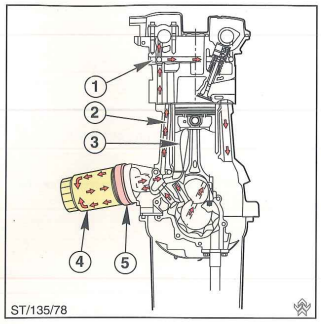
2 TDC mark on crankshaft pulley/damper assembly



ENGINE LUBRICATION CIRCUIT

Engine lubrication circuit by way of example of the 2.0 DOHC 16V Zeta engine

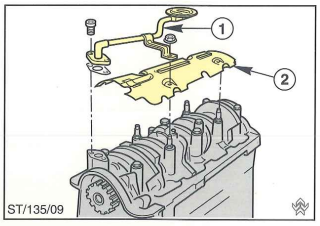
1 Oil gallery in cylinder head
2 Riser oil gallery
3 Oil spray for additional piston cooling
4 Oil filter
5 Oil cooler NOT FITTED



Oil Pump Pick-Up Pipe/Oil Baffle Plate

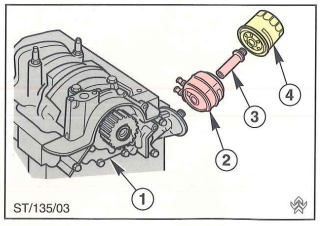
1 Modified oil pump pick-up pipe, supported by a bracket on main bearing.

2 Modified oil baffle plate, secured on stud at main bearing locations.



Oil Cooler

1 Ge-rotor-type oil pump
2 Oil cooler (for 2.0 l Zeta engine only) NOT FITTED
3 Fastening bolt for oil cooler (banjo bolt)
4 Oil filter



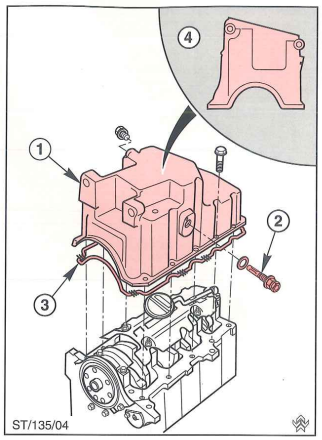
Oil Pan

1 New aluminium oil pan for all Mondeo engines. The oil pan is bolted to the engine block "metal on metal".

2 Oil level indication sensor (2.0 l Zeta engine with auxilliary warning system).

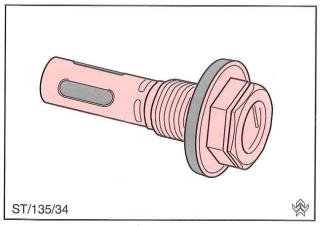
3 Pre-formed gasket

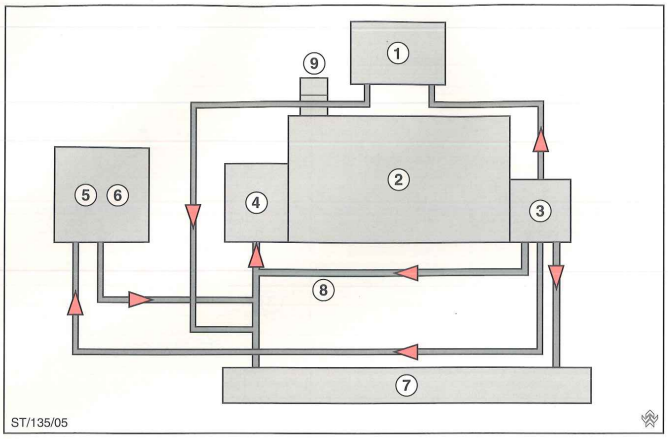
4 Due to the installation position of the engine tilted forward by 8°, the underside of the oil pan is tapered.



Oil Level Indication Sensor

- On vehicles equipped with the 2.0 l Zeta engine and the auxilliary warning system a sensor for indicating the engine oil level is installed in the side of the oil pan.
- The warning lamp lights when the oil level in the pan drops below "MIN".
- A low engine oil level will be indicated under **all operating conditions**.



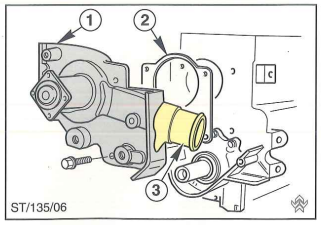


- Coolant circuit
1 Heater radiator
2 Engine
3 Thermostat housing
4 Water pump
5 Degas tank
6 Pressure cap
7 Radiator
8 Bypass pipe
9 Oil cooler (2.0 DOHC 16V Zeta engine only) NOT FITTED

Water Pump

- The coolant inlet connector has been modified. It is now cranked towards the rear.

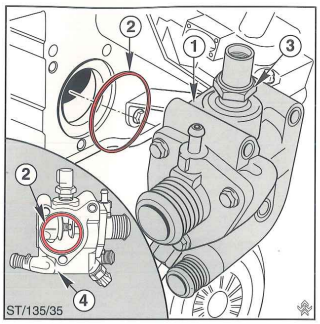
1 Water pump
2 Gasket
3 Coolant inlet connector



Thermostat Housing

- Sealing of the plastic thermostat housing is by means of a pre-formed ring.

1 Plastic thermostat housing
2 Pre-formed ring
3 Engine coolant temperature sensor (ECT)
4 Connection for bypass hose



Thermostat opening temperature for 1.6/1.8 and 2.0 DOHC 16V Zeta engines: 88 °C

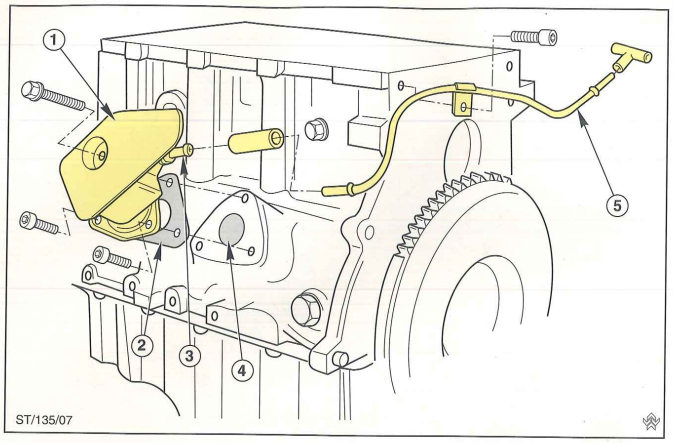
Radiator Fan

- The radiator fan is switched dependent on the engine temperature by the EEC IV module. The thermo switch which was previously used for this purpose (installed in main coolant circuit) is no longer fitted.
- The EEC IV module detects the engine coolant temperature on the basis of ECT signals and switches the radiator fan(s) on and off at the preprogrammed temperature.

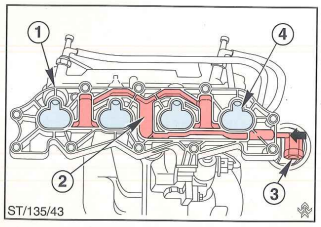
a) Single fan (one speed)
- switches on at approx. 100 °C - switches off at approx. 93 °C

b) Single fan (two speed)
- Stage 1 switches on at approx. 100 °C - Stage 2 switches on at approx. 103 °C
When the second stage switches off, the fan continues to run in the first stage until the temperature drops below approx. 93 °C.

c) Double fan (two speed)
- Stage 1: both fans switch on at approx. 100 °C - Stage 2 switches on at approx. 103 °C
After the second stage switches off, the fans continue to run in the first stage until the temperature drops below approx. 93 °C.

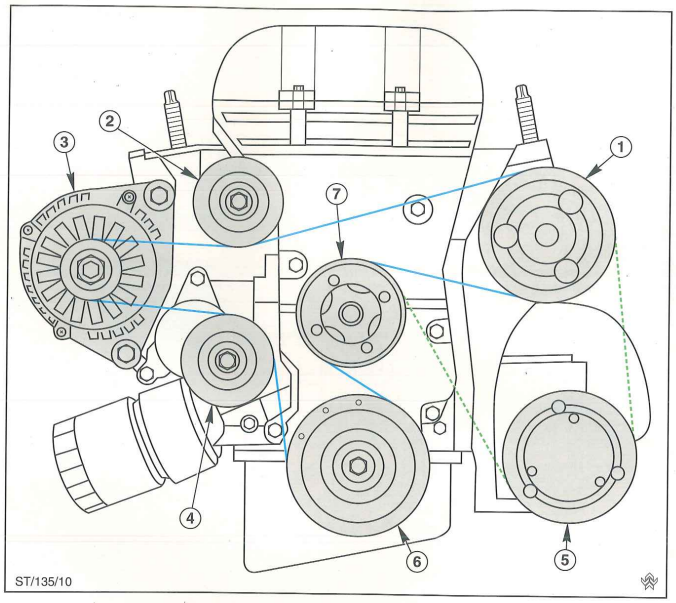


1 Oil separator
2 Oil separator gasket
3 PCV valve
4 Crankcase opening
5 Connecting hose of inlet manifold



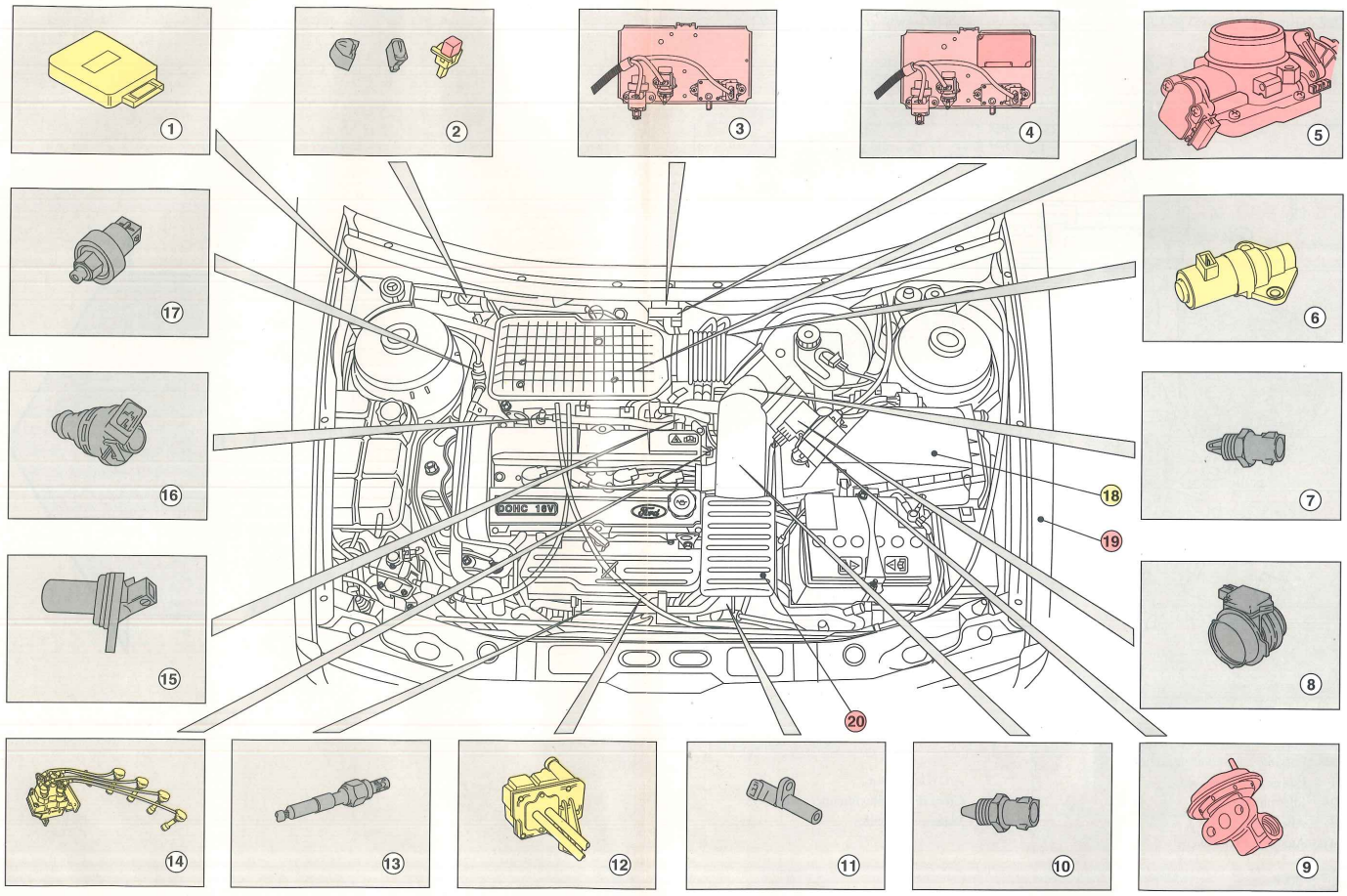
1 Inlet manifold
2 Channel for recirculation of crankcase gases to the cylinders
3 Crankcase gases from the PCV valve
4 Inlet ports - cylinder head

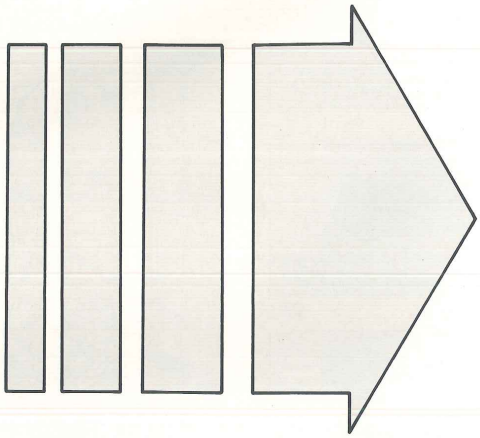
The illustration shows the possible auxiliary units which are driven by a multi-groove belt (Poly-V belt).



Standard equipment
Possible additional equipment

1 Power steering pump
2 Idler pulley
3 Alternator
4 Automatic tensioner
5 A/C compressor
6 Crankshaft pulley/damper assembly
7 Water pump pulley



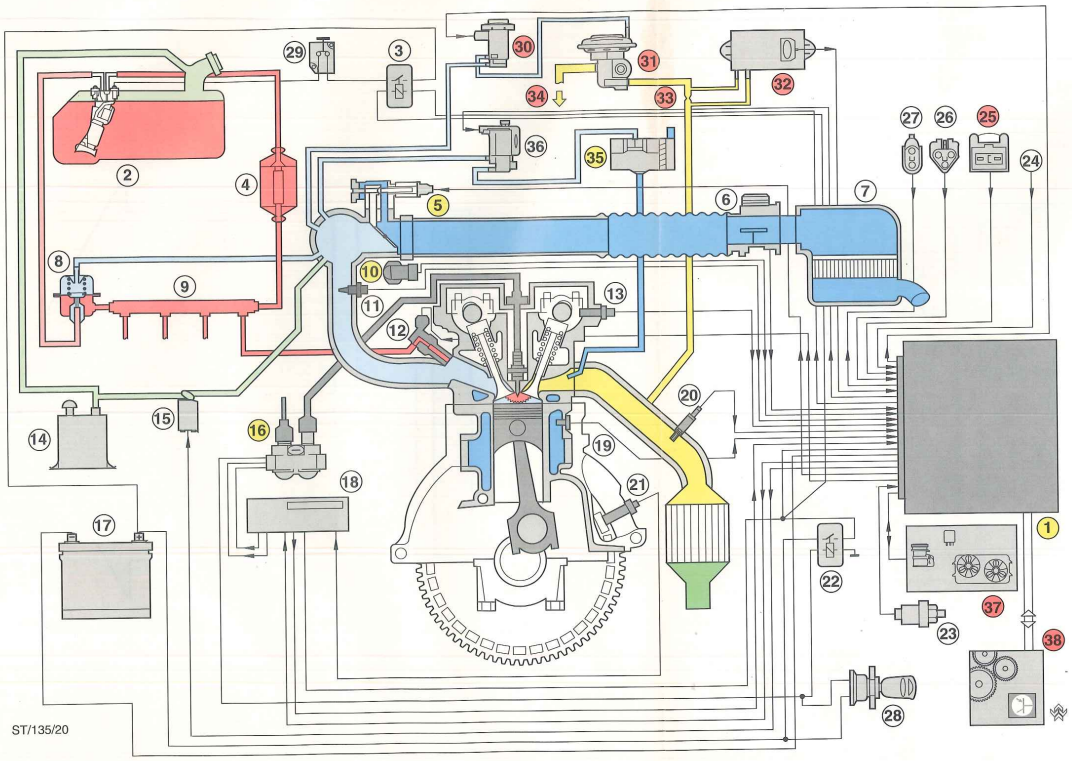


- Air mass measurement by hot-wire air mass meter
- Sequential electronic fuel injection (SEFI)
- Fuel injectors with lateral fuel supply
- Integrated fully electronic ignition system EDIS-4 with one DIS coil
- EEC IV module with integrated EDIS-4 module (vehicles with manual transmission)
- EEC IV module for electronic engine management and electronic CD4E transmission control
- Switching the air conditioning system with interface for switching the radiator fan (two speeds) by the EEC IV module
- Power steering pressure switch (PSPS) for idle speed control
- HEGO-controlled three-way catalytic converter
- Evaporative emission control system
- Electronically controlled pulse air system, filter housing with integrated valves and silencer
- Electronically controlled exhaust gas recirculation (EGR)
- Serial interface (diagnosis connector) for **F**ord **D**iagnostic **S**ystem FDS 2000

Key to folded page

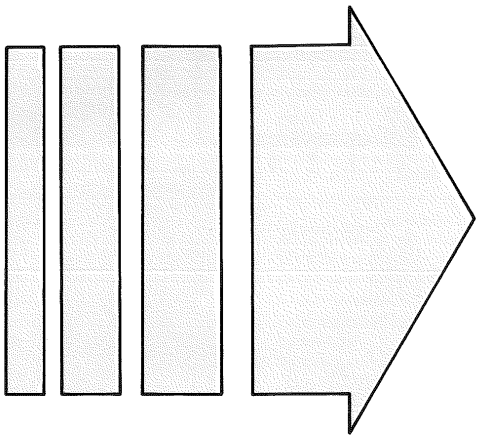
1 EEC IV module with integrated EDIS-4 module (manual transmission)
2 Self-test connector, diagnosis connector, service connector
3 Bracket (vehicles with manual transmission) with differential pressure transducer (DPFE sensor), electronic vacuum regulator (EVR) and pulse air solenoid valve
4 Bracket (vehicles with CD4E transmission) with EDIS-4 module, DPFE sensor, EVR and pulse air solenoid valve
5 Throttle housing with throttle position sensor (TPS)
6 Idle speed control valve (ISC)
7 Air charge temperature sensor (ACT)
8 Mass air flow meter (MAF)
9 EGR valve
10 Engine coolant temperature sensor (ECT)
11 Crankshaft position/speed sensor (CPS)
12 Pulse air filter/valve housing
13 HEGO sensor
14 DIS coil and HT leads
15 Camshaft identification sensor (CID)
16 Fuel injectors
17 Power steering pressure switch (PSPS)
18 Intake noise suppressor/air cleaner
19 Resonator for damping intake noise (under fender)
20 Resonator for damping intake noise in engine compartment

Shown: 1.8 and 2.0 DOHC 16V Zeta Engine with CD4E Automatic Transmission



1 EEC IV module
2 In-tank fuel pump
3 Fuel pump relay
4 Fuel filter
5 Idle speed control valve (ISC)
6 Mass air flow meter (MAF)
7 Air cleaner
8 Fuel pressure regulator
9 Fuel rail
10 Throttle position sensor (TPS)
11 Air charge temperature sensor (ACT)
12 Fuel injector
13 Camshaft identification sensor (CID)
14 Carbon canister (EVAP)
15 Purge solenoid valve (EVAP)
16 DIS coil
17 Battery
18 EDIS-4 module
19 Engine coolant temperature sensor (ECT)
20 HEGO sensor
21 Crankshaft position/speed sensor (CPS)
22 Power relay
23 Power steering pressure switch (PSPS)
24 A/C compressor clutch
25 Service connector (octane adjust (OAI)) (plug-in bridge during production for operation with Premium RON 95 unleaded fuel
26 Self-test connector
27 Diagnosis connector for FDS 2000
28 Ignition switch
29 Inertia switch
30 Electronic vacuum regulator (EVR)
31 EGR valve
32 Differential pressure transducer (DPFE sensor)
33 Differential pressure sampling point
34 To inlet manifold (air chamber)
35 Pulse air filter/valve housing
36 Pulse air solenoid valve
37 A/C radiator fan switching
38 Electronic transmission control (CD4E)

Air intake - atmospheric pressure
Fuel supply - low pressure
Fuel vapour
Air intake - inlet manifold pressure
Exhaust gases ahead of catalytic converter
Fuel supply - system pressure
Exhaust gases after catalytic converter



The function of the EEC IV engine management system of the Mondeo DOHC 16V Zeta engines is based on the system of the 1.8 l Zeta engine (see New Product Introduction Brochure 00/204).

The folded page opposite shows the overall system, the new or modified components are shown with corresponding colours in the figure numbers and are listed in the following.

EEC IV System

The EEC IV module additionally undertakes the control of the following systems:

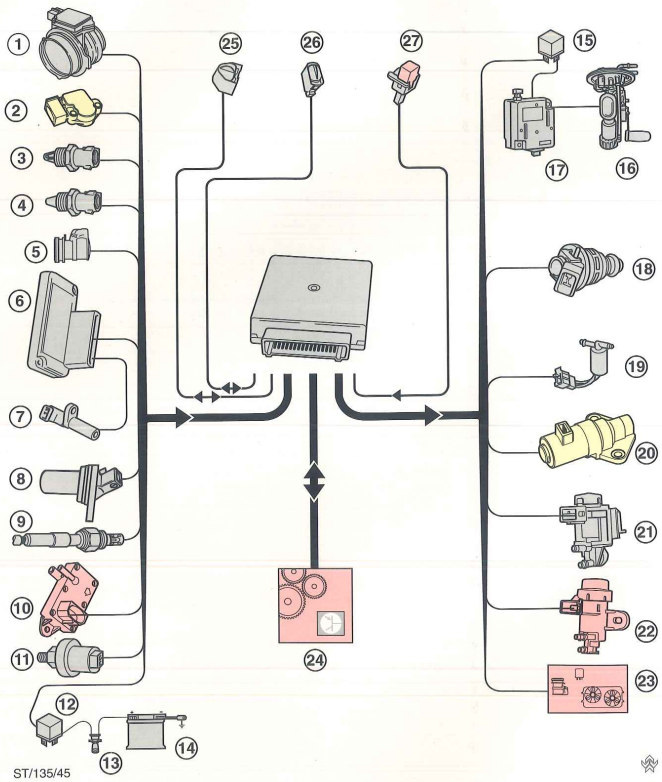
- Electronic control of the CD4E automatic transmission (see brochure 00/214).
- Switching of air conditioning system with interface for electronic radiator fan switching.
- Electronically controlled exhaust gas recirculation (EGR)

(Refer to component description on following pages.)

EGR System

- All Mondeo DOHC 16V Zeta engines are equipped with an Exhaust Gas Recirculation System (EGR) in order to reduce nitrogen oxides (NOx) under certain engine operating situations (see detailed description under "Exhaust System").

SENSORS ACTUATORS



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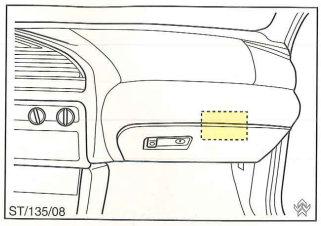
1 Mass air flow meter (MAF)
2 Throttle position sensor (TPS)
3 Air charge temperature sensor (ACT)
4 Engine coolant temperature sensor (ECT)
5 A/C compressor clutch
6 EDIS-4 module (on vehicles with manual transmission integrated in the EEC IV module)
7 Crankshaft position/speed sensor (CPS)
8 Camshaft identification sensor (CID)
9 HEGO sensor
10 Differential pressure transducer (DPFE sensor)
11 Power steering pressure switch (PSPS)
12 Power supply relay
13 Ignition switch
14 Battery
15 Fuel pump relay
16 In-tank fuel pump
17 Inertia switch
18 Fuel injector
19 Purge solenoid valve (EVAP)
20 Idle speed control valve (ISC)
21 Pulse air solenoid valve
22 Electronic vacuum regulator (EVR)
23 Air conditioning/radiator fan switching
24 Electronic transmission control (CD4E)
25 Self-test connector (STAR tester) for engine management and transmission control
26 Diagnosis connector (FDS 2000) for engine management and transmission control
27 Service connector for octane adjust (OAI) with plug-in bridge for operation with Premium RON 95 unleaded fuel

All new and modified components are described in the following.

EEC IV Module

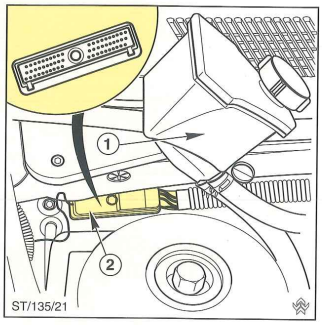
- The EEC IV module is located in LHD and RHD vehicles on the right hand side under the instrument panel (forward direction).



Installation location - EEC IV module (LHD vehicle shown)

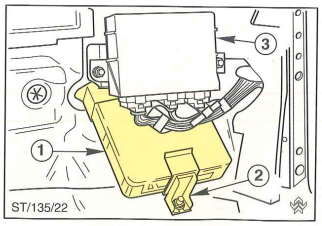
- The module cable connector is accessible from the engine compartment after removing the power steering reservoir (reservoir connected).

1 Power steering reservoir
2 EEC IV module connector



- The module is removed from the passenger compartment.

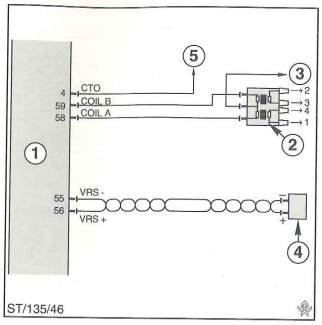
1 EEC IV module
2 Bracket
3 Antiheft alarm system module



EDIS-4 Module
Vehicles with Manual Transmission

- EDIS-4 module integrated in the EEC IV module (extract from wiring diagram)

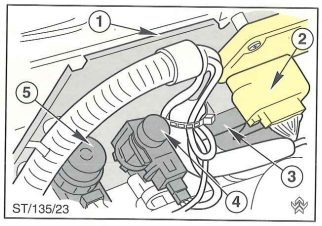
1 EEC IV module
2 DIS coil (coil A and B)
3 To ignition relay
4 Crankshaft position/speed sensor (CPS)
5 Tachometer



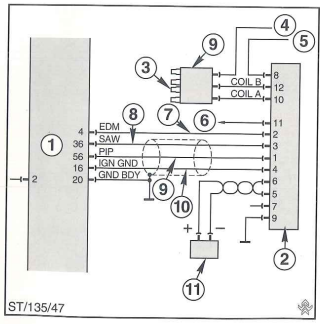
Vehicles with CD4E Automatic Transmission

- The EDIS-4 module is located in the engine compartment.

1 Bracket on bulkhead
2 EDIS-4 module
3 DPFE sensor
4 Pulse air solenoid valve
5 Electronic vacuum regulator (EVR)



Extract from wiring diagram
1 EEC IV module
2 EDIS-4 module
3 DIS coil (coil A and B)
4 To ignition relay
5 Battery
6 Tachometer
7 EDM signal
8 SAW signal
9 PIP signal
10 Ignition ground
11 Crankshaft position/speed sensor (CPS)

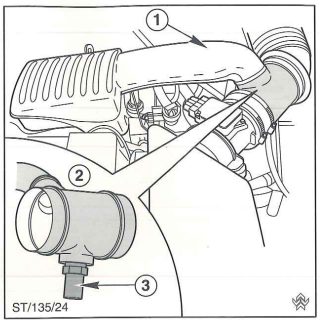


SENSORS

Air Charge Temperature Sensor (ACT)

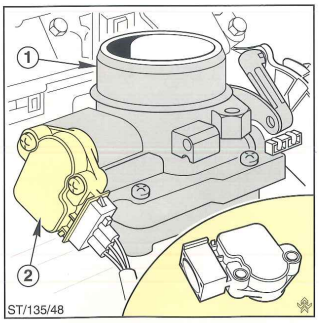
- The ACT sensor is installed from below in the intake air resonator (not visible from above).
- The intake air resonator must be removed in order to remove the ACT sensor.

1 Intake air resonator
2 Intake air resonator removed
3 ACT sensor



Throttle Position Sensor (TPS)

- The TPS sensor has a new design with lateral connector (due to vertical installation position of the throttle housing).

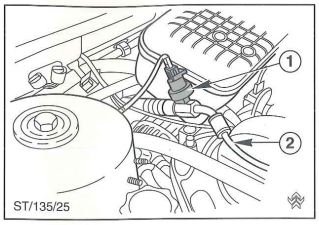


1 Throttle housing
2 TPS sensor

Power Steering Pressure Switch (PSPS)

- The PSPS is installed in the delivery pipe from the power steering pump to the steering gear. It is located in the engine compartment.
- The PSPS is closed at low oil pressure in the steering system.

Values apply to all Mondeo engines:
PSPS opens at: ..... 31.5 ± 3.5 bar
PSPS closes between: ..... 13.5 and 24.0 bar
Housing colour: ..... Green



1 Power steering pressure switch (PSPS)
2 Power steering delivery pipe

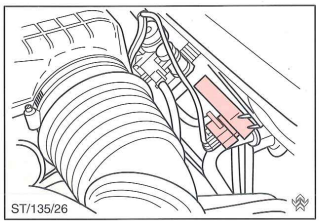
Differential Pressure Transducer (DPFE sensor)

DPFE = **D**elta **P**ressure **F**eedback **E**lectronic System

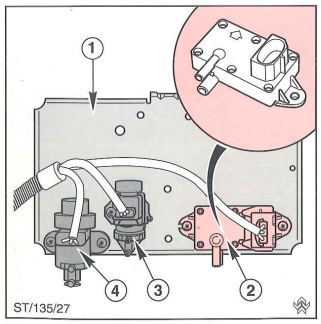
- The DPFE sensor for the EGR system is mounted together with other components on a bracket in the centre of the bulkhead.
- The DPFE sensor measures the differential pressure in the EGR exhaust pipe and sends a corresponding signal to the EEC IV module.

1 Bracket
2 DPFE sensor
3 Pulse air solenoid valve
4 Electronic vacuum regulator (EVR) (shown: Vehicle with manual transmission)

Refer to description in Section "Exhaust System".



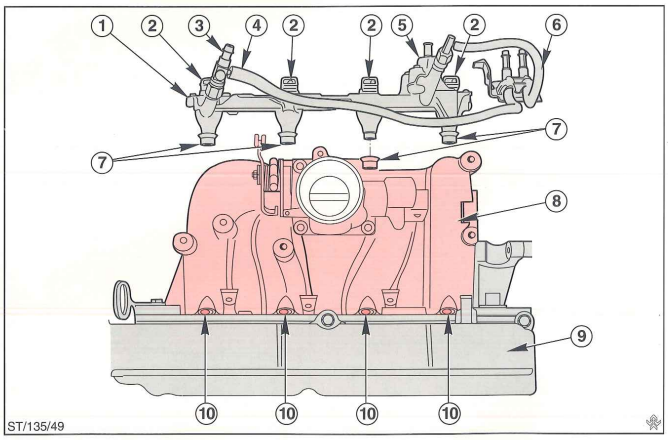
Installation location - DPFE sensor



ACTUATORS

Fuel Injectors/Fuel Rail

- Fuel injectors with lateral fuel supply. They are surrounded in the fuel rail by fuel-flushed pockets.
- The fuel rail (with integrated injectors and pressure regulator) is mounted **directly in the plastic inlet manifold**. The seal is provided by rubber sealing rings in the inlet manifold.
- The fuel injectors are sealed in the fuel rail by means of O-rings.
- All components shown have been subject to an endurance test of 100,000 miles (160.000 km). Maintenance during service work is therefore not necessary under normal conditions.



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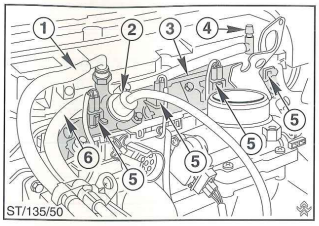
1 Fuel rail
2 Fuel injectors
3 Pressure test point
4 Fuel supply
5 Pressure regulator
6 Fuel return
7 Sealing rings in inlet manifold
8 Inlet manifold
9 Cylinder head
10 Locations for injectors in inlet manifold

Fuel Rail Location

1 Fuel return
2 Pressure regulator
3 Fuel rail
4 Control valve
5 Fuel injectors
6 Fuel supply



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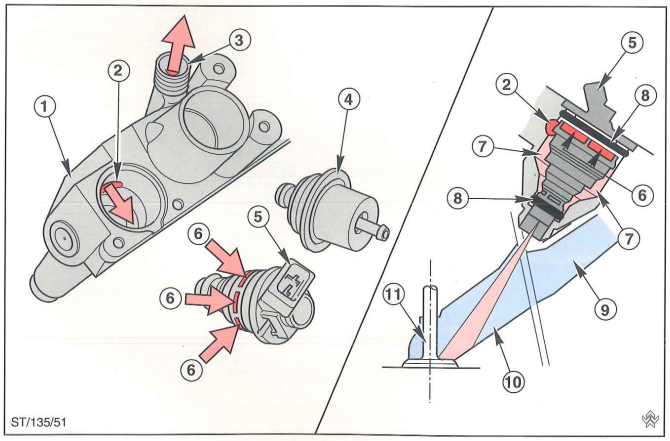

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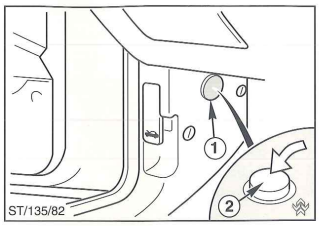
1 Fuel rail
2 Fuel supply
3 Fuel return to tank
4 Pressure regulator
5 Fuel injectors
6 Lateral fuel inlet
7 Valve pockets, filled with fuel
8 O-rings
9 Inlet manifold
10 Inlet port - cylinder head
11 Inlet valve

Inertia Switch

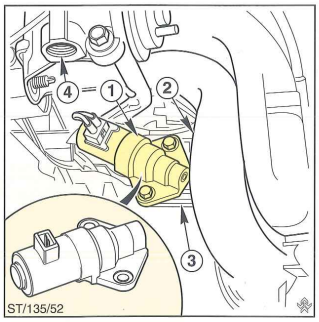
- The inertia switch is located on the left-hand side at the A-pillar under the lower dash insulation panel (LHD and RHD vehicles).
- The release button can be reached through an opening in the insulation panel.



1 Opening in the lower dash insulation panel
2 Inertia switch reset button

Idle Speed Control Valve (ISC)

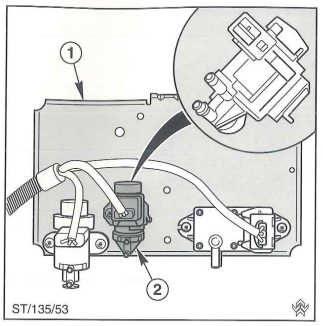
- The ISC (Hitachi valve) is mounted directly on the air chamber of the inlet manifold (not visible from above).



1 ISC
2 Inlet manifold
3 Air chamber
4 EGR valve

Pulse Air Solenoid Valve

- The pulse air solenoid valve is also mounted on the bracket at the bulkhead.
- The solenoid valve is switched by the EEC IV module and controls the vacuum necessary to operate the air control valve.

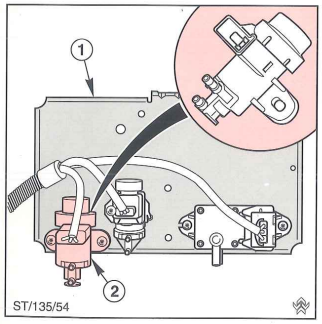


1 Bracket
2 Pulse air solenoid valve

Electronic Vacuum Regulator (EVR)

- The EVR for the EGR system is secured next to the pulse air solenoid valve on the support bracket.
- The EVR is controlled by the EEC IV module and regulates the vacuum which is applied to the EGR valve.

Refer to description in Section "Exhaust System".



1 Bracket
2 Electronic vacuum regulator (EVR)

Air Conditioning/Fan Switching

- The radiator fans of the Mondeo with or without air conditioning are switched electronically by the EEC IV module dependent on the input signals from the engine coolant temperature sensor (ECT).

- Dependent on the equipment configuration, the vehicles can be equipped with a one speed or two speed radiator fan or with two speed double radiator fans. Vehicles with CD4E automatic transmission and air conditioning are always equipped with double fans. Fans with two speeds are switched through a series resistor.

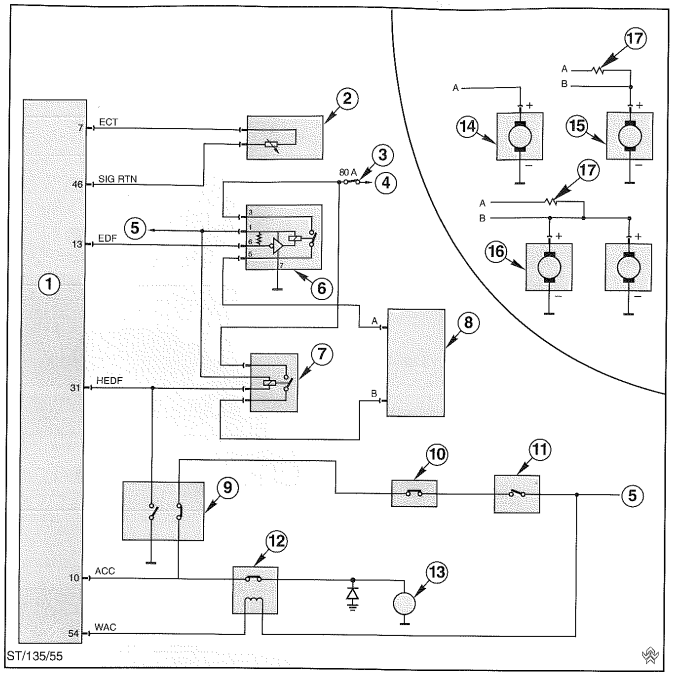
- The EEC IV module switches the electrical fans on and off either via the EDF relay* or HEDF relay** at different coolant temperatures dependent on the input signals of the ECT sensor.

- The EEC IV system compensates for the drop in speed by means of a corresponding correction in the air mass value. This value varies in line with activation of the air conditioning and the various radiator fan speeds.

- With the air conditioning switched on, the radiator fans operate at low speed when the vehicle speed is below 48 mph (76 km/h). This ensures adequate cooling for the air conditioning system.

* EDF = Electro Drive Fan

** HEDF = High Speed Electro Drive Fan



Wiring diagram - Air conditioning/radiator fan switching

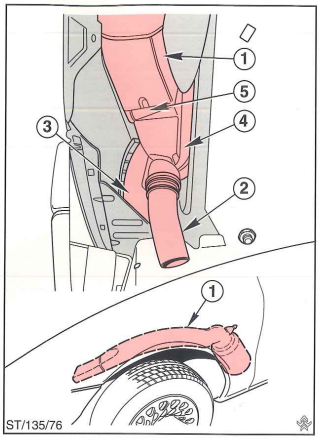
1 EEC IV module
2 Engine coolant temperature sensor (ECT)
3 80 Ampere fuse
4 Battery
5 Ignition switch
6 EDF relay (single-stage radiator fan)
7 HEDF relay (in conjunction with two-stage radiator fans (15 and 16)
8 Interface - radiator fan switching
9 Air conditioning - pressure switch
10 Air conditioning - pressure cycling switch
11 Air conditioning - operating switch
12 Air conditioning - cut-out relay
13 Air conditioning - clutch
14 Radiator fan - one speed
15 Radiator fan - two speeds
16 Double radiator fan - two speeds
17 Series resistor

INTAKE SYSTEM

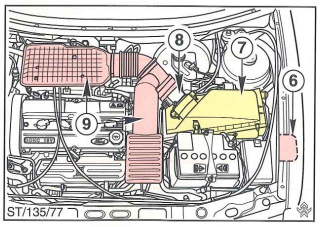
Air Intake Resonators

In order to reduce the intake noises of the engine to a minimum, all Mondeo vehicles are equipped with air intake resonators.

- Two resonators are located at the front under the left hand fender.
- The first is a small resonator which is connected into the air inlet tube and points vertically downwards.
- The second is a larger resonator which also connects into the air inlet tube. This resonator extends over the length of the wheelarch and is held in place with one retaining lug.
- Both resonators are covered by the plastic wheelarch liner.
- Two further resonators are located in the engine compartment between the MAF sensor and throttle housing.



Resonator unter left hand fender

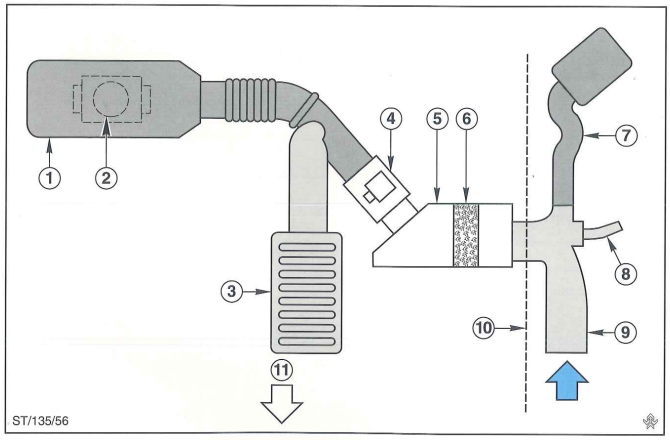


Resonators in engine compartment

1 Large resonator
2 Small resonator
3 Intake air inlet tube
4 Connection hose
5 Connection to large resonator
6 Connection to small resonator under fender
7 Air cleaner
8 MAF sensor
9 Resonators in engine compartment

- The air intake resonators act as silencers to reduce the noise produced by the engine air intake pulse.
- The resonators work by reducing the movement of air pulses in the intake system.
- Each resonator is designed to reduce noise over a particular engine speed range. This range and the amount of noise reduction is determined by the resonator volume and pipe sizes.

Schematic Representation of the Intake System

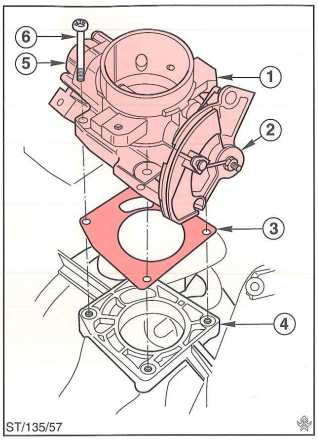


Intake air
1 Engine compartment resonator
2 Throttle housing
3 Engine compartment resonator
4 MAF sensor
5 Air cleaner housing
6 Air cleaner
7 Large resonator (under fender)
8 Small resonator (under fender)
9 Intake air inlet
10 Fender apron panel
11 Forward direction

Throttle Housing

- The throttle housing (single Venturi design) is installed in vertical position on the air chamber.

1 Throttle housing
2 Throttle operating linkage
3 Gasket
4 Inlet manifold flange
5 TPS
6 Retaining screws



- Venturi diameter:

  1.6 DOHC 16V Zeta: 42 mm

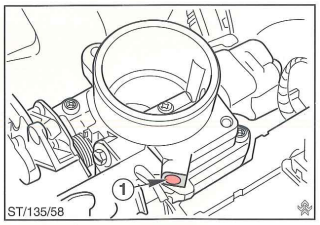
  1.8 DOHC 16V Zeta: 48 mm

  2.0 DOHC 16V Zeta: 55 mm

- The different throttle housings are identified by an adhesive label with part number on the housing.

- Same throttle plate operation on all engines.

- The basic idle speed is set in production by means of the bypass screw.
  The screw setting is fixed with a white plastic plug. If resetting is necessary during service work, secure screw with blue plug.



1 Bybass screw with plastic plug

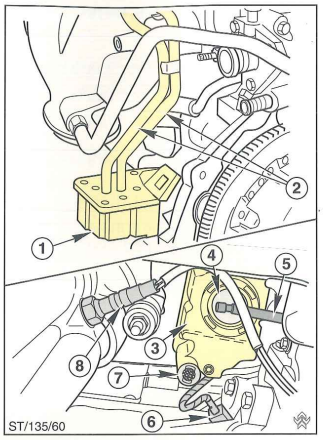
Note: If the idle speed changes due to dirt or similar problems, the speed is compensated by the EEC IV module. Therefore, wherever possible do not change the setting of the bypass screw during service work.

EXHAUST SYSTEM
Pulse Air System

The pulse air system of the Mondeo DOHC 16V Zeta engines is based on present Zeta engines, with the following modifications:

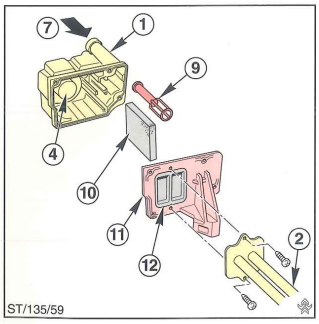
- The pulse air filter/valve housing is turned through 90° and features a new, separate aluminium cover, to which the pulse air pipes are screwed.

- A silencer installed in the air inlet duct reduces the intake noises which occur during the warm-up phase (while the pulse air system is in operation).



Installation location - pulse air filter/valve housing

1 Pulse air filter/valve housing
2 Air pipes to exhaust manifold
3 Pulse air filter/valve housing (viewed from below)
4 Air control valve
5 Vacuum hose from solenoid valve
6 Crankshaft position/speed sensor (CPS)
7 Air inlet direction
8 HEGO sensor
9 Silencer
10 Foam filter
11 Aluminium cover
12 Pulse air valve unit

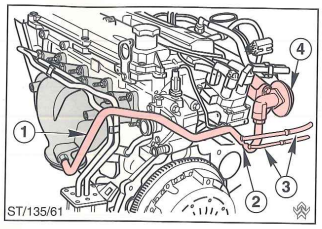


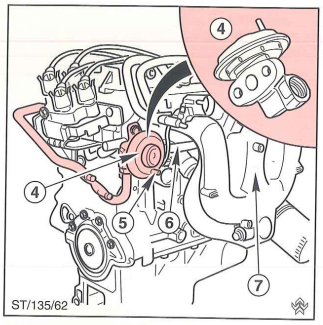
Exhaust Gas Recirculation (EGR)

All Zeta engines of the Mondeo are equipped with an electronically controlled Exhaust Gas Recirculation system (EGR).

- The EGR system is made up of the following:

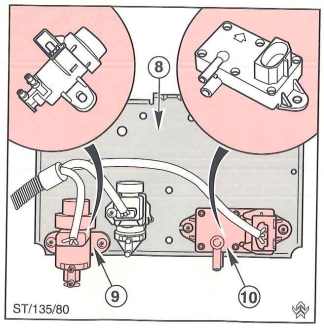
1 EGR tube to take exhaust gas from exhaust manifold to EGR valve
2 Control venturi in EGR tube: Measuring point for differential pressure in EGR tube
3 Hose connections to differential pressure transducer (DPFE sensor) (Different diameters to prevent the hoses being interchanged)
4 EGR valve
5 Vacuum spigot for the electronic vacuum regulator (EVR)
6 EGR tube from EGR valve to inlet manifold
7 Inlet manifold
8 Bracket, secured on bulkhead
9 Electronic vacuum regulator (EVR)
10 DPFE sensor





Service Note

If the exhaust gases blow back excessively (e.g. due to a blocked exhaust system), the hoses to the DPFE sensor must be replaced and the connection points on the EGR tube cleaned.



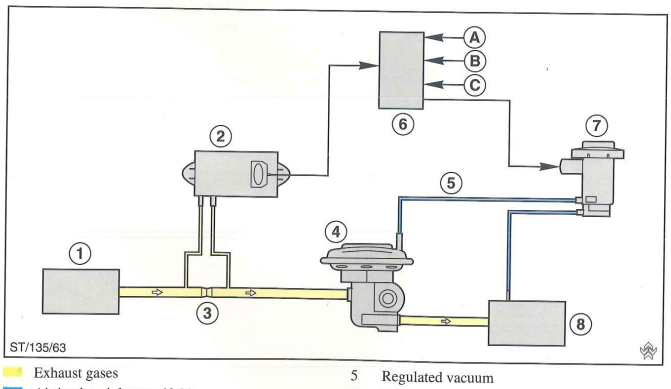
Function of the EGR System

The production of nitrogen oxides (NOx) during combustion is reduced by recirculating a part of the exhaust gases back into the combustion chamber. This procedure has to take place without impairing the running qualities of the engine. Since the EGR system operates in the part load range dependent on temperature and time, the engine coolant temperature at start up and during the warm-up period is an important factor.

The EGR system of the Mondeo contains a "**D**elta **P**ressure **F**eedback **E**lectronic System" (DPFE).

- The exhaust gases from the exhaust manifold pass through a venturi in the EGR tube. The difference in exhaust gas pressure which occurs at this point is measured by the DPFE sensor. The DPFE sensor determines the pressure drop value, converts into a voltage signal and sends it to the EEC IV module.

- The EEC IV module then modifies the signal to the EVR which in turn regulates the vacuum to the EGR valve according to the incoming signal. In this way, a precisely measured quantity of exhaust gas is routed via the EGR valve into the inlet manifold after the throttle plate.



Exhaust gases
Air intake - inlet manifold pressure
1 Exhaust manifold
2 DPFE sensor
3 Differential pressure measuring point (Delta P)
4 EGR valve
5 Regulated vacuum
6 EEC IV module
7 Electronic vacuum regulator (EVR)
8 Inlet manifold
A Engine speed
B Load
C Coolant temperature

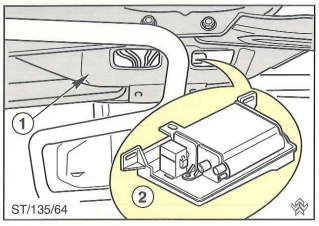
Evaporative Emission Control System

On the Mondeo, the carbon canister is mounted at the rear under the vehicle.

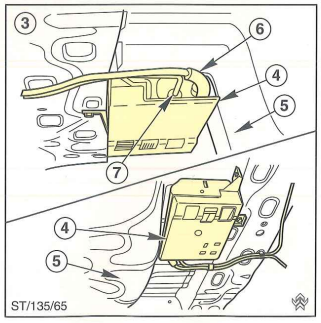
- On the 2WD Saloon, on the floor pan above the rear suspension cross member in front of the spare wheel well.
- On the Estate and Saloon/Estate 4x4 along side the spare wheel well.

The purge solenoid valve is installed in the engine compartment.

Installation Location - Carbon Canister (2WD Saloon shown)

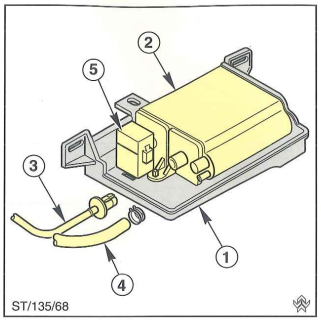


1 Rear suspension cross member
2 Location of carbon canister on floor pan above the cross member



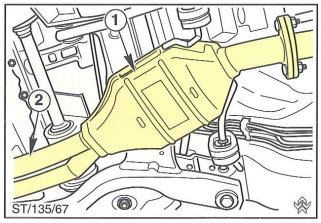
3 Location of carbon canister (with cross member removed for clear illustration)
4 Canister cover and support bracket
5 Spare wheel well
6 Fuel vapour pipe from tank
7 Fuel vapour pipe to engine

Carbon Canister Removed



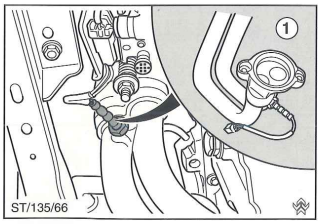
1 Canister cover and support bracket
2 Canister
3 Connection - fuel vapour pipe to engine
4 Connection - fuel vapour pipe from tank
5 Canister vent, water separator

Catalytic Converter/HEGO Sensor



- The three-way catalytic converter forms one unit with the front twin exhaust pipe

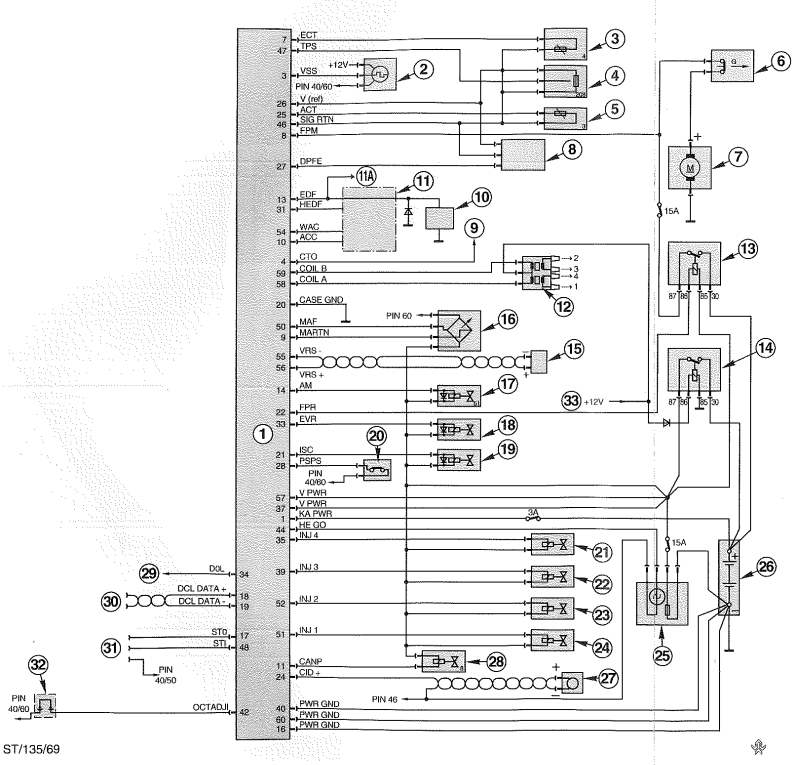
1 Catalytic converter
2 Front twin exhaust pipe



- The HEGO sensor (insulated sensor with 4 cables, ground connection via EEC IV module) is mounted directly under the exhaust pipe flange between the twin pipes.

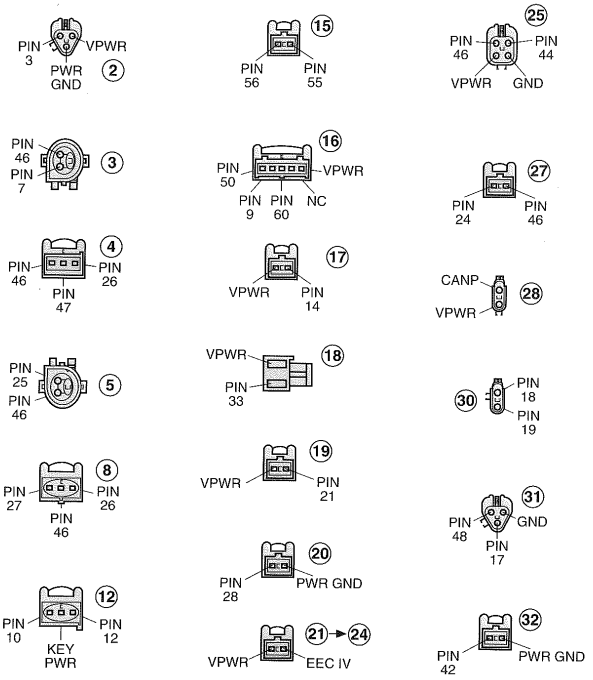
1 HEGO sensor

Wiring Diagram - 1.6/1.8 and 2.0 DOHC 16V Zeta Engines with Manual Transmission

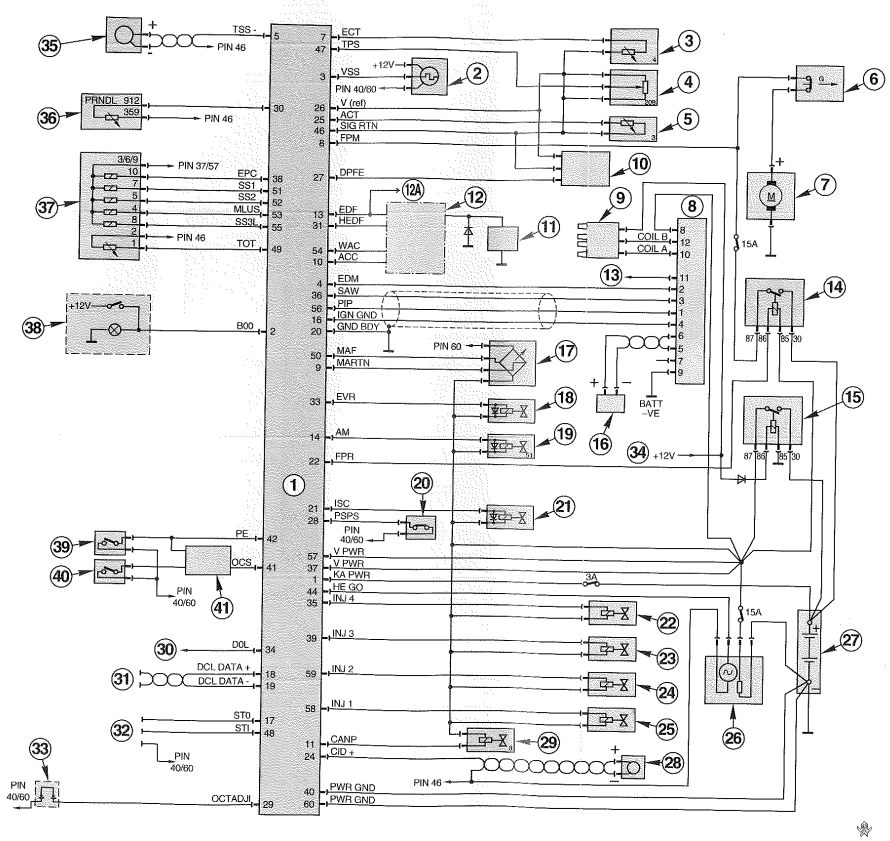


1 EEC IV module
2 Vehicle speed sensor (VSS)
3 Engine coolant temperature sensor (ECT)
4 Throttle position sensor (TPS)
5 Air charge temperature sensor (ACT)
6 Inertia switch
7 Fuel pump
8 DPFE sensor
9 Tachometer
10 A/C clutch
11 Air conditioning/radiator fan switch
11A Adaptive damping
12 DIS coil
13 Fuel pump relay
14 Power supply relay
15 Crankshaft position/speed sensor (CPS)
16 Mass air flow meter (MAF)
17 Pulse air solenoid valve
18 Electronic vacuum regulator (EVR)
19 Idle speed control (ISC)
20 Power steering pressure switch (PSPS)
21 Fuel injector, cylinder 4
22 Fuel injector, cylinder 3
23 Fuel injector, cylinder 2
24 Fuel injector, cylinder 1
25 HEGO sensor
26 Battery
27 Camshaft identification sensor (CID)
28 Purge solenoid valve (EVAP)
29 To fuel computer
30 Diagnosis connector for FDS 2000
31 Self-test connector
32 Service connector (octane adjust OAI)
33 From ignition relay

Connector Assignments - 1.6/1.8 and 2.0 DOHC 16V Zeta Engines with Manual Transmission



Wiring Diagram - 1.8 and 2.0 DOHC 16V Zeta Engines with CD4E Automatic Transmission



ST/135/71

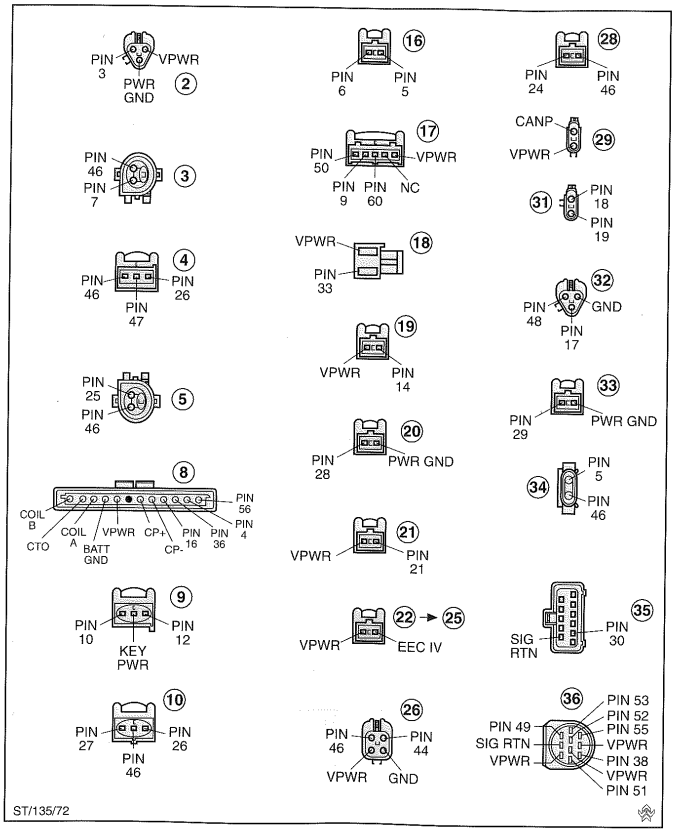
Engine Management

1 EEC IV module
2 Vehicle speed sensor (VSS)
3 Engine coolant temperature sensor (ECT)
4 Throttle position sensor (TPS)
5 Air charge temperature sensor (ACT)
6 Inertia switch
7 Fuel pump
8 EDIS-4 module
9 DIS coil
10 DPFE sensor
11 A/C clutch
12 Air conditioning/radiator fan switching
12A Adaptive damping
13 Tachometer
14 Fuel pump relay
15 Power supply relay
16 Crankshaft position/speed sensor (CPS)
17 Mass air flow meter (MAF)
18 Electronic vacuum regulator (EVR)
19 Pulse air solenoid valve
20 Power steering pressure switch (PSPS)
21 Idle speed control (ISC)
22 Fuel injector, cylinder 4
23 Fuel injector, cylinder 3
24 Fuel injector, cylinder 2
25 Fuel injector, cylinder 1
26 HEGO sensor
27 Battery
28 Camshaft identification sensor (CID)
29 Purge solenoid valve (EVAP)
30 To fuel computer
31 Diagnosis connector for FDS 2000 (for engine and CD4E)
32 Self-test connector
33 Service connector (octane adjust OAI)
34 From ignition relay

Transmission Control

35 Turbine speed sensor (TSS)
36 Selector lever position sensor (MLPS)
37 Solenoid valve unit
38 Wiring (stop light switch)
39 Power/economy switch
40 Overdrive switch
41 Module-instrument interface

Connector Assignments - 1.8 and 2.0 DOHC 16V Zeta Engines with CD4E Automatic Transmission



All checks and adjustments operations must always be performed in accordance with the New Vehicle System Test Manual (NVSTM).

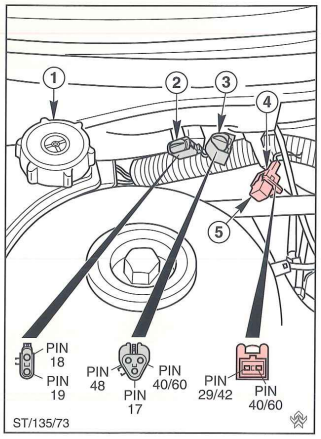
Test Connections

All test connectors are provided as a "connector bundle" on the right-hand side of the engine compartment on the bulkhead next to the power steering reservoir.

1 Power steering reservoir
2 **Diagnosis connector**
Serial interface for connection of the Ford Diagnostic System FDS 2000.
PIN 18 = Data link (+)
PIN 19 = Data link (-)

3 **Self-test connector**
For connection of the STAR tester.
PIN 48 = Self-test input (STI)
PIN 17 = Self-test output (STO)
PIN 40/60 = Ground

4 **Service connector with plug-in bridge (5)**
For octane adjust.
PIN 29 = Octane adjust
CD4E automatic transmission
PIN 42 = Octane adjust
MTX 75 transmission
PIN 40/60 = Ground



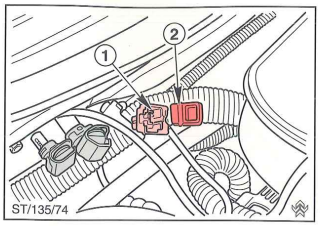
New Self-Test Codes for Ford Mondeo:
DPFE sensor: 326, 327, 335, 336, 337
EVR: 332, 558
EDV; 564

Service Note
Particular care must be taken during the engine test sequence to ensure the throttle plate is **not moved** before the code 010 **VISIBLY** appears in the display of the STAR tester. If the throttle plate is moved before code 010 appears, incorrect codes may be displayed.

Octane Adjust

- The service connector for octane adjust now features a simple plug-in bridge which is plugged into the connector during production to facilitate operation with Premium RON 95 unleaded fuel.

- If the plug-in bridge is removed the ignition timing will be shifted in the "retard" direction (no fixed value).

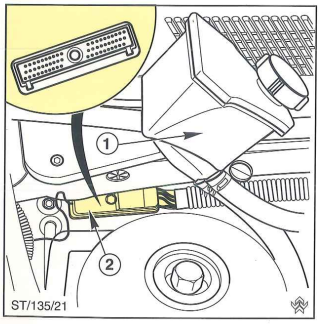


1 Service connector
2 Plug-in bridge removed

EEC IV Module - Test Connection

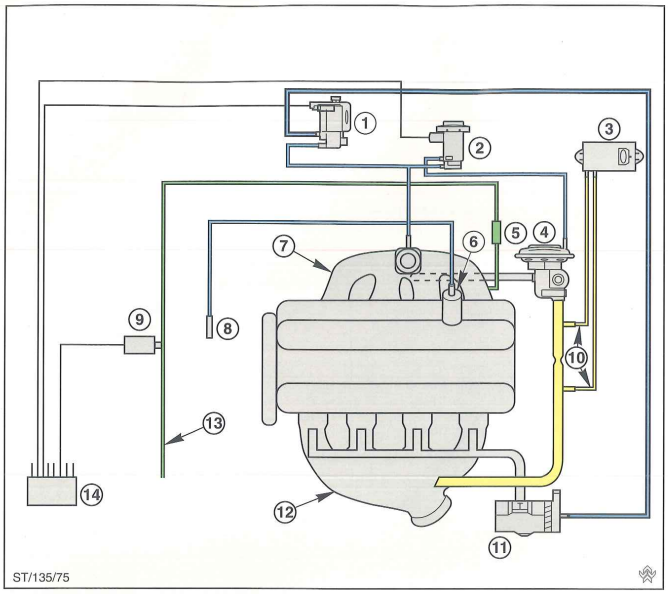
- Remove power steering reservoir (reservoir is plugged in).

- Unscrew EEC IV module cable connector and connect test lead.



1 Power steering reservoir
2 EEC IV module connector

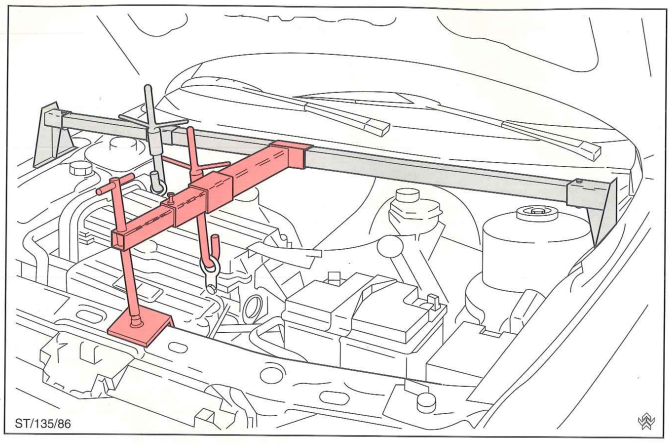
Schematic Graphic of Vacuum Hoses and Connections



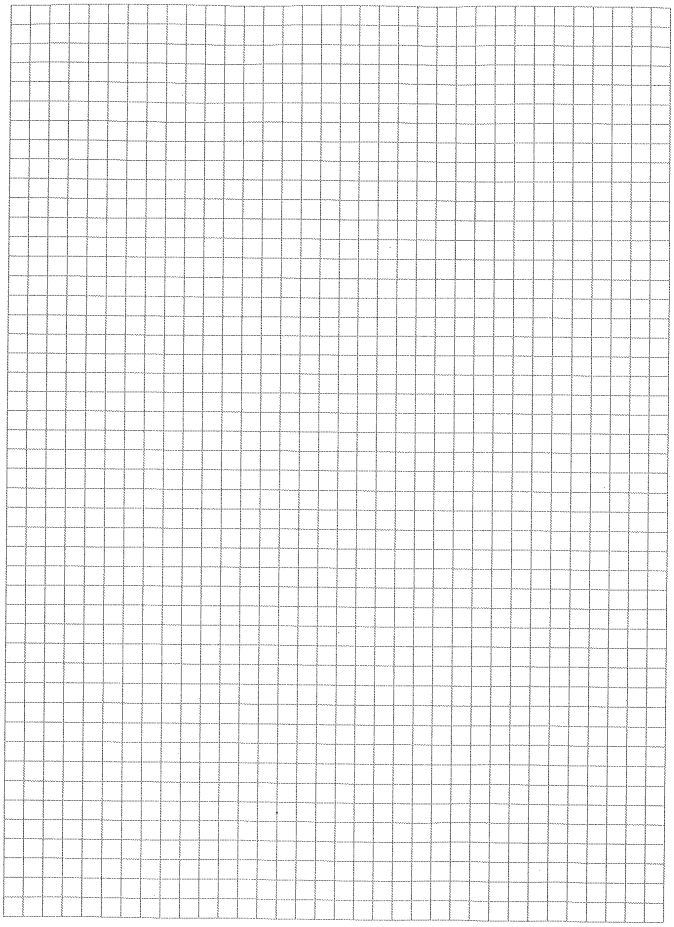
- Inlet manifold pressure
- Fuel vapour
- Exhaust gases

1 Pulse air solenoid valve
2 EVR
3 DPFE sensor
4 EGR valve
5 Restrictor
6 Fuel pressure regulator
7 Inlet manifold/air chamber
8 Heating/air conditioning
9 Purge solenoid valve (EVAP)
10 Hoses to DPFE sensor
11 Pulse air filter/valve housing
12 Exhaust manifold
13 Fuel vapour pipe from carbon canister (EVAP)
14 EEC IV module

- The vacuum hoses and connections shown must be visually checked at the regular service intervals for wear and/or demage.



New Special Tool	Description
21-140-03	Adaptor for Engine Support Bar 21-140



1.6 DOHC 16V Zeta Engine

Engine	1.6 litre DOHC 16V
Engine build code	L1F
Engine management	Electronic engine management (EEC IV)
Ignition system	Integrated electronic ignition system (EDIS-4)
Mixture control	Sequential electronic fuel injection (SEFI)
Emission system	Three-way catalytic converter
	Evaporative emission control system (EVAP)
	Pulse air system
Emission regulation	83 US
Bore	76.0 mm
Stroke	88.0 mm
Displacement	1597 cm^3
Throttle plate housing, Venturi diameter	42 mm
Power output (DIN)	66 kW (90 HP) at 5250 rpm
Torque (DIN)	138 Nm at 3500 rpm
Compression ratio	10.3 : 1
Idle speed	700 rpm
Overspeed limitation at	7100 rpm
Engine oil specification	API/SG/CD (SAE 10W-30)
Engine oil-filling capcity - with filter	4.25 litre
- without filter	3.75 litre
Oil filter	0.5 litre
Spark plug type	AYRF 22 PP (PP = platinum tipped centre and side electrodes)
Electrode gap	1.3 mm

For all engine tightening torques please refer to Ford Mondeo Service Microfiche, Section 21.

1.8 DOHC 16V Zeta Engine

Engine	1.8 litre DOHC 16V
Engine build code	RKA
Engine management	Electronic engine management (EEC IV)
Ignition system	Integrated electronic ignition system (EDIS-4)
Mixture control	Sequential electronic fuel injection (SEFI)
Emission system	Three-way catalytic converter
	Evaporative emission control system (EVAP)
	Pulse air system
Emission regulation	83 US
Bore	80.6 mm
Stroke	88.0 mm
Displacement	1796 cm^3
Throttle plate housing, Venturi diameter	48 mm
Power output (DIN)	85 kW (115 HP) at 5750 rpm
Torque (DIN)	158 Nm at 3750 rpm
Compression ratio	10.0 : 1
Idle speed	800 rpm
Overspeed limitation at	7100 rpm
Engine oil specification	API/SG/CD (SAE 10W-30)
Engine oil-filling capcity - with filter	4.25 litre
- without filter	3.75 litre
Oil filter	0.5 litre
Spark plug type	AYRF 22 PP (PP = platinum tipped centre and side electrodes)
Electrode gap	1.3 mm

For all engine tightening torques please refer to Ford Mondeo Service Microfiche, Section 21.

2.0 DOHC 16V Zeta Engine

Engine	2.0 litre DOHC 16V
Engine build code	NGA
Engine management	Electronic engine management (EEC IV)
Ignition system	Integrated electronic ignition system (EDIS-4)
Mixture control	Sequential electronic fuel injection (SEFI)
Emission system	Three-way catalytic converter
	Evaporative emission control system (EVAP)
	Pulse air system
Emission regulation	83 US
Bore	84.8 mm
Stroke	88.0 mm
Displacement	1988 cm^3
Throttle plate housing, Venturi diameter	55 mm
Power output (DIN)	103 kW (140 HP) at 6000 rpm
Torque (DIN)	180 Nm at 4000 rpm
Compression ratio	10.0 : 1
Idle speed	800 rpm
Overspeed limitation at	7100 rpm
Engine oil specification	API/SG/CD (SAE 10W-30)
Engine oil-filling capcity - with filter	4.25 litre
- without filter	3.75 litre
Oil filter	0.5 litre
Spark plug type	AYRF 22 PP (PP = platinum tipped centre and side electrodes)
Electrode gap	1.3 mm

For all engine tightening torques please refer to Ford Mondeo Service Microfiche, Section 21.

ACT	**A**ir **C**harge **T**emperature
CID	**C**amshaft **Id**entification Sensor
CPS	**C**rankshaft **P**osition/**S**peed **S**ensor
DPFE	**D**elta **P**ressure **F**eedback **E**lectronic System
EDIS-4	**E**EC IV with **D**istributorless **I**gnition **S**ystem, **4** Cylinder Engines
ECT	**E**ngine **C**oolant **T**emperature
EDF	**E**lectro **D**rive **F**an
EDM	**E**DIS **D**iagnostic **M**onitor
EEC	**E**uropean **E**conomic **C**ommunity
EEC IV	**E**lectronic **E**ngine **C**ontrol, System **IV**
EGR	**E**xhaust **G**as **R**ecirculation
EVAP	**Evap**orative Emission Control System
EVR	**E**lectronic **V**acuum **R**egulator
FDS	**F**ord **D**iagnostic **S**ystem

HEDF	**H**igh Speed **E**lectro **D**rive **F**an
HEGO	**H**eated **E**xhaust **G**as **O**xygen Sensor
ISC	**I**dle **S**peed **C**ontrol
MAF	**M**ass **A**ir **F**low Meter
OAI	**O**ctane **A**djust **I**nput
PCV	**P**ositive **C**rankcase **V**entilation
PIP	**P**rofile **I**gnition **P**ickup
PSPS	**P**ower **S**teering **P**ressure **S**witch
SAW	**S**park **A**dvance **W**ord
SEFI	**S**equential **E**lectronic **F**uel **I**njection
STI	**S**elf **T**est **I**nput
TPS	**T**hrottle **P**osition **S**ensor
VSS	**V**ehicle **S**peed **S**ensor