School of PEdagogical and Technological Education
ASPETE

ΜΕΚ ΙΙ

Συστήματα ελέγχου αέρα εισαγωγής

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ΜΕΚ ΙΙ – Συστήματα ελέγχου αέρα εισαγωγής

Overview

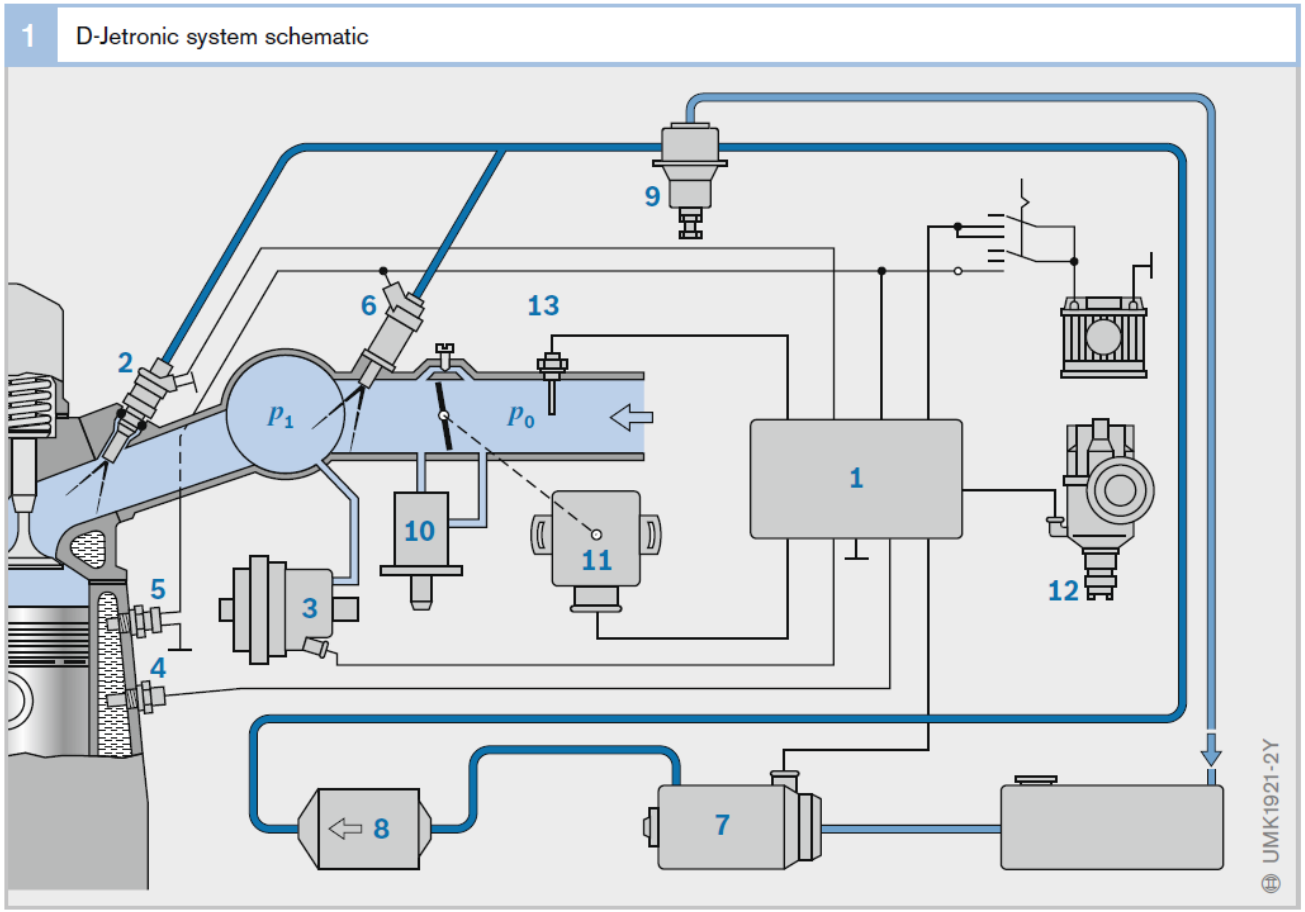
Year	System	Features
1967	D-Jetronic	– Analog-technology multi-point injection system – Intermittent fuel injection – Intake-manifold-controlled
1973	K-Jetronic	– Mechanical-hydraulic multi-point injection system – Continuous fuel injection
1973	L-Jetronic	– Electronic multi-point injection system (initially analog, later digital technology) – Intermittent fuel injection – Air-flow sensing

Year	System	Features
1981	LH-Jetronic	– Electronic multi-point injection system – Intermittent fuel injection – Air-mass sensing
1982	KE-Jetronic	– K-Jetronic with electronically controlled additional functions
1987	Mono-Jetronic	– Single-point injection system – Intermittent fuel injection – Air-flow calculation via throttle-valve angle and engine speed

ΜΕΚ ΙΙ – Συστήματα ελέγχου αέρα εισαγωγής

D-Jetronic – Επισκόπηση συστήματος

Fig. 1
1 ECU
2 Fuel injector
3 Pressure sensor
4 Coolant-temperature sensor
5 Thermo-time switch
6 Electric start valve
7 Electric fuel pump
8 Fuel filter
9 Fuel-pressure regulator
10 Auxiliary-air device
11 Throttle-valve switch
12 Injection trigger
13 Air-temperature sensor
p_0 Atmospheric pressure
p_1 Pressure in the intake manifold



D-Jetronic – Τρόπος Λειτουργίας

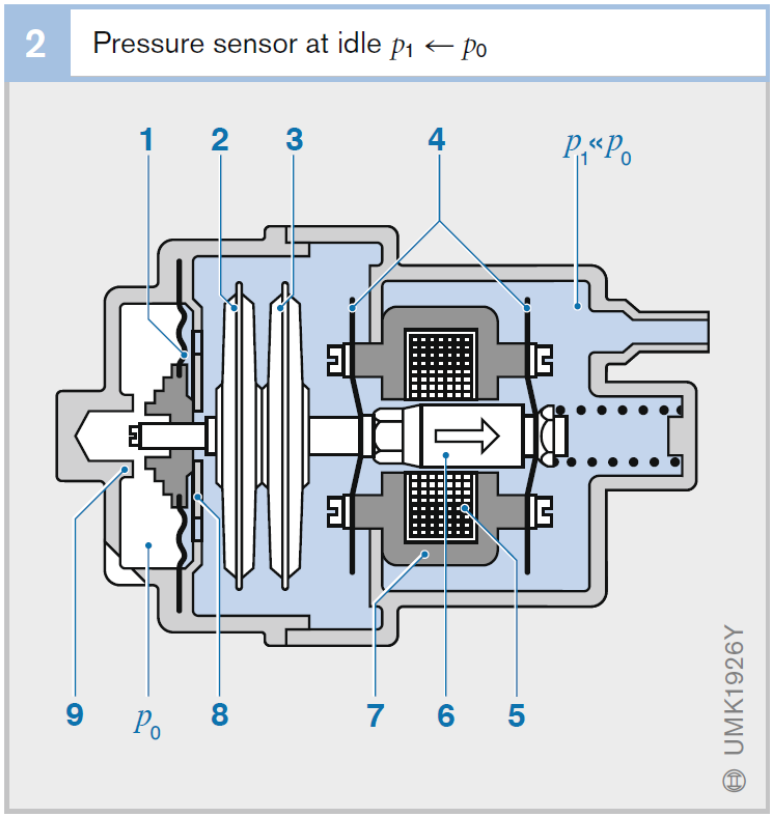
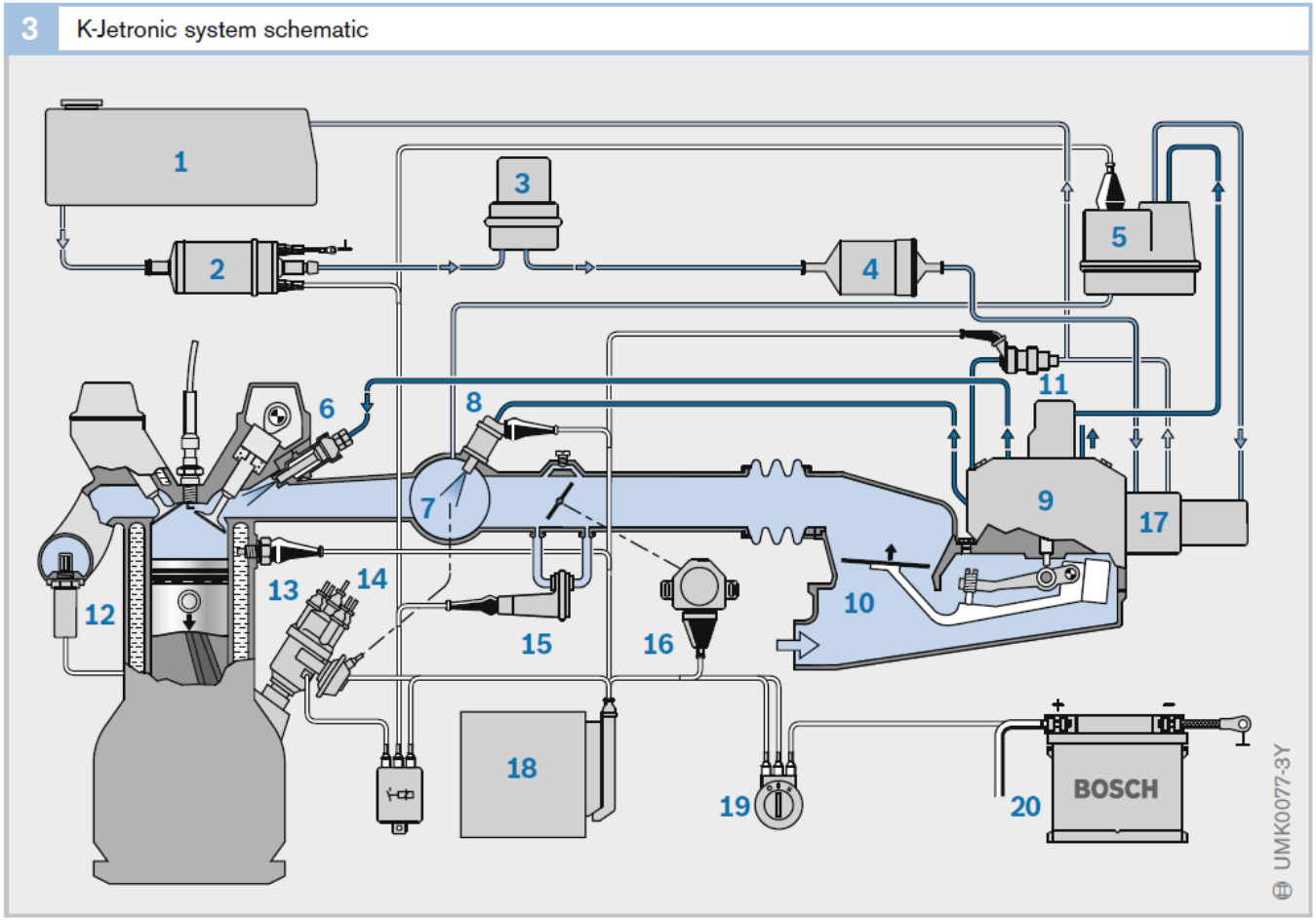


Fig. 2
Basic function:
Aneroid capsules 2 and 3 expanded
1 Diaphragm
2 Aneroid capsule
3 Aneroid capsule
4 Leaf spring
5 Coil
6 Armature
7 Core
8 Part-load stop
9 Full-load stop
*p*0 Atmospheric pressure
*p*1 Pressure in the intake manifold

ΜΕΚ ΙΙ – Συστήματα ελέγχου αέρα εισαγωγής

K-Jetronic – Επισκόπηση Συστήματος

Fig. 3
1 Fuel tank
2 Electric fuel pump
3 Fuel accumulator
4 Fuel filter
5 Warm-up regulator
6 Fuel injector
7 Intake manifold
8 Cold-start valve
9 Fuel distributor
10 Air-flow sensor
11 Timing valve
12 Lambda sensor
13 Thermo-time switch
14 Ignition distributor
15 Auxiliary-air device
16 Throttle-valve switch
17 Primary-pressure regulator
18 ECU (for version with lambda closed loop control)
19 Ignition/starting switch
20 Battery



K-Jetronic - Μονάδα Ελέγχου Μίγματος

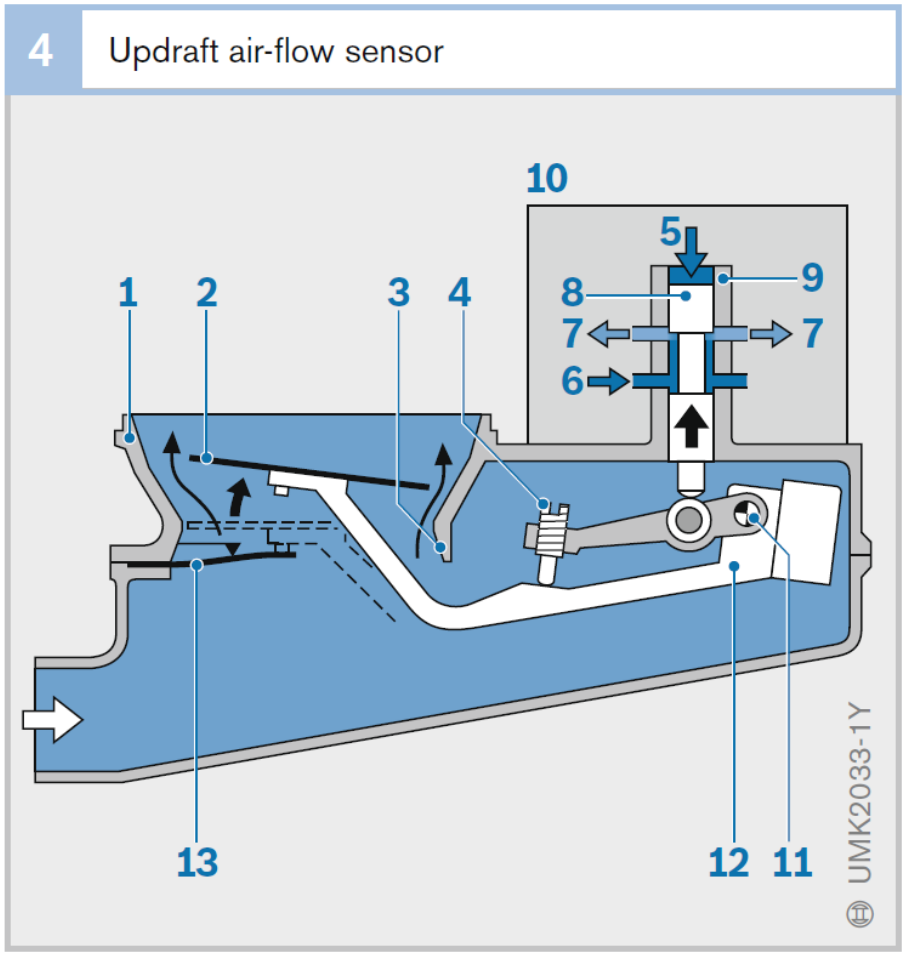


Fig. 4
1 Air funnel
2 Sensor plate
3 Relief cross-section
4 Mixture adjusting screw
5 Control pressure
6 Fuel inlet
7 Metered quantity of fuel
8 Control plunger
9 Barrel with metering slits
10 Fuel distributor
11 Pivot
12 Lever
13 Leaf spring

K-Jetronic - Μονάδα Ελέγχου Μίγματος

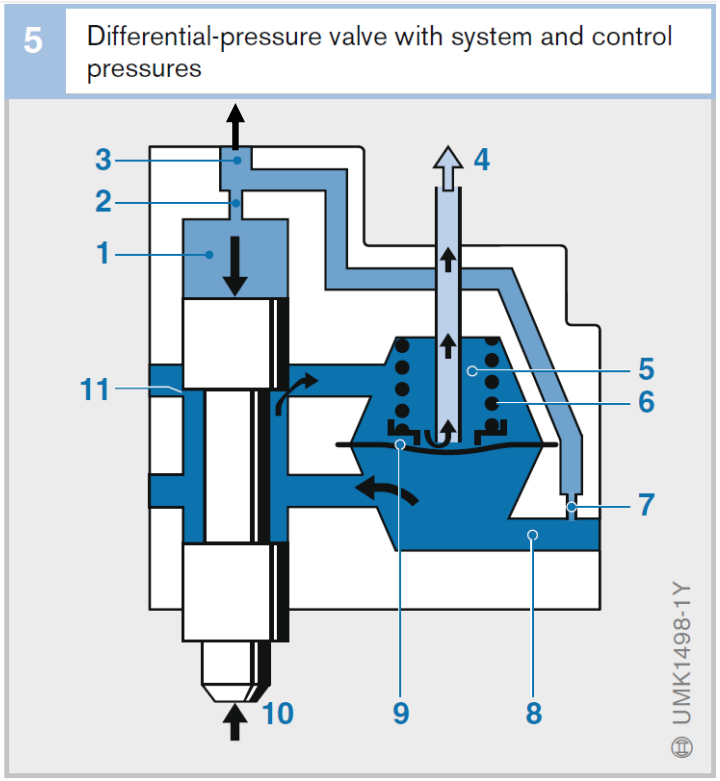


Fig. 5
1 Control-pressure effect (hydraulic force)
2 Damping orifice
3 Line to warm-up regulator
4 To intake valve
5 Pressure in upper chamber of differential- pressure valve (0.1 bar < primary pressure)
6 Control spring
7 Isolating throttle bore
8 Pressure in lower chamber = primary pressure (delivery pressure)
9 Diaphragm
10 Effect of air pressure via sensor-plate lever
11 Metering slits

K-Jetronic – Εγχυτήρες καυσίμου

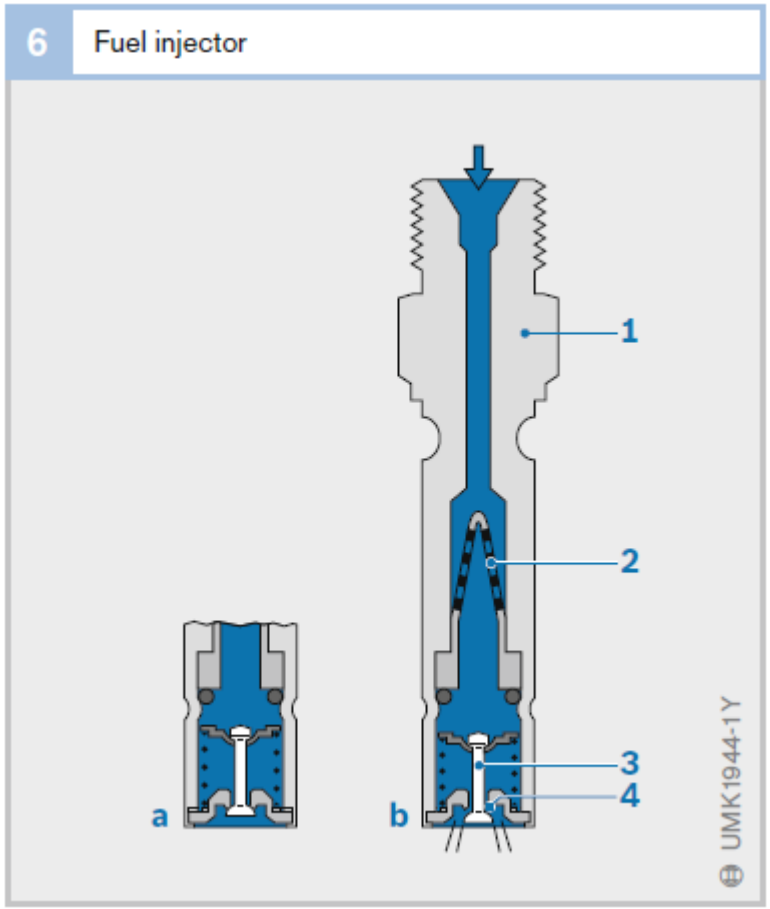


Fig. 6
a In rest position
b In actuated position

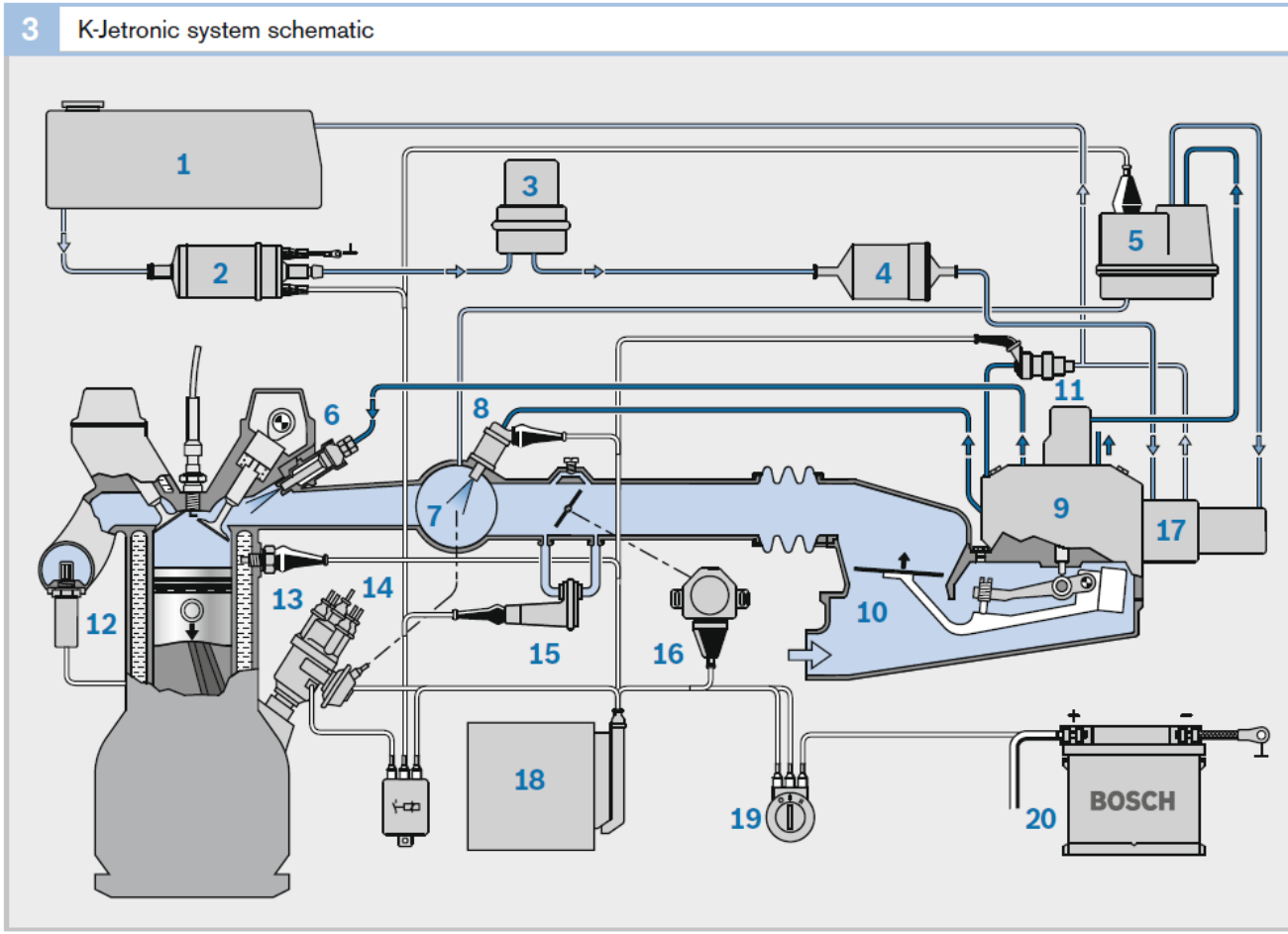
1 Valve housing
2 Filter
3 Valve needle
4 Valve seat

K-Jetronic – Προσαρμογή στις λειτουργικές συνθήκες

- Basic mixture adaptation
- Cold-start enrichment
- Warm-up enrichment
- Idle stabilization
- Full-load enrichment
- Transition response(acceleration)
- Overrun fuel cutoff

1 Fuel tank
2 Electric fuel pump
3 Fuel accumulator
4 Fuel filter
5 Warm-up regulator
6 Fuel injector
7 Intake manifold
8 Cold-start valve
9 Fuel distributor
10 Air-flow sensor
11 Timing valve
12 Lambda sensor
13 Thermo-time switch
14 Ignition distributor
15 Auxiliary-air device
16 Throttle-valve switch
17 Primary-pressure regulator

3 K-Jetronic system schematic



K-Jetronic – Έλεγχος λ κλειστού βρόγχου

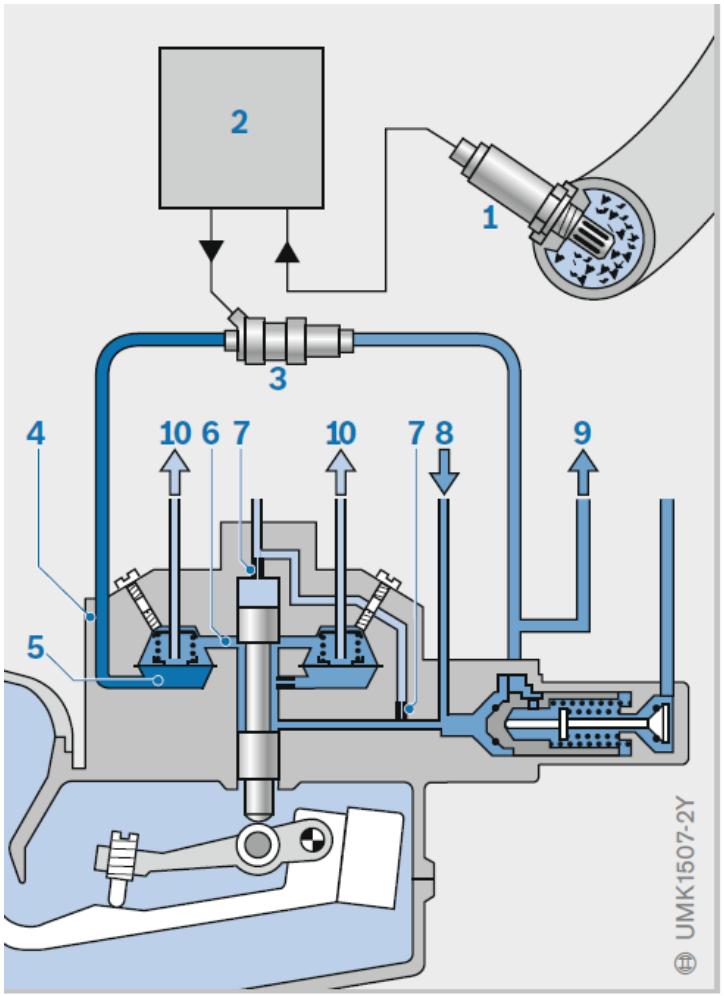


Fig. 7
1 Lambda sensor
2 ECU
3 Timing valve (variable restrictor)
4 Fuel distributor
5 Lower chambers of differential-pressure valves
6 Metering slits
7 Isolating throttle bore (fixed restrictor)
8 Fuel inlet
9 Fuel return
10 To fuel injector

KE-Jetronic

8 Electrohydraulic pressure actuator

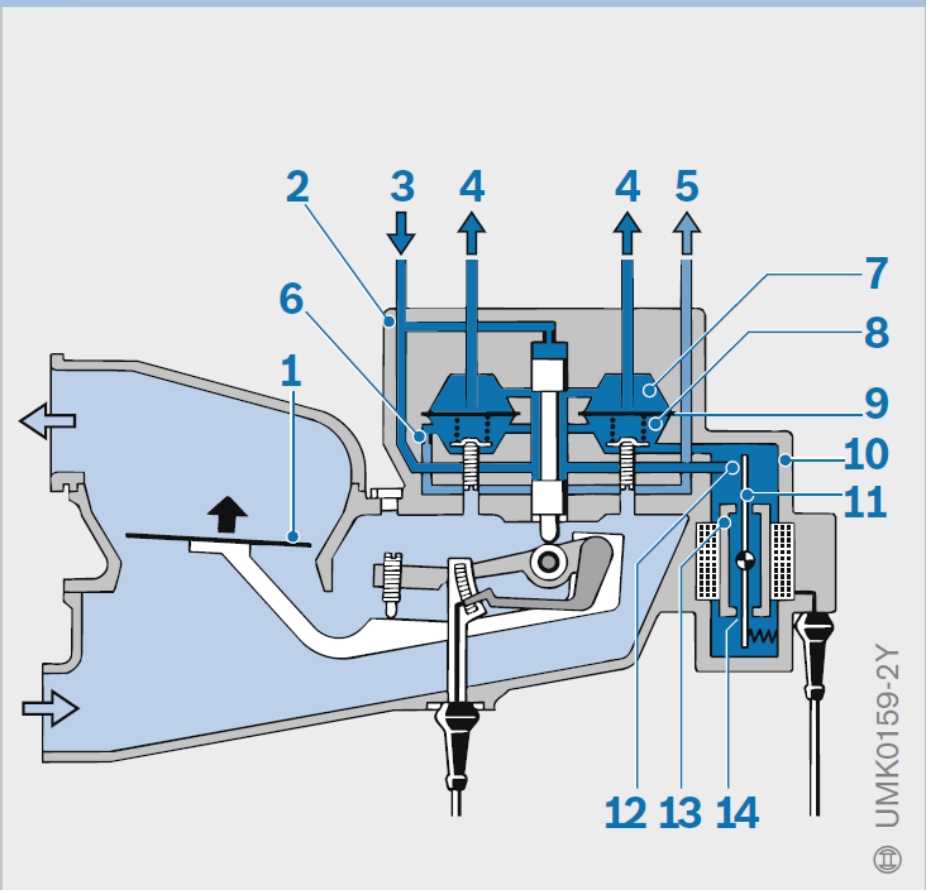


Fig. 8
1 Sensor plate
2 Fuel distributor
3 Fuel inlet (primary pressure)
4 Fuel to fuel injectors
5 Fuel-return line to pressure regulator
6 Fixed restrictor
7 Upper chamber
8 Lower chamber
9 Diaphragm
10 Pressure actuator
11 Baffle plate
12 Nozzle
13 Magnetic pole
14 Air gap

L-Jetronic - Επισκόπηση Συστήματος

9 Schematic diagram of an L-Jetronic system with lambda closed-loop control

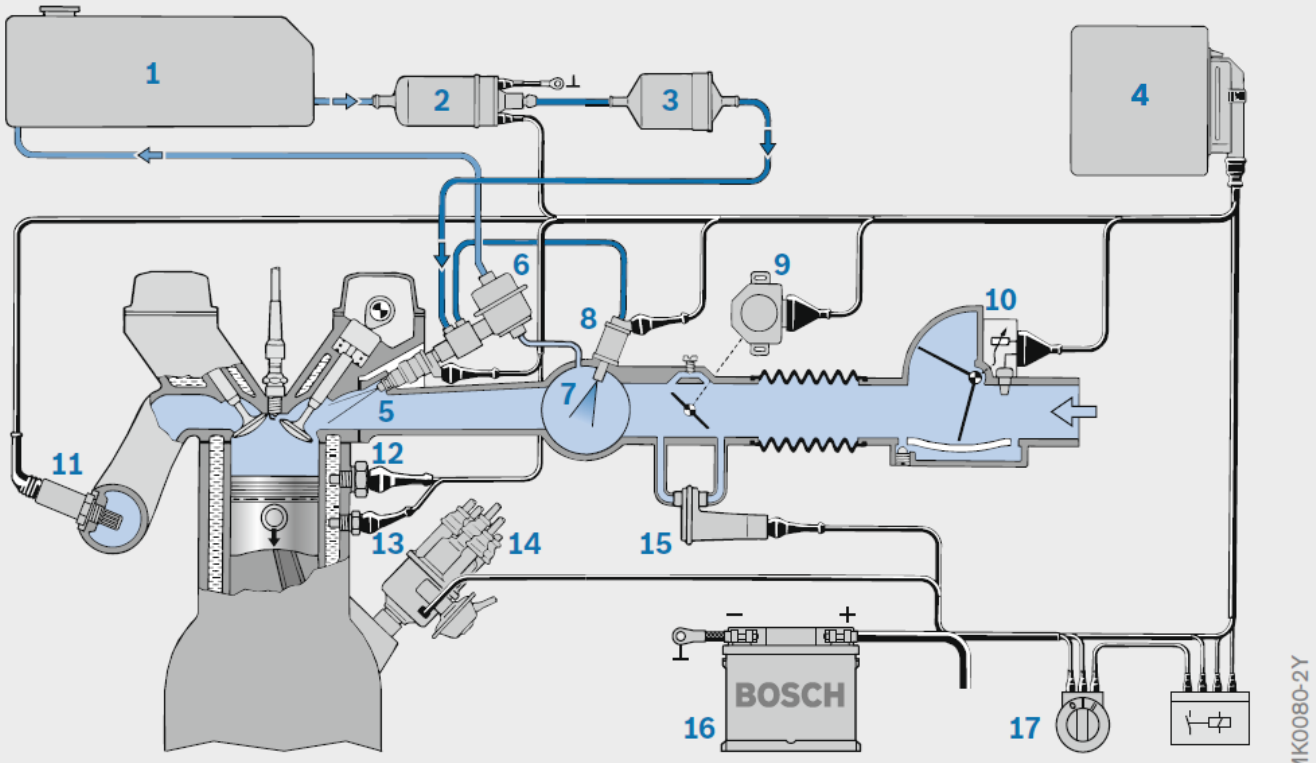


Fig. 9
1 Fuel tank
2 Electric fuel pump
3 Fuel filter
4 ECU
5 Fuel injector
6 Fuel rail and pressure regulator
7 Intake manifold
8 Cold-start valve
9 Throttle-valve switch
10 Air-flow sensor
11 Lambda sensor
12 Thermo-time switch
13 Engine-temperature sensor
14 Ignition distributor
15 Auxiliary-air device
16 Battery
17 Ignition/starting switch

L-Jetronic – Λήψη των λειτουργικών δεδομένων και έλεγχος ποσότητας καυσίμου

9 Schematic diagram of an L-Jetronic system with lambda closed-loop control

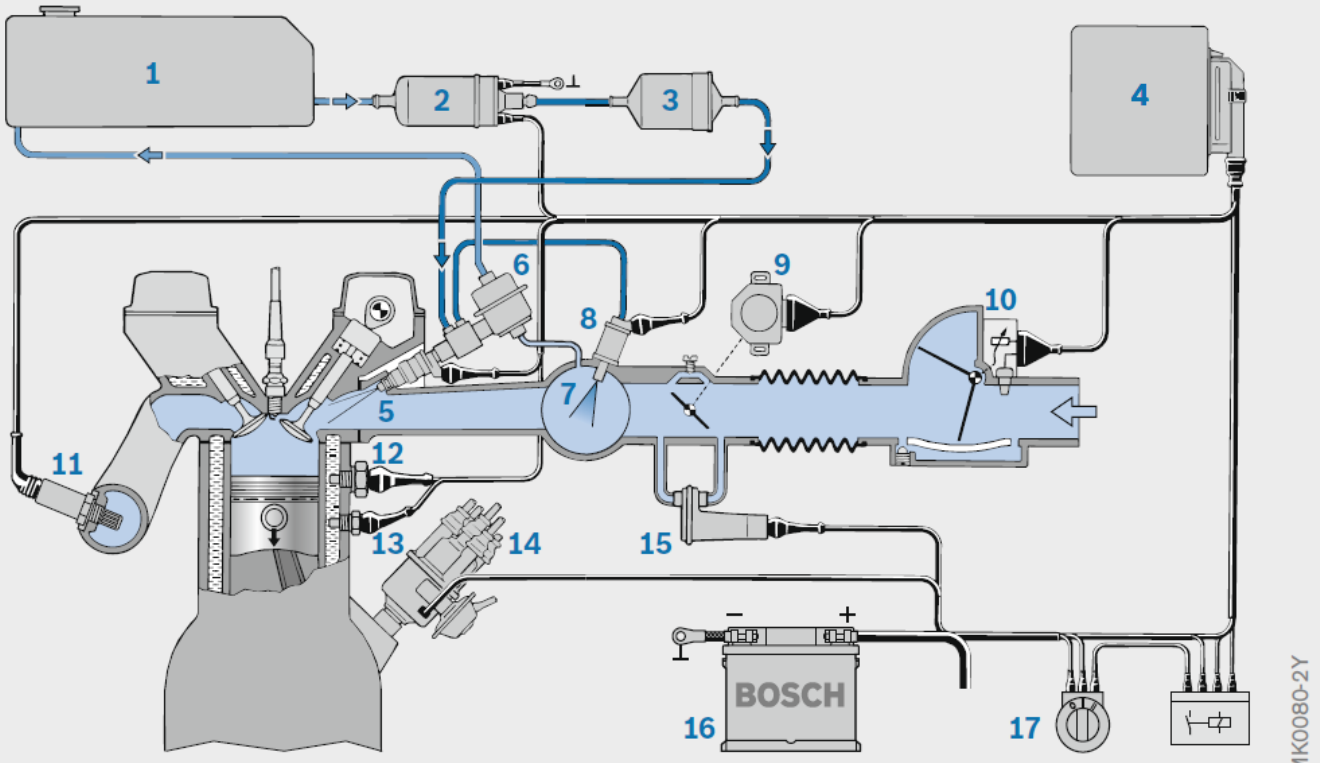
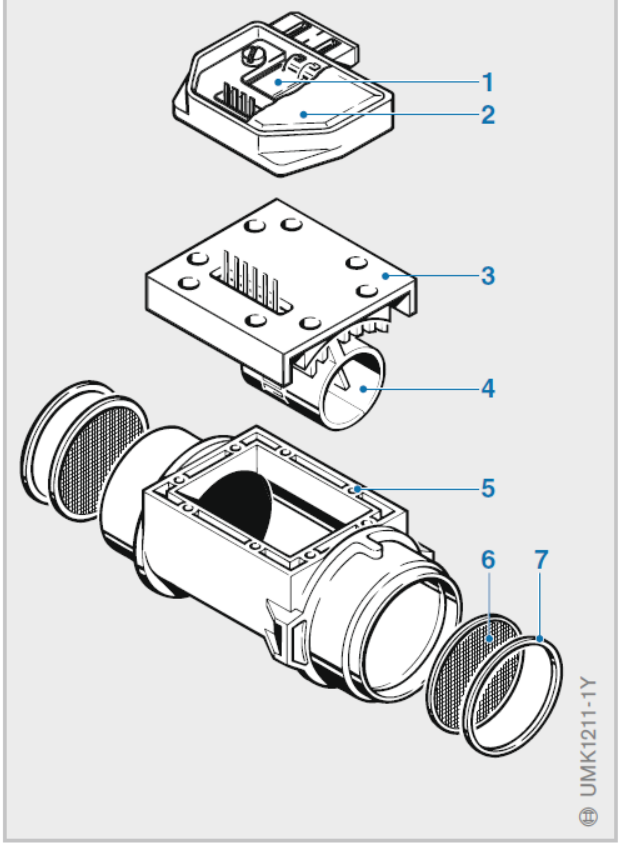


Fig. 9
1 Fuel tank
2 Electric fuel pump
3 Fuel filter
4 ECU
5 Fuel injector
6 Fuel rail and pressure regulator
7 Intake manifold
8 Cold-start valve
9 Throttle-valve switch
10 Air-flow sensor
11 Lambda sensor
12 Thermo-time switch
13 Engine-temperature sensor
14 Ignition distributor
15 Auxiliary-air device
16 Battery
17 Ignition/starting switch

LH-Jetronic

10 Hot-wire air-mass meter



11 Hot-film air-mass meter

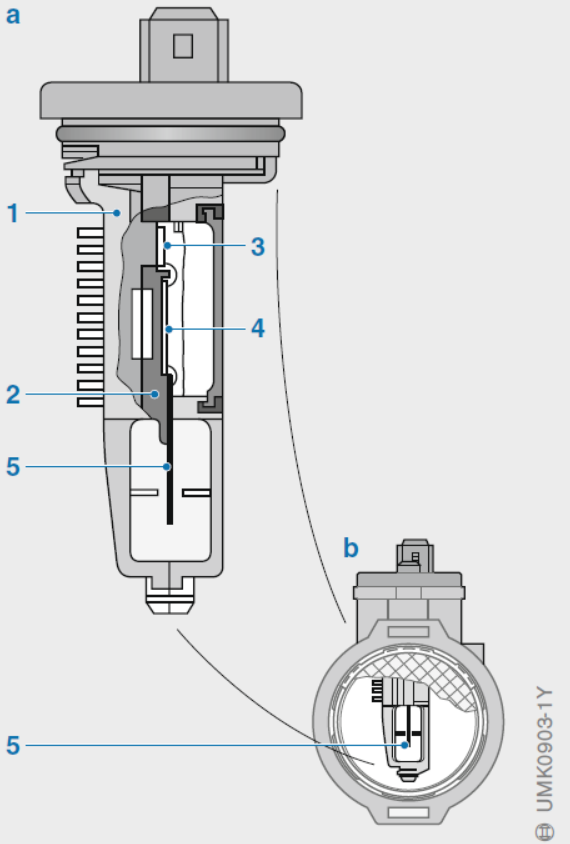


Fig. 10
1 Hybrid circuit
2 Cover
3 Metal insert
4 Inner tube with hot wire
5 Housing
6 Protective screen
7 Retaining ring
Fig. 11
a Hot-film sensor
b Plug-in tube with built-in hot-film sensor
1 Heat sink
2 Intermediate module
3 Power module
4 Hybrid circuit
5 Sensor element (heater element)

Mono-Jetronic - Επισκόπηση Συστήματος

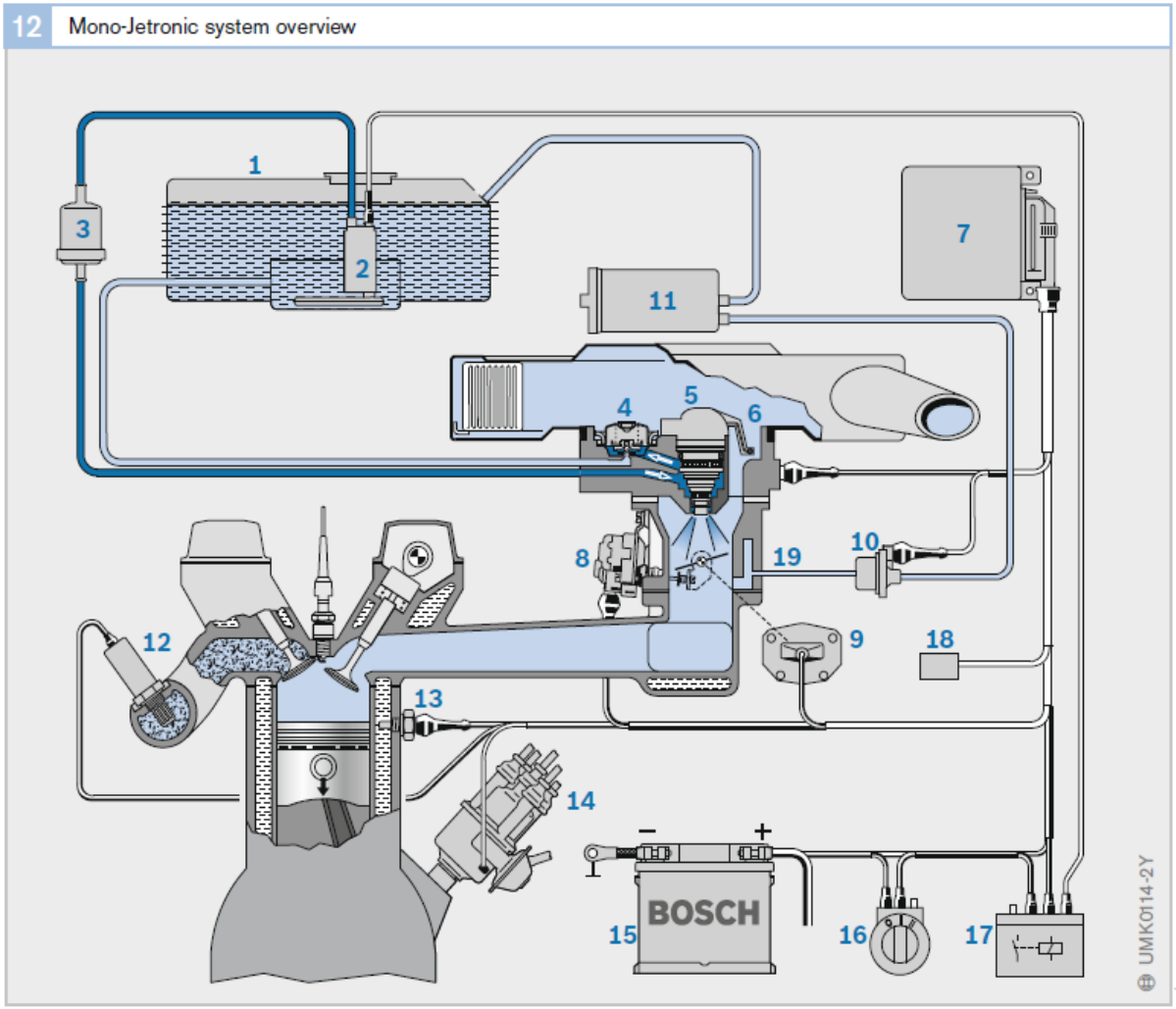
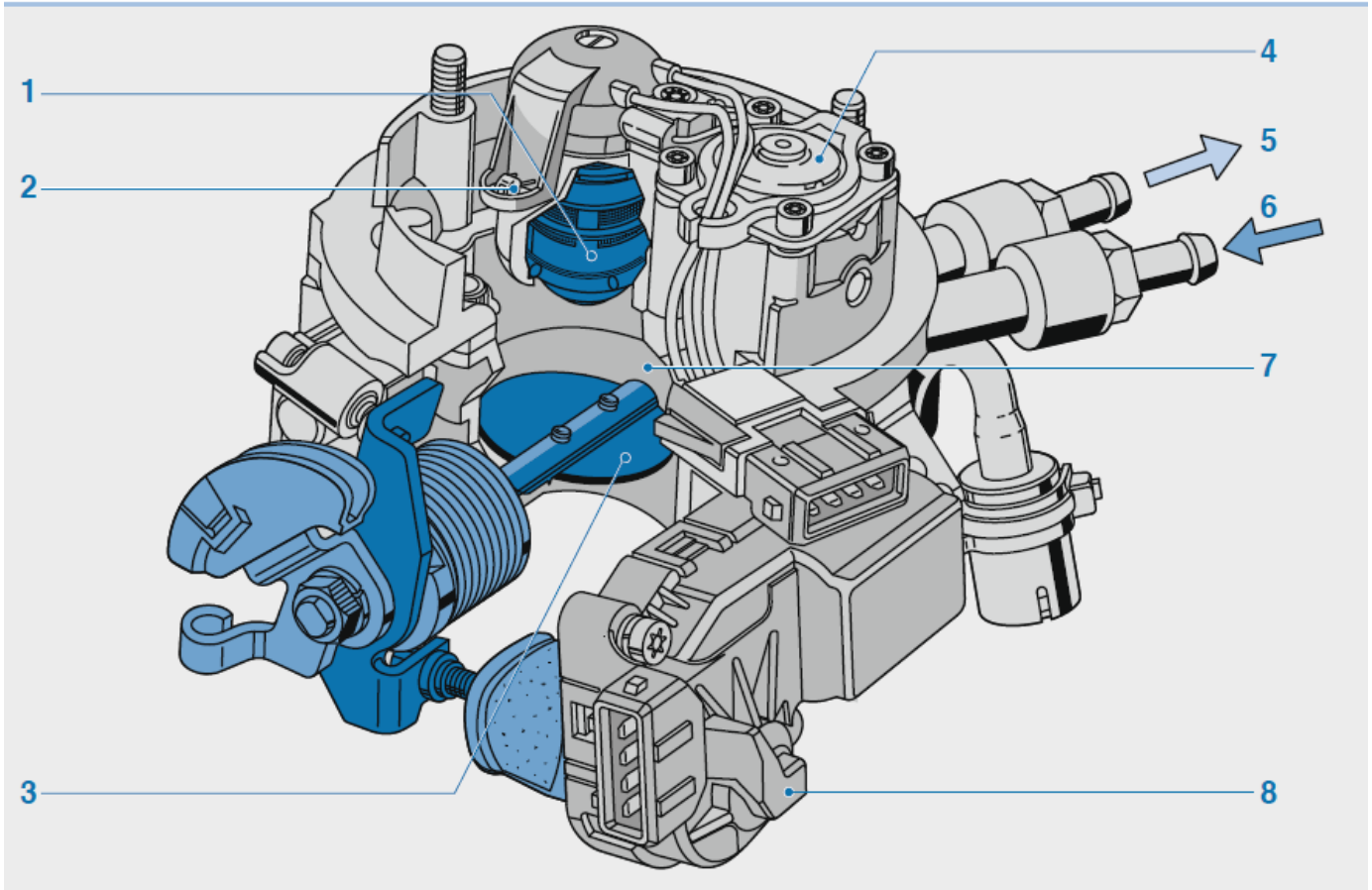


Fig. 12
1 Fuel tank
2 Electric fuel pump
3 Fuel filter
4 Pressure regulator
5 Electromagnetic fuel injector
6 Air-temperature sensor
7 ECU
8 Throttle-valve actuator
9 Throttle valve with throttle-valve potentiometer
10 Canister-purge valve
11 Carbon canister
12 Lambda sensor
13 Engine-temperature sensor
14 Ignition distributor
15 Battery
16 Ignition/starting switch
17 Relay
18 Diagnosis connection
19 Central injection unit

Mono-Jetronic – Κεντρική μονάδα έγχυσης

Central injection unit (view with partial section)



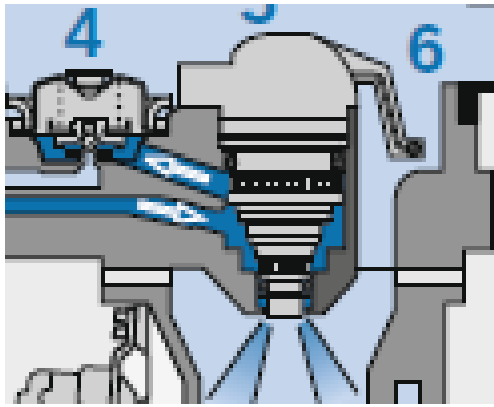


Fig. 13
1 Fuel injector
2 Air-temperature sensor
3 Throttle valve
4 Fuel-pressure regulator
5 Fuel return
6 Fuel inlet
7 Throttle-valve sensor (not shown)
8 Throttle-valve actuator

Mono-Jetronic - Fuel injector

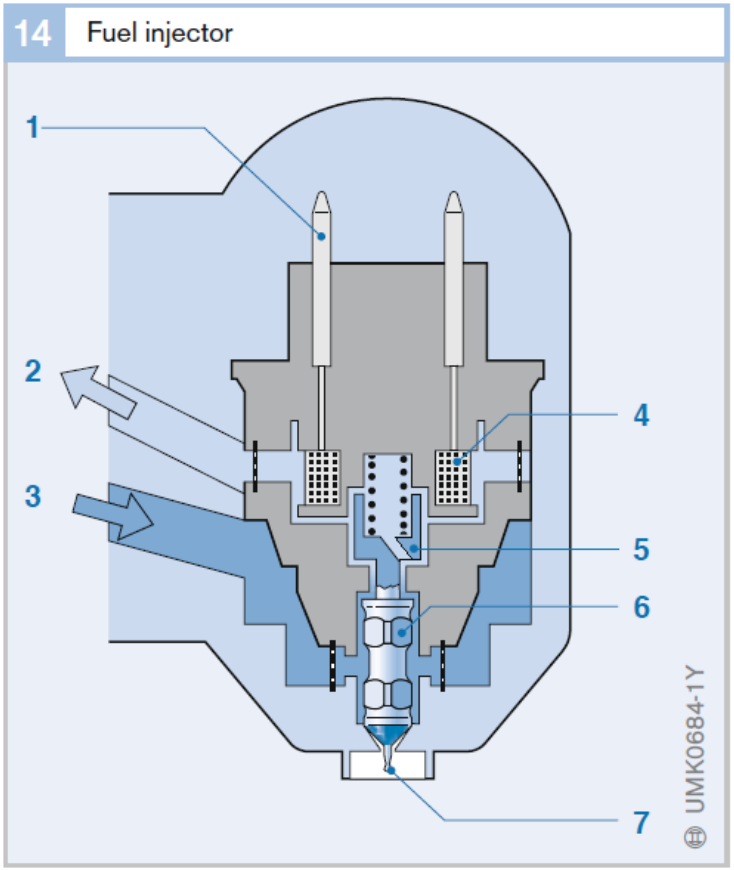


Fig. 14
1 Electrical connection
2 Fuel return
3 Fuel inlet
4 Solenoid winding
5 Solenoid armature
6 Valve needle
7 Pintle

Mono-Jetronic -Fuel-pressure regulator

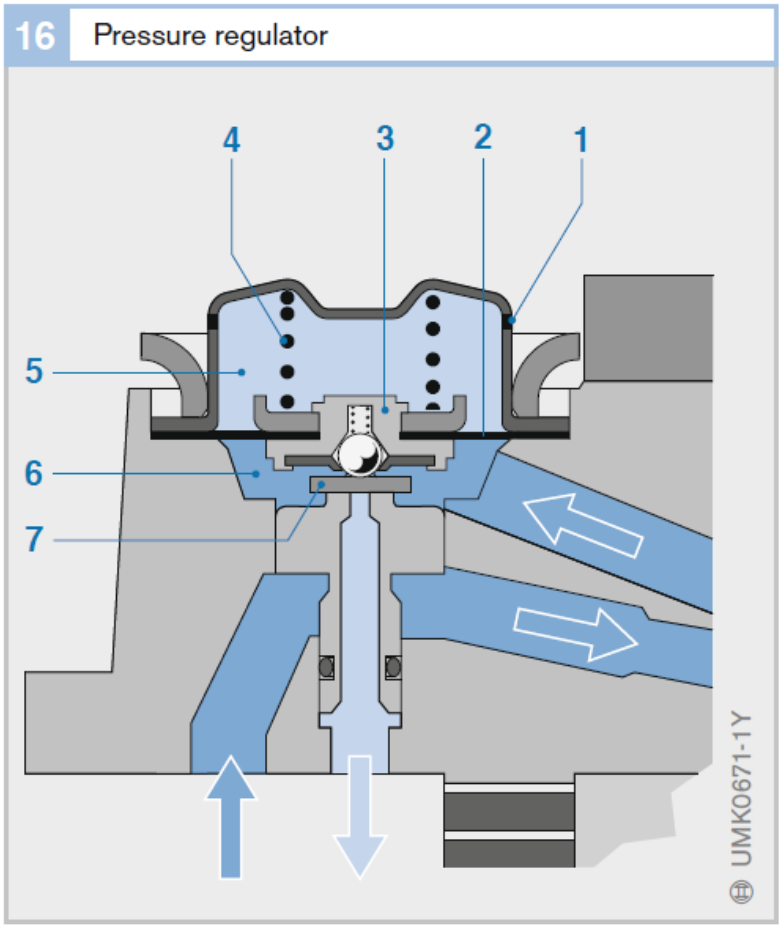
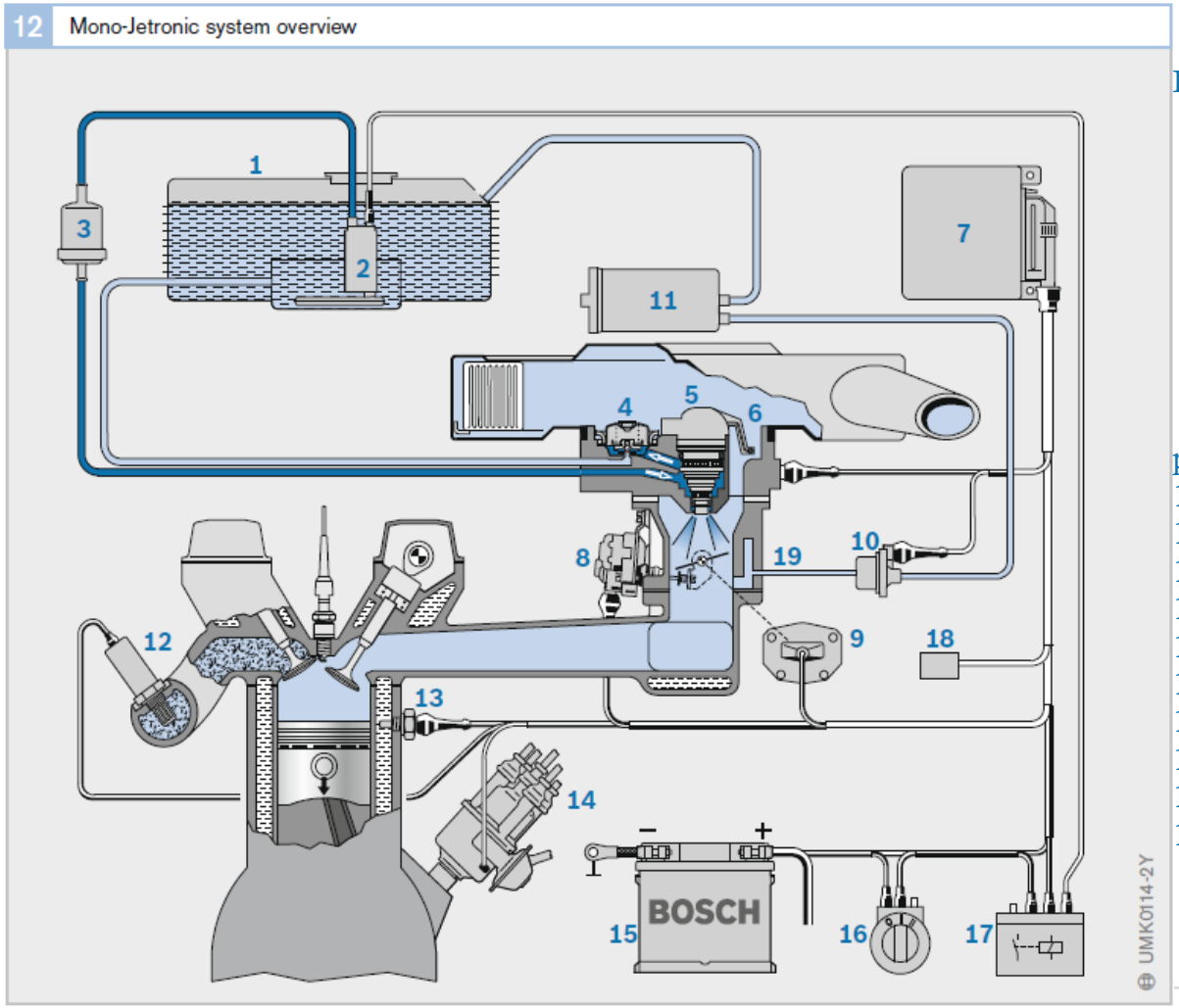


Fig. 16
1 Venting ports
2 Diaphragm
3 Valve holder
4 Pressure spring
5 Upper chamber
6 Lower chamber
7 Valve plate

Mono-Jetronic Acquisition of operating data



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14 Ignition distributor
15 Battery
16 Ignition/starting switch
17 Relay
18 Diagnosis connection
19 Central injection unit

Mono-Jetronic- Processing of operating data

17 Lambda program map