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CHARACTERISTIC FEATURES

The Mono-Motronic is an integrated system for electronic control of central injection and ignition. The joint, heavy-duty control unit makes for optimal, low-cost and reliable fuel metering as well as ignition control.
The outlay for the control unit is less than for separate injection and ignition systems, since, for example, voltage supply and housing are only required once.

Utilization of the sensor signals for injection and ignition produces the following advantages:

- Consumption-optimized adaptation during warm-up thanks to precise quantity of fuel and temperature-dependent ignition angle.
- Minimization of consumption due to precise ignition-angle adaptation over entire map.
- Idle stabilization by means of dynamic ignition-angle action.
- More drive comfort due to ignition-angle action on accelerating and braking.
- Ignition-angle adjustment for smooth selection in the case of vehicles with automatic transmission.

Injection
The intermittent central injection is based on the proven Mono-Jetronic. Extended functions are designed to provide drive comfort and improve emergency running in the event of sensor failure.
Ignition
Instead of mechanical centrifugal and vacuum advance, electronically stored ignition map in control unit.
Dwell-angle control with load-sensitive and speed-insensitive ignition-angle adjustment. Additional influencing in line with engine and intake-air temperature, throttle-valve position and throttle-valve angular velocity.
Ignition variants

- Rotating high-voltage distribution. The ignition distributor operates with Hail trigger for speed sensing and with high-voltage distributor. The control unit actuates an external ignition output stage.
- Fully electronic ignition.
  No mechanically driven high-voltage distributor. The control unit routes the primary voltage to individual ignition coils. The high voltage generated is passed directly to the spark plug of the assigned cylinder.

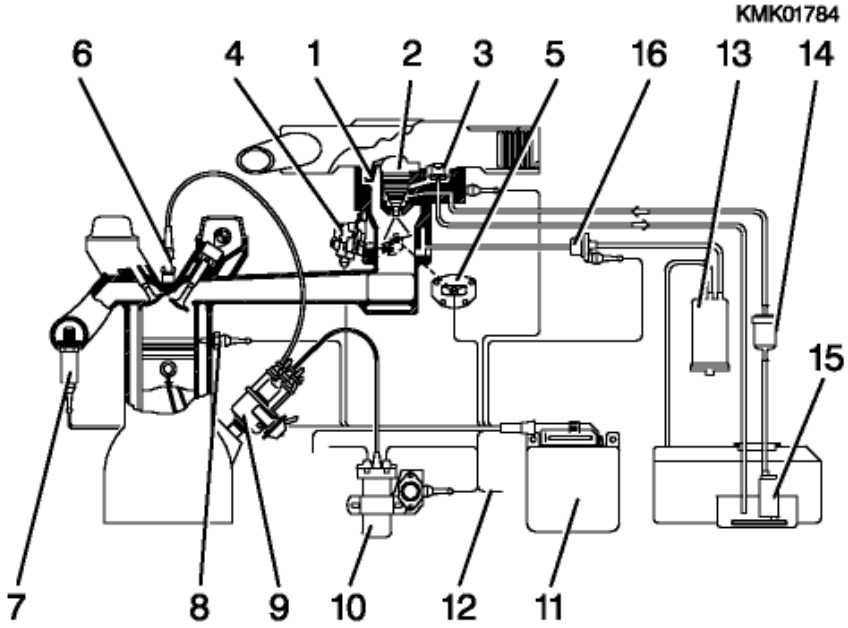
Example - 4-cylinder engine:
Its two twin-spark ignition coils are actuated by the control unit via external power output stages.
An inductive pickup picks off the speed information and a reference-mark

signal for cylinder no. 1 or 4 at a sensor wheel attached to the crankshaft.

SYSTEM OVERVIEW

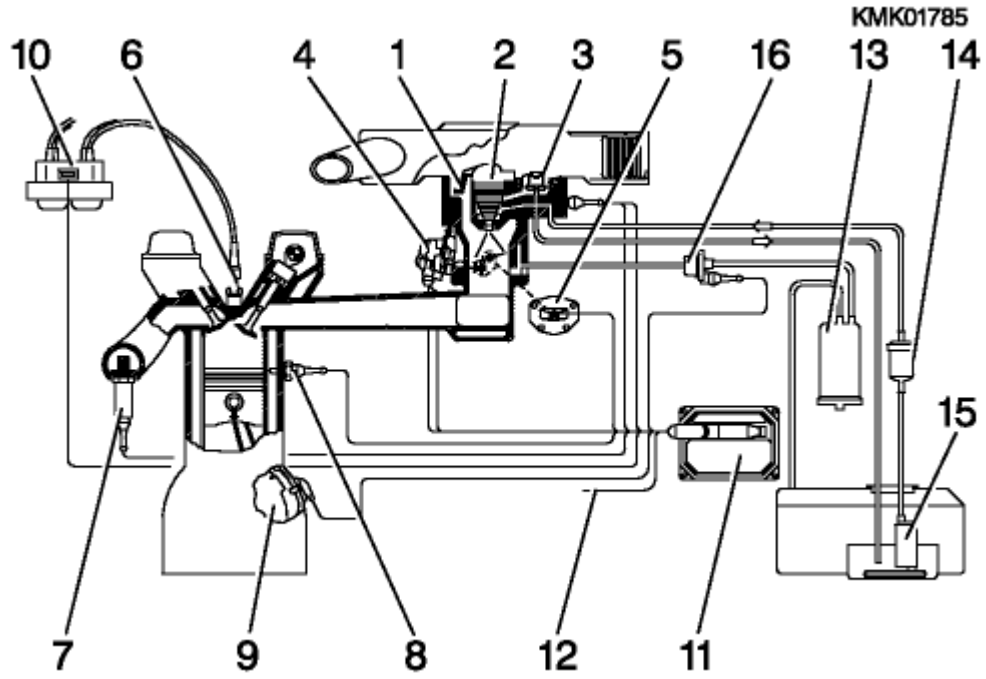
MA 1. 2

1 = Temperature sensor (intake air)
2 = Solenoid-operated injection valve
3 = Pressure regulator
4 = Throttle-valve positioner
5 = Throttle-valve twin potentiometer
6 = Spark plug
7 = Lambda sensor
8 = Temperature sensor (coolant)
9 = Ignition distributor with Hall trigger
10 = Ignition coil with ignition output stage
11 = Mono-Motronic control unit
12 = Diagnosis lead
13 = Active-carbon container
14 = Fuel filter
15 = In-tank electric fuel pump
16 = Tank-ventilation frequency valve



SYSTEM OVERVIEW MA 1.7

1 = Temperature sensor (intake air)
2 = Solenoid-operated injection valve
3 = Pressure regulator
4 = Throttle-valve positioner
5 = Throttle-valve twin potentiometer
6 = Spark plug
7 = Lambda sensor
8 = Temperature sensor (coolant)
9 = Engine-speed/reference-mark sensor
10 = Twin-spark coil
11 = Mono-Motronic compact control unit
12 = Diagnosis lead
13 = Active-carbon container
14 = Fuel filter
15 = In-tank electric fuel pump
16 = Tank-ventilation frequency valve



SYSTEM VARIANTS

MA 1.2.1

- 35-pole, two-row control unit. Same design as for Mono-Jetronic.
- Hall trigger in ignition distributor for triggering ignition and injection.
- External ignition output stage with ignition coil.
- Safety circuit by way of pump relay.
- Self-diagnosis for tester readout.
- Flashing code integrated, however lamp lead usually not brought out.
- Relay for intake-manifold preheating.
- Inputs, travel signal and encoding.
- Output for consumption indicator.
- Further inputs and outputs similar to Mono-Jetronic.

MA 1.2.2

Corresponds to HA 1.2.1 with same functions and components, however:

- 45-pole, 2-row control unit with microtimer pins.
- Modified pin assignment.
- Lambda sensor with ground lead (grey).

MA 1.2.3

Same control unit and components as for MA 1.2.2, however:

- Throttle-valve positioner with position feedback by Hall trigger. Control unit recognizes plunger position by counting Hall pulses.
- Self-diagnosis without flashing code, however still for diagnosis tester KTS 300.

MA 1.7

- 35-pole, low-cost compact control unit with 2-row contact strip on front.
- New pin assignment vis a vis MA 1.2.1.
- Inductive engine-speed/ reference-mark sensor for ignition and injection.
- Stationary high-voltage distribution, no ignition distributor.
- 2 internal ignition output stages.
- Twin-spark coil.
- Safety circuit by way of pump and main relay.
- Self-diagnosis for tester utilization, no flashing code.
- Lambda sensor with ground lead (grey) for sensor signal.

MA 3.0

- 31-pole control unit. 2-row contact strip in 3-row plug housing on end face.
- Hew pin assignment.
- Inductive engine-speed/reference-mark sensor for ignition and injection.
- Mode of operation similar to MA 1.7 with stationary high-voltage distribution.
- Safety circuit by way of relay combination with main and pump relay.
- Self-diagnosis with flashing code and for tester readout.
- Input for variant encoding (e.g. fuel grade) and reserve input.
- Output for A/C suppression relay

TESTING

All Mono-Motronic control units are equipped with self-diagnosis. A

flashing code can be additionally realized depending on system variant. Fault-memory readout, actuator diagnosis etc. are effected with the KTS 300 pocket system tester 0 684 400 300 and the program module PPG ... with software.
Appropriate adapter leads are available for connecting up the system tester to the respective diagnosis sockets in the vehicle.
The flashing code can be read out with the evaluation unit KDAW 9980.

There is no provision for testing with universal test adapter. No corresponding adapter leads will be made. Electrical testing with the aid of" the self-diagnosis and readout with KTS 300/flashing code is sufficient. For fault-finding, the fault path and component are subsequently tested with Motor tester and multimeter.
Further tests, such as: delivery of electric fuel pump, fuel pressure of pressure regulator, recording of injection signal or start control, are effected in the same way as for the Mono-Jetronic.

FURTHER NEW FEATURES OF MONO-JETRONIC AND MOTRONIC

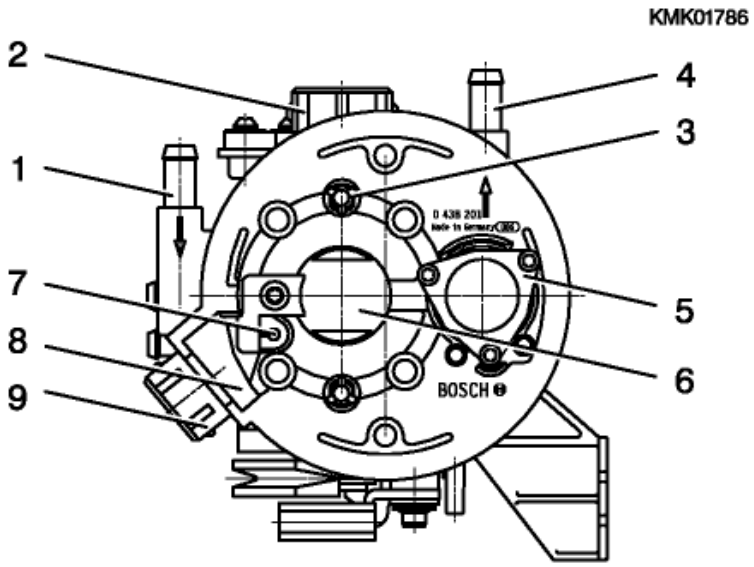
Compact injection unit and throttle-valve positioner with position feedback represent further-developed components of the central injection system. They supplement the available range without replacing the previous components.
Both components can be used both with the Mono-Jetronic and the Mono-Motronic. Vehicle manufacturers can decide which components to use: Either the familiar or the newly developed components.

COMPACT INJECTION UNIT

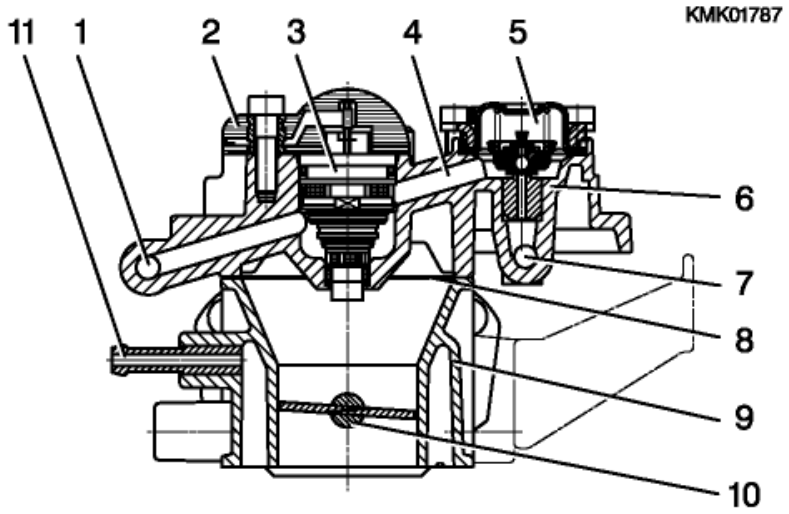
Differences with respect to previous unit:

- Compact, production-optimized design for engines up to 1.61 capacity.
- Standard design
- Throttle valve diameter 25... 3B mm
- 3 screws for pressure-regulator upper section
- Plastic molding with 4-pole plug for injection valve and temperature sensor. Modified plug assignment.
- Integrated potentiometer venting
- Fuel inlet and return not next to one another at an angle r but in parallel with one another and with greater distance between them.
- Upper and lower part slightly staked.

Top view
1 = Fuel inlet
2 = Throttle-valve potentiometer
3 = Staking of upper to lower part
4 = Fuel return
5 = Pressure regulator with 3 screws
6 = Injection valve and plastic molding with connector
7 = Temperature sensor (intake air)
8 = Rubber molding as seal
9 = 4-pole plug for injection valve and temperature sensor (intake air)



Sectional view
1 = Fuel inlet
2 = Plastic molding with plug
3 = Injection valve
4 = Rising duct for fuel
5 = Pressure regulator
6 = Upper part (hydraulic section)
7 = Fuel return
8 = Seal
9 = Lower part (throttle-valve section)
10 = Throttle valve
11 = Vacuum connection for tank venting and air preheating



Handling, testing and adjustment
Largely correspond to the previous Injection unit. Differences:

- Despite slight staking, hydraulic section and throttle-valve section can be separated and Individually replaced.
- Modified pin assignment of 4-pole plug at hydraulic section. Injection valve pin 3 and pin 4_r temperature sensor pin 1 and pin 2.
- Replacement of the previous injection unit with a compact one or vice versa is not envisaged.

Note:
Attention is to be paid to the following familiar features so as not to damage the injection unit:

- Do not adjust stop screw (minimum stop) of throttle valve.
- Do not loosen screws of pressure regulator.
- Do not adjust throttle-valve potentiometer.
- Assignment screw (on bottom of throttle lever) is not intended for adjustment of idling speed. When installing service parts, adjust assignment screw exclusively by way of voltage measurement at potentiometer.

THROTTLE-VALVE POSITIONER WITH POSITION FEEDBACK
This throttle-valve positioner corresponds to the previous one in terms of

design, function and outside dimensions. Differences:

- 6-pole connector on outside
- Permanent magnet on worm shaft on inside. To the side of it, fixed board with Hall 1C and evaluation electronics.

Mode of operation

The pulses generated by the permanent magnet in the Hall 1C are amplified by the electronics. The Motronic control unit senses the position of the plunger by counting the pulses. Such position recognition makes it possible to realize the dashpot function. There is thus no need for the mechanical dashpot required with certain engines.
Handling, testing and adjustment are the same as for the previous positioner. There is an additional check on the supply voltage and pulses of the electronics.