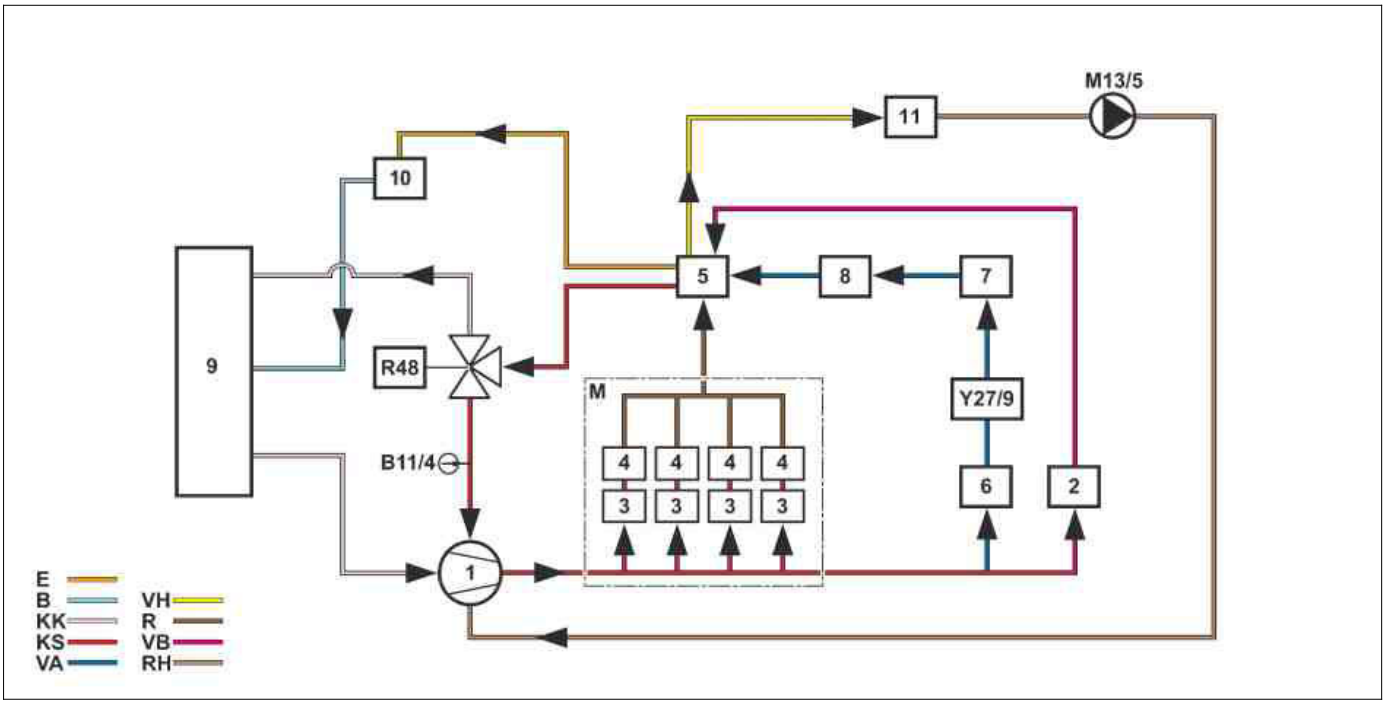

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Schematic diagram

1	*Coolant pump*
2	*Oil/water heat exchanger*
3	*Crankcase*
4	*Cylinder head*
5	*Coolant collector*
6	*Chain case housing*
7	*Bypass housing*
8	*Exhaust gas recirculation cooler*
9	*Radiator*
10	*Coolant expansion reservoir*
11	*Heat exchanger for the vehicle heating*
B11/4	*Coolant temperature sensor*
M13/5	*Coolant circulation pump*
R48	*Coolant thermostat heating element*
Y27/9	*Exhaust gas recirculation actuator*
B	*Filling line*
E	*Vent line*
KK	*Cooler circuit*
KS	*Short-circuit circuit*
M	*Engine*
R	*Engine return line*
RH	*Vehicle heating return line*
VA	*Exhaust gas recirculation (EGR) circuit*
VB	*Oil-water heat exchanger circuit*
VH	*Vehicle heating feed line*

Coolant circuit, function

The coolant in the cooling system is brought into circulation by the coolant pump. To allow the coolant to heat up more quickly in the post-start phase, the coolant pump can be switched off by means of the coolant pump switchover valve (Y133). The coolant pump switchover valve is actuated by the CDI control unit (N3/9).

The coolant pump pumps the coolant into the crankcase via 2 independent coolant inlets.

Part of the coolant is fed simultaneously to the cylinder head, to the oil-water heat exchanger and to the exhaust gas recirculation actuator (Y27/9), the bypass housing and the exhaust gas recirculation cooler via the chain case housing.

The coolant flow of the oil-water heat exchanger is controlled by a thermocouple depending on the engine oil temperature.

Part of the coolant is then fed via a coolant collector to the heat exchanger for the vehicle heating in the vehicle interior and the other part to the coolant thermostat housing.

When the coolant thermostat is in its closed state, the coolant flows to the coolant pump again and rejoins the circuit.

When the operating temperature of the engine is reached, the coolant thermostat opens to switch in the radiator circuit, and the radiator then becomes part of the coolant circuit.

Depending on the position of the coolant thermostat, more or less coolant now flows through the radiator or directly to the coolant pump. The temperature of the coolant in the coolant circuit is regulated in this way. The coolant thermostat is controlled by the CDI control unit via the coolant thermostat heating element.

The temperature-dependent coolant level is adjusted by means of the filling line between the coolant expansion reservoir and the radiator.

The cooling system is ventilated via a vent line between the coolant expansion reservoir and the coolant collector.

The coolant pump is switched off for a cold start for a maximum of 500 s if the following conditions are fulfilled:

- The limits stored in the CDI control unit for the intake air and coolant temperature as well as for the injected total fuel quantities are still not reached.
- The engine speed or injection quantity has not exceeded its established limit value.
- No "heating" was requested by the automatic air conditioning control and operating unit (N22/7).

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ENGINE 651.9