Electric fan

The electric fan is arranged behind the cooler. The engine control system activates the electric fan.

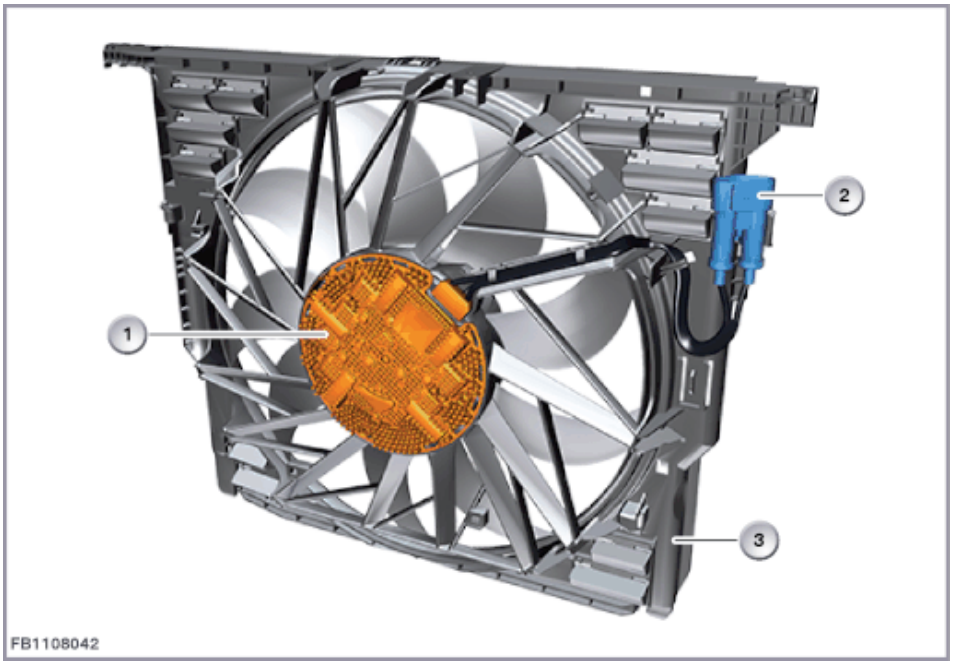
A **new** feature is that the power supply from terminal 30 via a relay comes from the engine control system.

Depending on the equipment specification, this electric fan cutoff relay is at different installation locations. Observe the diagnosis installation location!

Functional description

The electric fan is controlled by the engine control unit via a pulse-width-modulated signal (evaluation by electronic circuitry in the fan). The engine control unit controls the various radiator fan speeds by means of a pulse-width modulated signal (between 7% and 93%). Pulse duty factors less than 7% and greater than 93% do not trigger activation but rather they are used for fault recognition purposes. The speed of the radiator fan is dependent on the coolant temperature at the coolant outlet (radiator) and the pressure in the air conditioning system. When the cars driving speed increases, the speed of the radiator fan decreases.

For the after-run of the electric fan, the engine control system lowers the frequency to 10 Hz. The pulse duty factor is used to select the time (maximum 11 minutes) and fan speed.

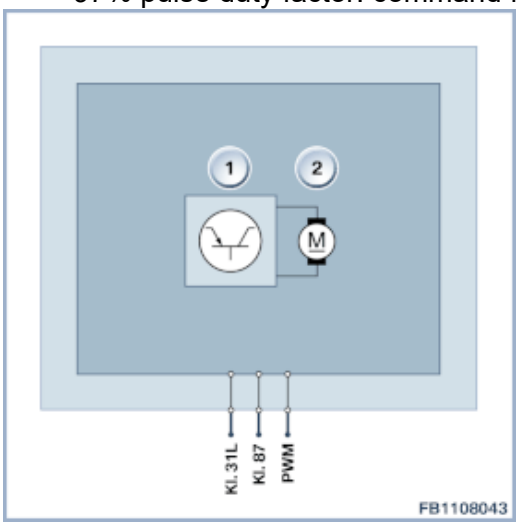


Item	Explanation	Item	Explanation
1	Drive for electric fan	2	4-pin plug connection
3	Fan cowl		

Structure and inner electrical connection

The drive of the electric fan is a brushless motor. The electric fan has its own electronic evaluation unit and its speed is regulated by a pulse-width modulated signal. The pulse duty factor in the normal operating mode (100 Hz) is converted into a speed signal.

- 93% pulse duty factor: maximum fan speed
- 97% pulse duty factor: command for self-diagnosis of the electronic evaluation unit



Item	Explanation	Item	Explanation
1	Evaluation electronics	2	Drive for electric fan

Pin assignments

Pin	Explanation
Terminal 31L	Load ground
Terminal 87	Battery voltage terminal 30 via radiator fan cutoff relay
PWM	Pulse-width modulated signal

Characteristic curve and setpoint values

The permitted operating temperature lies between -20 °C and 120 °C. The static pressure lies between 0 and 0.8 bar.

Example: characteristic curve depending on fan output

Item	Explanation	Item	Explanation
1	Static pressure	2	Characteristic curves for flow rate
3	Volumetric flow		

Observe the following setpoint values for the electric fan:

Variable	Value
Voltage range	8 to 17 Volts
Temperature range	-40 to 120 deg C

Diagnosis instructions

Failure of the component

If the electric fan fails, the following behaviour is to be expected:

- Fault entry in the engine control unit
- Power reduction (if engine overheated)
- Check Control message in the instrument panel
- Damage to thermally critical components in the car front end after stopping the engine (post-heating of the engine)

General notes

The electronic evaluation unit runs an internal fault diagnosis for critical states. If a fault is detected, operation is maintained as far as possible.

If activation by pulse width modulation fails, the electric fan is activated in the emergency mode with a fixed pulse duty factor.