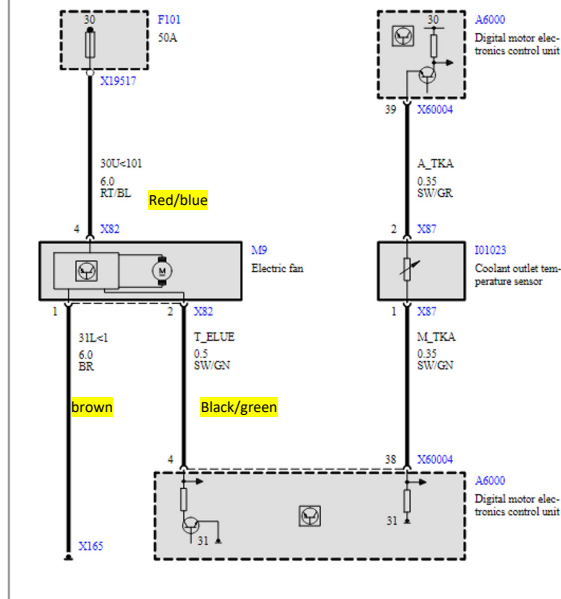


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WIRE COLORS	
English	DIN (German)
Black	.Sw
Blue	.Bl
Brown	.Br
Green	.Gn
Gray	.Gr
Orange	.Or
Pink	.Rs
Purple	.Vi
Red	.Rt
Turquoise	.Tk
White	.Ws
Yellow	.Ge

BMW 328Ci E46 Coupe (1999-2000)

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CAR INFORMATION	
Brand	BMW
Type	328Ci
Code	E46
Series	3
Built	1999 - 2000
BODY	
Length	4488 mm
Width	1757 mm
Height	1369 mm
Weight	1470 kg
Body type	Coupe
POWER UNIT(S)	
Engine brand	BMW
Type	M52
	6 cylinder inline DOHC 24v VANOS petrol engine
Code	M52TU B28
Management system	DME MS42.0
Cylinders	6
Valves	24
Arrangement	inline 6
Displacement	2793 cm3
Stroke	84 mm
Bore	84 mm
Compression	10.2 :1
Fuel type	petrol
Power	144 kW / 196 HP
at	5500 rpm
Torque	280 Nm
at	3500 rpm
PERFORMANCE	

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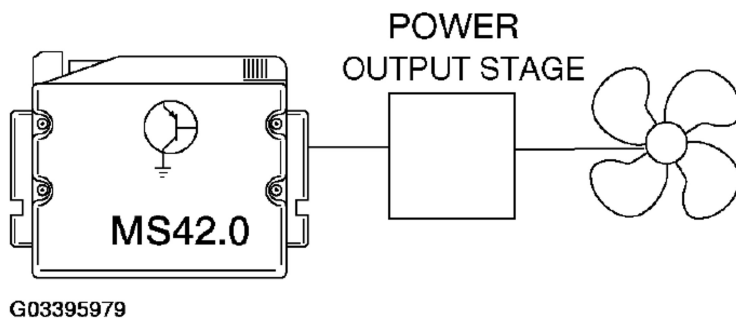
Electric fan

Under certain operating conditions, the engine control activates the electric fan at various speeds.

The electric fan is activated by means of a power output stage directly on the fan motor. The motor control unit activates this power output stage by means of a square-wave signal with duty factors (variable pulse width) between 10 and 90 %, thus controlling the various speeds of the electric fan. Pulse duty factors less than 5 % and greater than 95 % do not trigger activation but rather they are used for fault detection purposes. The power output stage features its own positive and ground supply.

The fan speed is influenced by the coolant temperature at the radiator outlet and the pressure in the air conditioning system. The fan speed is reduced as the vehicle speed increases.

Fig. 26: Electric Fan Circuit Diagram
Courtesy of BMW OF NORTH AMERICA, INC.



Electric Fan

The electric cooling fan is controlled by the ECM. The ECM uses a remote power output final stage (mounted on the fan housing).

The power output stage receives power from a 50 amp fuse (located in glove box above the fuse bracket). The electric fan is controlled by a pulse width modulated signal from the ECM.

The fan is activated based on the ECM calculation (sensing ratio) of:

- Coolant outlet temperature
- Calculated (by the ECM) catalyst temperature

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The fan is activated based on the ECM calculation (sensing ratio) of:

- Coolant outlet temperature
- Calculated (by the ECM) catalyst temperature
- Vehicle speed
- Battery voltage
- Air Conditioning pressure (calculated by IHKA and sent via the K-Bus to the ECM)

Fig. 26: Electric Fan Circuit Diagram

Courtesy of BMW OF NORTH AMERICA, INC.

Activation of the electric fan:

When the vehicle is first started the fan is activated briefly (20% of maximum speed), then it is switched off. This procedure is performed for diagnostic purposes.

The voltage generated by the fan when it slows down (it becomes a generator at this time) must meet the power output stages programmed criteria. This will confirm the RPM of the fan, if this is not met the signal wire from the output stage is switched to ground and a fault is set in memory.

NOTE: If the ECM indicates a fault check the fan for freedom of movement

After the initial test has been performed, the fan is brought up to the specified operating speed. At 10% (sensing ratio) the fan runs at 1/3 speed. At a sensing ratio of between 90-- 95% the fan is running at maximum speed. Below 10% or above 95% the fan is stationary.

The sensing ratio is suppressed by a hysteresis function, this prevents speed fluctuation. When the A/C is switched on, the electric fan is not immediately activated.

After the engine is switched off, the fan may continue to operate at varying speeds (based on the ECM calculated catalyst temperature). This will cool the radiator down from a heat surge (up to 10 minutes).