



Innovative
temperature management
Thermal management control units

BEHR[®]

MAHLE Aftermarket GmbH
Pragstraße 26–46
70376 Stuttgart/Germany
Phone: +49 711 501-0

www.mahle-aftermarket.com
www.mpulse.mahle.com



We've got it under control

MAHLE—your global partner for thermal management

Our aftermarket portfolio brings you the comprehensive system expertise of the MAHLE Group—a leading original equipment manufacturer in the international automotive industry. It encompasses thermal management components for engine cooling & air conditioning in both passenger cars and commercial vehicles, as well as engine parts, gaskets, filters, starter motors & alternators, e-mobility & electronics, alongside workshop equipment & diagnostics. Thanks to our international presence, numerous regional warehouses, and an extensive distribution network, we guarantee swift worldwide access to products in MAHLE's proven quality.

Our large portfolio of control units includes thermostats, thermal switches, and thermal sensors for a wide range of applications in passenger cars and commercial vehicles

Very good market coverage

The MAHLE thermostat range of our BEHR sales brand has a very good market coverage. It is being continuously updated, and is sold via the MAHLE aftermarket network.

MAHLE quality

Our products are produced to our exacting standards—if it's got the MAHLE name on the outside you will always find MAHLE quality on the inside. We are committed to providing the finest products at the highest quality with the best service.



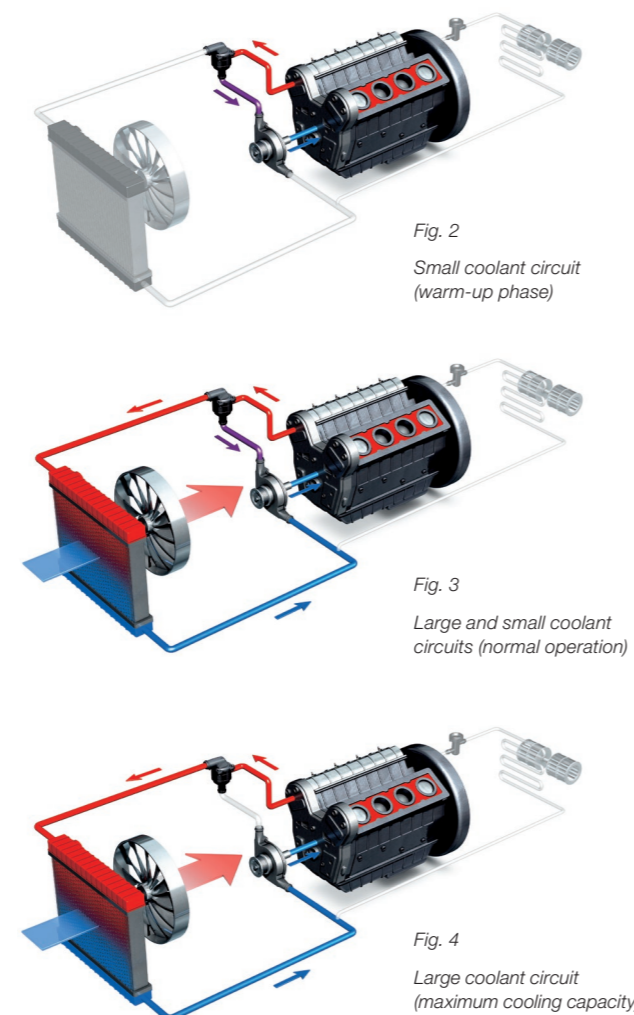
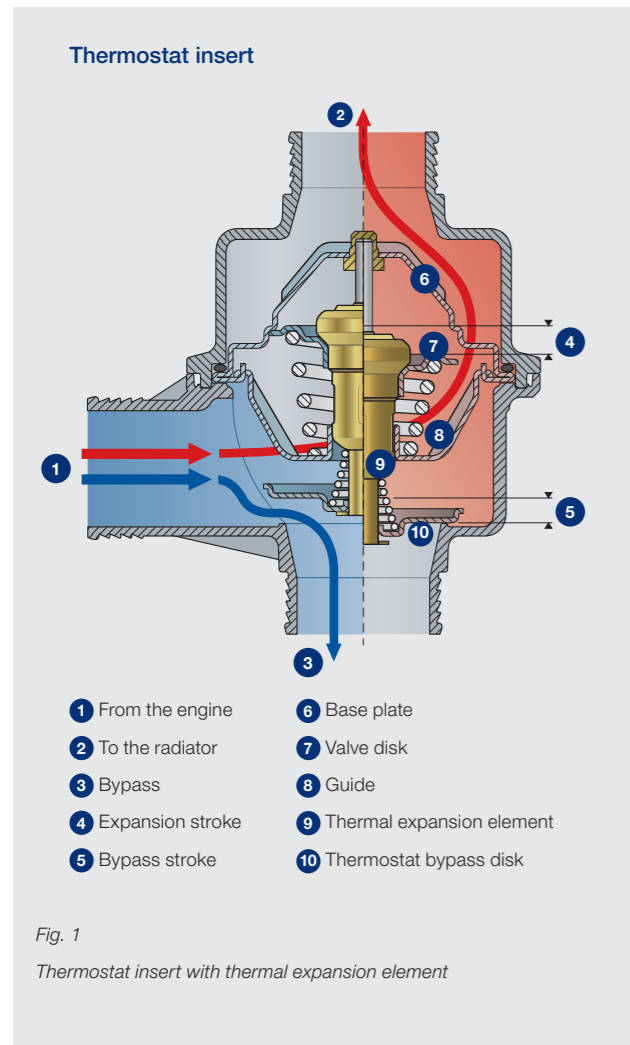
➤ Always a great decision:
MAHLE thermal management control units

Thermostats: the managers of the cooling circuit

Engines and engine accessories are only energy-efficient and low-wearing at certain operating temperatures. Smart control of the coolant flows ensures that the optimal temperature is reached more quickly and held constant. This process is regulated by coolant thermostats. These have a thermal expansion element in the thermostat insert at their core (Fig. 1). As the temperature changes, a built-in wax element changes volume, thus acting as a regulator.

When the engine is cold, the coolant circuit remains closed, allowing the engine components to come up to operating tem-

perature more quickly. Instead of flowing through the radiator, the coolant passes through a smaller circuit known as the by-pass loop (Fig. 2). Heat from the engine warms the coolant to a defined temperature. Once the optimum temperature level is reached, the thermostat opens the flow inlet to the radiator (Fig. 3). If the temperature rises too sharply, all the coolant circulates through the radiator while the by-pass loop closes, again avoiding overheating of the engine (Fig. 4). The cooling circuits of the engine accessories can be controlled separately according to this mechanism, in the same manner as the engine's primary cooling circuit.

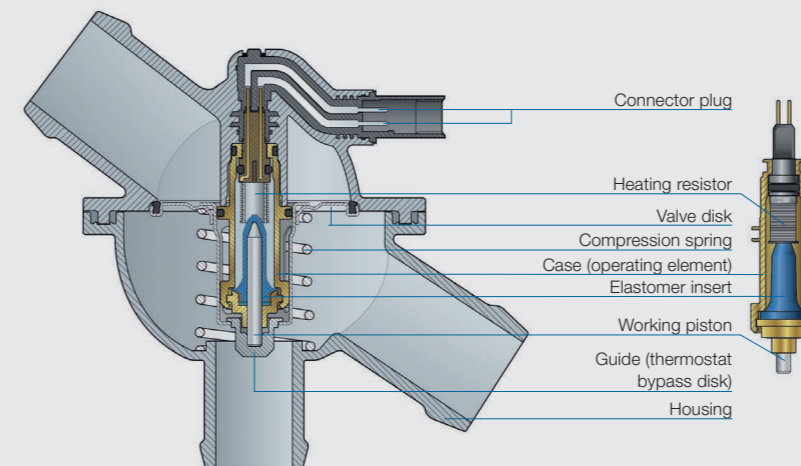


Map-controlled thermostats: the safe choice for greater efficiency

This thermostat technology allows the operating temperature of passenger car engines to be safely raised to a constant higher level, thus optimizing combustion and all accompanying parameters. The operating map, a dataset stored within the engine's control unit, provides optimal values for temperature and cooling-circuit mode whatever the operating conditions. In addition, the electronic control unit analyzes the current output profile to determine, for instance, whether the engine is being called upon to perform at a high or low level. This data is used to control a heating element inside the thermostat, enabling it to adjust much more rapidly than traditional thermostats that use conventional thermal expansion elements. Map-controlled thermostats can thus respond more quickly and accurately to keep the engine within an optimal temperature range, helping to reduce fuel consumption and lower emissions.



Design of a map-controlled thermostat



Advantages:

- Improved combustion due to increased wall and component temperatures
- Lower fuel consumption due to increased viscosity of the engine oil and reduced frictional loss
- Lower pollutant emissions
- Higher performance at full load due to reduced coolant temperature
- Greater comfort thanks to improved cabin heating performance

Possible causes of a malfunction:

- Jamming of the working piston
- Component corrosion
- Defective thermostat housing or damaged gasket
- Foreign matter in the cooling system
- Faulty electric actuation of map-controlled thermostats

Possible consequences of a malfunction:

- Engine overheating to the point of engine damage
- Greater wear and inefficient operation due to incorrect operating temperature
- Insufficient cabin heating
- Malfunctioning of the climate control system
- Noncompliance with exhaust emission standards
- Increased fuel consumption
- Coolant loss

Optimal working atmosphere

Our thermal management control units

Coolant thermostats

TX thermostat inserts

Precise regulation of coolant circuit to about 20 m³/h. For passenger cars, commercial vehicles, stationary engines, and construction and agricultural machinery.



THD sleeve valve thermostats

Regulates coolant circuit over 20 m³/h. For large passenger cars, commercial vehicles, ships, and railroad vehicles.



TH housing thermostats

Integrated mixing chamber in the thermostat housing, linked to the coolant circuit by a flange or hose connectors.



TI integral thermostats

Thermostat insert, cover, connection, and gasket in one product. Enables direct flange mounting on the engine block.



TM map-controlled thermostats

Electronic actuation by means of an integrated heating resistor. Load-dependent regulation of the temperature level allows for optimal engine temperatures, enhanced efficiency, and fuel savings of up to 2%.



Exhaust gas regulation

TE EGR thermostats

Regulation of coolant flow in the EGR cooler. An optimized EGR temperature reduces pollutant emissions.



Oil thermostats

TO oil temperature controllers and inserts

For automatic transmissions. A regulated oil temperature shortens warm-up times, maintains the ideal operating temperature, and optimizes shifting comfort while reducing wear and providing fuel savings of up to 1%.



Thermal switches and thermal sensors

TSW thermal switches

Reliable protection against engine overheating. The circuit opens at a defined coolant temperature, activating the radiator fan.



TSE thermal sensors

These provide real-time temperature data to the electronic engine control unit from various parts of the engine.



Our services

We provide our customers with a comprehensive range of information, advice, and services. For example, we provide educational materials such as technical posters or our TechTool, regular workshop information such as our Technical Messenger, direct help from our Aftermarket Hotline workshop professionals, and sales support materials. In our training portal, we offer automotive professionals numerous opportunities to deepen and expand

their theoretical and practical expertise, including live in-person or online events, and interactive e-learning offerings that are available around the clock.

You can find comprehensive information online at www.mahle-aftermarket.com.



Find out more about MAHLE Aftermarket and our products and services on the following websites:

- **Aftermarket online catalog**
catalog.mahle-aftermarket.com
- **MAHLE e-shop**
Wholesalers can order MAHLE products here quickly, easily, and securely. Features product images and full details about availability and prices. customer.mahle-aftermarket.com
- **Media Center**
Our brochures and publications: the latest information at your fingertips. mahle-aftermarket.com/media-center

- **Services**
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