

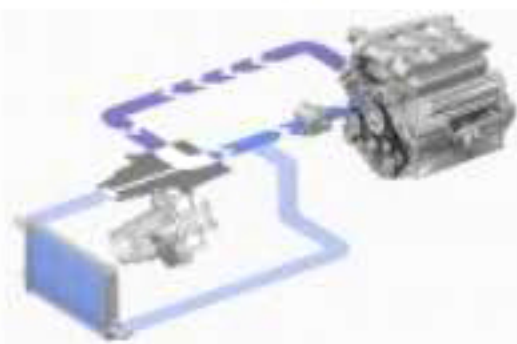
So Simple, it's Ingenious



Functional Principle of Wahler Thermostats

Wahler thermostats ensure that an engine reaches its operating temperature as quickly as possible and then maintains it despite constant load changes. This is necessary in order to make an engine work economically and with a minimum of wear and tear. Consequently, the thermostat only needs to control the path of the coolant through the coolant circuit on the basis of coolant temperature. The principle is demonstrated by these illustrations.

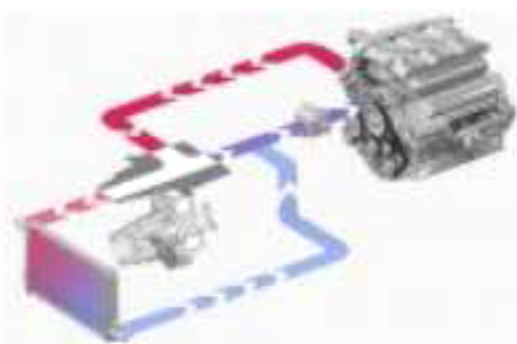
Over the years, although thermostats have been continuously improved—e.g., with respect to response speed and accuracy, measuring sensitivity, and measuring tolerance—their basic operating principle remains virtually unchanged.



inner engine circuit.

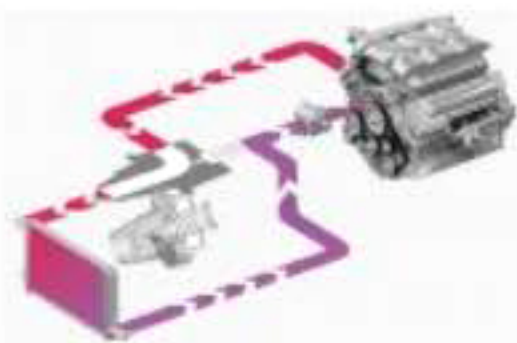
Warm-up period

Once the cold engine has been started, it must reach its optimum operating temperature as quickly as possible. This is an essential prerequisite for fuel economy and maximum engine output. To accomplish this, the thermostat closes the radiator inflow, and the coolant circulates only through the



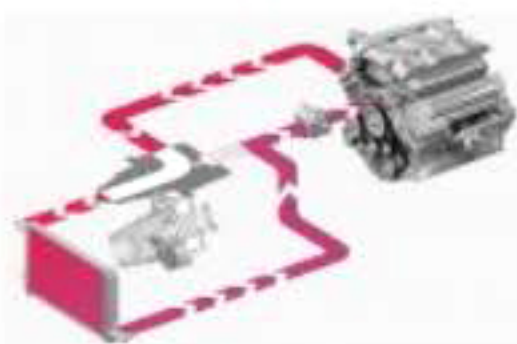
Standard operation

The engine has attained its operating temperature. The coolant temperature reaches the thermostat's opening temperature. To regulate the coolant temperature in standard operation, only a small portion of the volumetric coolant flow needs to be directed through the radiator. The thermostat therefore independently controls the volumetric distribution rate between radiator and bypass. This operating condition represents the most common thermostat application.



Full-temperature operation

In full-load operation, e.g., ascending a mountain road, the engine produces much heat and requires the maximum cooling system effect in order to retain its safe operating temperature. In response, the thermostat closes the bypass port and directs the full volumetric flow through the radiator.



Post-heating phase

After it has been shut down, the engine still continues to produce heat for some time. With the engine at a standstill, coolant circulation occurs only due to thermal processes. In this condition, it is essential that the engine is not allowed to overheat. As a result, the thermostat opens to its full lift, allowing the maximum volumetric flow. This opening ratio is important in special operating conditions such as the post-heating phase discussed in this example.