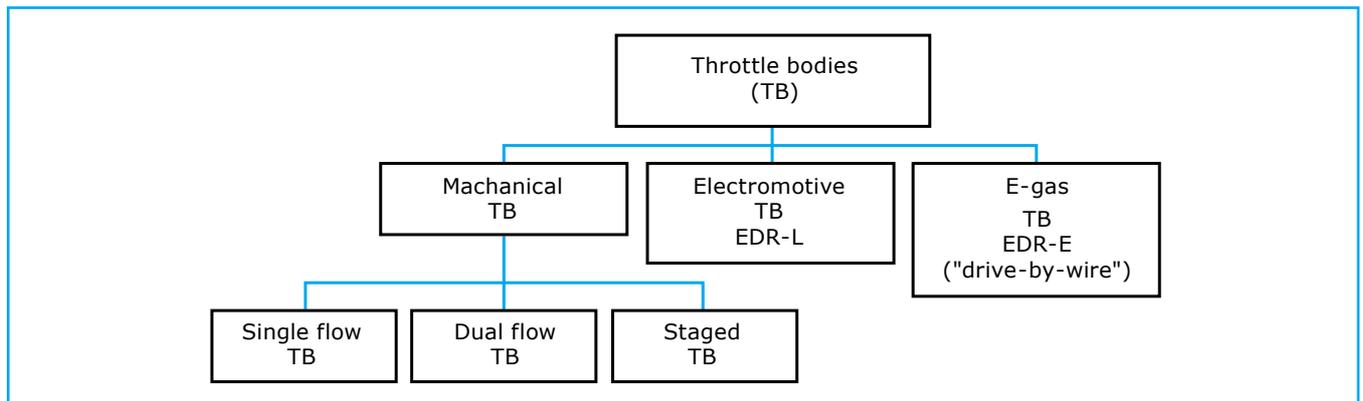


Throttle bodies

Product Summary (gasoline-powered vehicles)

Vehicle:	Product:	Throttle bodies
Various with gasoline engines	Pierburg no.:	Various: See the current catalog, TecDoc CD or system using TecDoc data.



Overview of throttle bodies (gasoline-powered vehicles)

Throttle valves regulate the air flow from the motor and thus the cylinder charge by restricting the intake air.

In the past, throttle bodies were used primarily for gasoline engines. In conjunction with pollution reduction efforts, they are increasingly finding application with diesel engines as well.

The summary above shows the range of models offered for gasoline-powered vehicles. It reflects the technical development of throttle bodies.

An application in the future will be for rate control of fuel cells.

➔ For information regarding throttle bodies with diesel vehicles ("butterfly control valves"), see *Service Information SI 0075*.



Single flow mechanical throttle body

Mechanical throttle body

Load control with a mechanical throttle body is still the most widespread method used worldwide.

A linkage is used to transfer the motion of the acceleration pedal to the throttle valve.

Other constructions are available for various requirements:

- Idling actuator
- Vacuum connections
- Potentiometers/angle sensors
- Micro switches
- Heating connectors

Depending on the application, the throttle body is produced as a single or multipass model.

Subject to change and deviation from the illustrations

Among **multipass throttle bodies**, a distinction is made between staged and dual or multiple flow throttle bodies.

The **dual throttle body** basically consists of two parallel throttle valves. Both throttle valves open and close simultaneously.



Dual throttle body

Staged throttle bodies consist of two mechanically coupled throttle valves, usually with differing diameters. The two throttle valves do not open and close at the same time.

When the accelerator pedal is pressed, at first only one valve opens. The second stage opens only after the first is opened between 20 and 50 degrees (depending on the application).



Staged throttle body

Whereas the idling speed used to be controlled by a separate adjuster (on the intake manifold for example), newer mechanical throttle bodies have an **integrated idle speed actuator (ISA)** as an add-on.

Depending on the running state, the ISA uses an air bypass of the throttle valve to regulate the air flow necessary for warm-up or stable idling.



Throttle body with an ISA using a step motor

☞ There are a number of other common designations for an ISA, such as *idle regulator, idle setting valve, idle stabilizer* etc.

See also *Service Information SI 0061* and *SI 0062*



Throttle body with an ISA using a proportional valve

EDR-L (electromotive throttle body)

The EDR-L, with integrated electromotive throttle adjustment for idling, represents the transition from mechanical throttle bodies to the fully electronic "E-gas" system.

With an EDR-L, idle adjustment is carried out using the throttle valve. Depending on the engine load and temperature, the throttle valve is opened or closed by the throttle actuator.



Electromotive throttle body "EDR-L"

☞ For more information regarding EDR-L, see → *Service Information SI 0073*

The EDR-L offers many of the advantages of electronic throttle valve control:

- Start control
- Warm-up control
- Autothrottle
- Dashpot control (close damping)

If the accelerator is released too quickly, the throttle valve is caught by the throttle actuator and returned slowly until the required idle speed has been reached.

EDR-E (E-gas throttle body)

With electronic engine power control (E-gas, electronic gas pedal, "drive by wire") actuation is no longer carried out via linkages, but rather under complete electronic control:

The position of the accelerator is recorded by a gas pedal encoder and the value is entered in the engine control unit.

The EDR-E is then adjusted according to a characteristic curve stored in the engine control unit, and the throttle valve set to the desired position via an electronic actuator.



E-gas throttle body "EDR-E"

These components can take advantage of all the options for influencing the air mass flow rate in a modern gasoline engine:

- Accelerator conversion
- Idle control
- Cruise control
- Adjustment to the characteristic curve for the vehicle
- Anti-slip control
- Improved fuel economy
- Reduction of emissions

☞ For more information regarding EDR-E, see → *Service Information SI 0074*.

Information for the workshop

Throttle bodies generally do not require maintenance.

However, if a malfunction does occur, the cause is usually contamination, particularly in conjunction with exhaust gas recirculation (EGR). In this case, the throttle body and idle speed actuator (if present) should be checked for dirt or grime deposits.

Intake air with a high oil content can lead to deposits which

- reduce the flow cross-section,
- cause the throttle valve and the ISA to respond sluggishly or
- cause moving parts to stick.

Causes of oil in the intake could be leaks, excessive wear or damaged piston rings („blow-by“) which allow gases from the combustion chamber to get into the crankcase. Crankcase ventilation causes contaminants in the crankcase to be returned to the engine for combustion.

Thus, for example, it can occur that the throttle valve and ISA no longer operate normally and that the on-board diagnostics detect this and indicate a malfunction.

Please also check:

- Any switches present for idle detection or full-load detection
- Wear on the throttle shafts (for vehicles with high tachometer readings)
- A defective mass air flow sensor can send false input signals to the engine control unit, which can cause it to regulate the throttle valve incorrectly.

Additional information

The following additional information is available on the subject of throttle bodies:

- Throttle bodies catalog
- Service information SI 0022/A, SI 0054, SI 0055, SI 0061, SI 0062, SI 0069
- Technical information TI 202 (information regarding testing and adjustment of older mechanical throttle bodies)

 Product information (PI) and service information (SI) about our products are found on the Pierburg CD (item no. 8.40002.50.0) or as a collection in "Folder I".

The information is also available free of charge on our Web site at

www.msi-motor-service.com