Smooth-Running Value and Misfiring Detection

The smooth-running values of the individual cylinders are indicated for troubleshooting purposes.

The engine must run at idle speed for at least 3 minutes to ensure that the correct values are set. Smooth idle speed can only be evaluated with the engine running at idle speed (cold or hot). An indication of the combustion quality of individual cylinders can be obtained by evaluating the crankshaft acceleration, measured at the crankshaft position/rpm sensor. An individual cylinder with poor combustion can be detected very well in this way.

Random fluctuations of the individual cylinders can only be detected by close observation of the value. The values over all cylinders are zero in the engine with theoretically uniform combustion.

An increase in the smooth-running values may be caused by various factors (e.g. misfiring, secondary air, mixture deviations, faults in fuel supply, low compression). For this reason, exact intervention limits cannot be specified.

The rotational speed (engine speed) of the engine is measured at the incremental wheel with the aid of a hall-effect sensor. Moreover, the smooth running of the engine is also monitored (misfire detection) as a measure of the engine speed.

To detect misfiring, the increment gear is divided (by the control unit) into 3 segments corresponding to the ignition interval, i.e. 3 sparks per crankshaft turn on a 6-cylinder engine and 2 sparks in 2 segments on the 4-cylinder engine. Within the control unit, the periodic duration of the individual increment gear segments is measured and statistically evaluated. For each point on the characteristic map, the maximum permissible rough running values are stored as a function of engine speed, load and engine temperature.

If these values are exceeded within a certain number of combustion cycles, the cylinders detected as faulty are stored in the fault code memory.