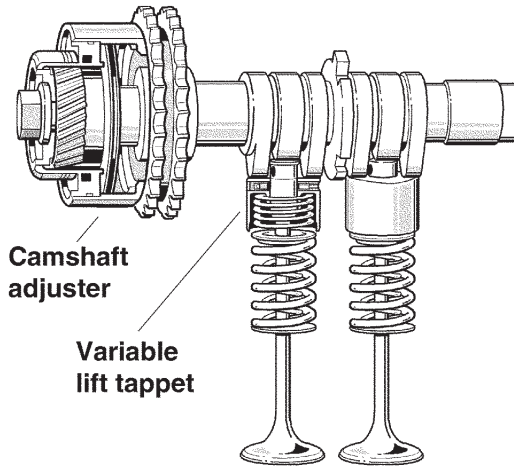


## System Descriptions – E-Throttle 7.8

### VarioCam Plus

The intake camshaft adjustment system (VarioCam) has been upgraded to the VarioCam Plus system by the addition of an intake valve stroke control function. The two systems of the VarioCam Plus are actuated independently of each other by the ME 7.8 ECM.



VarioCam Plus System – Adjustable Tappet Controls Valve Stroke (3mm or 10mm valve lift) and Camshaft Adjuster Controls Valve Timing (advance or retard cam timing)

An electrohydraulic switching valve is attached to each of the cylinder heads of cylinder bank 1 and 2. Engine speed, accelerator pedal position, engine oil and coolant temperature as well as gear detection (and vehicle speed) are all required as input variables.

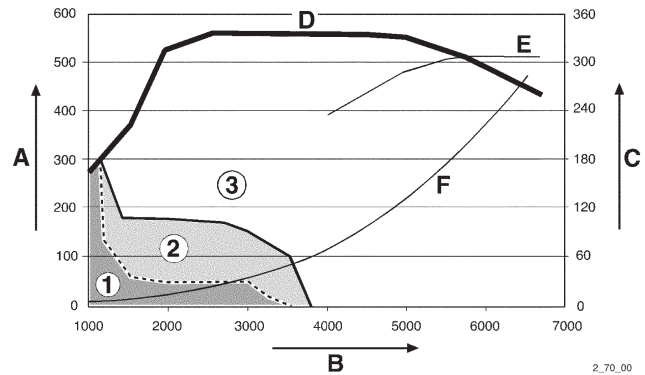
The switch-over points are calculated according to the needs of the driver based on the programmed shift maps in the ME 7.8 ECM. Adjustment of the throttle valve position, mixture formation, ignition timing and actuation of the switching valves occur simultaneously during the switch-over operation. The end result is an optimal compromise between maximum power and maximum torque.

Other operating phases of the engine have also been optimized thanks to variability of the system. This includes better fuel economy, lower emissions (including the cold-start and warm-up phases), improved driveability and idle quality.

### Valve Stroke Adjustment System

The electrohydraulic 3/2-way switching valve is closed when de-energized. When closed, the valve stroke of the inlet camshafts is 3 mm. With the small valve stroke (3 mm), the new Turbo can reach a maximum speed of 90 mph (150 km/h).

When the system is switched over to the large valve stroke (10 mm) with performance-oriented cam timing, speeds of over 180 mph (300 km/h) are possible. Due to the configuration of the ME 7.8 ECM with E-Throttle, the switching operations are so smooth that they are hardly noticed by the driver.



Switching points of camshaft and valve stroke adjustment systems.

- 1 - Timing Retarded, Valve Stroke 3 mm
- 2 - Timing Advanced, Valve Stroke 3mm
- 3 - Timing Advance, Valve Stroke 10 mm

- A - Torque (Nm)
- B - Engine Speed (rpm)
- C - Power Output (kW)
- D - Torque
- E - Power Output
- F - Road Resistance in Top Gear