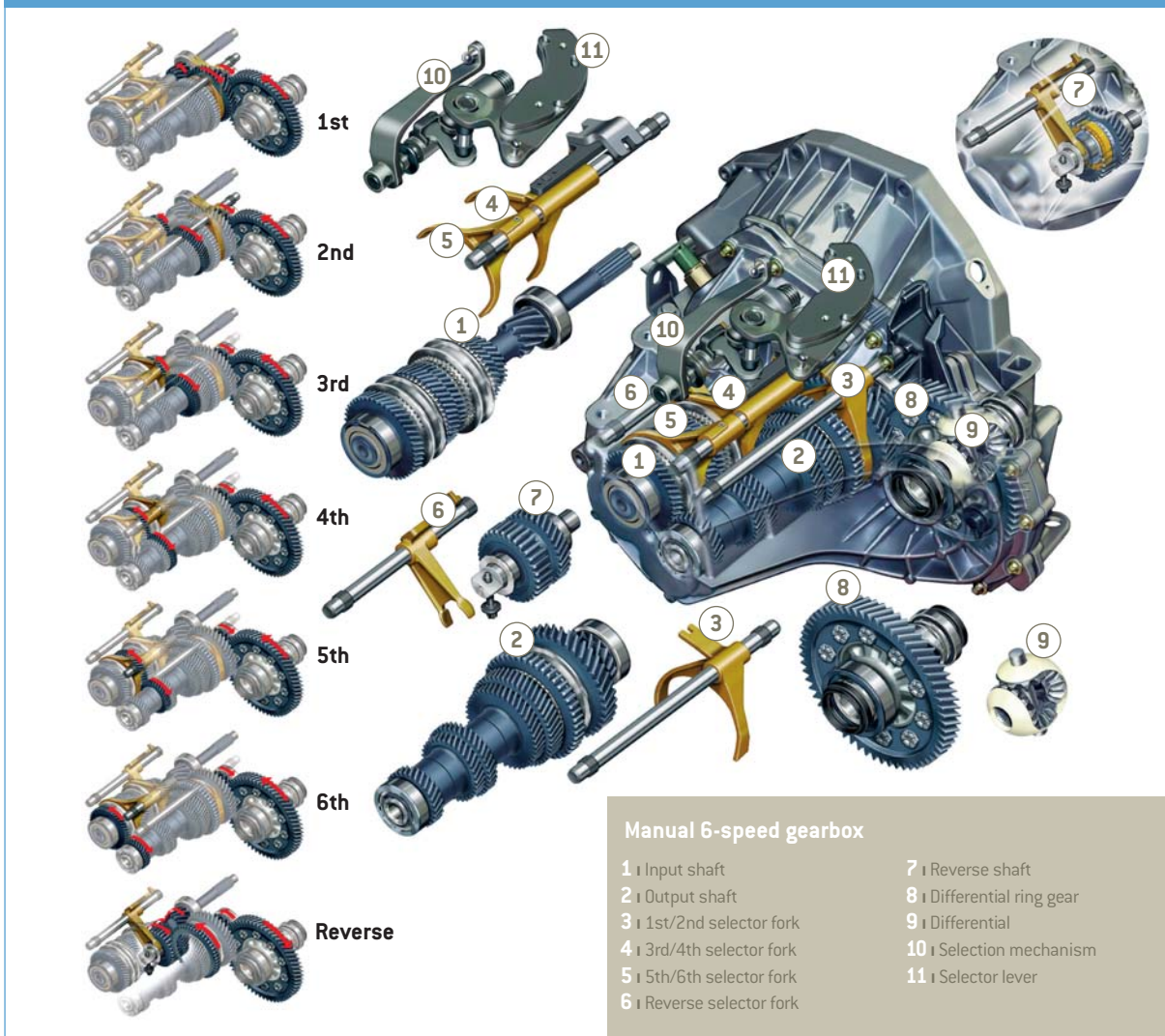




# The gearbox

The gearbox affects both the behaviour of a car and its engine. The length and number of gear ratios give the engine a temperament which may be **sporty, or more sedate and fluid** in the case of a touring car.



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## BASIC FACTS

**Gearboxes can be classified** into two major families, manual and automatic, and each family comprises several subdivisions.

**On manual gearboxes**, the decision to change gears is left entirely to the driver, who can thus adapt the behaviour of the car just as he wants, stretching the gears for a sporty drive or, on the contrary, changing them early for a more economic drive. However, from its design, the gearbox predestines the

vehicle for a specific type of behaviour. Short gears require frequent intervention from the driver, but they give the car greater "responsiveness" on acceleration. Inversely, tall gears improve comfort while reducing consumption on motorway journeys, for example. The only drawback of manual gearboxes is that they do not protect the powertrain and, in particular, the engine. As it is up to the driver alone to decide when to change gears, over-revving or under-revving may occur, which may compromise the lifespan or reliability of the engine. ●●●

Life on board : Safety

Life on board : Environment

Life on board

Life on board : Mobility



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●●● **Automated gearboxes**, managed by a computer, protect the engine from these sort of risks. Moreover, thanks to the appearance of fuzzy logic, the computer can occasionally modify gear change decisions, adapting them to a sports driving style, or, inversely, to motorway driving. The computer can also choose the best gear in order to reduce consumption. Currently, three major technologies share the automated gearbox market.

**The robotised gearbox** (see sheet) is a manual gearbox to which servo-mechanisms are added, i.e. a “robot” which changes the gears and manages the clutch according to the

instructions received from the computer. It provides excellent efficiency, and hence does not lead to over-consumption. Its only drawback is a short break in engine torque when the gears are changed. The comfort obtained is similar to that of a car with a manual gearbox.

**The automatic gearbox** (see sheet) does not have this special feature. Able to change gears under load, i.e. without a break in engine torque, it provides a high level of comfort. However, this is offset by over consumption, in particular at the torque converter, which replaces the clutch.

**CVT (Continuously Variable Transmission)** removes the notion of changing gears. Its pair of conical pulleys, linked by a belt, allows continuous variation of its transmission ratio. In addition, by constantly adjusting the engine speed to driving conditions, it enables the best torque, maximum power or best efficiency to be exploited, for economical driving.

### IN SHORT

The gearbox affects both the behaviour of a car and its choice of engine. Whether it be a manual or automatic gearbox, there must be consistency between the number and length of its gears and the vocation of the car: sports, urban, touring, economy.