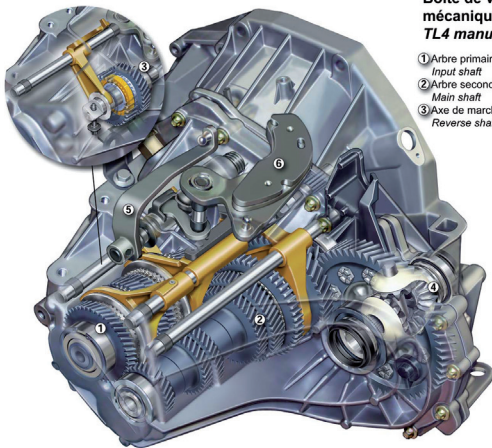


# GEARBOX

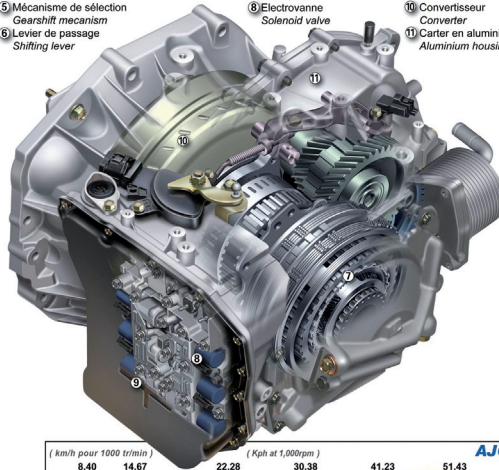
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The gearbox affects both the behaviour of a car and its engine. The length and number of gear ratios give the engine a temperament which may be **sporty, or more sedate and fluid** in the case of a touring car.



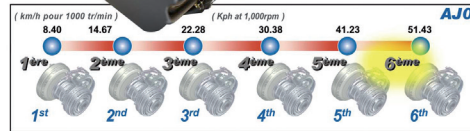
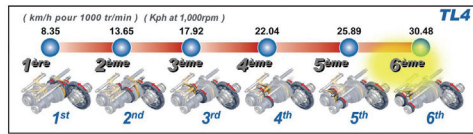
**Boîte de vitesses mécanique TL4 6 vitesses**  
**TL4 manual transmission (6 gears)**

- ① Arbre primaire  
Input shaft
- ② Arbre secondaire  
Main shaft
- ③ Axe de marche arrière  
Reverse shaft
- ④ Différentiel  
Differential
- ⑤ Mécanisme de sélection  
Gearshift mechanism
- ⑥ Levier de passage  
Shifting lever



**Boîte de vitesses automatique AJ0 (6 vitesses)**  
**AJ0 automatic transmission (6 gears)**

- ⑦ Train épicycloïdal  
Gear train
- ⑧ Electrovanne  
Solenoid valve
- ⑨ Boîtier électronique  
Electronic controller
- ⑩ Convertisseur  
Converter
- ⑪ Carter en aluminium  
Aluminium housing



HUBERT VINCENT

▶ Safety

▶ Environment

▶ Life on board

▶ Mobility

▶ Competitiveness

## 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.

**Automated gearboxes,** managed by a computer, protect the engine from these sort of risks.

## 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.

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.