

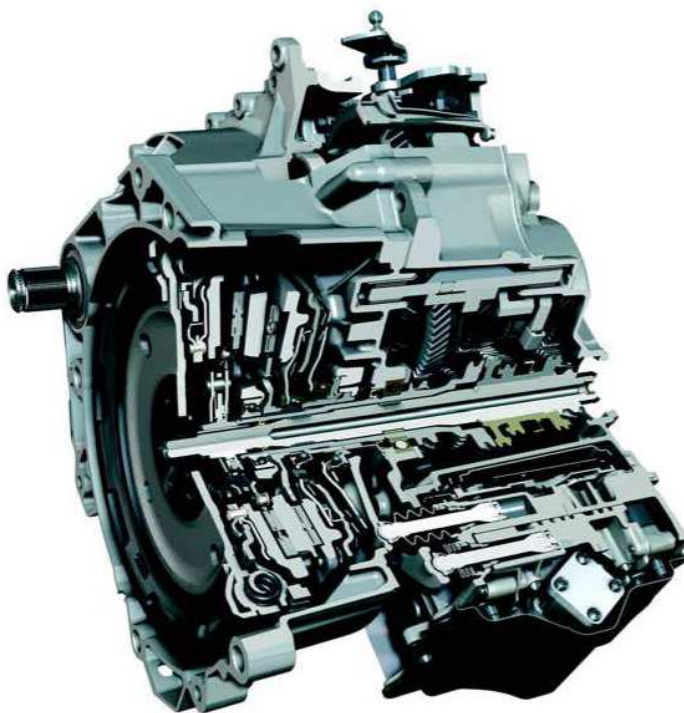
The OAM automatic gearbox is based on the **DSG** 'Direkt SchaltGetriebe' technology. This type of transmission combines the level of comfort provided by an automatic gearbox with the gears dynamism of a manual gearbox.

What was aimed at during the design and development of the DSG OAM automatic gearbox was a substantial **reduction of fuel consumption** and of **polluting emissions**. This has been achieved thanks to the development of a specific "software" for each vehicle, a careful double clutch design and an excellent mechanical performance.

The major new features this gearbox provides compared to other DSG gearboxes are the **double clutch** configuration and the **lubrication system**. The double clutch has two dry operating clutch disks. Lubrication of mechanical components is independent from the hydraulic circuit destined at activating the clutches and the selector mechanisms.

Conceptually the mechanical operation is equivalent to **two parallel transmissions**, each of them with a clutch that transfers engine torque to a main shaft and from these to the lay shafts. This type of operation allows having two gears selected at the same time, and transition between gears takes places when opening one clutch and coupling the other one, this is why it is so fast and smooth.

Summing up, SEAT is launching a new automatic gearbox aimed at satisfying every kind of driver.



D126-01

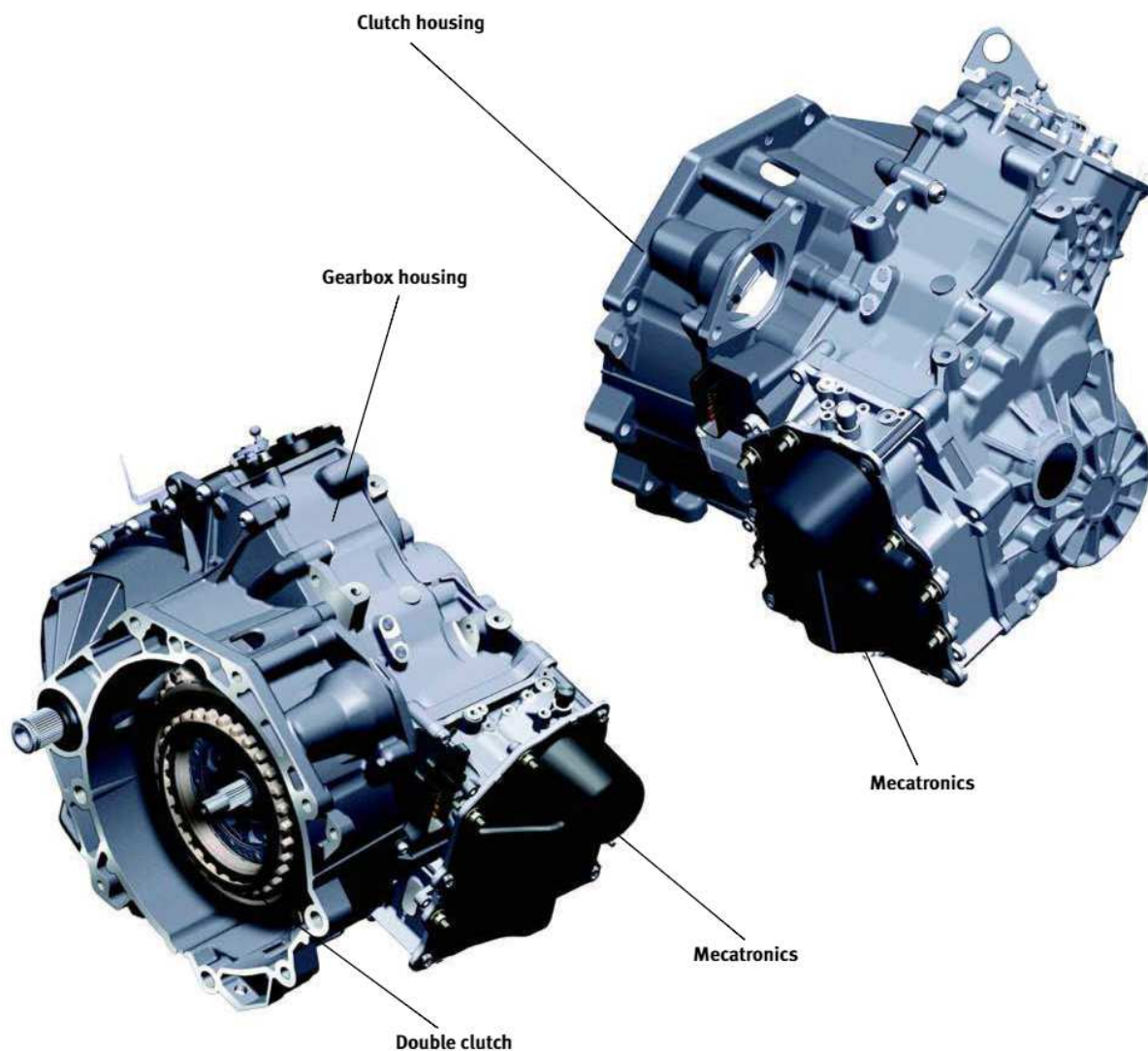
Note: The exact instructions for checking, adjusting and repair are included in the ELSA application.

SUMMARY OF CONTENTS

■	General aspects	4
■	General layout	6
■	Connection with the engine	9
■	Double clutch	10
■	Mainshafts	16
■	Layshafts	18
■	Engaging of gears	21
■	Parking lock	22
■	Flow of force	24
■	Hidraulics	26
■	Lubrication	34
■	System layout	36
■	Sensors	38
■	Actuators	47
■	Can-Bus communication	52
■	Assumed functions	53
■	Self-diagnosis	60
■	Maintenance and repair	61

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

GENERAL ASPECTS



The DSG 0AM automatic gearbox is the second gearbox used by SEAT with the DSG technology.

The DSG 0AM automatic gearbox is combined with engines with a maximum torque delivery of 250 Nm, which are transversally fitted.

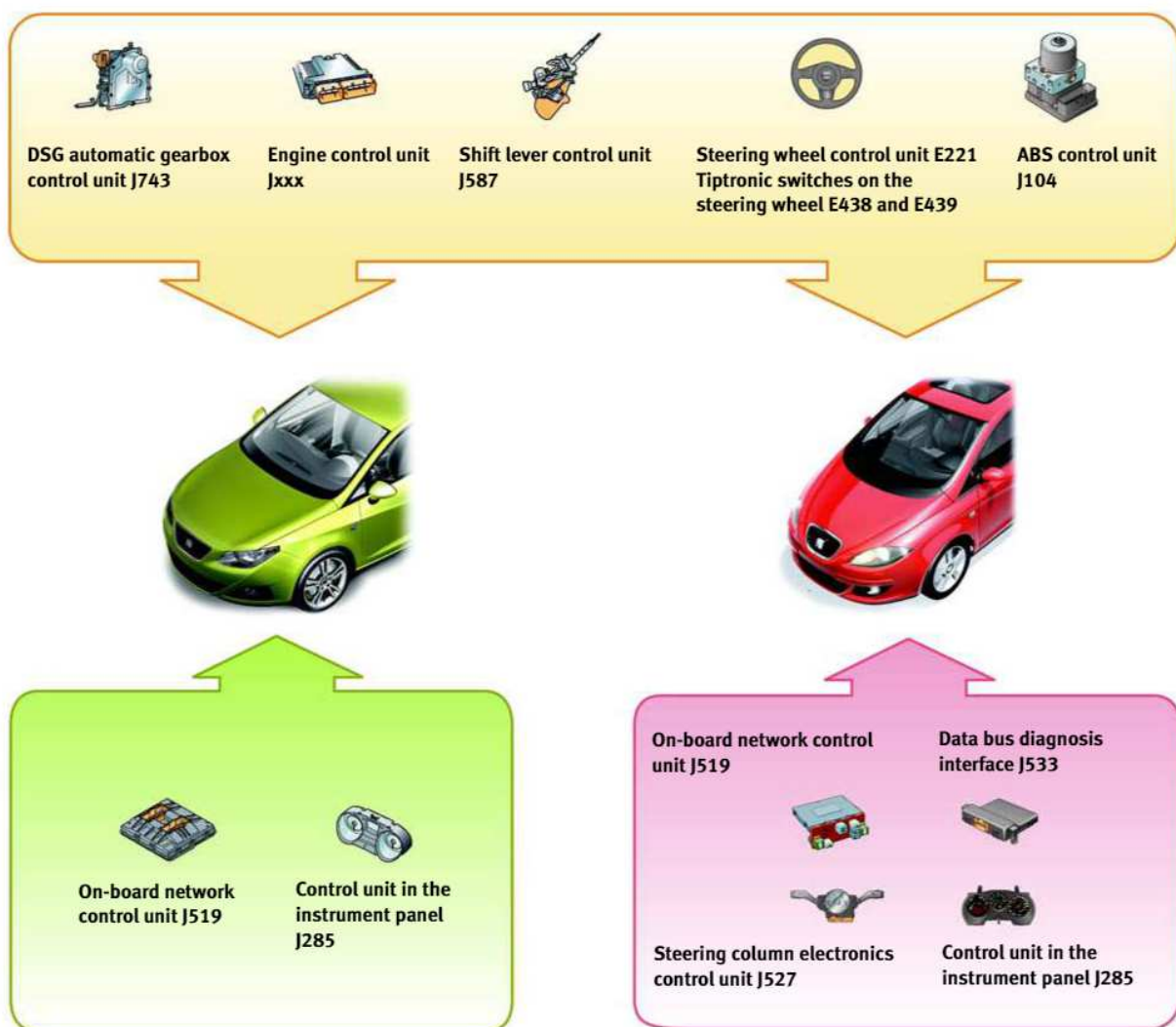
The main **features** of the gearbox are:

- Double dry clutch.
- Seven forward speeds and one reverse speed.
- The hydraulic and electronic components are grouped into an assembly named mecatronic.
- It uses two types of oil.
- It uses an electric hydraulic pump.
- It weighs about 70 kg.

The following information can be found on the gearbox housing:

- The designation letters.
- Date of manufacturing.
- **Factory code**
- **Series number**.
- Time of manufacturing.

Protected by copyright. No reproduction for advertising or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.



D126-02

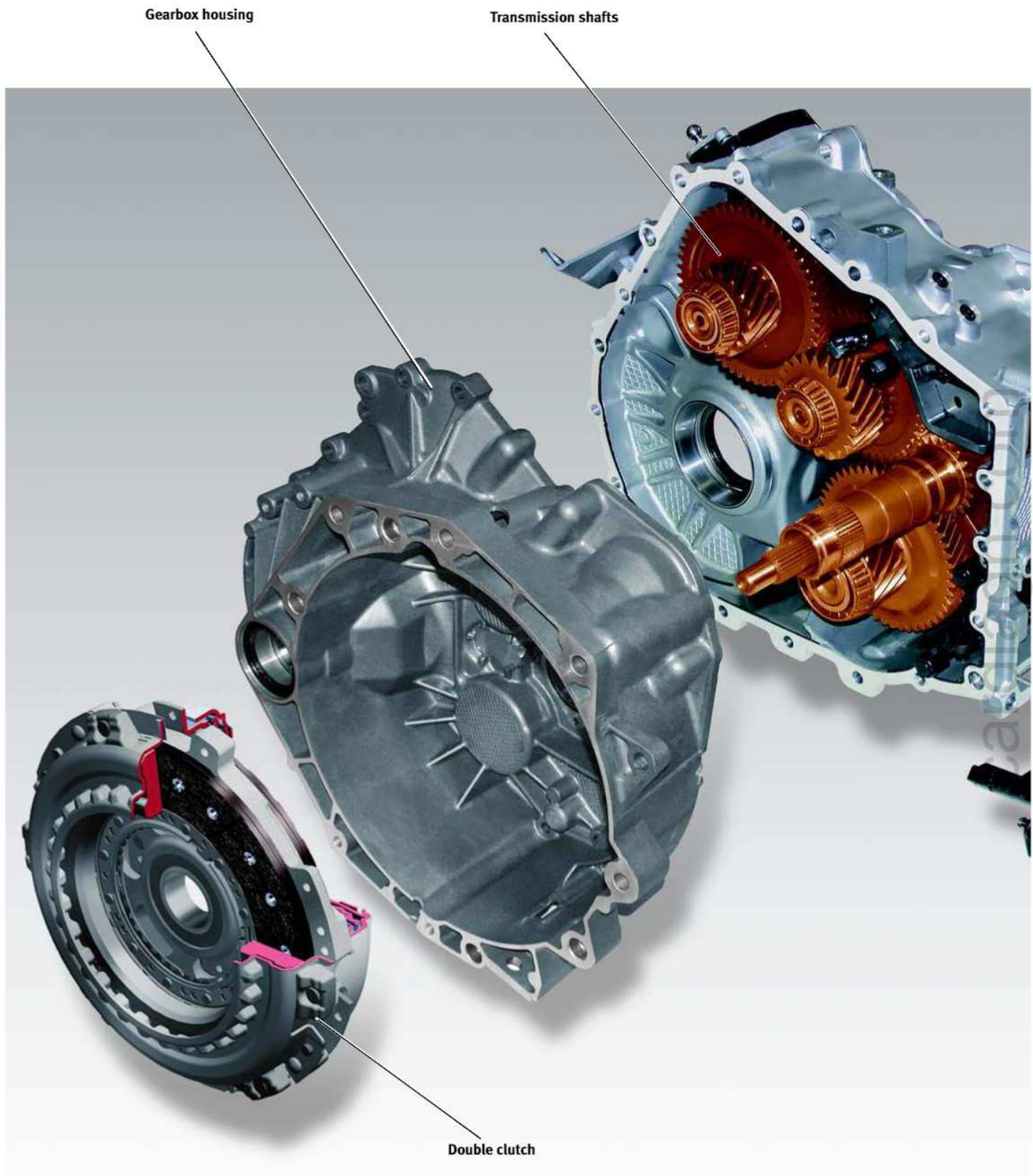
The DSG OAM gearbox is offered in several SEAT range models such as the Ibiza 08, Altea, Toledo, Leon and Altea XL.

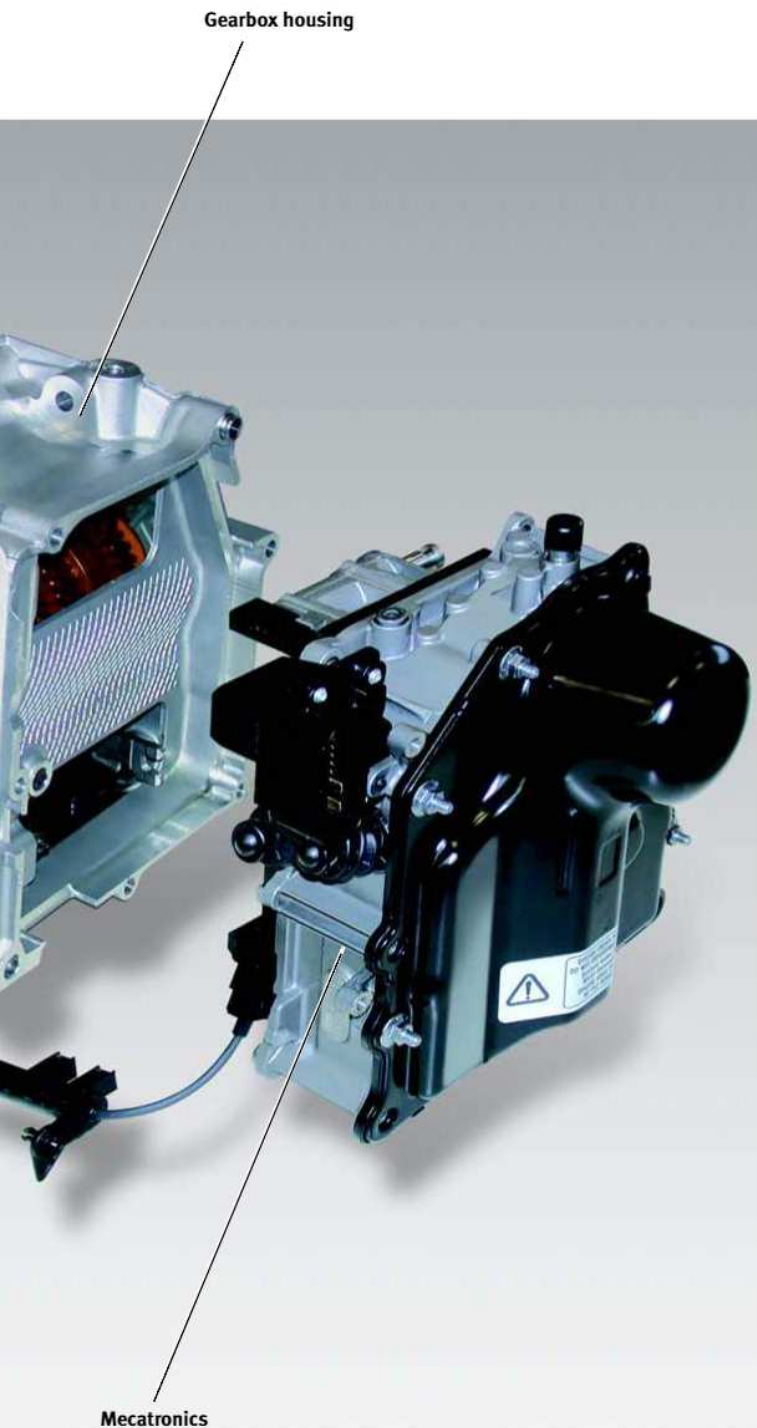
The gearbox operation is identical in all vehicles. The difference lies in how the electrical signals reach the mecatronics. In the **Ibiza 08** the

on-board network integrates the data bus diagnosis interface whilst in the **Altea, Toledo, Leon and Altea XL** the on-board network and the data bus diagnosis interface are two physically separated units.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted without the written consent of SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

GENERAL LAYOUT





D126-03

e, is not
ability with
A.

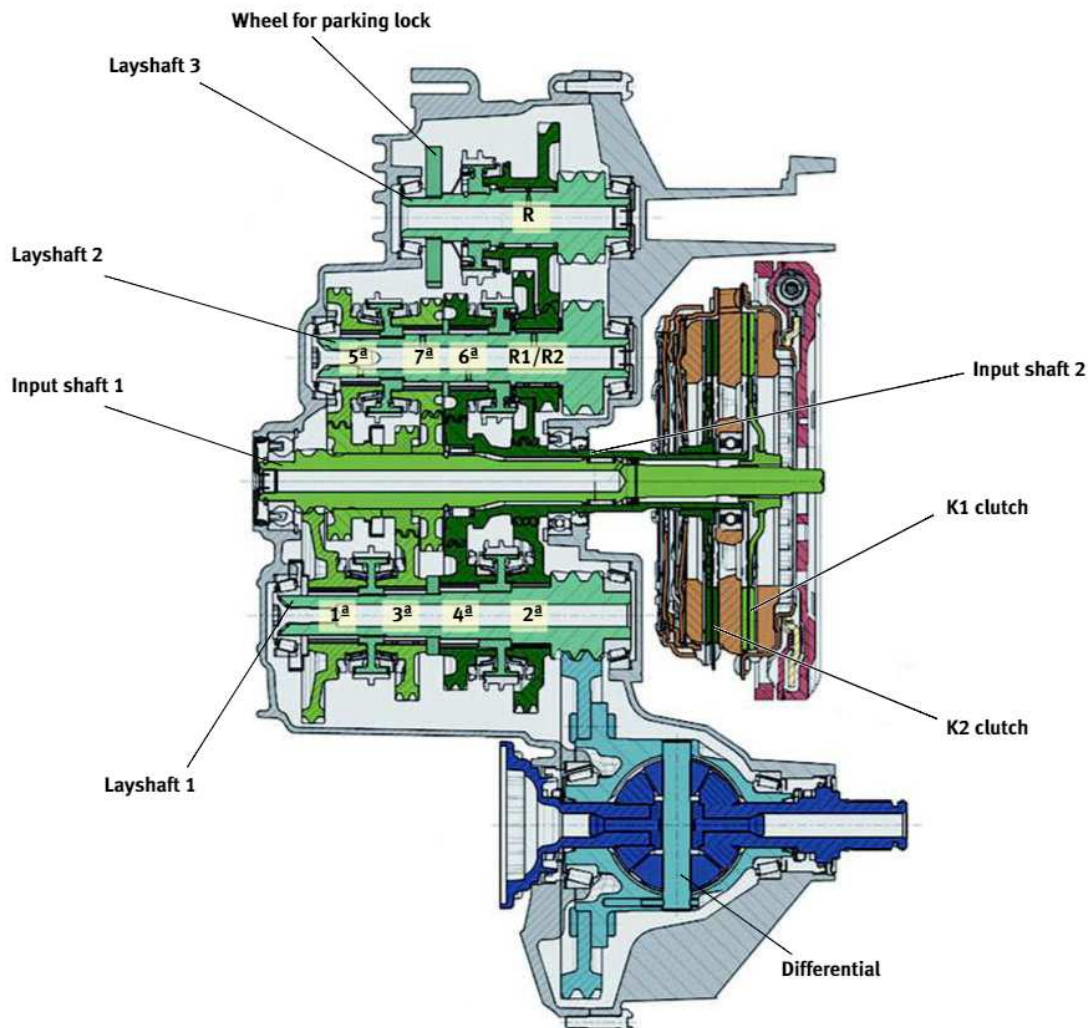
Functionally, the DSG 0AM automatic gearbox is made up by three groups of components: **mechanical, electrical and hydraulic.**

The **mechanical** components have two functions: to transfer engine torque to the inside of the gearbox (double clutch), and to obtain the necessary down-gearing to increase torque at the wheels (transmission shafts, final drive, differential, etc.)

The **electrical** components assume the function of managing the position of each of the clutches, determine the moment of engaging, and the gear to engage. The mecatronics control unit of the automatic gearbox DSG J743 is the main electrical component of the DSG 0AM automatic gearbox, and it is placed inside the mecatronics.

The **hydraulic** components have the purpose of generating the necessary oil pressure for acting on the clutches and engaging or disengaging one gear when the mecatronics control unit of the DSG J743 automatic gearbox determines it. The hydraulic components are integrated in the mecatronics.

GENERAL LAYOUT



D126-04

The mechanical components of the OAM gearbox are configured as if they were two partial transmissions **independent** from each other.

The partial transmission 1 is made up of:

- The K1 clutch.
- Main shaft 1.

The 1st. and 3rd. gears of layshaft 1

The 5th. and 7th. gears of layshaft 2.

The partial transmission 2 is made up of:

- Clutch K2.
- Main shaft 2.

The 2nd. and 4th. gears of layshaft 1.

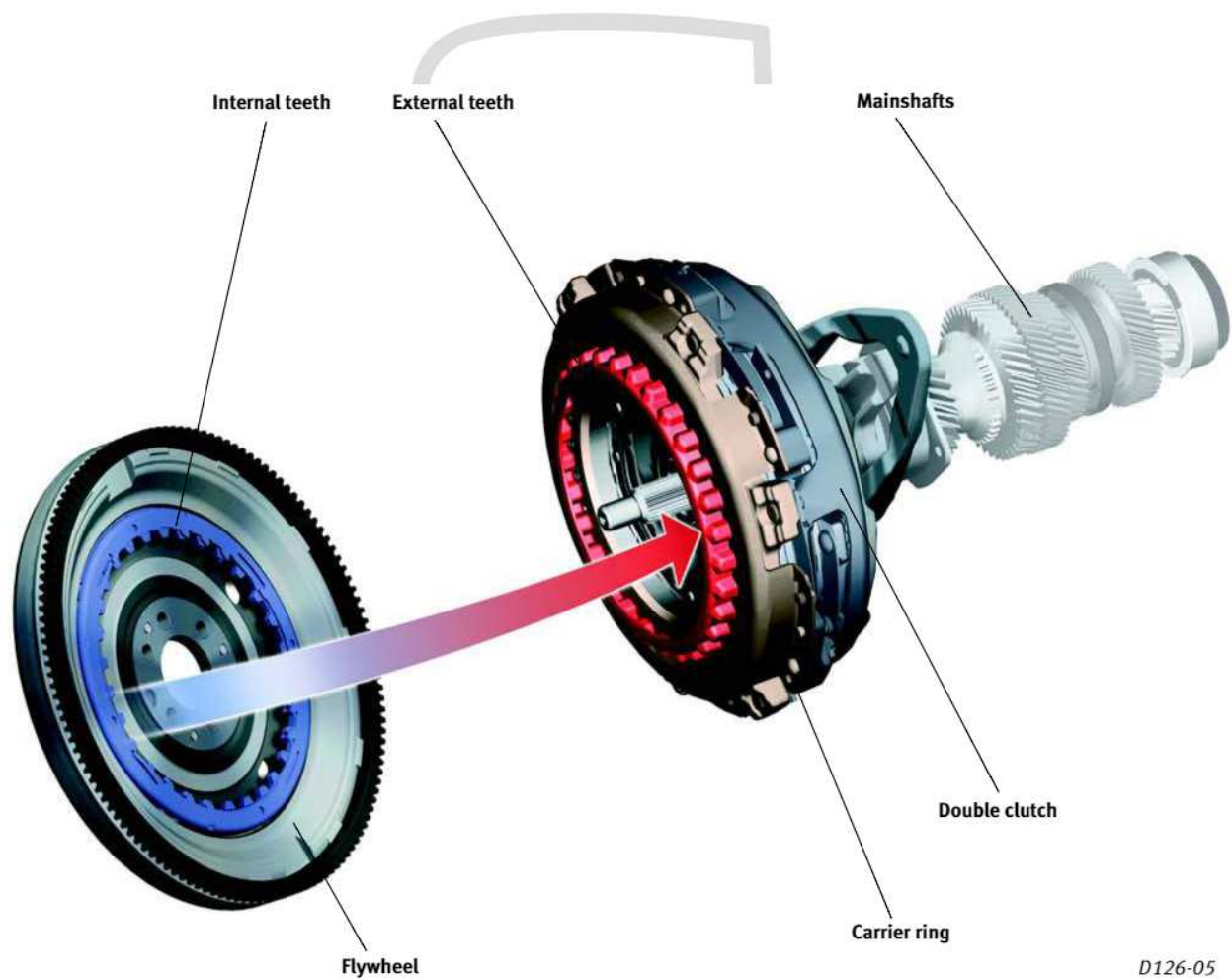
- The 6th. gear of layshaft 2.

- The reverse gear of layshaft 3.

The transmission shafts contain the different gear pinions.

TRANSMISSION SHAFT	PINIONS
Input shaft 1	1st, 3rd, 5th. and 7th.
Input shaft 2	2nd., 4th., 6th. and R.
Layshaft 1	1st, 2nd., 3rd and 4th.
Layshaft 2	5th., 6th., 7th. and R1/R2
Layshaft 3	R

CONNECTION WITH THE ENGINE



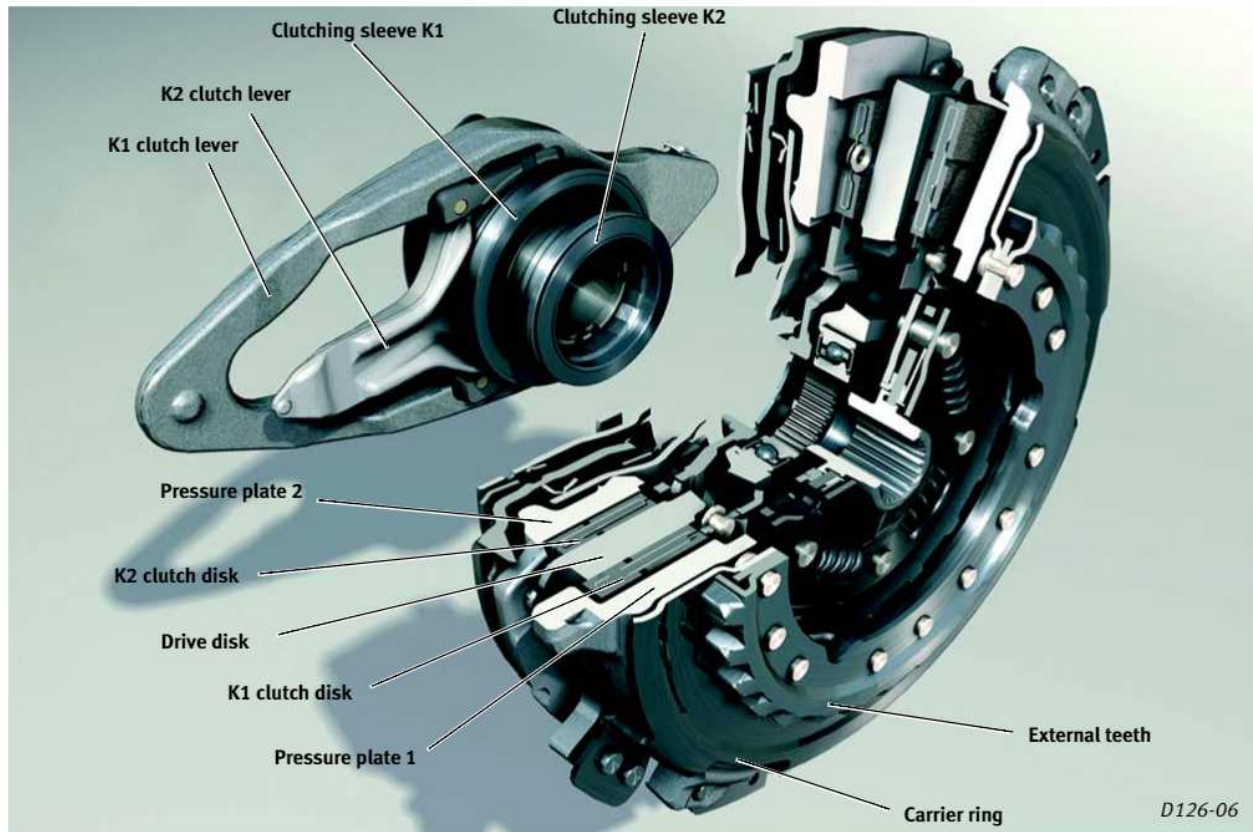
D126-05

The double clutch is attached to the gearbox. The engine torque reaches inside the gearbox via the double clutch.

The fly-wheel, which is attached with screws onto the crankshaft, has **internal teeth** that

meshes onto the **external teeth** of the double clutch carrier ring. The **carrier ring** drives the engine torque into the double clutch through the drive disk and from it to the K1 or K2 clutch.

DOUBLE CLUTCH



The double clutch is made up of two clutches, named K1 and K2. The K1 clutch transmits torque to the mainshaft 1 and the K2 clutch to the mainshaft 2.

When at rest, both clutches are disengaged and do not transmit torque to the inside of the gearbox.

The double clutch is made up of:

- A carrier ring
- A drive disk.
- Two pressure plates.
- Two dry clutch disks, clutch disk K1 and clutch disk K2.

- Two clutching sleeves.
- Two clutch activation levers.

The flow the engine torque follows from the flywheel to the mainshafts is:

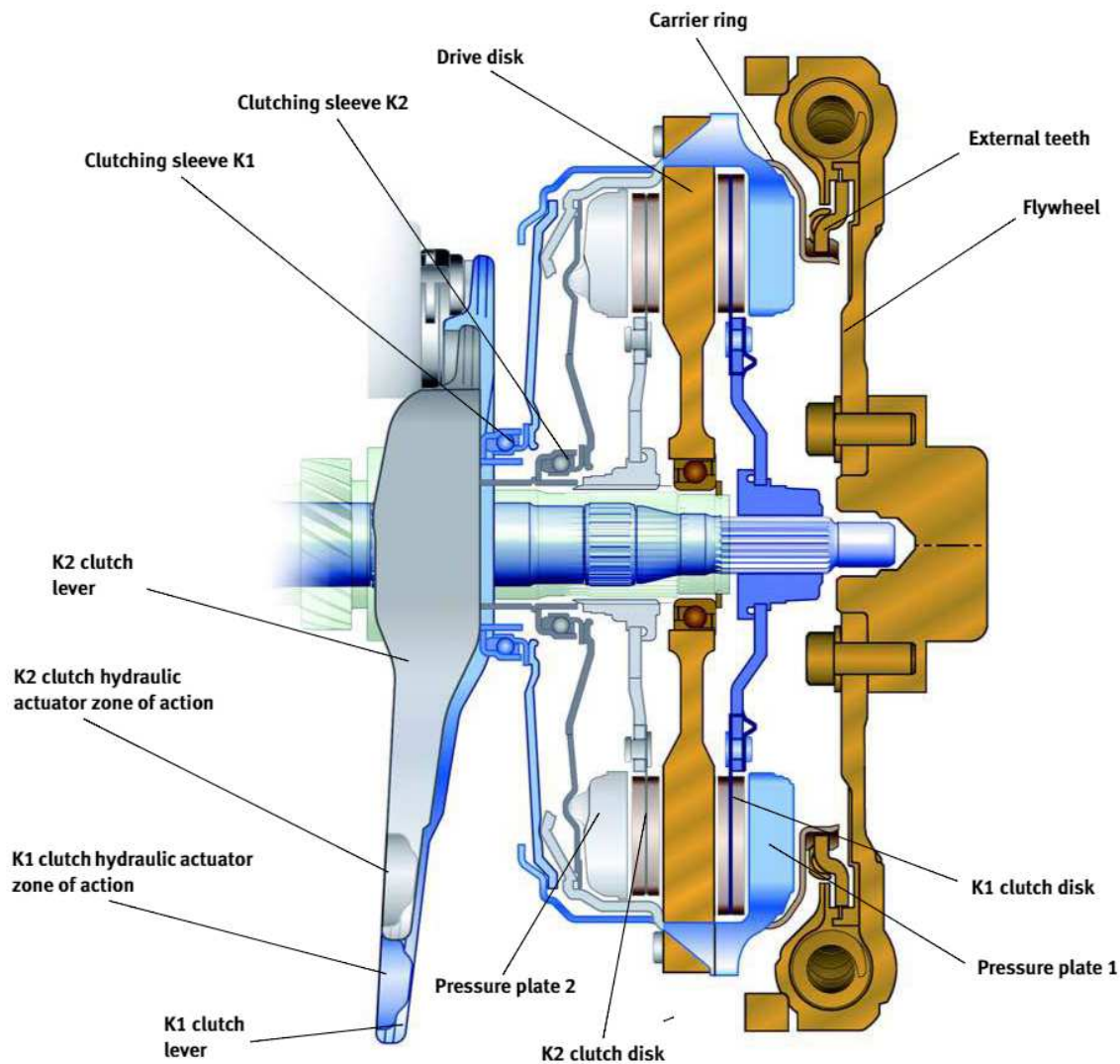
- Torque enters through the external teeth of the drive disk.

- The drive disk rotates as a single assembly with the carrier ring as both are rivetted together.

- If no clutch is activated, the double clutch does not transmit torque to the inside of the clutch.

- If the clutch lever K1 is activated the pressure plate K1 moves and the K1 clutch disk comes in contact with the drive disk and torque is transmitted to the mainshaft 1.

- If the clutch lever K2 is activated the pressure plate K2 moves and the K2 clutch disk comes in contact with the drive disk and torque is transmitted to the mainshaft 2.



D126-07

The coupling is similar to that of a conventional dry clutch, however as the OAM gearbox has two clutches the structure changes compared to a conventional one.

An important feature of the OAM gearbox double clutch is that we must speak of **clutch engaging levers and clutch engaging sleeves**. The reason is that the clutch disks when at rest are disengaged and it is only when one of the clutch levers is activated that the engaging takes place and torque is transmitted to the gearbox.

When torque is being transmitted **only one of the disks is engaged**.

If the K1 clutch is activated (engaged) torque is transmitted to mainshaft 1 and torque can be transmitted to the 1st., 3rd., 5th. and 7th. gears.

And if the K2 clutch is activated (engaged) torque is transmitted to mainshaft 2 and torque can be transmitted to 2nd., 4th. 6th. and R gears.

DOUBLE CLUTCH

K1 CLUTCH

An hydraulic actuator placed in the mecatronics activates the clutch lever K1. The lever acts on the clutch engaging sleeve K1. The clutch engaging sleeve makes pressure on the diaphragm K1 to move the pressure plate 1. The pressure plate 1 presses on the clutch disk 1 against the drive disk and they then rotate together as a single assembly. It is in this moment when it is considered that clutch K1 is **engaged** and torque is being transmitted to mainshaft 1.

When the clutch K1 lever reduces the pressure being applied to the clutch engaging sleeve, the diaphragm makes the pressure plate 1 move back and the clutch is then **disengaged**.

K1 CLUTCH AT REST

K1 clutch engaging lever

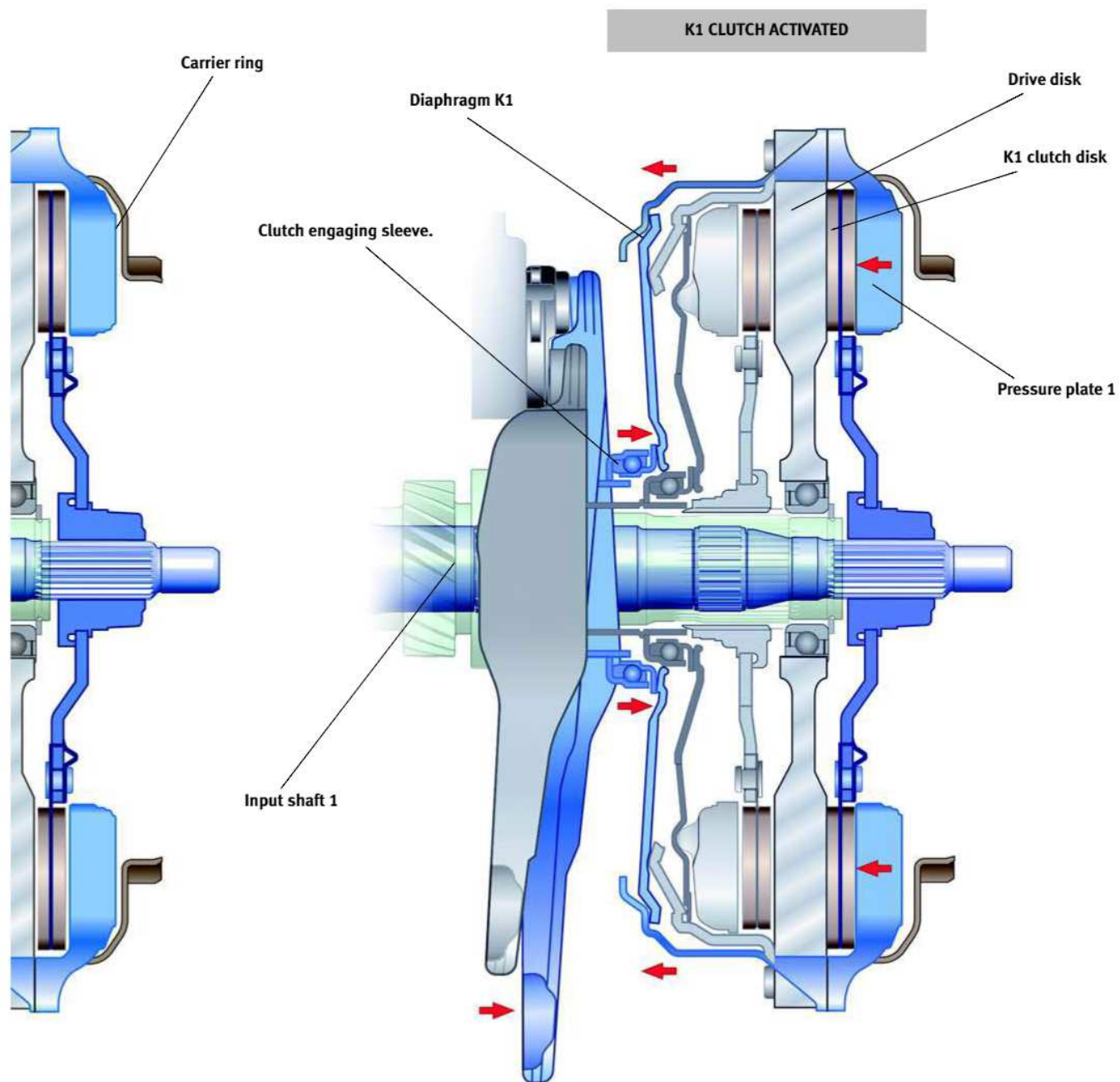
K1 clutch hydraulic actuator zone of action



SEAT

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.





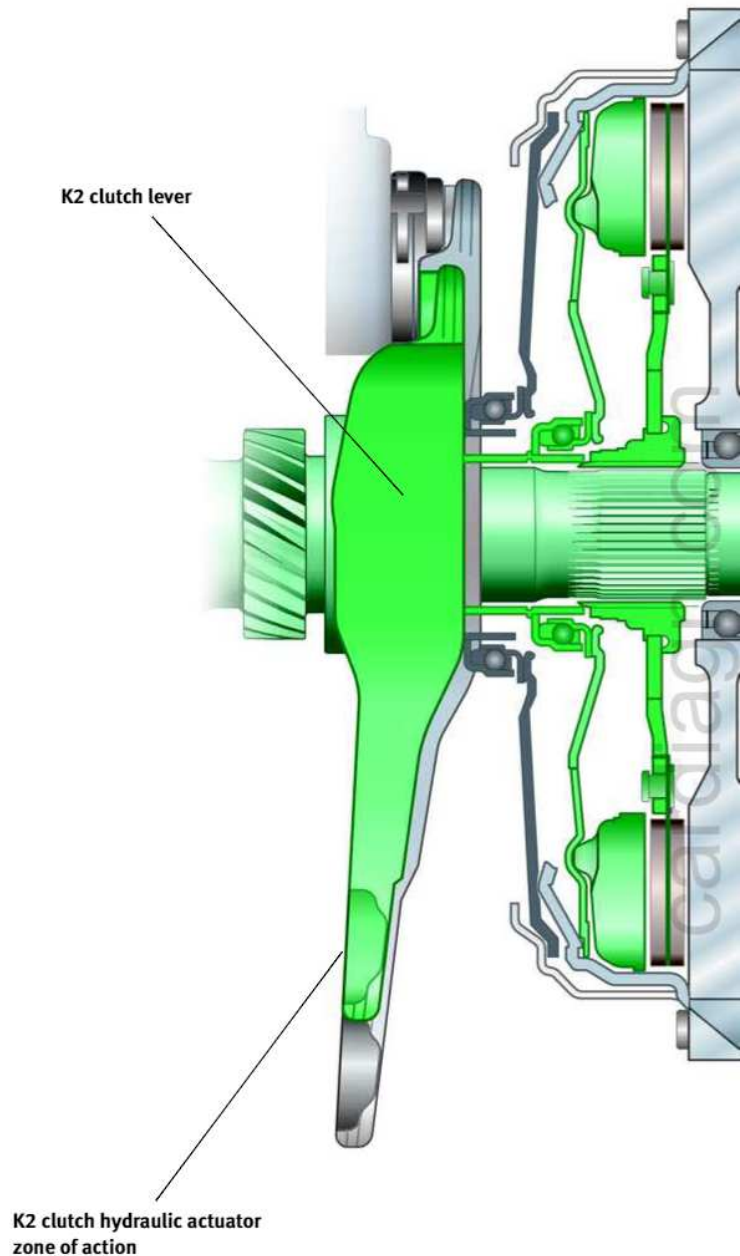
DOUBLE CLUTCH

K2 CLUTCH

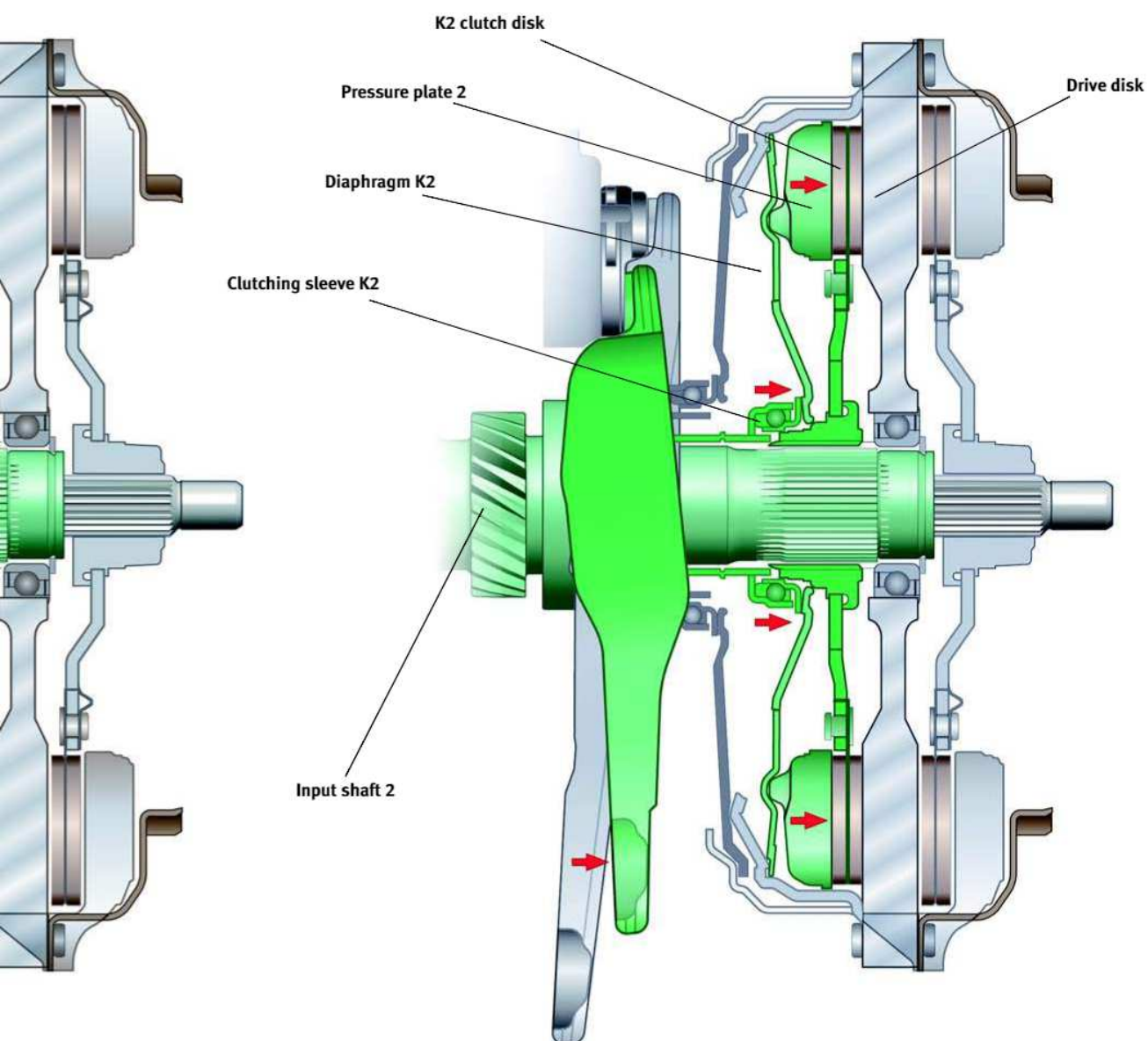
A hydraulic actuator, **different** from the one that activates the K1 clutch lever and also placed in the mecatronics, activates the clutch lever K2. The lever acts on the clutch engaging sleeve K2. The clutch engaging sleeve presses on diaphragm K2 to move the pressure plate 2; the pressure plate 2 presses on the clutch disk 2 against the drive disk and they then rotate together as a single assembly. It is in this moment when it is considered that clutch K2 is **engaged** and torque is being transmitted to mainshaft 2.

When the clutch K2 lever reduces the pressure being applied to the clutch engaging sleeve, the diaphragm makes the pressure plate 2 move back and the clutch is then **disengaged**.

K2 CLUTCH AT REST



K2 CLUTCH ACTIVATED



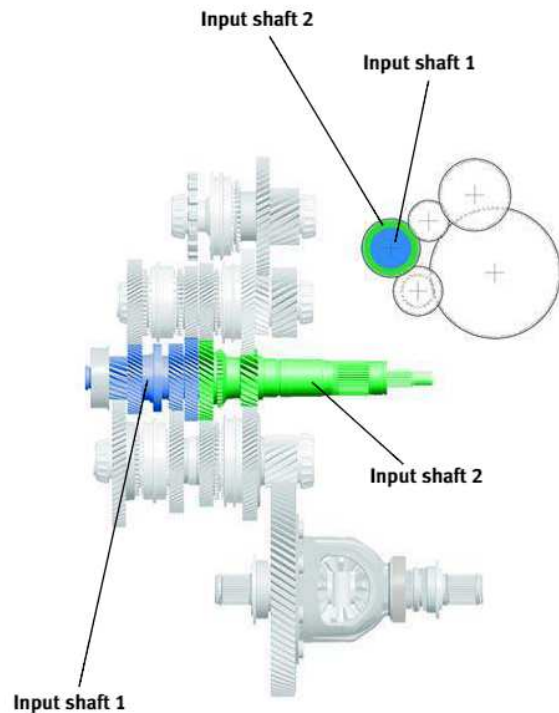
MAINSHAFTS

Main shafts are **concentric**. Mainshaft 2 is completely hollow and mainshaft 1 runs through it.

The mainshafts set leans on the housings on two ball bearings. The bearing housed in the gearbox housing is in mainshaft 1, and the one in the gearbox housing on mainshaft 2.

Two safety rings assure the position of the mainshafts in the gearbox housing. One safety ring is in mainshaft 1 next to the ball bearing housed in the gearbox housing, and the other safety ring is in mainshaft 2 next to the ball bearing housed in the gearbox housing.

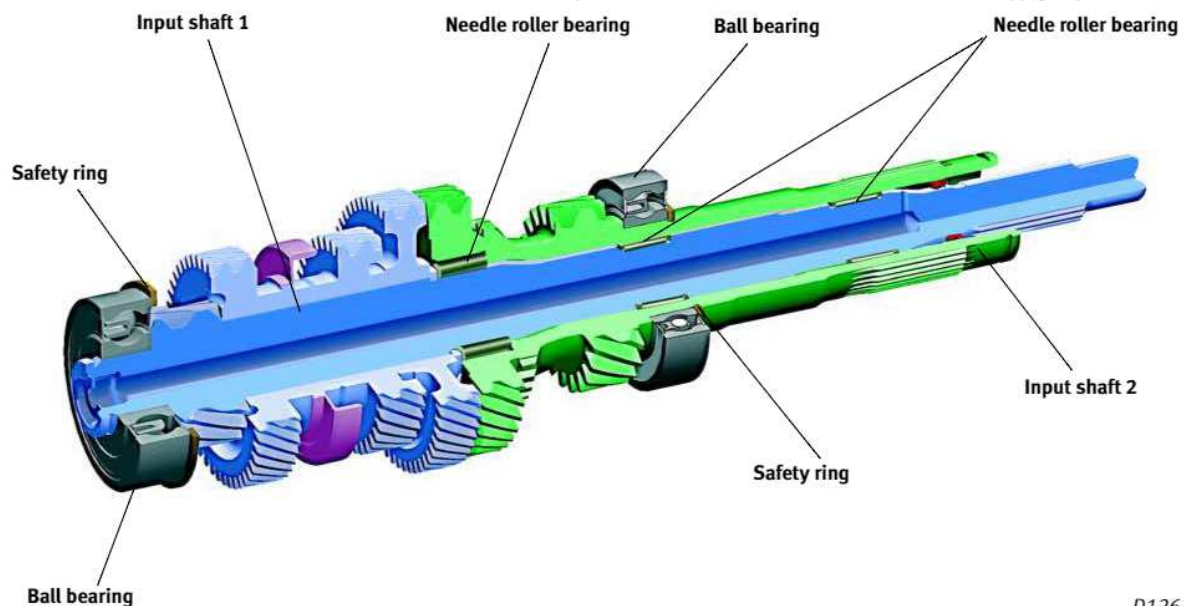
There are three needle roller bearings **between the mainshafts**.



D126-10

SEAT

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.



D126-11

MAINSHAFT 1

Mainshaft 1 houses 4 pinions. These pinions are used for the **1st., 3rd., 5th. and 7th. gears.**

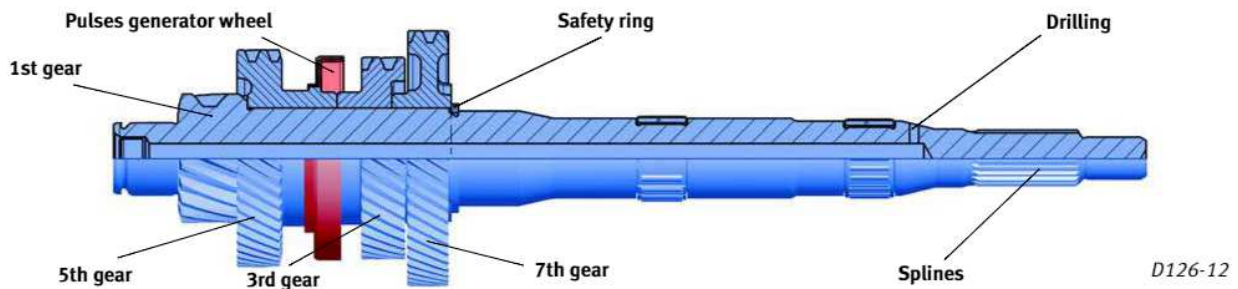
As well as the gear pinion, this shaft has a **pulses generator wheel or crown** machined onto it for the gearbox input revs sensor 1, G612. The signal generated by the sensor is used by the DSG J743 automatic gearbox mecatronics control unit to read the mainshaft 1 revs.

The mainshaft has the following components machined onto the shaft itself:

- A spline onto which the K1 clutch disk meshes.

- A drilling for lubricating the roller bearings housed between both mainshafts.

The gear pinions and the generator wheel are inserted. A safety ring prevents these components moving from their position.



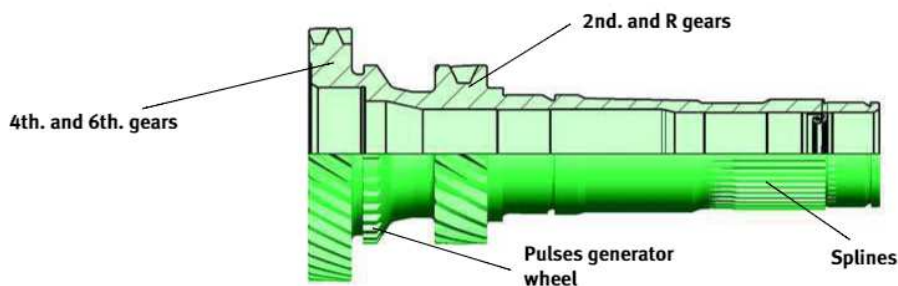
MAIN SHAFT 2

Mainshaft 2 has two pinions machined onto it, which are used for the 2nd., 4th., 6th. and reverse gears. **Each pinion activates 2 gears** which are grouped into two couples, one couple includes the 4th. and 6th. gears, and the other couple includes the 2nd. and reverse gears.

As well as the gear pinion, this shaft has a **pulses generator wheel or crown** machined onto it

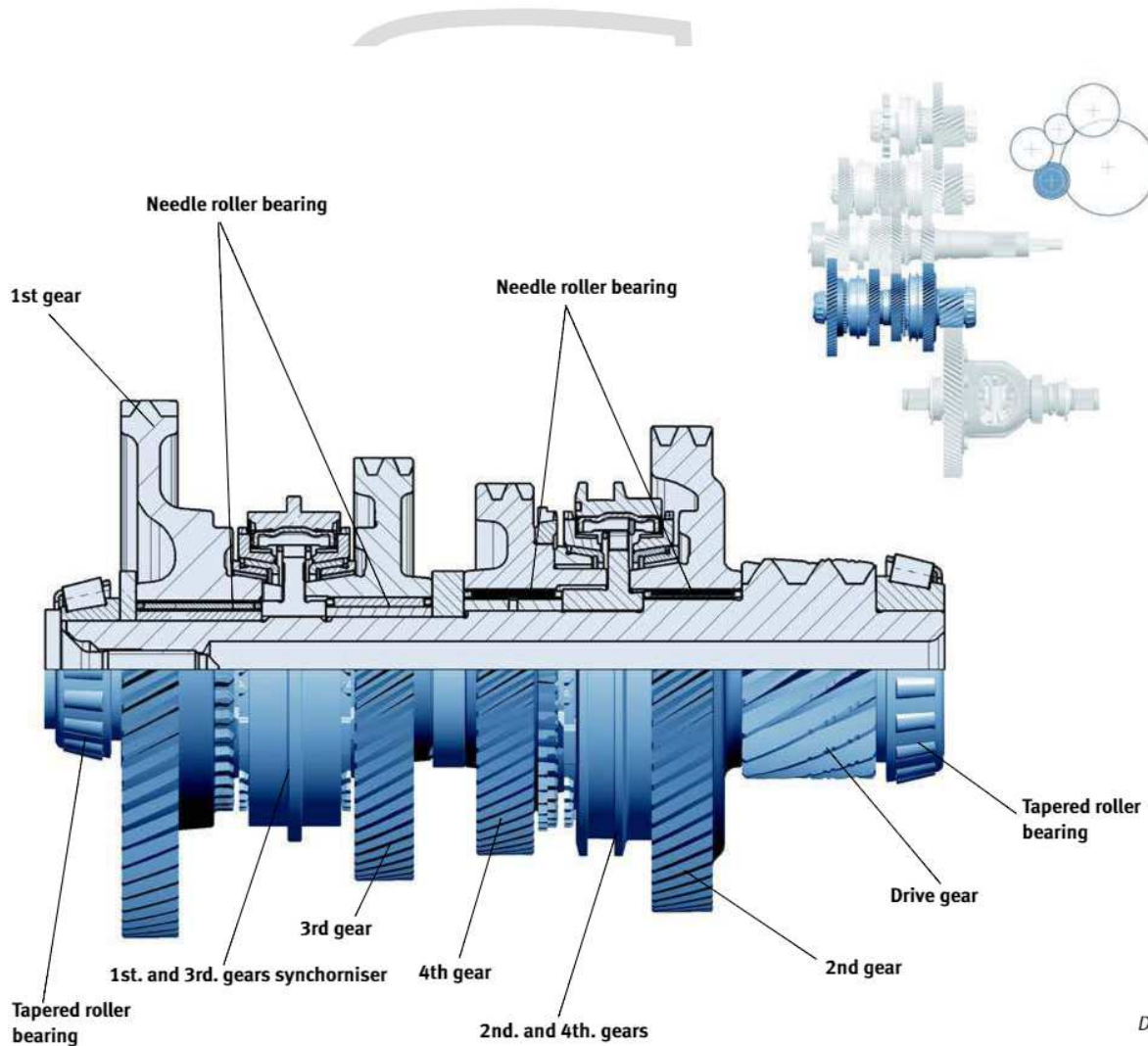
for the gearbox input revs sensor G612. The signal generated by the sensor is used by the DSG J743 automatic gearbox mecatronics control unit to read the mainshaft 2 revs.

And, finally, also machined on the shaft are the mesh splines with the K2 clutch disk.



Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

LAYSHAFTS



D126-14

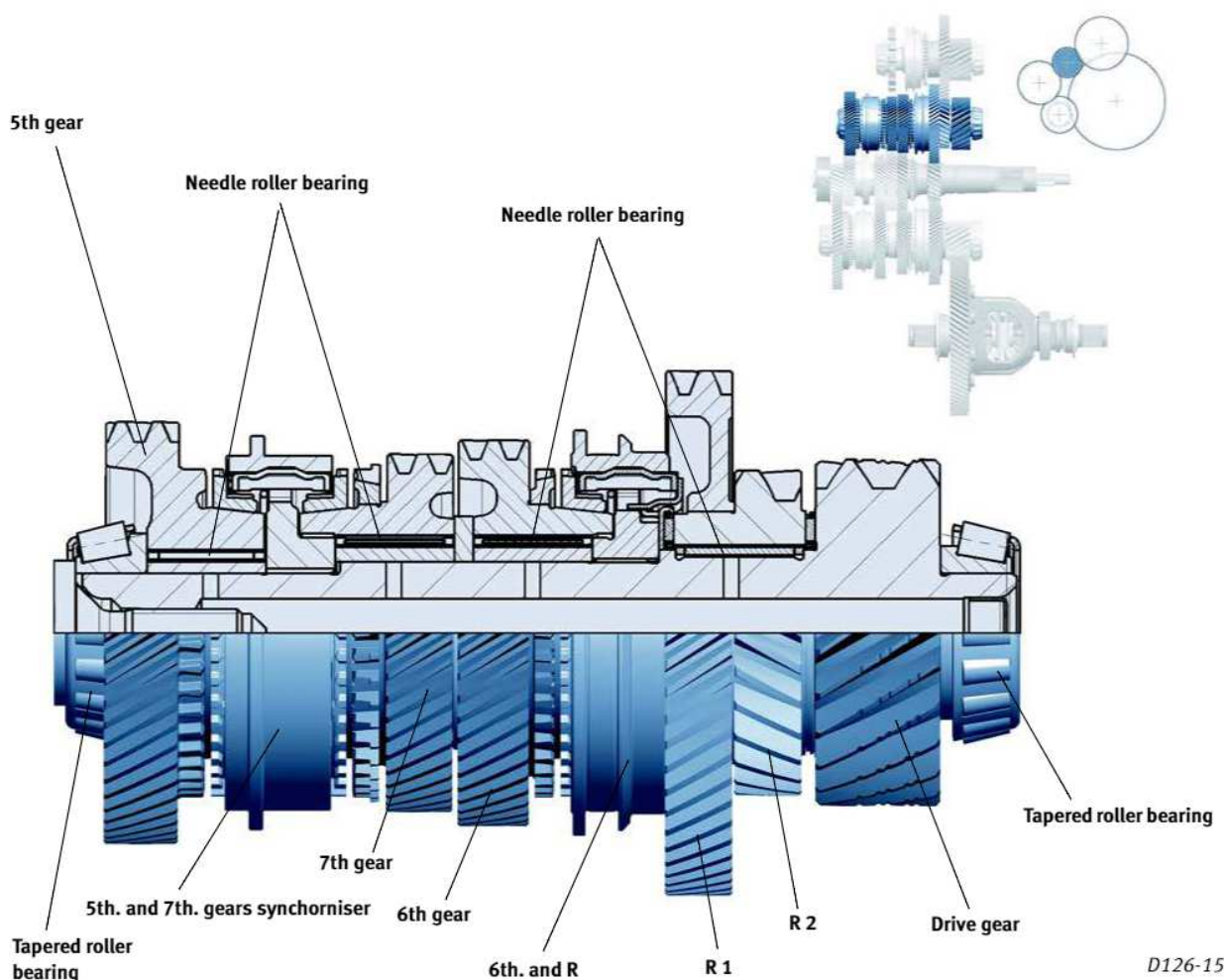
The three layshafts drive the final drive by means of a pinion machined on each shaft.

LAYSHAFT 1

Mainshaft 1 leans on two tapered roller bearings, one leans on the clutch housing and the other one on the gearbox housing.

Mainshaft 1 includes **four mobile pinion** (1st, 2nd, 3rd. and 4th. gears) **and two synchronisers** (synchroniser 1st/3rd and syhncronser 2nd./4th.).

The mobile pinions rotate on the shaft by means of needle roller bearings. All the gears are synchronised, 1st., 2nd. and 3rd. gears with a **triple synchronising** and 4th. gear with a **double synchronising**.



LAYSHAFT 2

Mainshaft 1 leans on two tapered roller bearings, one leans on the clutch housing and the other one on the gearbox housing.

Layshaft 2 includes **four mobile pinions and two synchronisers**.

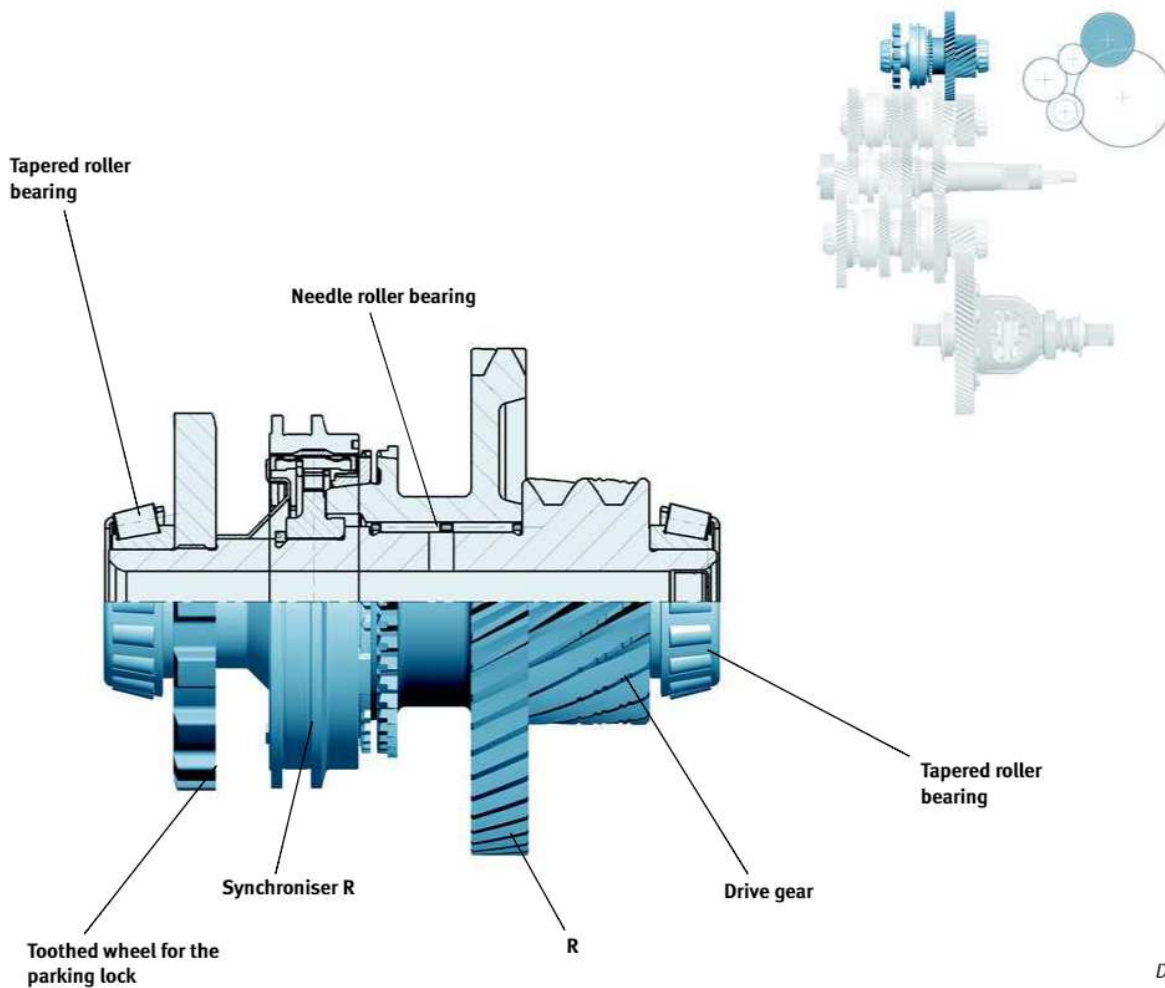
The mobile pinions rotate on the shaft by means of needle roller bearings. Three pinions are for the 5th., 6th. and 7th. gears and the fourth one is a **double pinion (R1 and R2)** that meshes the layshaft 2 onto layshaft 3 for the reverse gear.

These mobile pinions, R1 and R2, are machined separately although they make up a **single assembly**.

The synchronisers are for the 5th., 7th., and for the 6th., R1 and R2 gears.

All the gears are synchronised, the 5th., the 6th., and the 7th. gears by means of a **double synchronising**, and the double pinion R1 and R2 by means of a **single synchronising**.

LAYSHAFTS



D126-16

LAYSHAFT 3

Layshaft 3 is the **reverser shaft**. It reverses rotation for the reverse gear. The shaft takes in motion from layshaft 2 pinion R2.

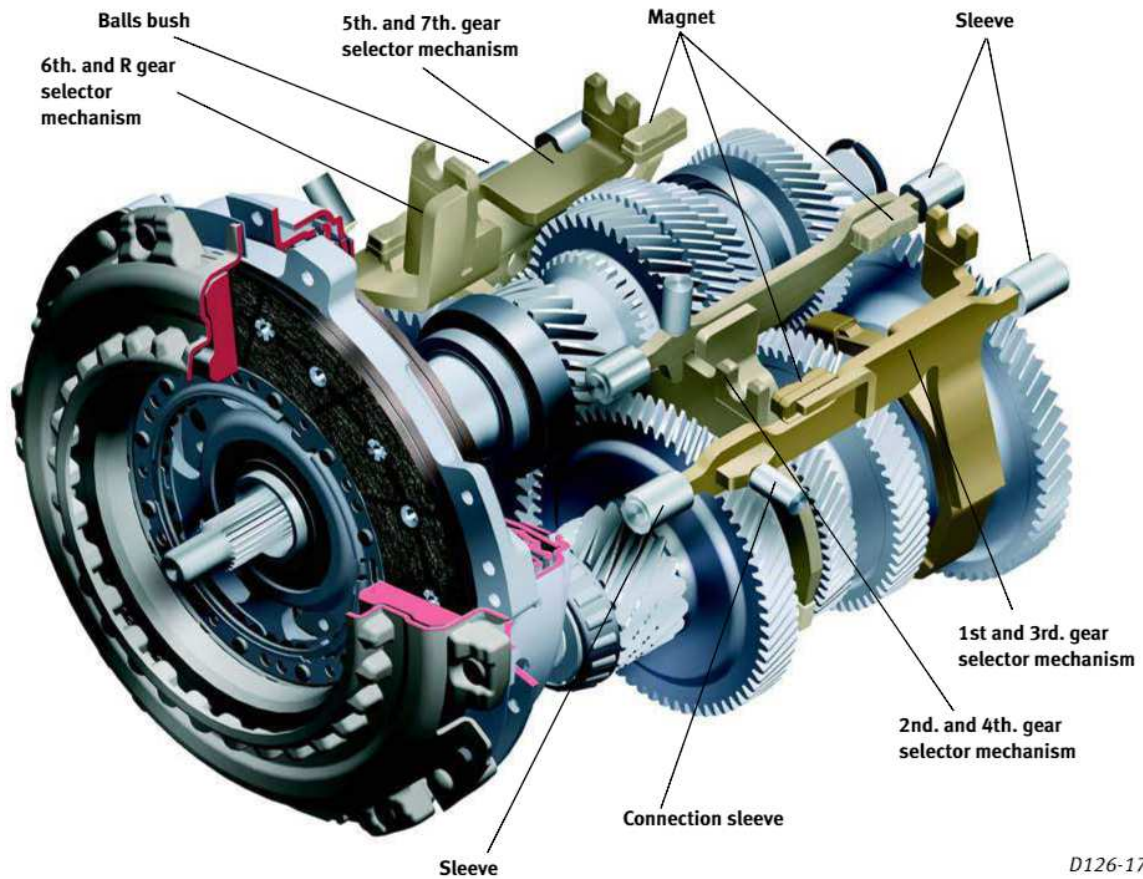
Mainshaft 3 leans on two tapered roller bearings, one leans on the clutch housing and the other one on the gearbox housing.

Layshaft 3 includes the **reverse gear mobile pinion**, the reverse gear synchroniser, and the **toothed wheel for the parking lock**.

The mobile pinion rotates on the shaft by means of a needle roller bearing and it has **single synchronising**.

The reverse gear is activated by moving the 6th./R1 and R2 gears synchroniser of layshaft 2 and the R synchroniser of layshaft 3.

ENGAGING GEARS



D126-17

SELECTOR MECHANISMS

Inside the gearbox housing are the 4 selector mechanisms that move the synchronisers. Hydraulic actuators placed in the mecatronics move the selector mechanisms.

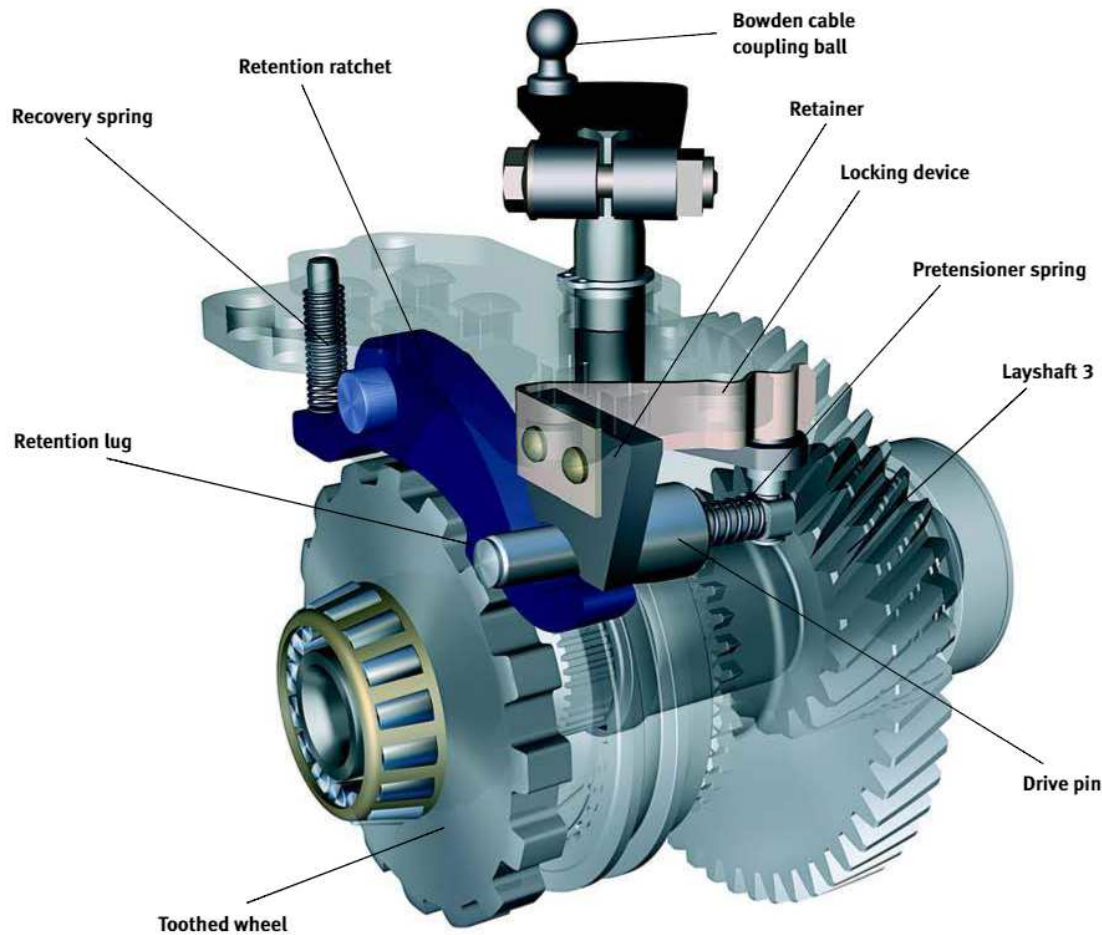
The selector mechanisms move smoothly because there are **sleeves** on the bearings of the ends. These sleeves move inside drillings on the gearbox housing. The 6th./R gears selector includes at the ends of its bearing **sleeves with balls** instead of a sleeve like in the other mechanisms; this is because of its size, because

the 6th./R selector mechanism moves two synchronisers, the 6th./R1 and R2 gears synchroniser for the layshaft 2 and the R gear synchroniser for layshaft 3.

All the selector mechanisms have a **7magnet** that energises sensors. The signal generated by these sensors is used by the DSG automatic gearbox mecatronics control unit to recognise **the position of each selector mechanism**.

Connection sleeves, inside the housing, provide **static retention**.

PARKING LOCK



D126-18

The OAM automatic gearbox incorporates a parking lock system. This system prevents the vehicle from moving involuntarily when the parking brake is not activated.

The parking lock is **mechanical**. The shift lever is linked to a Bowden cable, and the other end of the cable is attached to the locking system. When the shift lever is moved to the 'P' position, the locking system immobilises layshaft 3. The immobilised shaft prevents the vehicle from moving because it is **meshed to the final drive**.

The parking lock system is made of:

- A toothed wheel, which is a single assembly with layshaft 3.

- A retention ratchet that locks the toothed wheel with the retention lug.

- A recover spring for positioning the retention ratchet.

- An drive pin that moves the retention ratchet.

- A pretensioner spring to provide tension to the activation bolt.

- A locking device to assure the locking

- A retainer to assure that the drive pin moves the ratchet downwards.

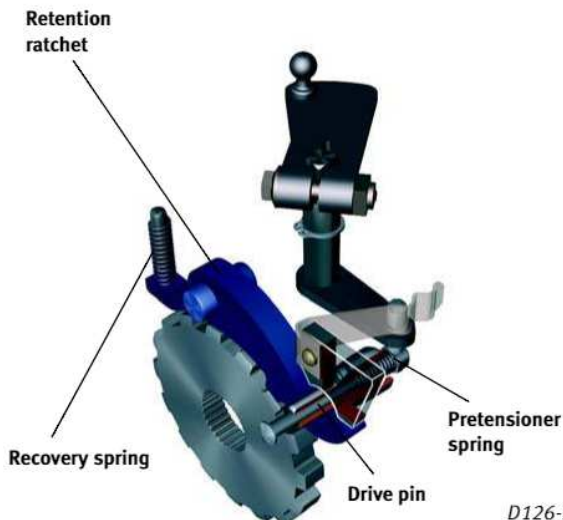
- A coupling ball that takes motion from the bowden cable and transmits it to the locking system.

PARKING LOCK NOT ACTIVATED

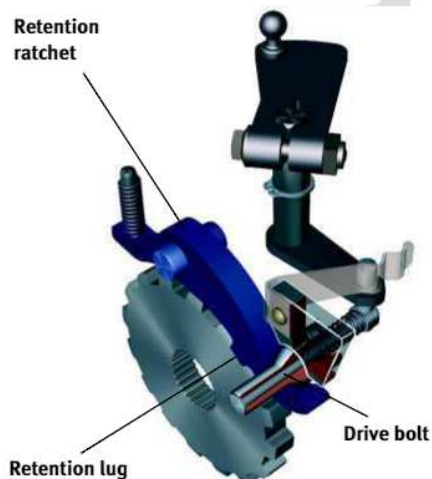
When the parking lock is not activated, the drive pin does not make any pressure on the retention ratchet. In this situation, the ratchet recovery spring pushes the ratchet so that it does not stick into the locking wheel.



D126-19



D126-20



D126-21

PARKING LOCK ACTIVATED

When in position 'P', the bowden cable moves the coupling bar, which moves the drive pin. The drive pin moves the retention ratchet by positioning the ratchet tooth between the teeth of the toothed wheel, thus immobilising the toothed wheel. The layshaft will be immobilised because it is **a single assembly**.

If the ratchet tooth is placed on a tooth of the locking tooth, the drive tooth cannot move the ratchet, so the locking system remains in tension and ready to carry out the locking.

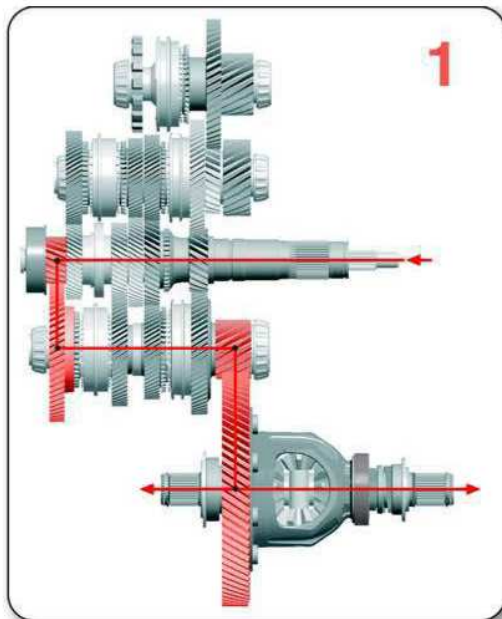
When the vehicle moves slightly, the toothed wheel rotates and the tooth of the retention ratchet and the tooth of the toothed wheel are not faced. Because the system is **tensed**, the pin moves and moves the ratchet, meaning that the tooth of the ratchet is fitted into the toothed wheel.

If the ratchet tooth is fitted between the locking wheel teeth, the drive pin moves fully making the ratchet move downwards, which **blocks** the vehicle.

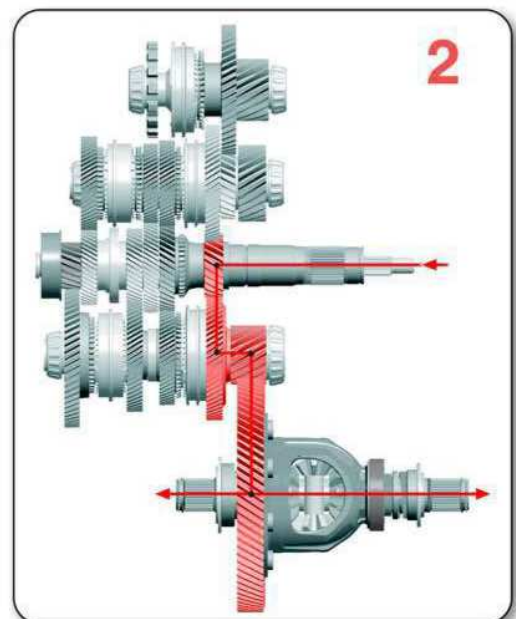
The different locking positions are assured with the locking sleeve.

or commercial purposes, in part or in whole, is not
T.S.A. does not guarantee or accept any liability with
in in this document.

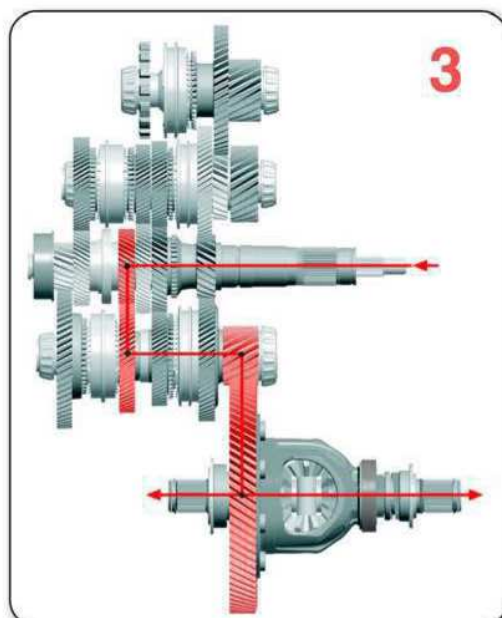
FLOW OF FORCE



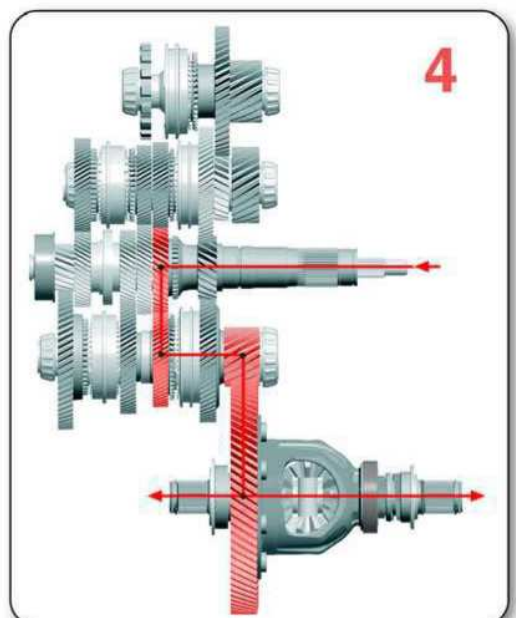
1st gear
K1 clutch
Input shaft 1
Layshaft 1
Final drive



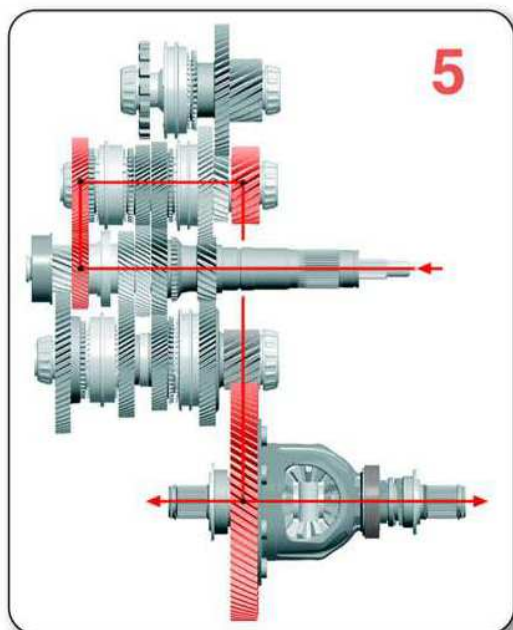
2nd gear
K2 clutch
Input shaft 2
Layshaft 1
Final drive



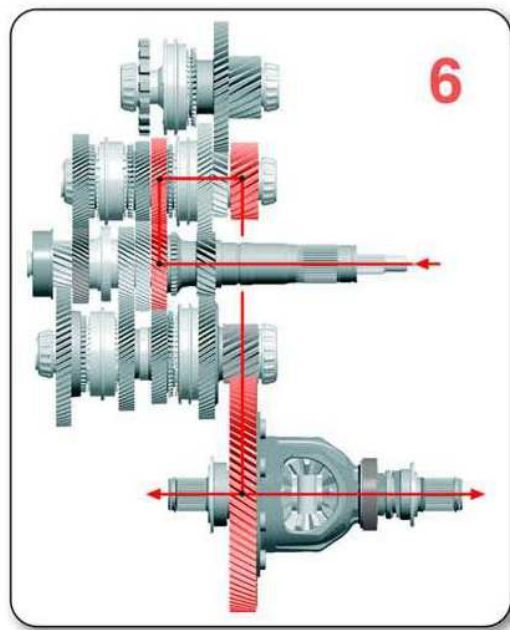
3rd gear
K1 clutch
Input shaft 1
Layshaft 1
Final drive



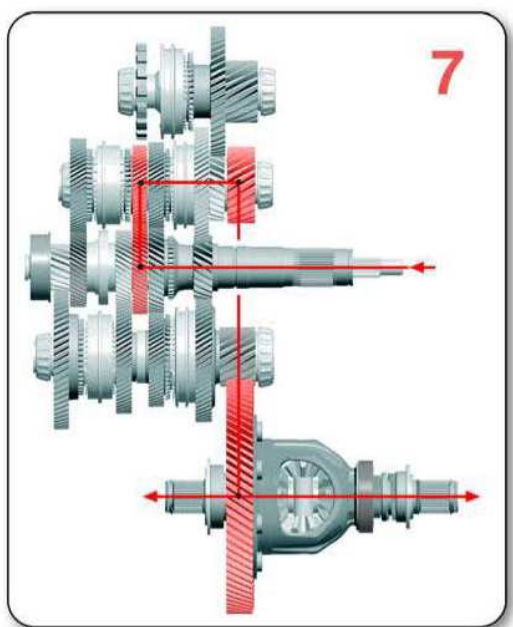
4th gear
K2 clutch
Input shaft 2
Layshaft 1
Final drive



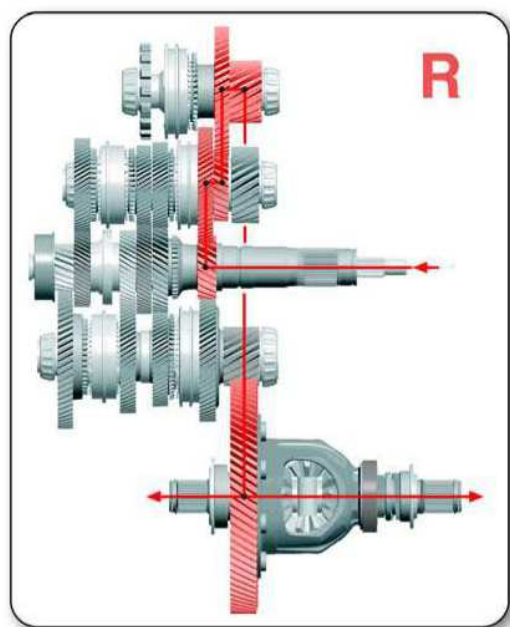
5th gear
K1 clutch
Input shaft 1
Layshaft 2
Final drive



6th gear
K2 clutch
Input shaft 2
Layshaft 2
Final drive



7th gear
K1 clutch
Input shaft 1
Layshaft 2
Final drive



Reverse gear
K2 clutch
Input shaft 2
Layshaft 2
Layshaft 3
Final drive

D127-22

HYDRAULICS

MECATRONICS

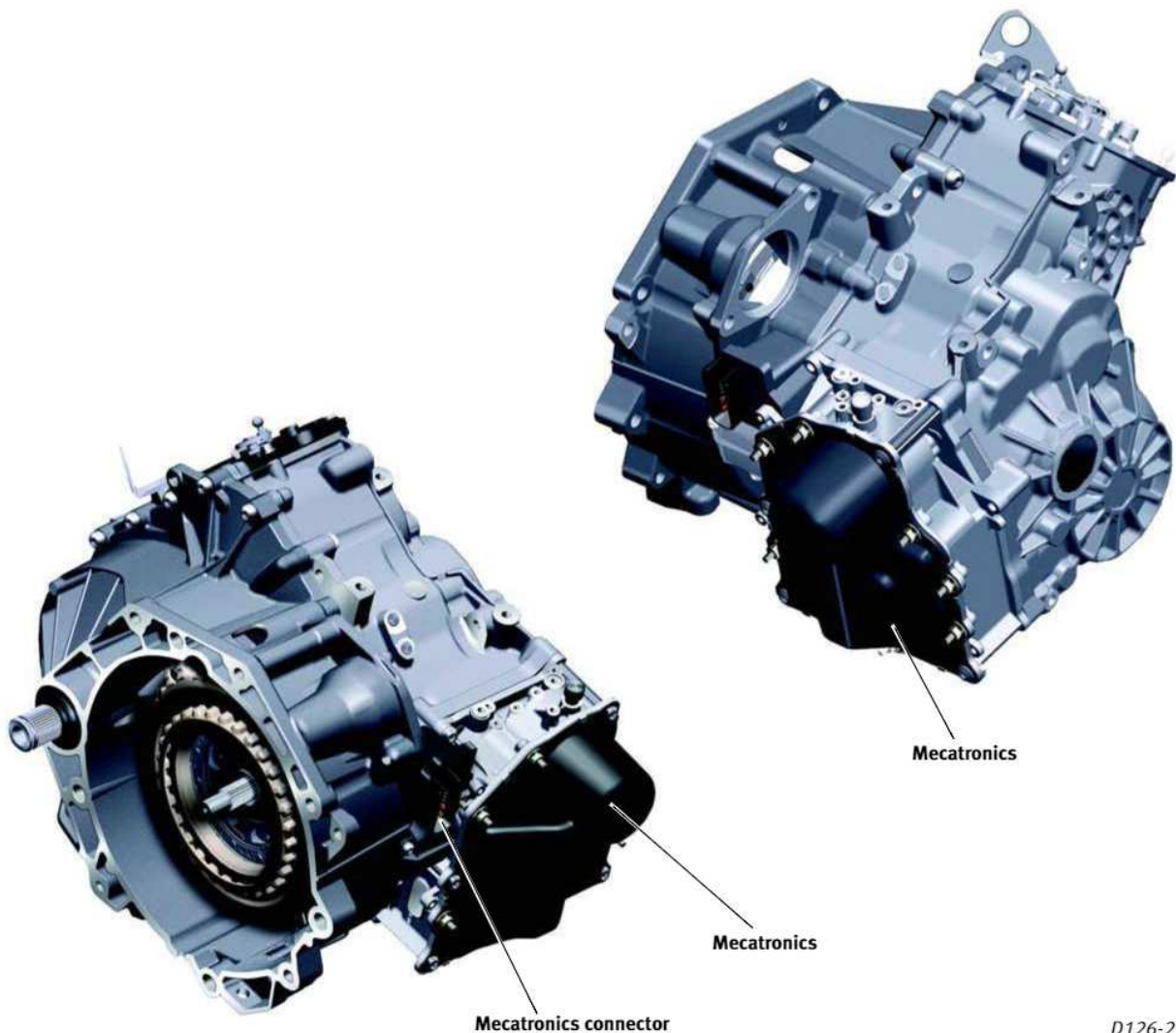
The mecatronics is a unit which is attached with screws to the exterior of the gearbox and is has an electrical part and a hydraulic part.

The **electrical part** includes the DSG J743 automatic gearbox mecatronics control unit and the sensors.

The signals from the sensors and other control units converge in the mecatronics. The

mecatronics control unit of the DSG J743 automatic gearbox **initiates and controls** all the gearbox actions.

The necessary signals and supplies for the mecatronics operation arrive via a **single connector**.

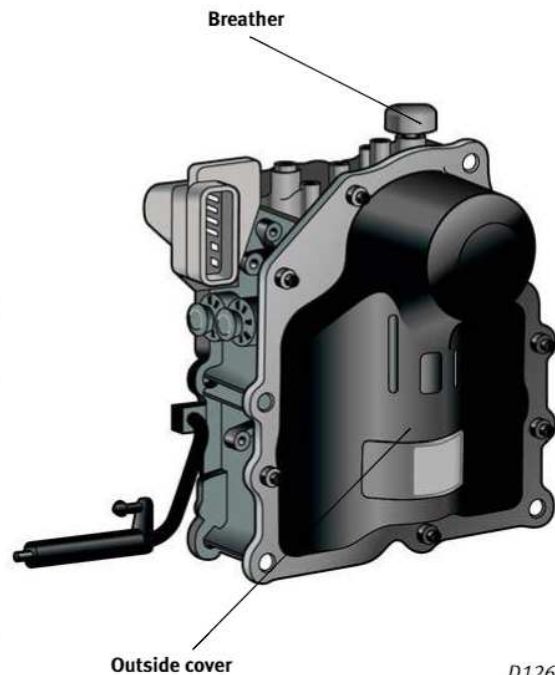


D126-23

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

The **hydraulic part** of the mecatronics includes the hydraulic pump, the pressure accumulator, the solenoid valves and the hydraulic actuators. These components -except for the hydraulic actuators- are housed under the external cover of the mecatronics. The hydraulic actuators are on the outside of the mecatronics.

The hydraulic part runs on an hydraulic oil **independent** from the one that lubricates the gearbox gears. The mecatronics has a breather at the top for ventilating the hydraulic oil.



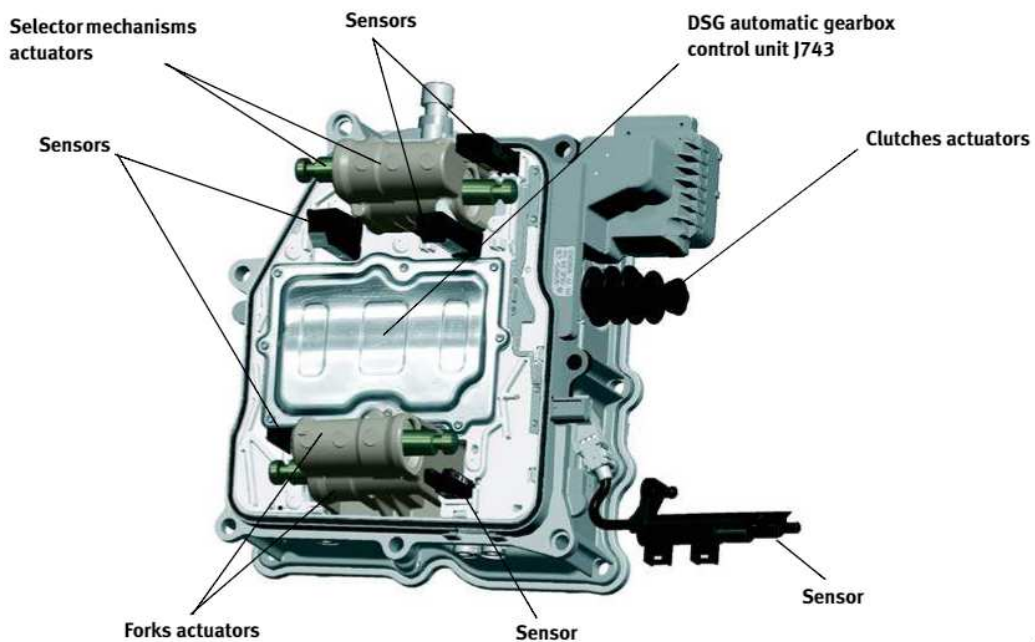
D126-24

Protected by copyright. Copying for private use is permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

The actuators that activate the double clutch are placed at one of the sides of the mecatronics.

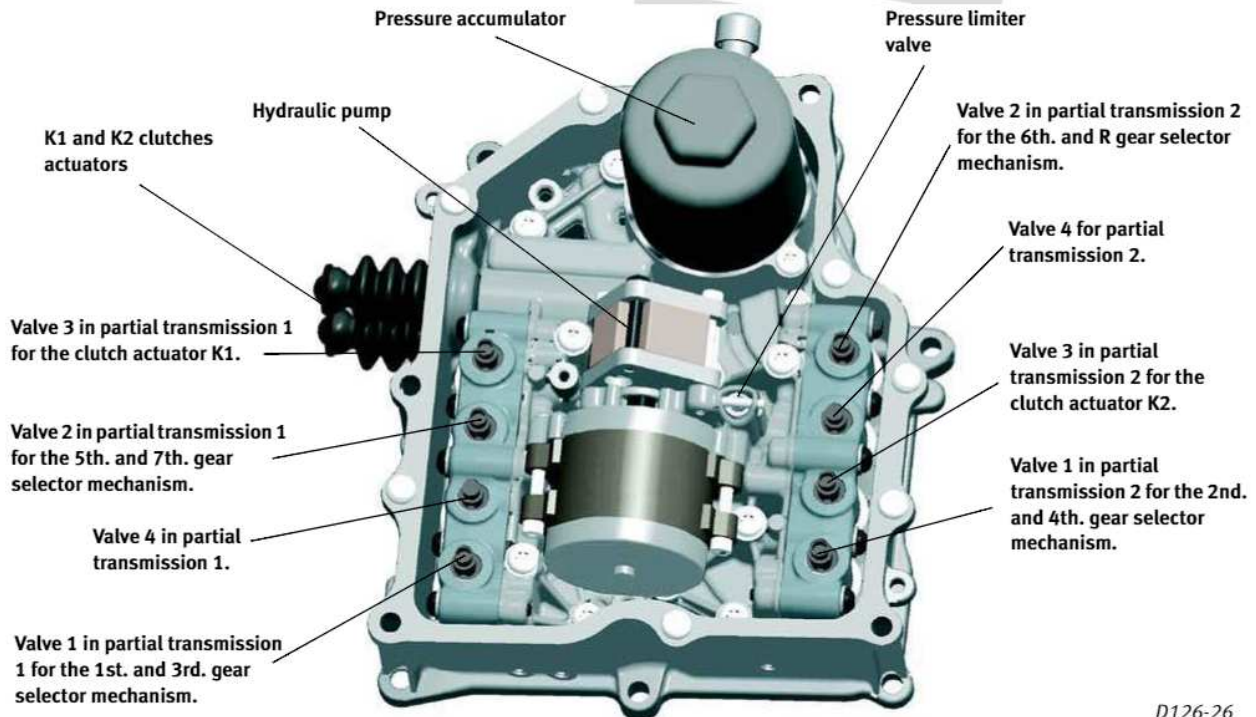
mecatronics control unit J743 are placed at the rear of the mecatronics.

The gearbox forks actuators, most of the sensors and the DSG automatic gearbox



D126-25

HYDRAULICS



D126-26

The hydraulic part of the mecatronics **generates, distributes and regulates** the necessary hydraulic pressure for activating the clutches and engaging or disengaging the gears.

Pressure is generated with:

- The hydraulic pump.
- The pressure limiter valve.
- The hydraulic pressure sensor G270.
- The accumulator.
- The by-pass valve.

Distribution and regulation of the hydraulic pressure is assumed by eight valves which are electrically activated. The valves are grouped into: partial transmission 1 and partial transmission 2.

The components related to partial transmission 1 are:

- Valve 4 in partial transmission 1, which is controlled by the N436.
- Valve 1 in partial transmission 1 for the 1st. and 3rd. gears selector mechanism actuator, controlled by the N433.

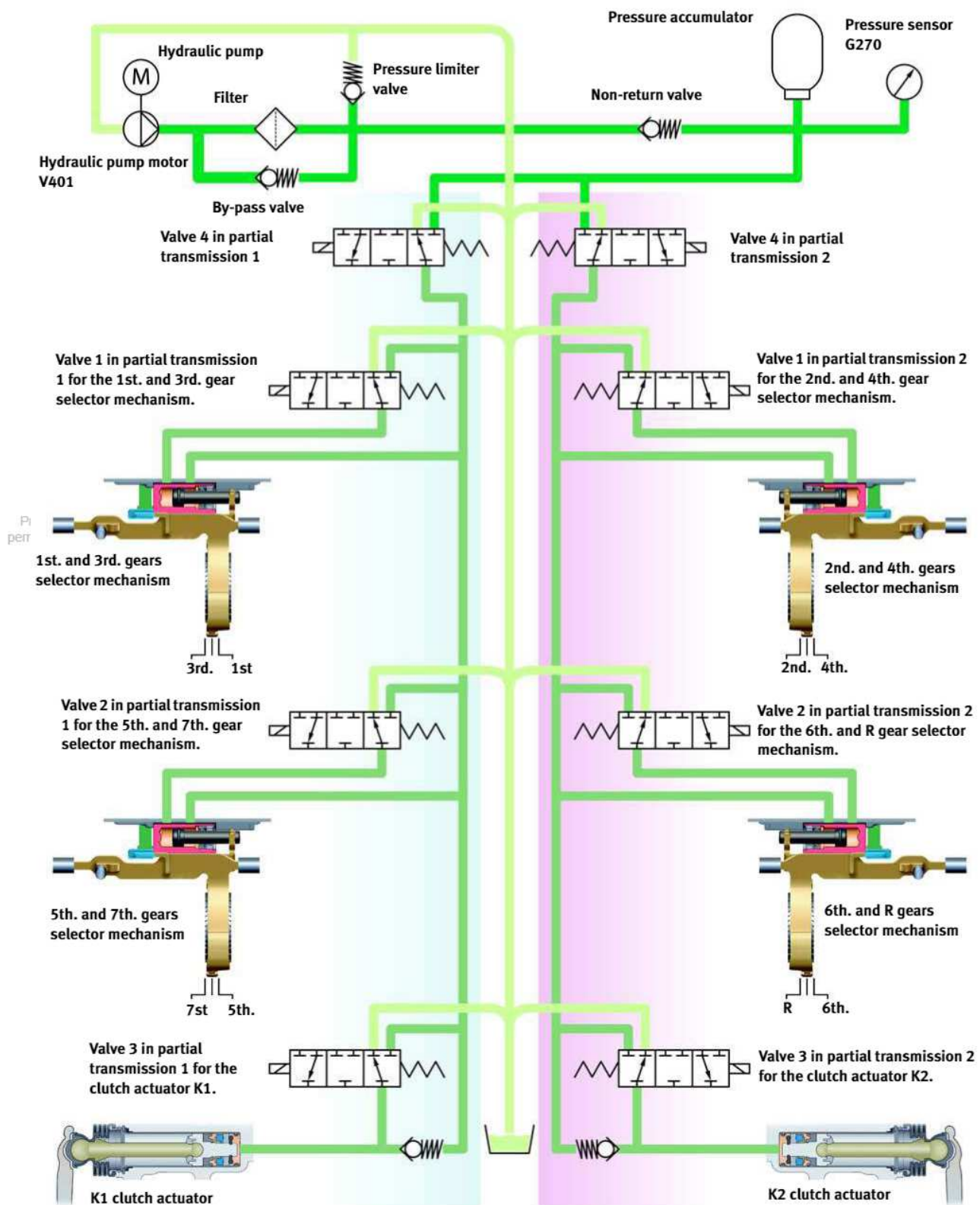
- Valve 2 in partial transmission 1 for the 5th. and 7th. gears selector mechanism actuator, controlled by the N434.

- Valve 3 in partial transmission 1 for the K1 clutch actuator, controlled by the N435.

The components related to partial transmission 1 are:

- Valve 4 in partial transmission 2, which is controlled by the N440.
- Valve 1 in partial transmission 2 for the 2nd. and 4th. gears selector mechanism actuator, controlled by the N437.
- Valve 2 in partial transmission 2 for the 6th. and R gears selector mechanism actuator, controlled by the N438.
- Valve 3 in partial transmission 2 for the K2 clutch actuator, controlled by the N439.

In the hydraulic circuits of the clutches actuators there are safety valves for disengaging the clutches in the event of a fault.



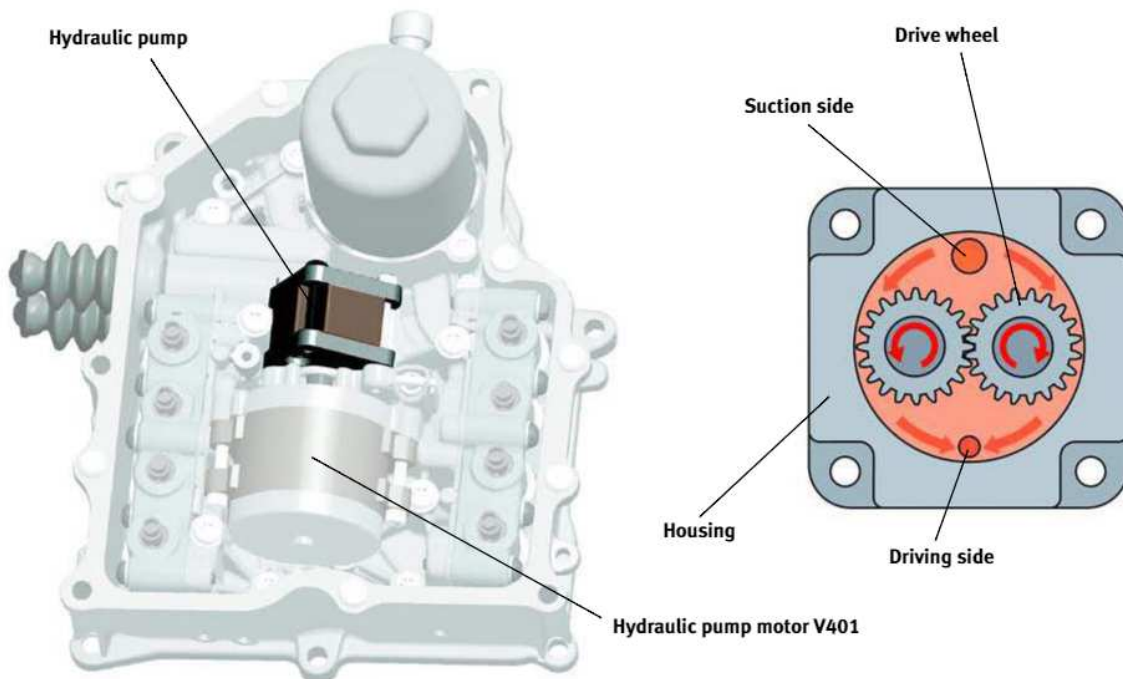
D126-27

HYDRAULICS

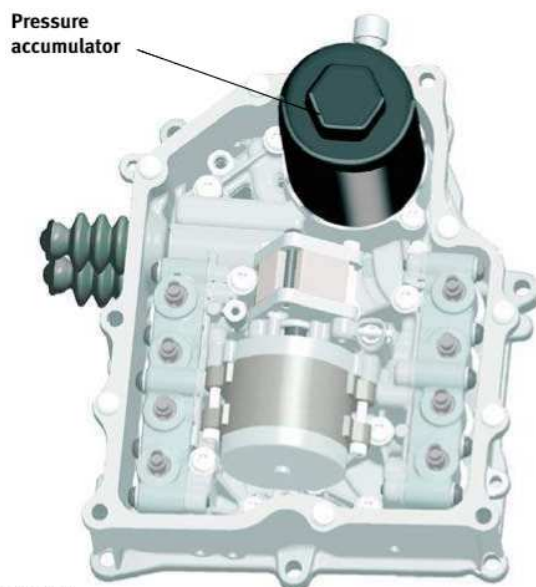
HYDRAULIC PUMP

The hydraulic pump is placed inside the mecatronics. It is an external lobes pump. The electrical motor V401 drives the pump. The pump **generates the pressure** required in the hydraulic pressure. The maximum pressure it can generate is 75 bar.

The pump sucks in the hydraulic oil and drives it to the pressure accumulator and to the valves.



D126-28



D126-29

PRESSURE ACCUMULATOR

The pressure accumulator is inside the mecatronics. It has a 2.0l capacity.

The accumulator **stores** part of the oil driven by the hydraulic pump and supplies it to the solenoid valves when the hydraulic pump is not running. This is how the hydraulic pump is not continuously running.

VALVES

The valves inside the mecatronics are:

- 2 valves for the partial transmissions.
- 2 valves for the clutch actuators.
- 4 valves for the selector mechanism actuators.

PARTIAL TRANSMISSIONS

The partial transmission valves are controlled by the N436 for valve 4 of partial transmission 1 and the N440 for the partial transmission 2 valve.

They are pressure downgrade valves.

CLUTCHES ACTUATORS

The valves of the clutches' actuators are controlled by:

- The N435 for valve 3 of partial transmission 1 that controls the clutch actuator K1.
- The N439 for valve 3 of partial transmission 2 that controls the clutch actuator K2.

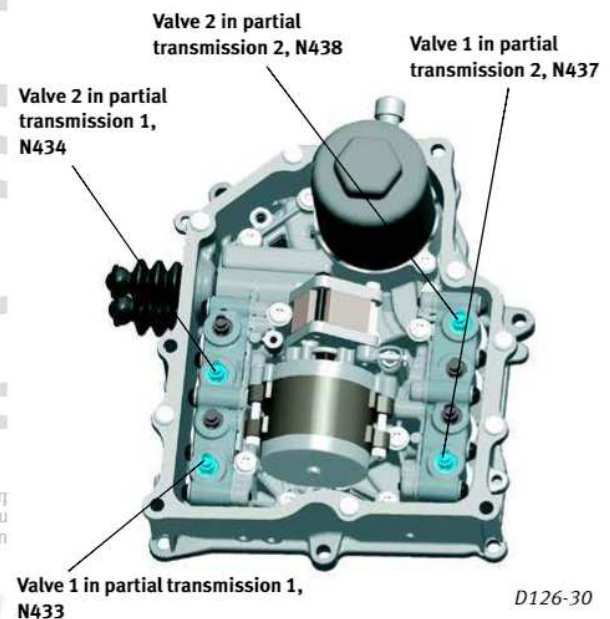
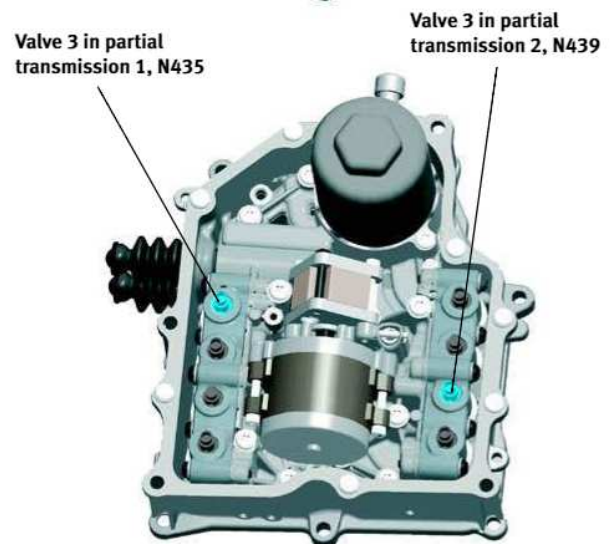
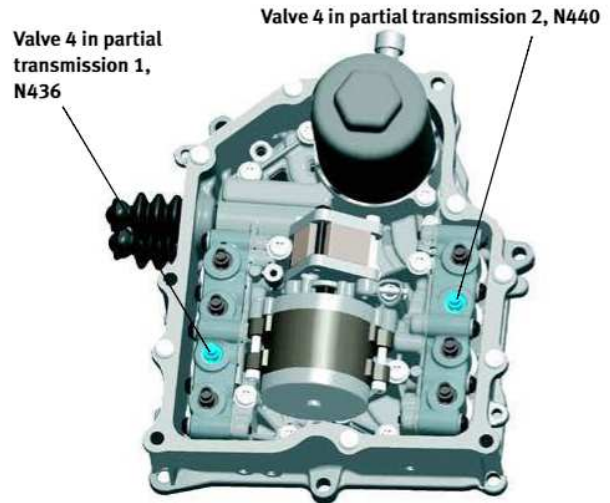
They are flow regulator valves.

SELECTOR MECHANISMS ACTUATORS

The selector mechanisms' valves are controlled by:

- The N433 for valve 1 of partial transmission 1 that controls the 1st./3rd. gears selector mechanism.
- The N434 for valve 2 of partial transmission 1 that controls the 5th./7th. gears selector mechanism.
- The N437 for valve 1 of partial transmission 2 that controls the 2nd./4th. gears selector mechanism.
- The N438 for valve 2 of partial transmission 2 that controls the 6th./R gears selector mechanism.

The valves are flow regulators.



Protected by copyright. Copying for private or commercial purp
permitted unless authorised by SEAT S.A. SEAT S.A does not gu
respect to the correctness of information in this document

D126-30

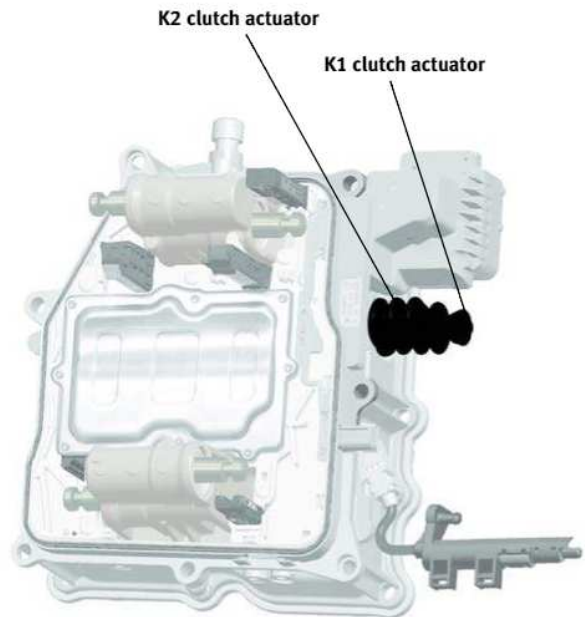
HYDRAULICS

CLUTCHES ACTUATORS

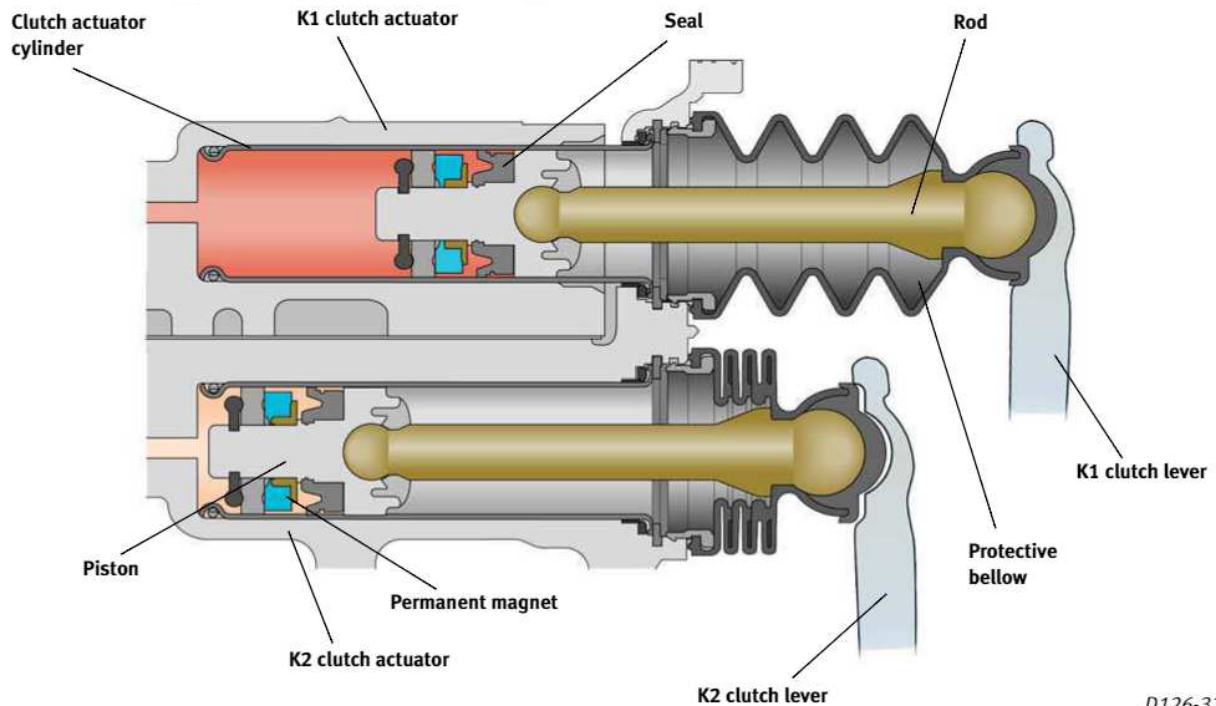
The mecatronics has **two hydraulic actuators** for activating the clutch levers. Each actuator **only activates one** clutch lever. Each actuator includes:

- A cylinder through which the piston moves.
- A piston that holds the rod, the seal and the permanent magnet.
- A permanent magnet whose position is detected by the clutch travel sensor.
- A seal to prevent hydraulic oil loss.
- A rod that pushes the clutch lever
- A protective bellow to keep the inside of the actuator free of dirt.

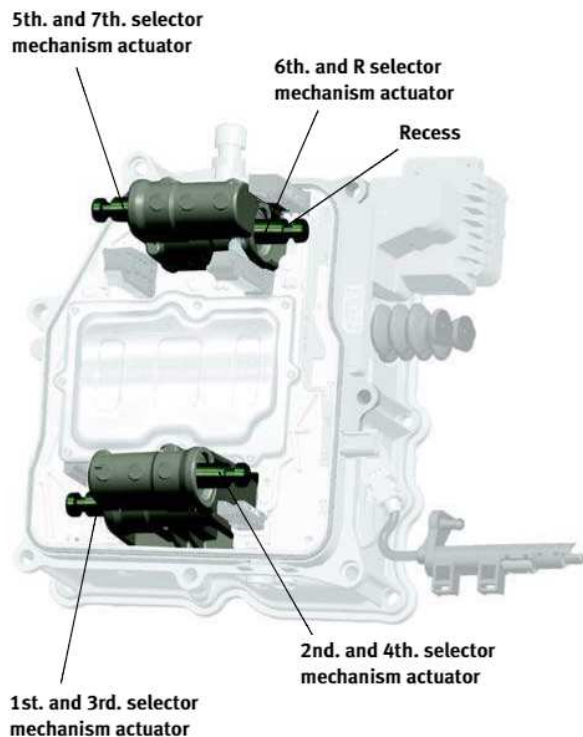
When the cylinder is filled with hydraulic oil, the rod pushes the clutch lever.



D126-31



D126-32



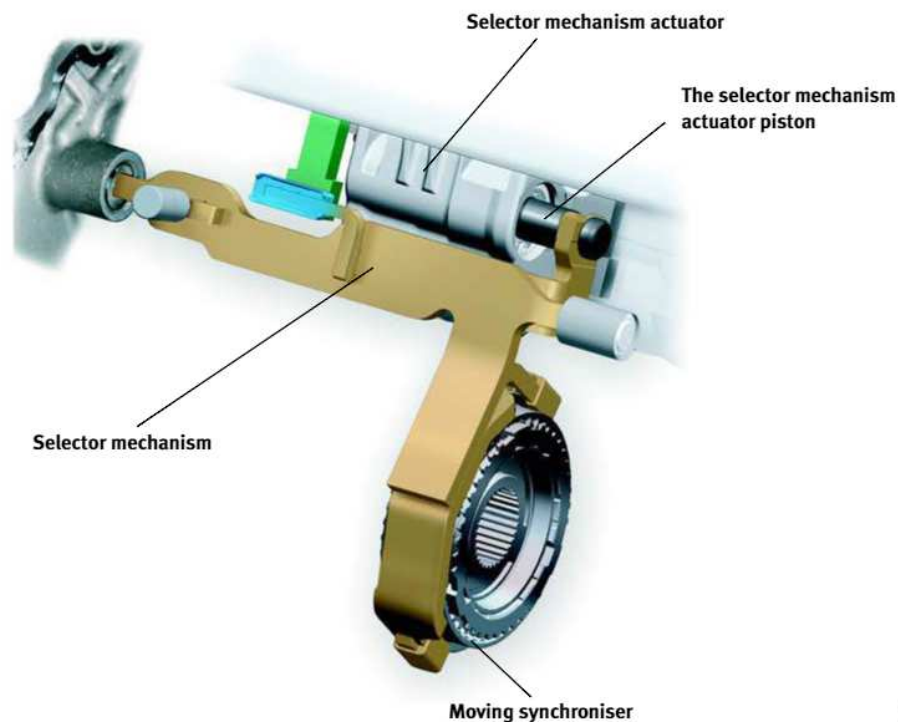
D126-33

SELECTOR MECHANISMS ACTUATORS

The mecatronics has **four hydraulic actuators** for moving the four gearbox selector mechanisms. Every actuator **only moves one selector mechanism**.

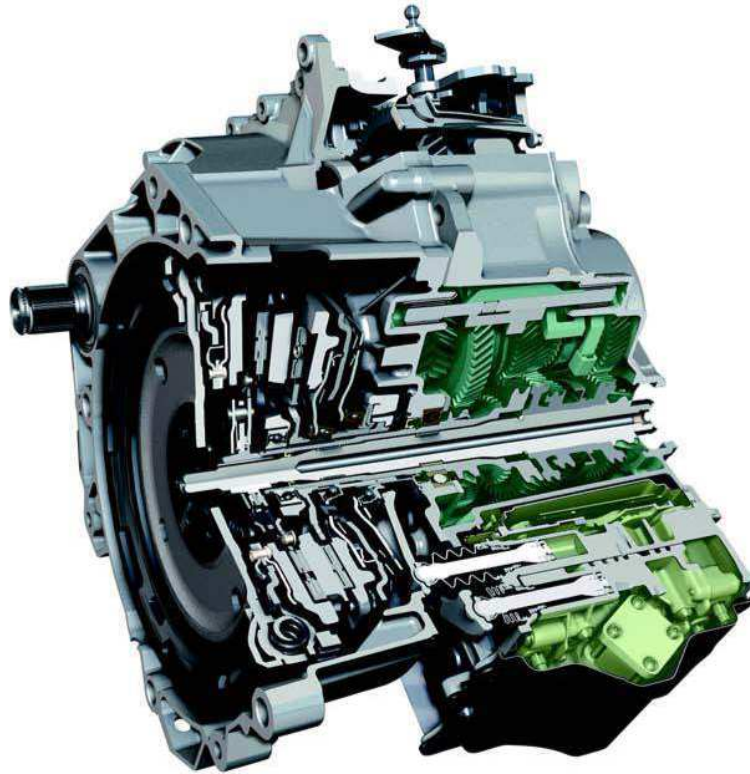
The rods of the selector mechanism actuators have a recess where the selector mechanisms are held.



When the hydraulic pressure is applied to the actuator, the actuator rod moves making the selector mechanism move. The selector mechanism also moves the moving synchroniser. This is how the gears are engaged and disengaged.



D126-34

LUBRICATION



-  Gears lubrication oil
-  Hydraulic oil

The DSG 0AM automatic gearbox uses **two types of oil**. One is for **lubricating the gears**, and the other one for the **hydraulic circuit of the mecatronics**.

Using both oil types separately brings the following advantages:

- The oils **are specific** for the demands of the functions they carry out.
- **No dirt or any other type of particles is transferred** from the clutch to the mechatronics.

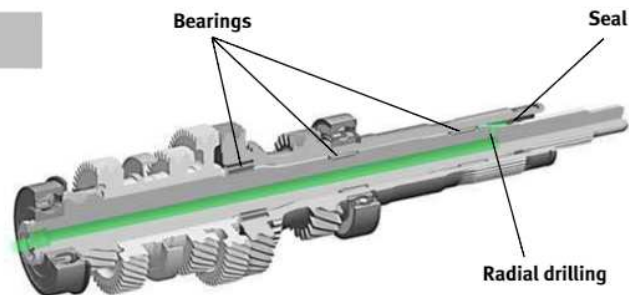
The oil charges are life-long, this is why it is not permitted to replace the oils.

The oil **types and volumes** are:

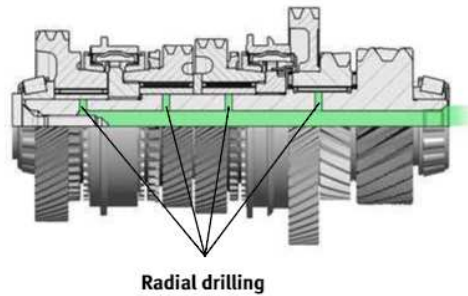
For lubricating the gears **1.7 l of G 052 171 gears oil is used.**

- For the mecatronics operation **1.0 l of G 004 000 hydraulic oil is used.**

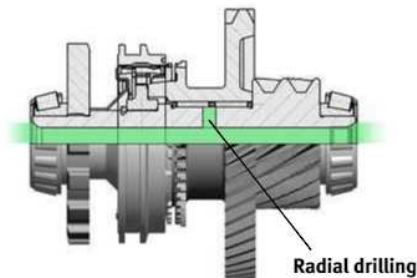
MAINSHAFTS



LAYSHAFT 2



LAYSHAFT 3



Gears lubrication oil

D126-35

LUBRICATION OF BEARINGS

Mainshaft 1, layshaft 2 and lyshaft 3 have internal **axial and radial drillings**. These drillings facilitate lubrication of the needle bearings of each shaft.

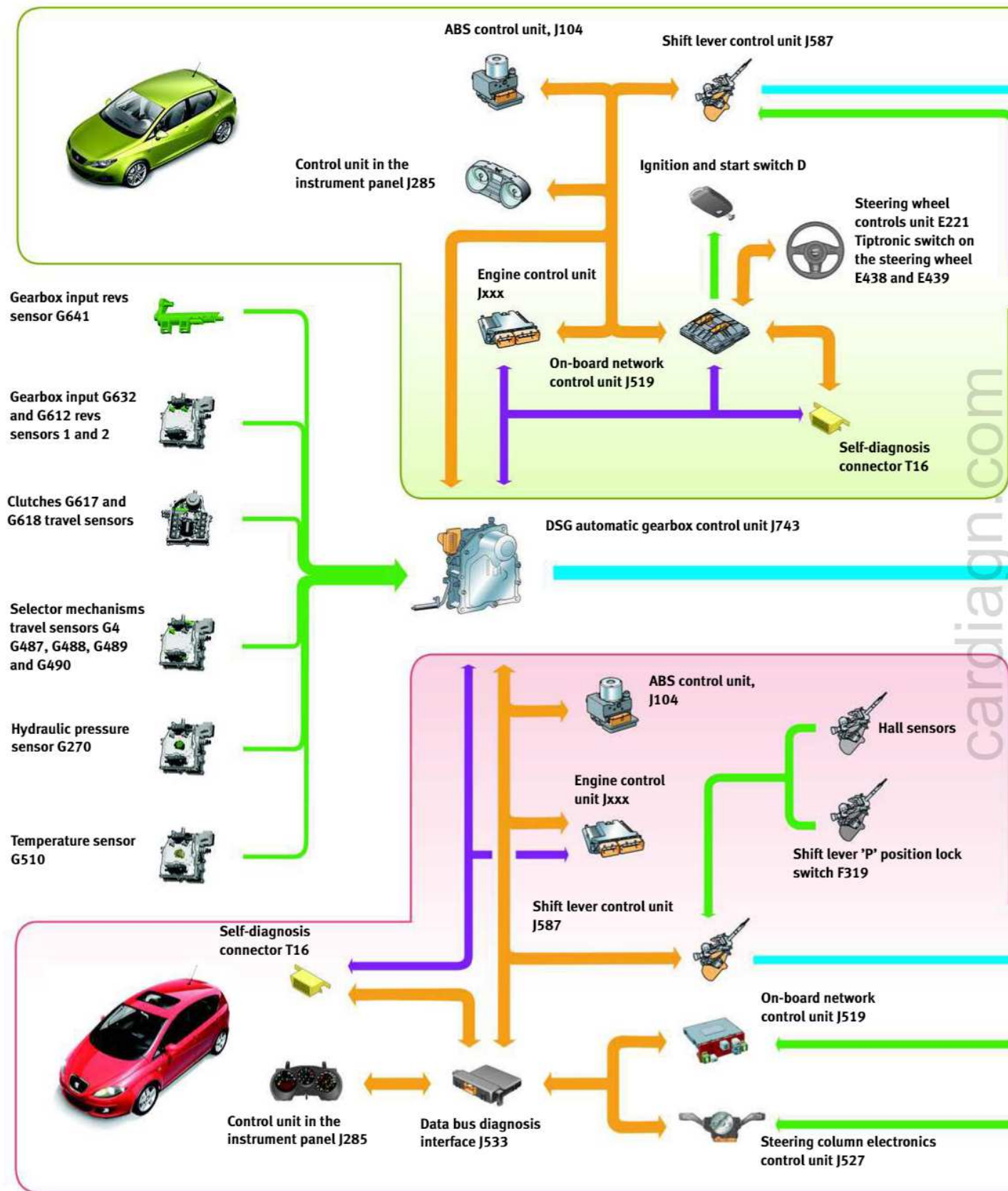
Oil enters the shafts through a hole on the shaft bearing housings. The oil moves due to shaft rotation and enters mainshaft 1 and layshaft 2. On layshaft 3 a plastic tray collects the oil that gushes forth and brings it to the hole.

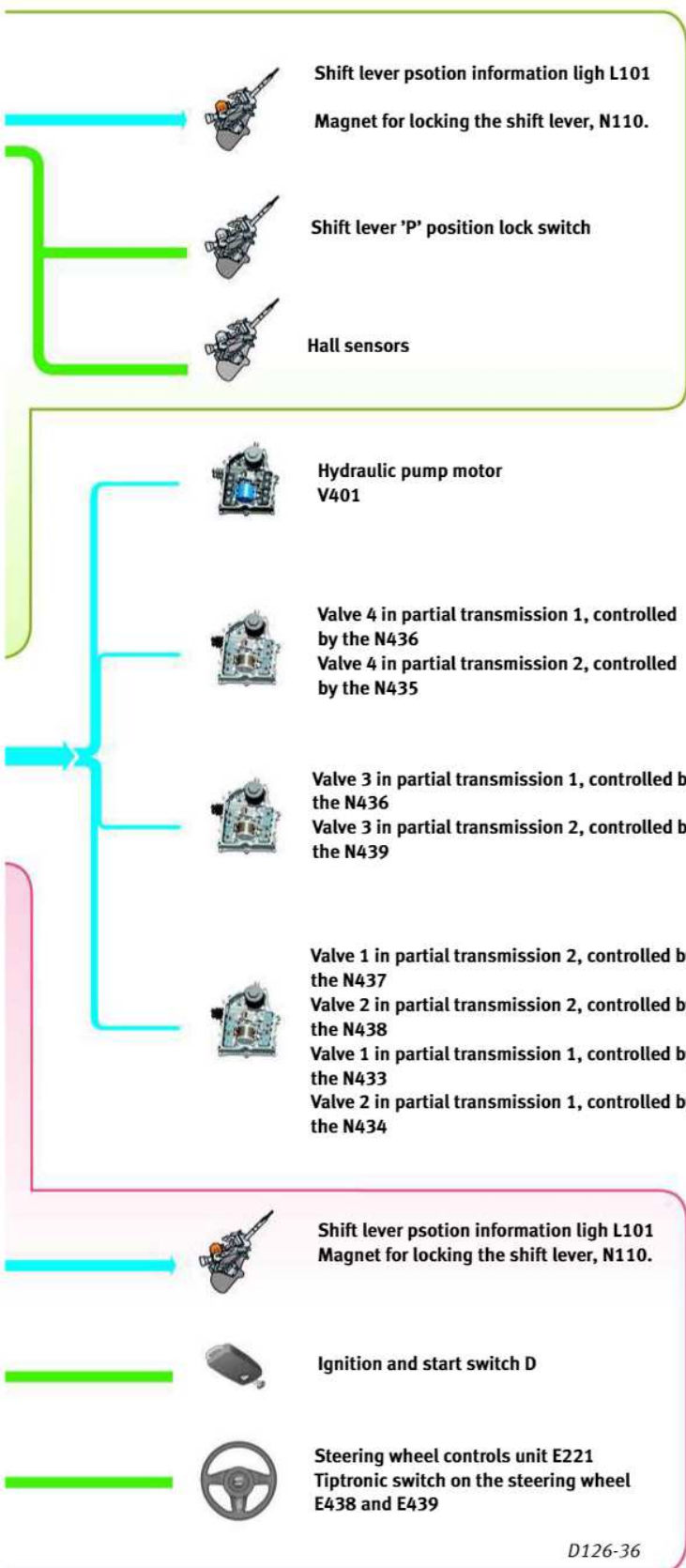
Mainshaft 1 has a radial drilling to improve lubrication of the three needle bearings placed between the mainshafts.

Mainshaft 2 has four radial drillings for lubricating the needle bearings of the mobile pinions of the gears.

Mainshaft 3 has a radial drilling to lubricate the needle bearing of the reverse gear mobile pinion.

SYSTEM LAYOUT





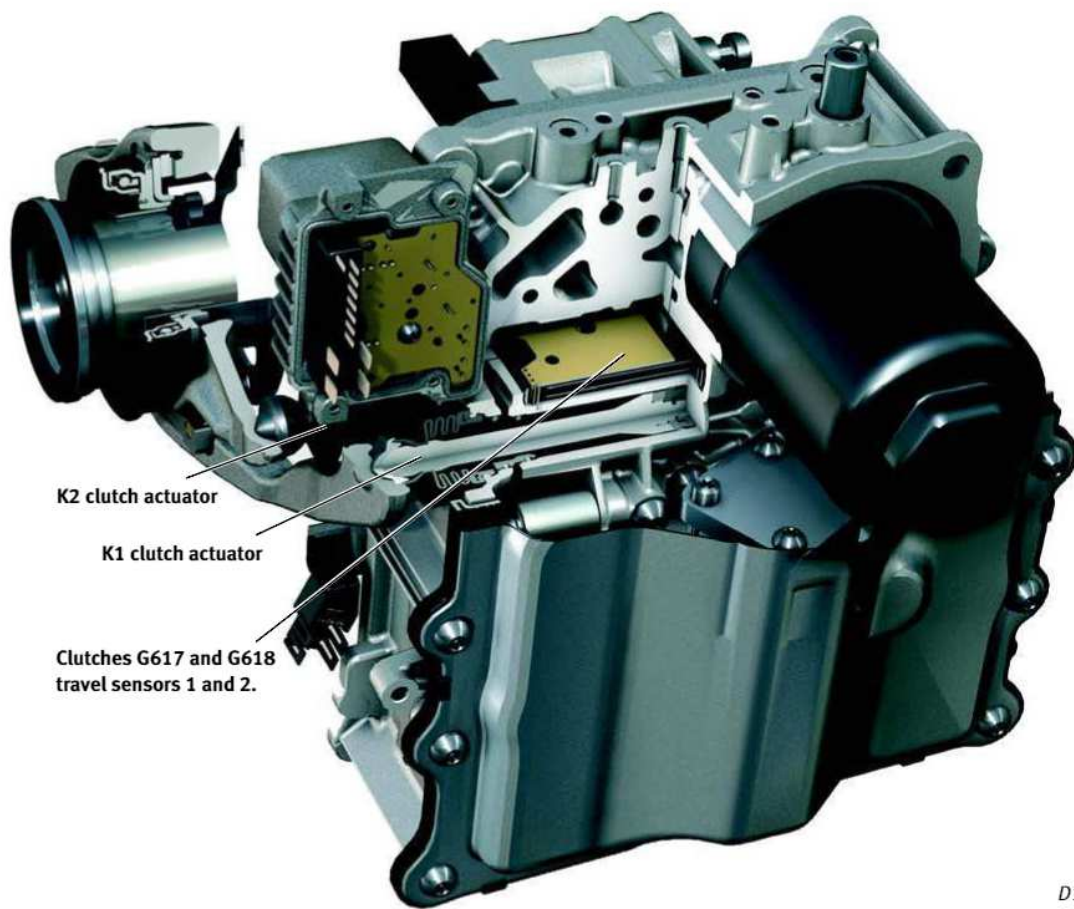
ASSUMED FUNCTIONS

The DSG J743 automatic gearbox mecatronics control unit assumes the functions related with:

- Pressure generation.
- Hydraulic pump pressure excess regulation.
- Clutches management.
- Double clutch hydraulic activation.
- Regulation in manoeuvres.
- Dual clutch self-adapting.
- Microslippage regulation.
- Safety disconnection of double clutch.
- Selector forks actuators' activation.
- Down-shifting with intermediate acceleration.
- Emergency drive.
- Driving programs.
- Start-up authorisation.
- "Shift-lock" software function.

for private or commercial purposes, in part or in whole, is not
AT S.A. SEAT S.A. does not guarantee or accept any liability with
of information in this document. Copyright by SEAT S.A.

SENSORS



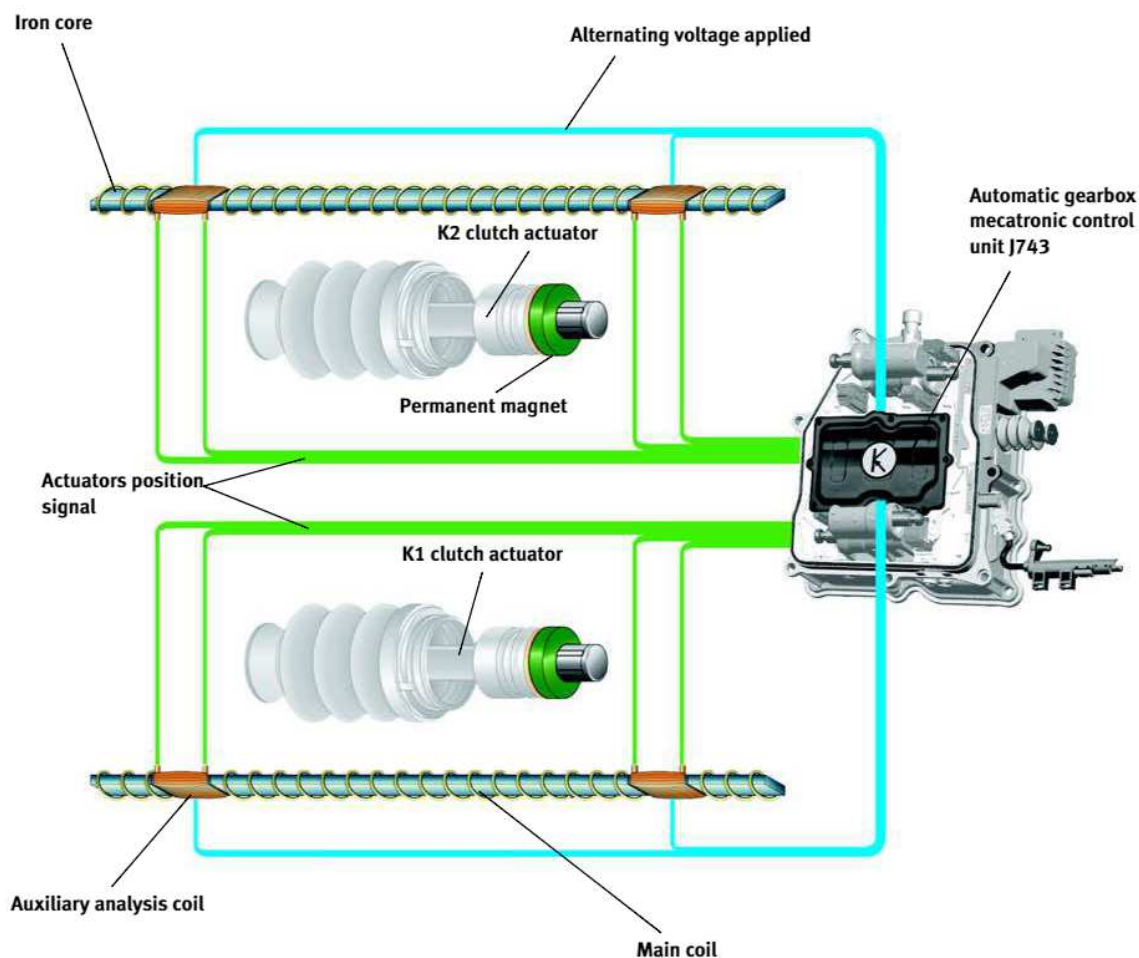
D126-37

CLUTCHES G617 AND G618 TRAVEL SENSORS 1 AND 2.

The clutch travel sensors are placed inside the mecatronics over the double clutch actuators.

The clutch travel **sensor 1, G617**, informs the control unit of the **K1 clutch** piston position. And **sensor 2, G618**, informs about the position of the **K2 clutch** piston.

The G617 and G618 sensors **do not have pins** because they operate under the voltage induction principle on a coil when iron material is under the effects of a magnetic field.



D126-38

- Each sensor includes:
- A primary coil rolled around a ferro-magnetic core.
 - Two analysis coils.
 - One permanent magnet.

The gearbox control unit J743 generates a magnetic field on the main coil by applying an **alternating current** to it. This magnetic field is extended with the iron core. When the permanent magnet each clutch actuator incorporates moves, it induces a voltage on the analysis coils. The gearbox control unit J743 detects the induced voltage on the auxiliary coils and reads the position of the actuator.

SIGNAL APPLICATION

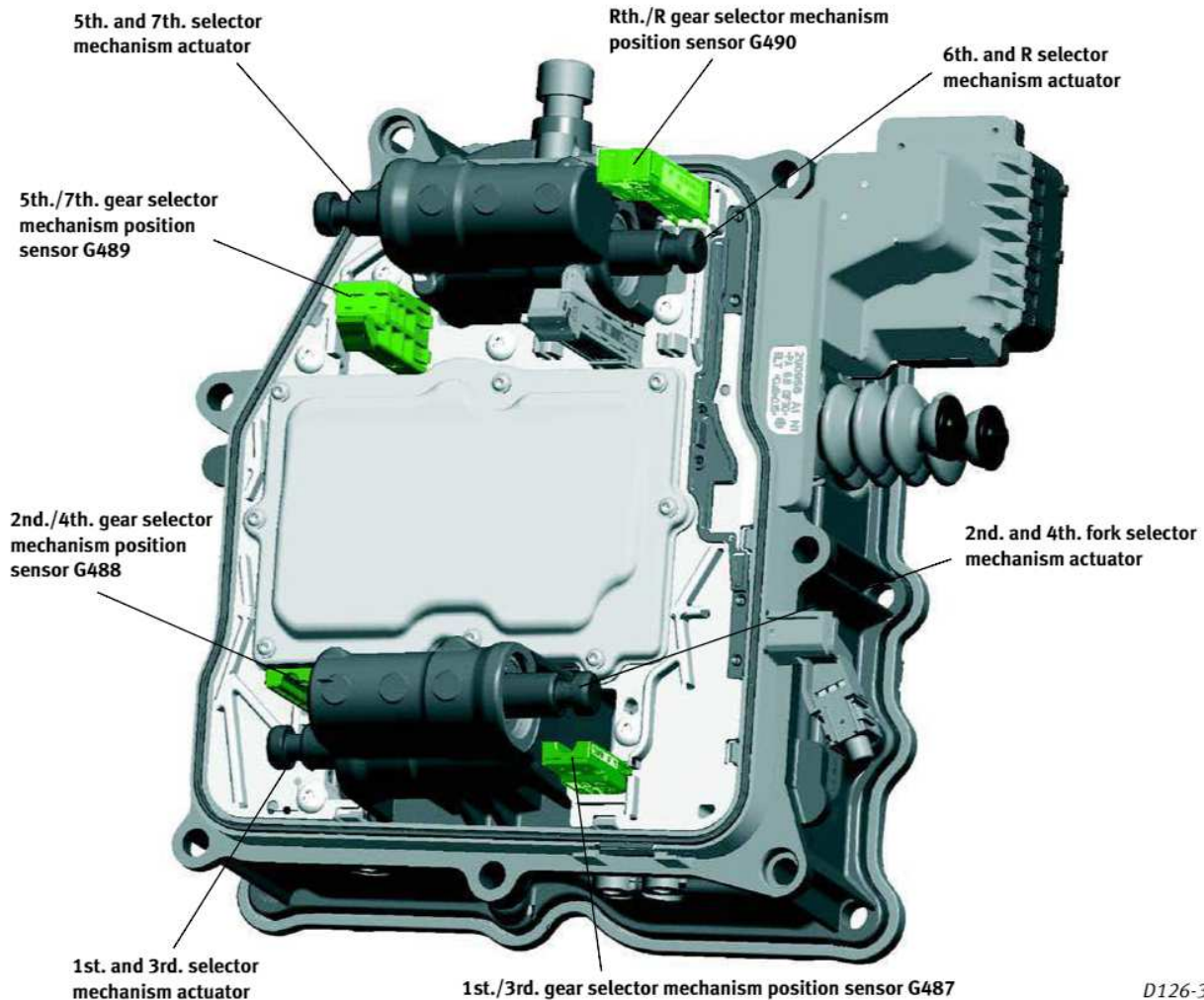
The gearbox control unit J743 uses these signals to **recognise the positions of the clutch actuators**.

REPLACEMENT FUNCTION

If one of the sensors fails, the DSG J743 automatic gearbox control unit **disconnects** the partial transmission in which the faulty sensor is involved.

Protected by copyright. Copying for private purposes, in part or in whole, is not permitted without the prior written consent of SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

SENSORS



D126-39

SELECTOR MECHANISMS POSITION SENSORS G4 G487, G488, G489 AND G490

The sensors are placed in the mecatronics next to the hydraulic actuators of the selector mechanisms.

The sensors, together with the magnet inside each selector mechanism, detect the position of the hydraulic actuators. There **is a position sensor for every actuator**.

The G487 sensor for the 1st. and 3rd. gears actuator.

The G488 sensor for the 2nd. and 4th. gears actuator.

The G489 sensor for the 5th. and 7th. gears actuator.

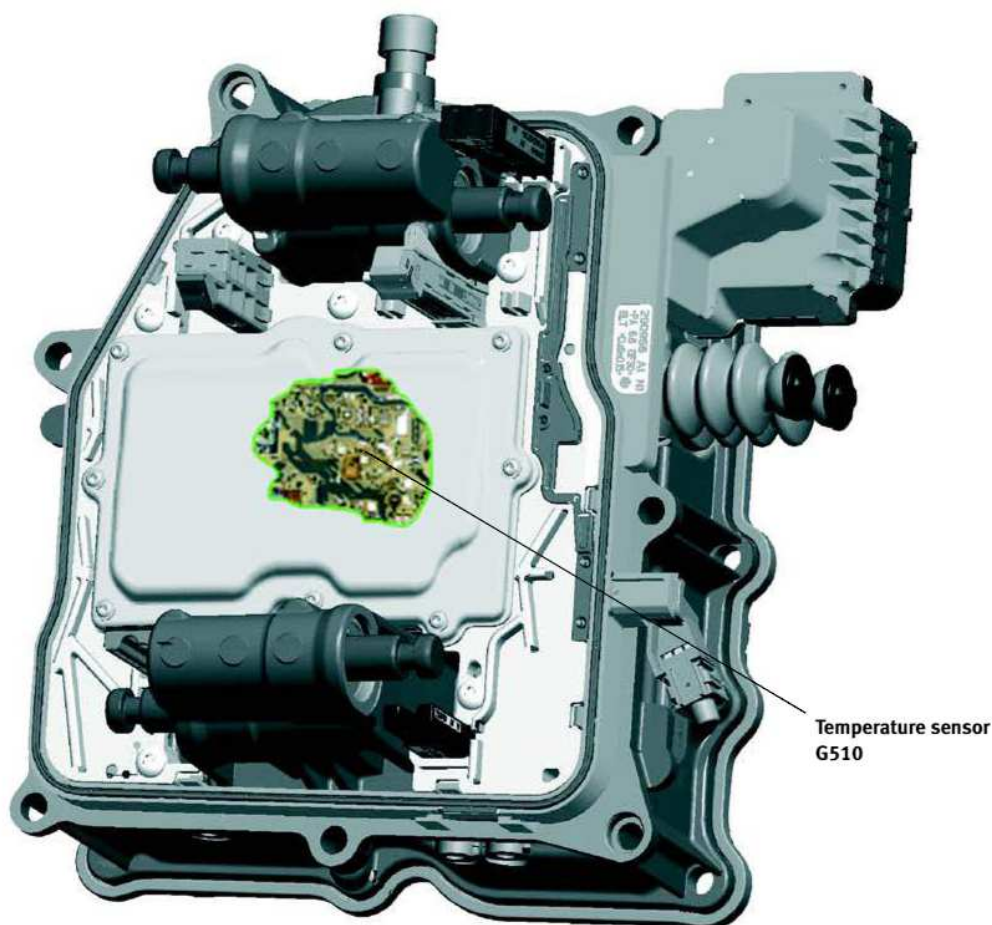
The G490 sensor for the 6th. and R gears actuator.

SIGNAL APPLICATION

The DSG J743 automatic gearbox mecatronics control unit uses the signal from each of the sensors to **recognise the position of the selector mechanisms' actuators**, and therefore to know what gear is engaged.

REPLACEMENT FUNCTION

If one of the sensors fails, the DSG J743 automatic gearbox mecatronics control unit **disconnects** the partial transmission in which the faulty sensor is involved.



D126-40

TEMPERATURE SENSOR G510

It is integrated in the mecatronics electronics. The sensor measures the temperature of the mecatronics.

SIGNAL APPLICATION

The gearbox control unit J743 uses this signal to **know the temperature of the mecatronics** and to carry out the mecatronics **thermal protection** function. Excess work heats up the electronic components and the hydraulic oil in excess. This temperature excess might damage the electronic components.

The mecatronics thermal protection function consists of **reducing torque** delivered by the

engine according to the temperature value:

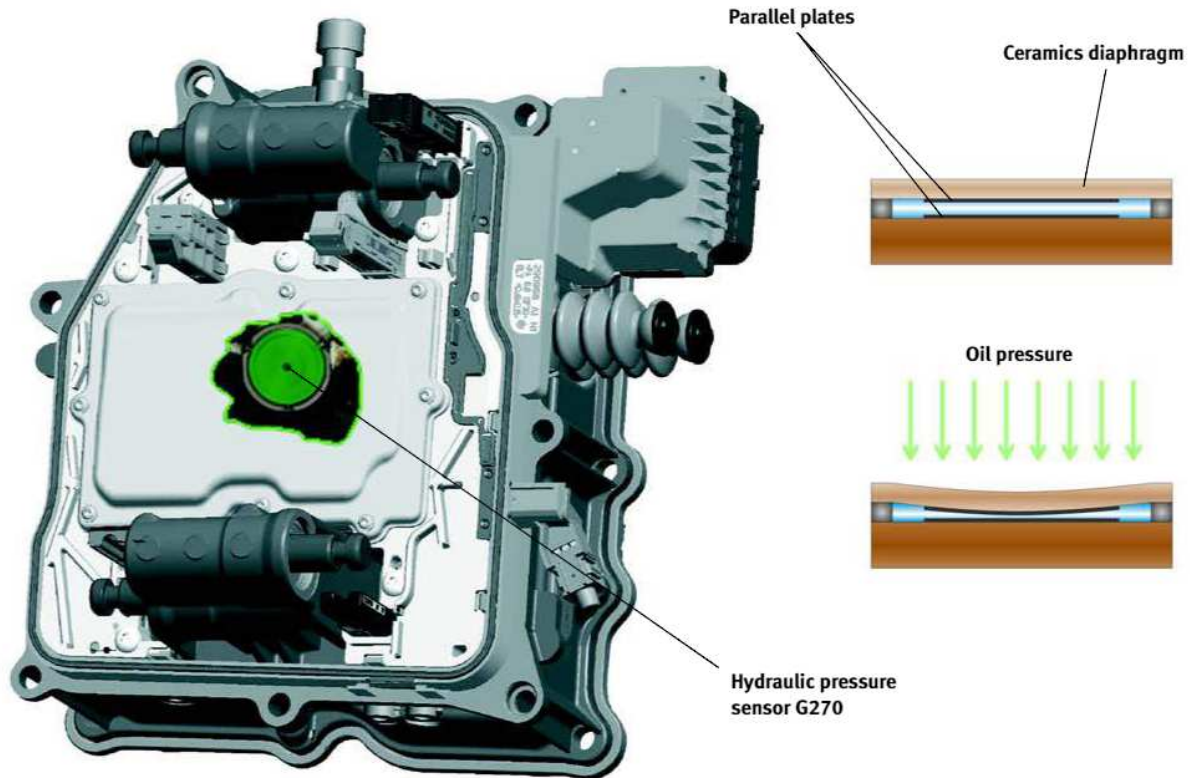
- If there is a temperature variation between **138 °C and 145 °C**, the available engine torque is progressively reduced.

- If the temperature rises over **145 °C**, the available engine torque is reduced.

All the engine torque is available again when the temperature is reduced to **135 °C**.

REPLACEMENT FUNCTION

If the signal were missing, the gearbox control unit J743 **uses an auxiliary value** to carry out the system's calculation.



D126-41

HYDRAULIC PRESSURE SENSOR G270

It is placed in the mechatronics, integrated in the electronics.

It is a **diaphragm pressure sensor**. The pressure sensor is made of two parallel electricity conductor plates. One of them is attached to a ceramics diaphragm, which is in contact with the circuit pressure. The ceramics diaphragm bends and modifies the distance between plates, which generates a signal that is interpreted by the DSG automatic gearbox mechatronics control unit J743.

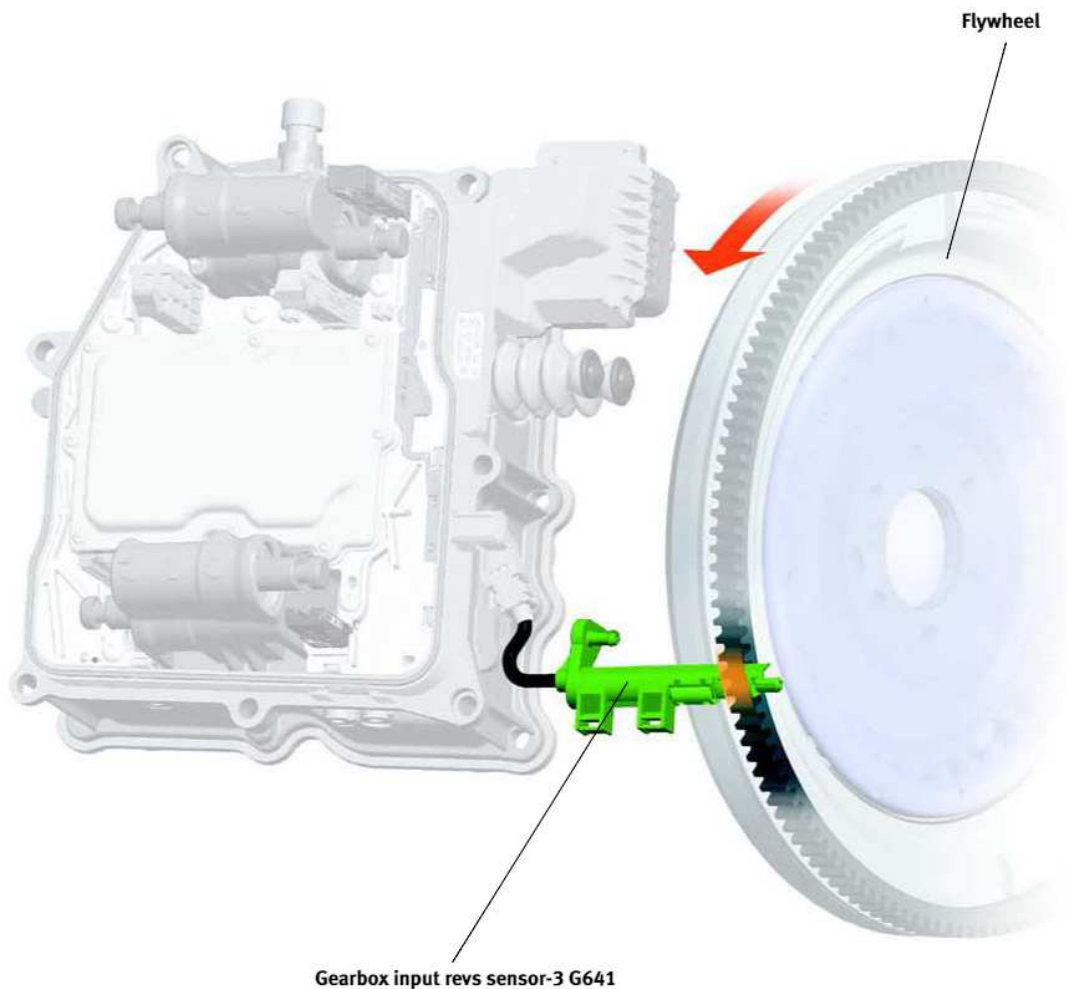
SIGNAL APPLICATION

The gearbox control unit J743 uses this signal to **know the pressure** in the hydraulic circuit and

manage the hydraulic pump motor V401 energising to maintain the pressure in the hydraulic circuit within the operation margins.

REPLACEMENT FUNCTION

If the pressure sensor is faulty, the gearbox control unit J743 **energises the V401 motor continuously**, and the pressure limiter valve - mechanically activated- opens and releases the hydraulic circuit excess of pressure.



D126-42

GEARBOX INPUT REVS SENSOR-3 G641

It is placed on the outside of the mecatronics and is embedded into the clutch housing. The sensor operates under the Hall principle and explores the flywheel crown electronically.

SIGNAL APPLICATION

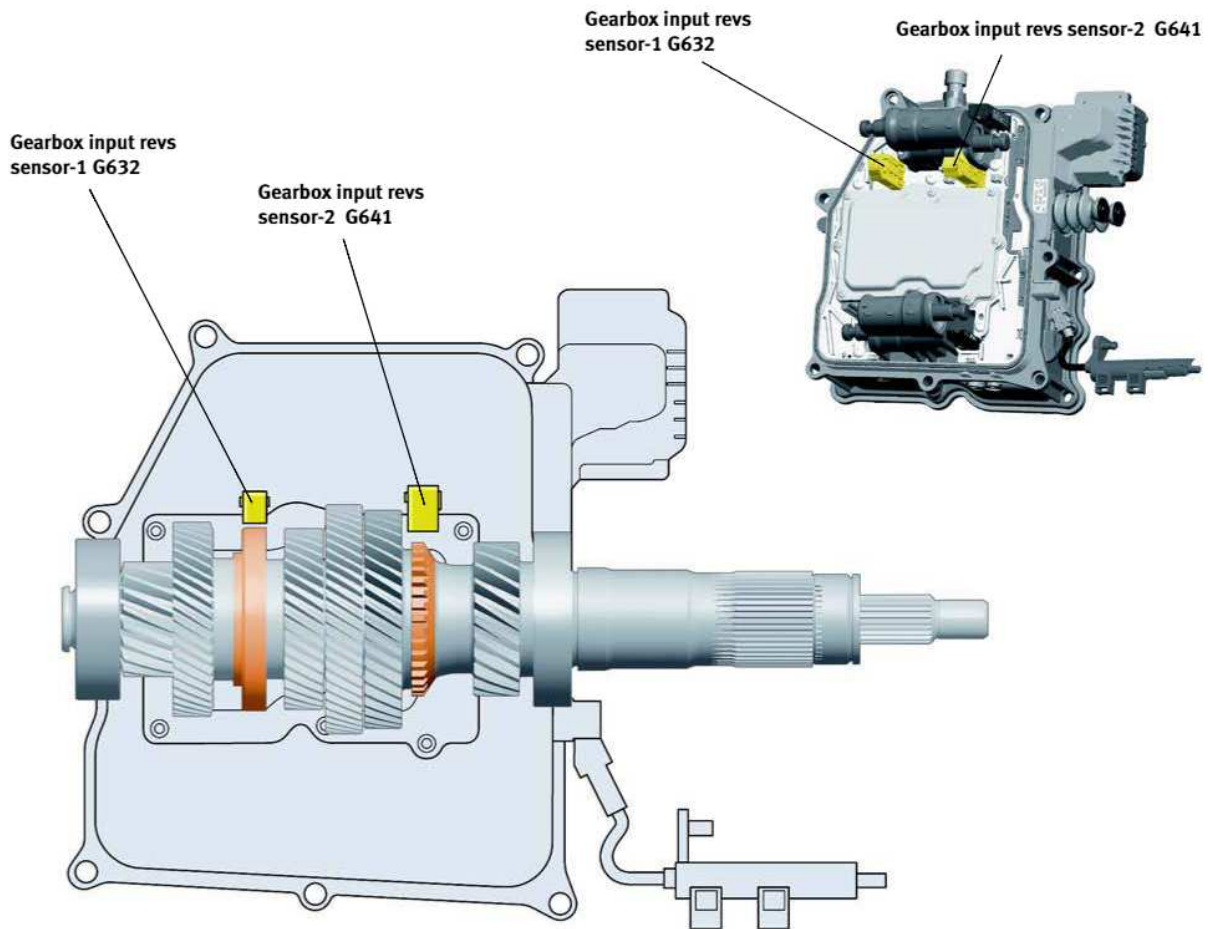
The DSG automatic gearbox mecatronics control unit J743 uses this signal to know the number of **revs** at the **gearbox intake**, the value of

which is identical to that of the engine revs. This value is one of the values used by the control unit J743 to calculate the double clutch slippage.

REPLACEMENT FUNCTION

If the sensor fails, the gearbox control unit J743 **uses the engine revs signal** that arrives via the drive CAN-Bus.

SENSORS



D126-43

GEARBOX INPUT G632 AND G641 REVS SENSORS 1 AND 2

They are placed in the mechatronics. They are sensors that operate under the Hall principle.

The **G632 sensor** explores the **mainshaft 1** generator crown wheel. It is a magnetic generator crown and alternates the north and south magnetic fields.

The **G641 sensor** explores the **mainshaft 2** generator crown wheel. It is a toothed generator crown.

SIGNAL APPLICATION

With the G632 sensor signal, the gearbox control unit J743 knows the mainshaft 1 revs and calculates the slipping of clutch K1.

With the G641 sensor signal, the gearbox control unit J743 knows the mainshaft 2 revs and calculates the slipping of clutch K2.

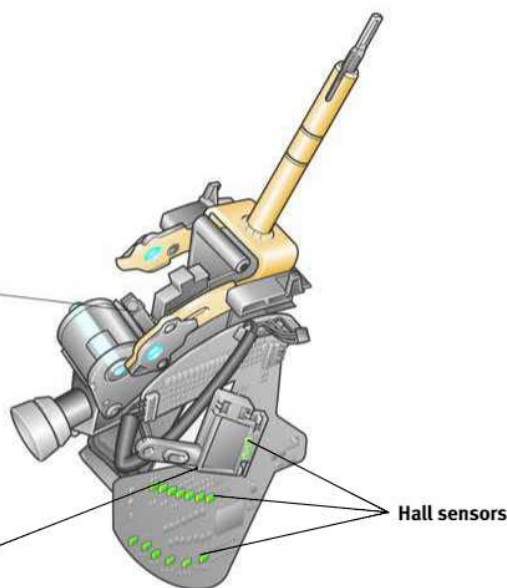
REPLACEMENT FUNCTION

If one of the sensors fails, the DSG J743 automatic gearbox control unit **disconnects** the partial transmission in which the faulty sensor is involved.

Switch F319



Shift lever control unit J587



D126-44

SELECTOR LEVER SENSORS SYSTEM CONTROL UNIT J587

It is made of 16 Hall sensors, three magnets and a control electronics. The driver transmits through unit J587 the driving program or the gear he wants by modifying the shift lever position.

The Hall sensors and the magnets are used for detecting the **shift lever positions**, the electronics recognises the signal of each Hall sensor and determines the lever position, then the electronics sends this information into the drive CAN-Bus.

SIGNAL APPLICATION

The shift lever position signal is used by:

- The gearbox control unit J743 to determine the gearbox programs and the gear to engage in Tiptronic mode.
- The instrument panel J285 to display the gear.

REPLACEMENT FUNCTION

If the sensors control unit fails, the gearbox control unit does not recognise the shift lever position and **the gears shifting does not take place**. The instrument panel J285 indicates the fault by blinking the gears indicators.

SHIFT LEVER 'P' POSITION LOCK SWITCH F319

It is a **switch** placed on the shift lever assembly, which **opens** when the shift lever gets into **P position**.

SIGNALS APPLICATION

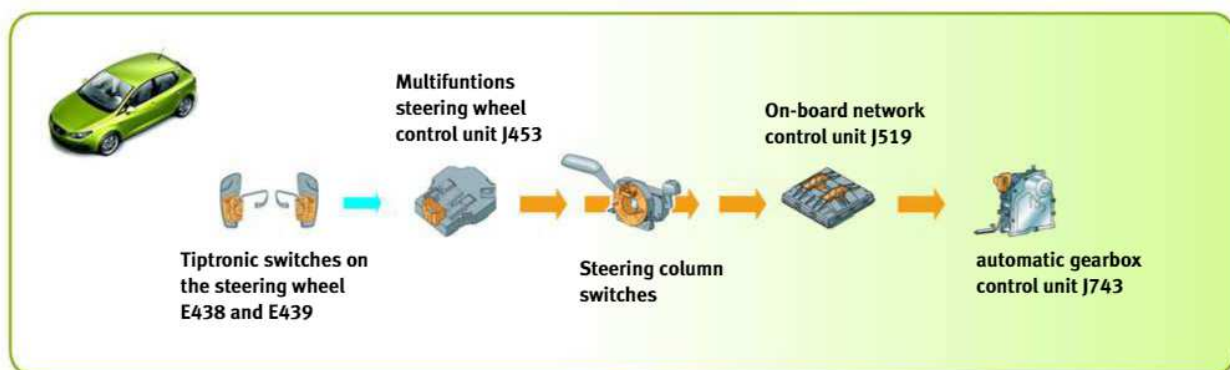
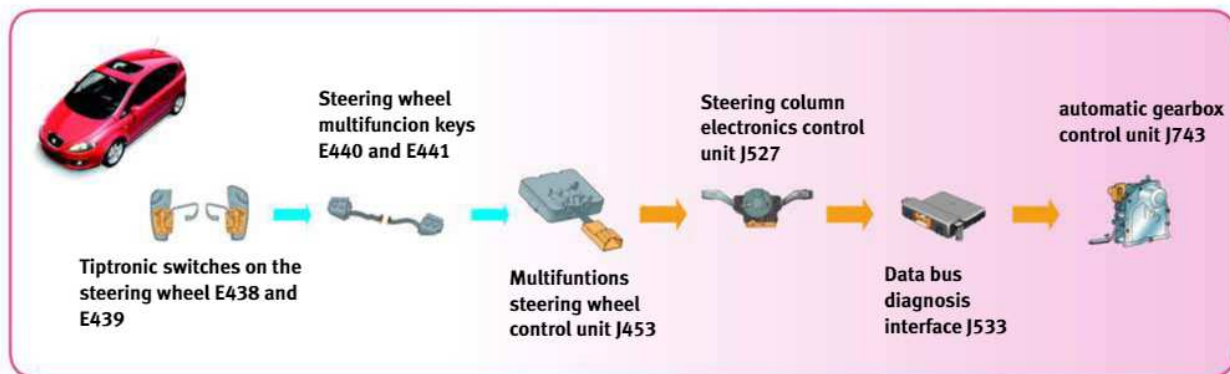
The switch signal is used by the steering column control unit J527 to allow removing the key as long as the shift lever is in position "P".

REPLACEMENT FUNCTION

If the switch is always closed, **the key can be removed** by turning it slowly when the shift lever is in "P".

Copyright © 2012 SEAT S.A. All rights reserved. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

SENSORS



D126-45

TIPTRONIC SWITCHES ON THE STEERING WHEEL E438 AND E439

The switches, which are screwed onto the steering wheel, are used for **downgearing and upgearing** in Tiptronic mode as the driver wishes. The E438 switch is placed on the right of the steering wheel and it is used for upgearing. The E439 switch is placed on the left of the steering wheel and it is used for downgearing.

The signals **reach the mecatronics differently** depending on the model.

In Altea, Toledo 05, Leon 06 and Altea XL, the switch signal reaches the steering column control unit through the steering wheel multifunction keys and the steering wheel control unit J453. From the steering wheel control unit J527 it reaches the mecatronics gearbox control unit J743 via **Can-Bus**.

In the Ibiza 08 the switches signal reaches a steering wheel unit, this unit sends the signal via the **doors LIN-Bus** to the on-board network control

unit J519. From the on-board network to the gearbox control unit it is a Drive CAN-Bus signal.

Faults related with the steering switches E438 and E439 are registered in the fault memory of the DSG automatic gearbox mecatronics control unit J743.

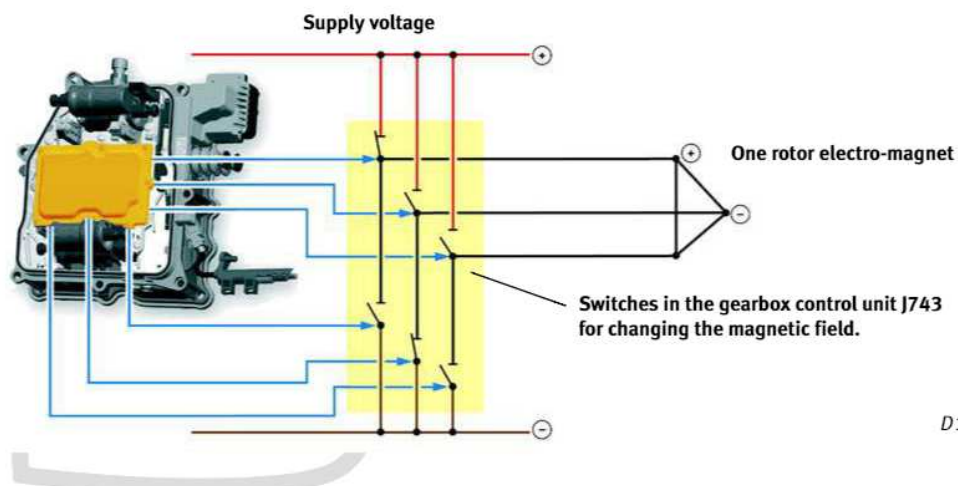
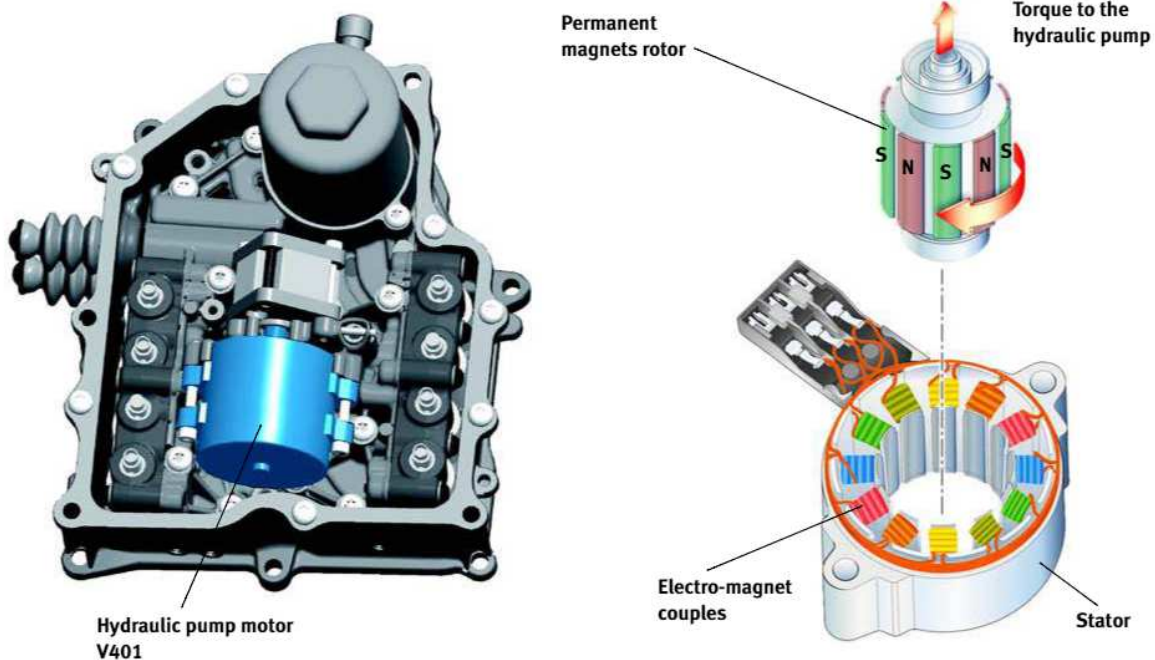
SIGNALS APPLICATION

The automatic gearbox control unit J743 uses the switch signal to shift between gears. The gearbox control unit J743 **ignores** the signal if the gears shifting demanded makes the engine rotate outside its range of operation.

REPLACEMENT FUNCTION

If the switch fails, **gear shifting is not possible** from the faulty switch.

ACTUATORS



D126-46

HYDRAULIC PUMP MOTOR V401

The hydraulic pump motor V401 is placed inside the mecatronics and activates the hydraulic pump to generate the pressure in the hydraulic circuit.

It is a direct current motor and does not have brushes. It is made up of a **rotor** containing **eight permanent magnets**, and one **stator** containing **six pairs of electromagnets**.

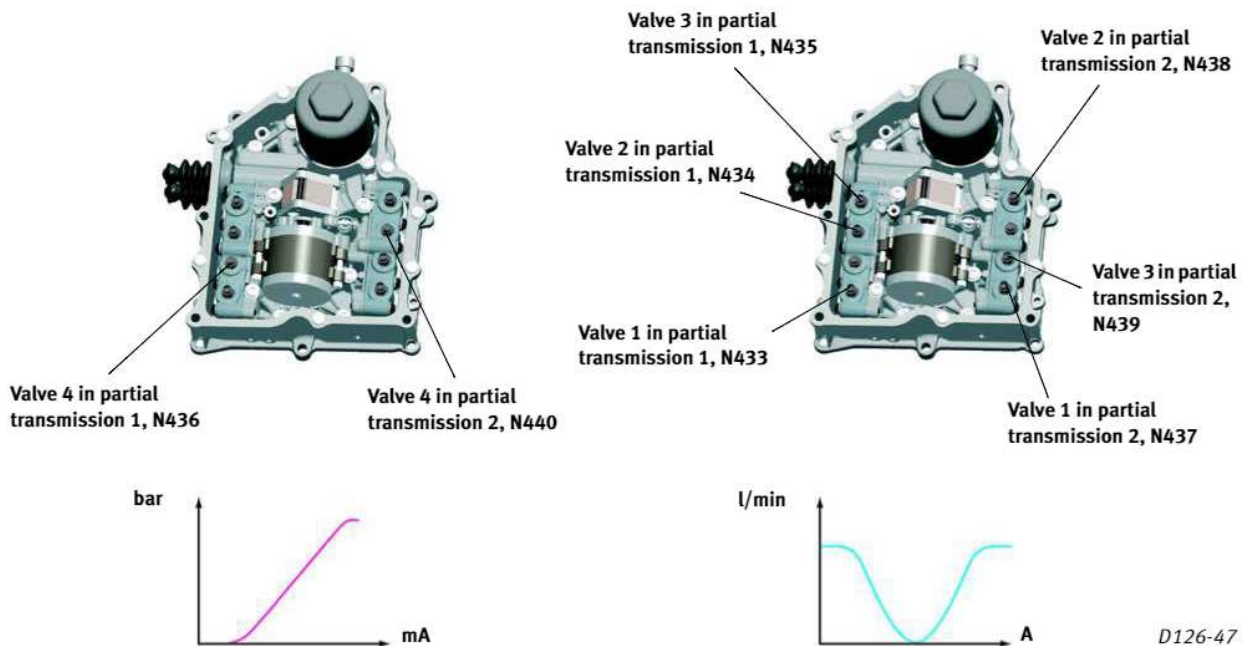
To make the rotor turn, the mecatronics control unit of the J743 gearbox changes polarity of the

different pairs of the stator electro-magnets, this is how the magnetic field direction is changed and forces the rotor to constantly modify its position.

REPLACEMENT FUNCTION

If the V401 motor fails, the hydraulic pump cannot be activated.

ACTUATORS



D126-47

VALVES

The J743 gearbox mecatronics control unit **controls** the eight valves of the hydraulic circuit **and it energises them** according to the needs. These valves are inside the mecatronics.

VALVES 4 FOR THE PARTIAL TRANSMISSIONS 1 AND 2, N436 AND N440

They are pressure downgrade valves. They regulate the hydraulic pressure of partial transmissions 1 and 2.

The valves are controlled with a **variable duty cycle** signal. Variation of the duty cycle allows energising the valve at a **higher or lower intensity**.

When at rest they prevent the hydraulic pressure from reaching the hydraulic actuators. Depending on the energising, they regulate the hydraulic pressure in each partial transmission.

VALVES 3 FOR THE PARTIAL TRANSMISSIONS 1 AND 2, N435 AND N439

They are valves that regulate the hydraulic oil passage to the actuators of the K1 and K2 clutches.

When at rest they divert the clutch actuators' flow to the return. Depending on the energising, **they either close completely or allow the flow** to the actuators.

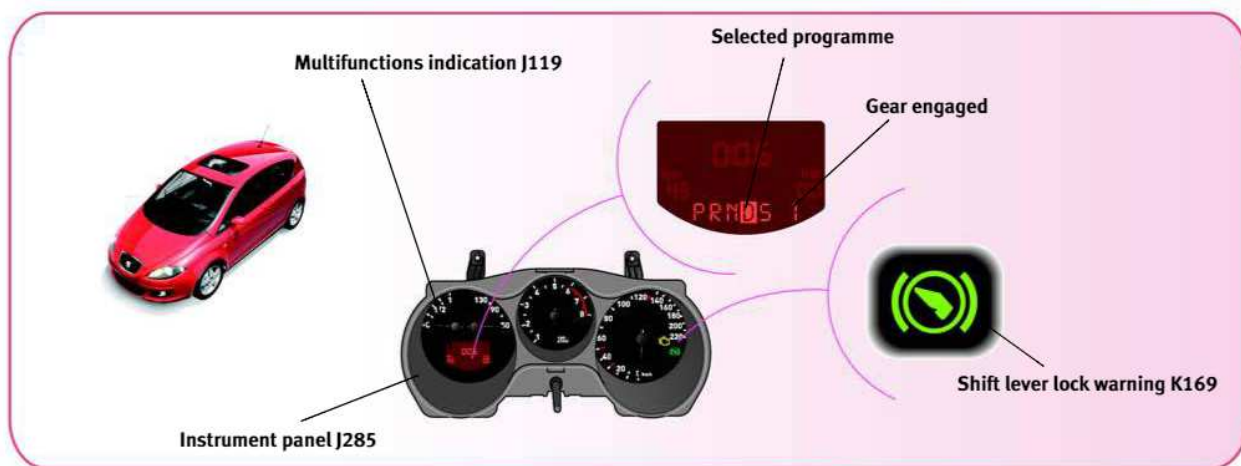
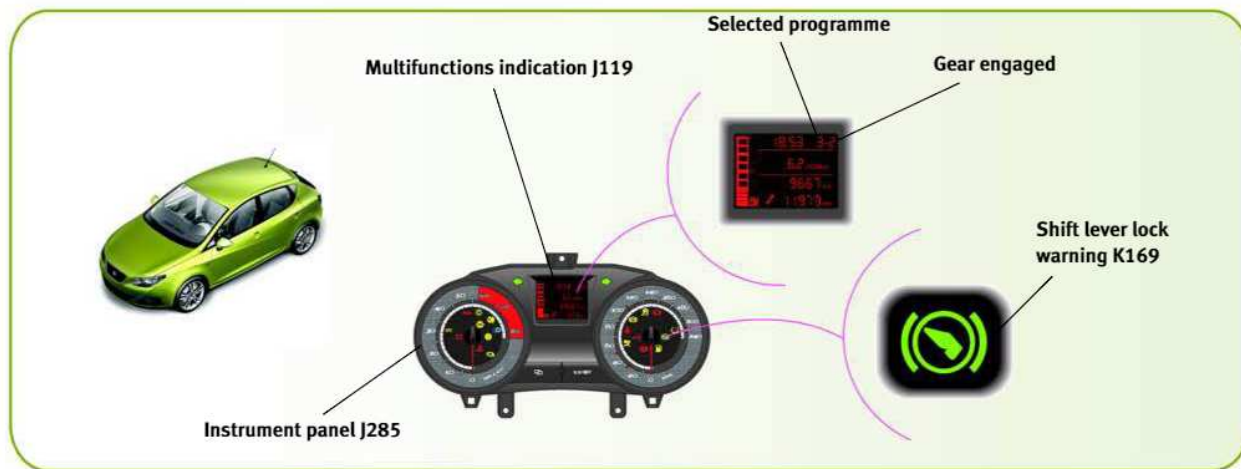
VALVES 1 AND 2 ACTUATORS OF PARTIAL TRANSMISSIONS 1 AND 2. N433, N434, N437 AND N438

They are valves that regulate the hydraulic oil passage to the actuators of the selector mechanisms.

When at rest they divert the hydraulic flow from the selector mechanisms' actuators to the return, and depending on the energising, **they either close completely or allow the flow** to reach the actuators.

VALVES REPLACEMENT FUNCTION

If one of the valves fails, the DSG J743 automatic gearbox mecatronics control unit **disconnects** the partial transmission where the faulty valve is involved.



D126-48

INSTRUMENT PANEL J285

The instrument panel indicates the driver three things:

- That the brake has to be pressed to unlock the shift lever when the **shift lever lock warning light K169 is activated**.

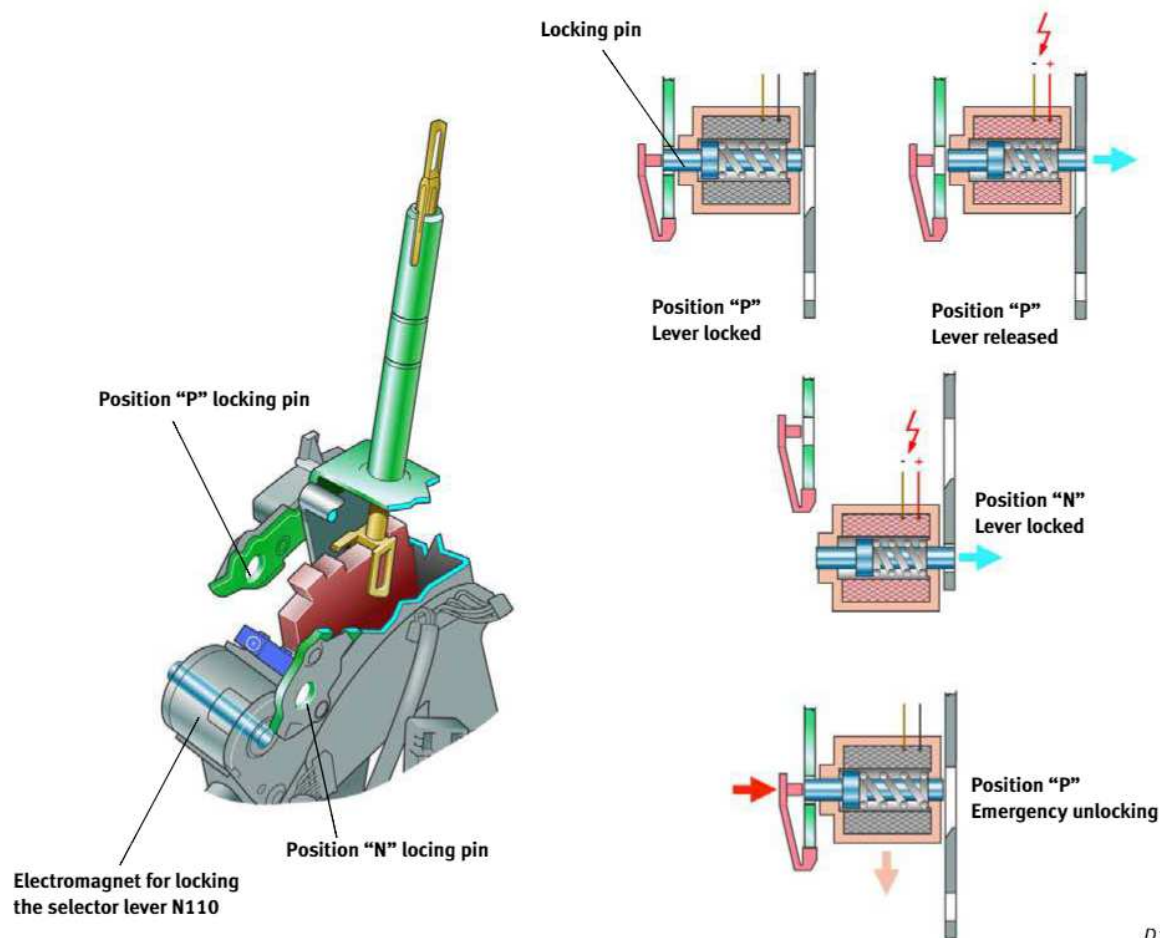
- The lever position and the gear engaged by the **multifunctions indicator J119**.

The instrument panel **activates** these indicators from drive CAN-Bus messages the DSG automatic

gearbox mecatronics control unit J743 receives from the shift lever sensors control unit J587 and from the ABS control unit J104.

Also, the multifunctions indicator J119 informs the driver about possible faults in the automatic gearbox. This warning varies according to the model.

ACTUATORS



D126-49

ELECTROMAGNET FOR LOCKING THE SELECTOR LEVER N110

It is part of the shift lever set. It is an electro-magnet, which is **energised** by the **shift lever sensors control unit J587**.

The electro-magnet contains a locking pin and a compression spring.

When the shift lever is in "P", the compression spring pushes the locking pin and fits it into the corresponding position pin.

When the shift lever is in "N" for more than two seconds, the shift lever sensors control unit J587 energises the electro-magnet N110 to move the pin to the opposite side and fit it into the other position pin, thus locking the lever.

To unlock the electro-magnet and move the shift lever all that needs to be done is to press the brake pedal with the ignition on.

REPLACEMENT FUNCTION

The selector lever sensors control unit does not have any replacement function to activate the electro-magnet, however, it can be unlocked **manually**.

Note: For further information consult SSP D105 "DSG 02E automatic gearbox".

SHIFT LEVER POSITION LIGHTS L101

It is a set of seven leds that light up the different shift lever positions.

The shift lever sensors control unit J587 supplies each led separately.

The warning lights **can light up in three ways:**

- **Soft lighting**, when the position does not selected.
- **Intense lighting**, when the position selected.
- **Intense blinking lighting**, when there is no communication with the gearbox control unit.

REPLACEMENT FUNCTION

In the event of a fault the shift lever positions lighting is **cut off**.



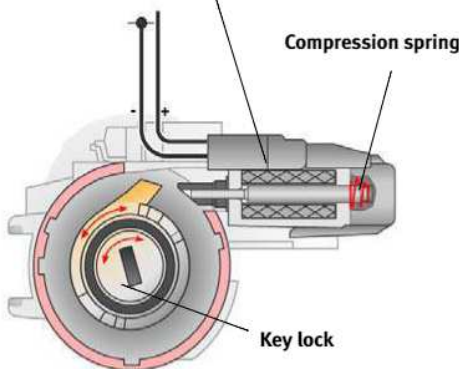
Lit-up positions

D126-50

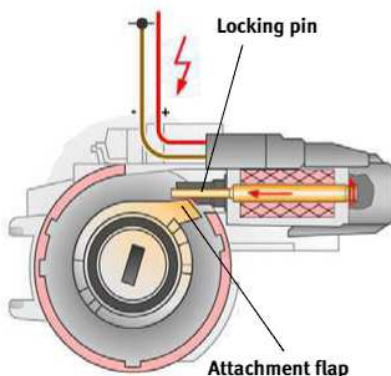
CONTACT KEY
FREE

Electromagnet for blocking the
contact key N376

Compression spring



CONTACT KEY BLOCKED



D126-51

ELECTROMAGNET FOR BLOCKING THE CONTACT KEY N376

It is placed next to the ignition and start-up switch, connected to the steering column control unit J527. The **Ibiza 08 does not have** the electromagnet for the ignition key locking and therefore it does not lock the key.

The key removal locking prevents turning the ignition key back to the removal position when the shift lever is not in position "P".

The operation principle is that of a **coil**, energised by the steering column control unit J527, which when generating a magnetic field moves a **locking pin**.

When the electro-magnet is not energised, the **compression spring** is expanded and the locking pin moved towards the outside in such a way that it prevents the **attachment flap** from rotating together with the key barrel so that it cannot be removed.

REPLACEMENT FUNCTION

In the event of a fault the key **is not blocked**.

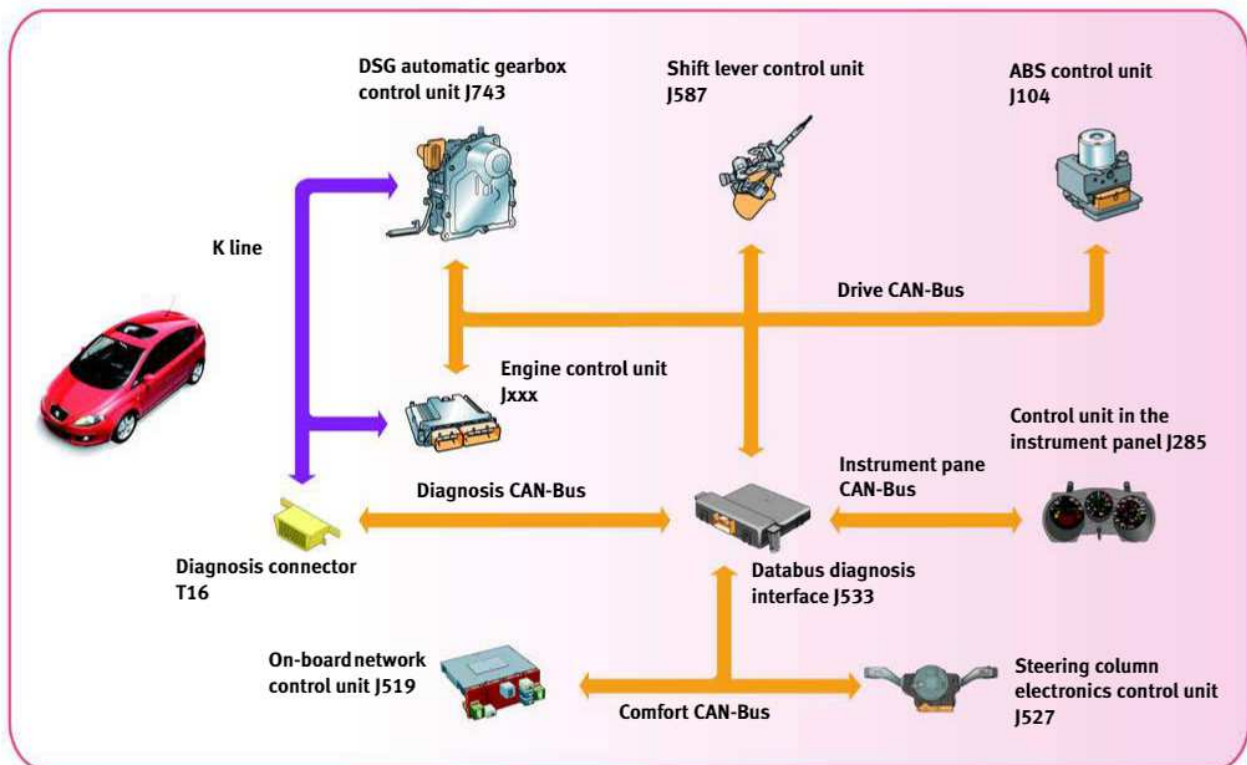
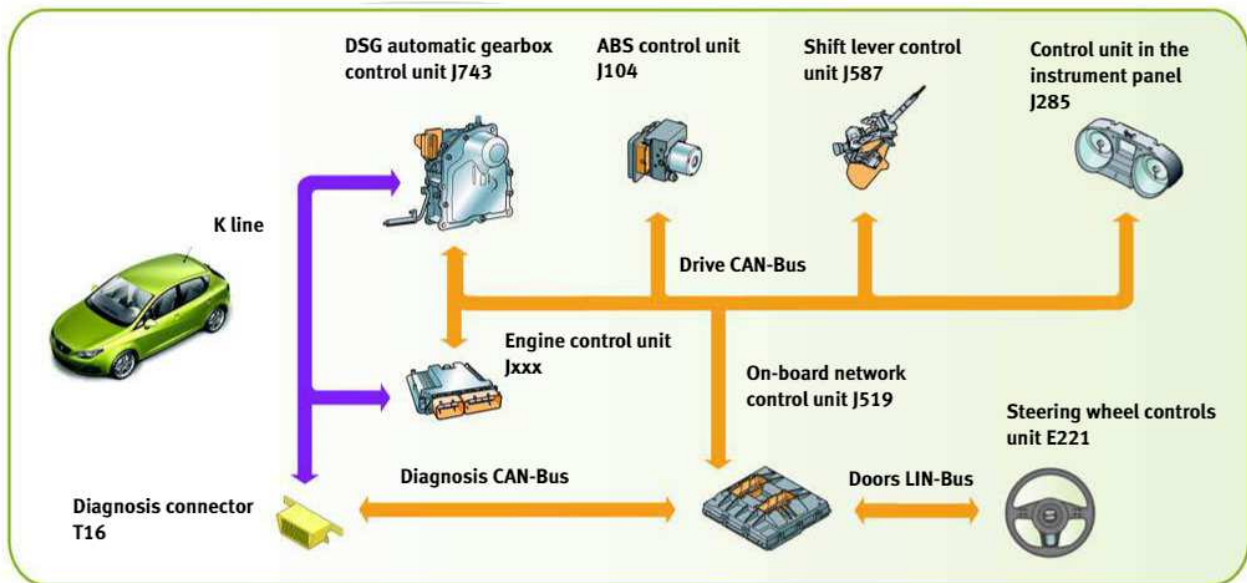
Note: For further information consult SSP D105 "DSG 02E automatic gearbox".

CAN-BUS COMMUNICATION

The automatic gearbox control unit J743 and the shift lever control unit J587 are linked to the **drive CAN-Bus line in all models**.

In all the vehicles the control units **receive and send** the same information. The difference is that

the units are linked up to different lines depending on the vehicle.



D126-52

ASSUMED FUNCTIONS

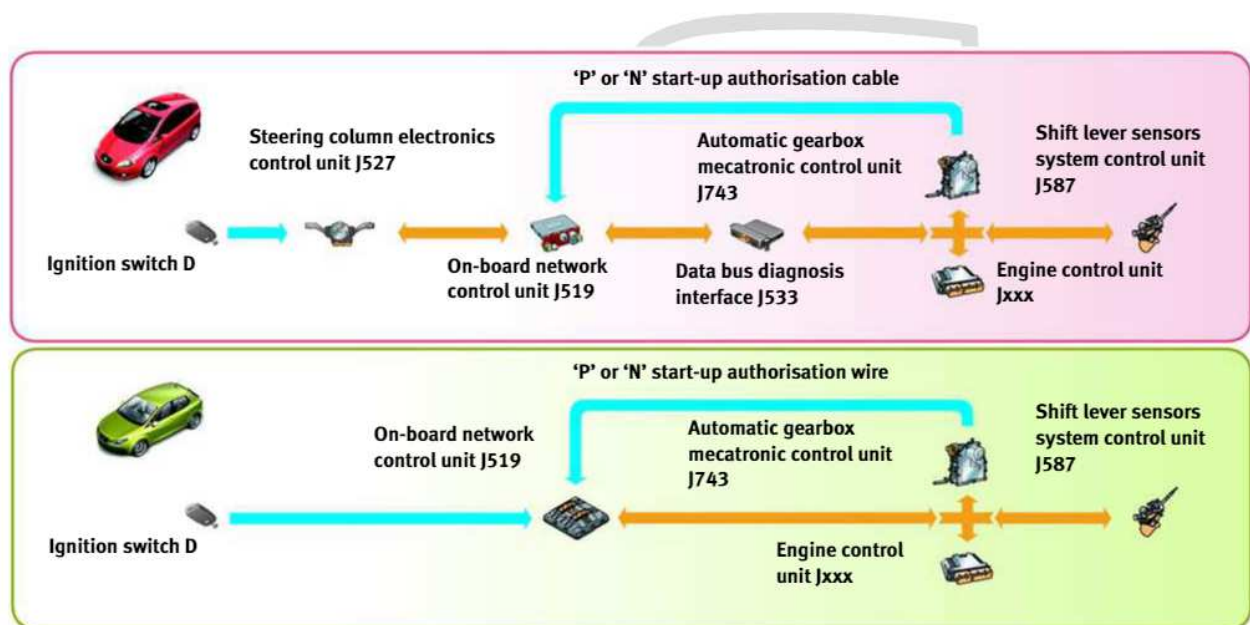
START-UP AUTHORISATION

Starting of a car is only authorised when the shift lever is in position **“P” or “N”**. The on-board network control unit receives two signals via a discrete wire from the DSG automatic gearbox mecatronics control unit J743:

- An **earth signal** indicates that the shift lever is in the ‘P’ or ‘N’ position.
- A **pulse signal** indicates that the shift lever is not in the ‘P’ or ‘N’ position.

When start-up is authorised the on-board network control unit J519 energises the locking relay J207 with positive, in the biza 08, and the terminal “50” voltage supply relay J682, for the rest of models, to allow engine start-up.

When start-up is not authorised the relay remains open and engine start-up is not possible.



D126-53

SHIFT-LOCK SOFTWARE FUNCTION

This function is activated to **prevent** the car from **starting off involuntarily** when releasing the brake.

The DSG automatic gearbox mecatronics control unit J743 uses the following signals:

- Shift lever position signal from the shift lever sensors control unit J587
- Brake activated signal from the ABS control unit J104.

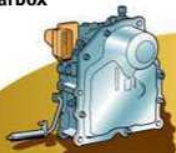
The DSG automatic gearbox mecatronics control unit J743 activates this function when the lever has not yet selected position 'R', 'D' or 'S' and is halfway **without the shift lever activated**.

The driver is informed about this function being active because the selected driving mode blinks on the multifunctions display.

The gearbox mecatronics control unit J743 holds the clutches disengaged and limits the energising of the valves 3 of partial transmissions 1 and 2 until the driver positions the lever in 'P' or 'N', then the shift lever is locked and the function is deactivated. The car can start driving by unlocking and selecting a driving mode properly.

ASSUMED FUNCTIONS

DSG automatic gearbox
control unit J743



Engine control unit
Jxxx



Shift lever control
unit J587



D126-54

DRIVING PROGRAMMES

The driving programs available are:

- When the shift lever is in 'D', **normal driving**.
- When the shift lever is in 'S', **sporty driving**.

When the shift lever is in the side track 'T',

Tiptronic driving.

Note: For further information consult SSP D105 "DSG 02E automatic gearbox".

EMERGENCY MODE

The gearbox control unit J743 activates the emergency mode function when it **detects a fault** in the gearbox. When this position is activated there are two different behaviours depending on the type of fault:

- Either the faulty partial transmission is **deactivated**.

- Or the faulty partial transmission is **deactivated** and the number of gears that can be engaged in the other partial transmission is **limited**. This is how **excessive revs is prevented** in the shafts and in the disconnected partial transmission clutch.

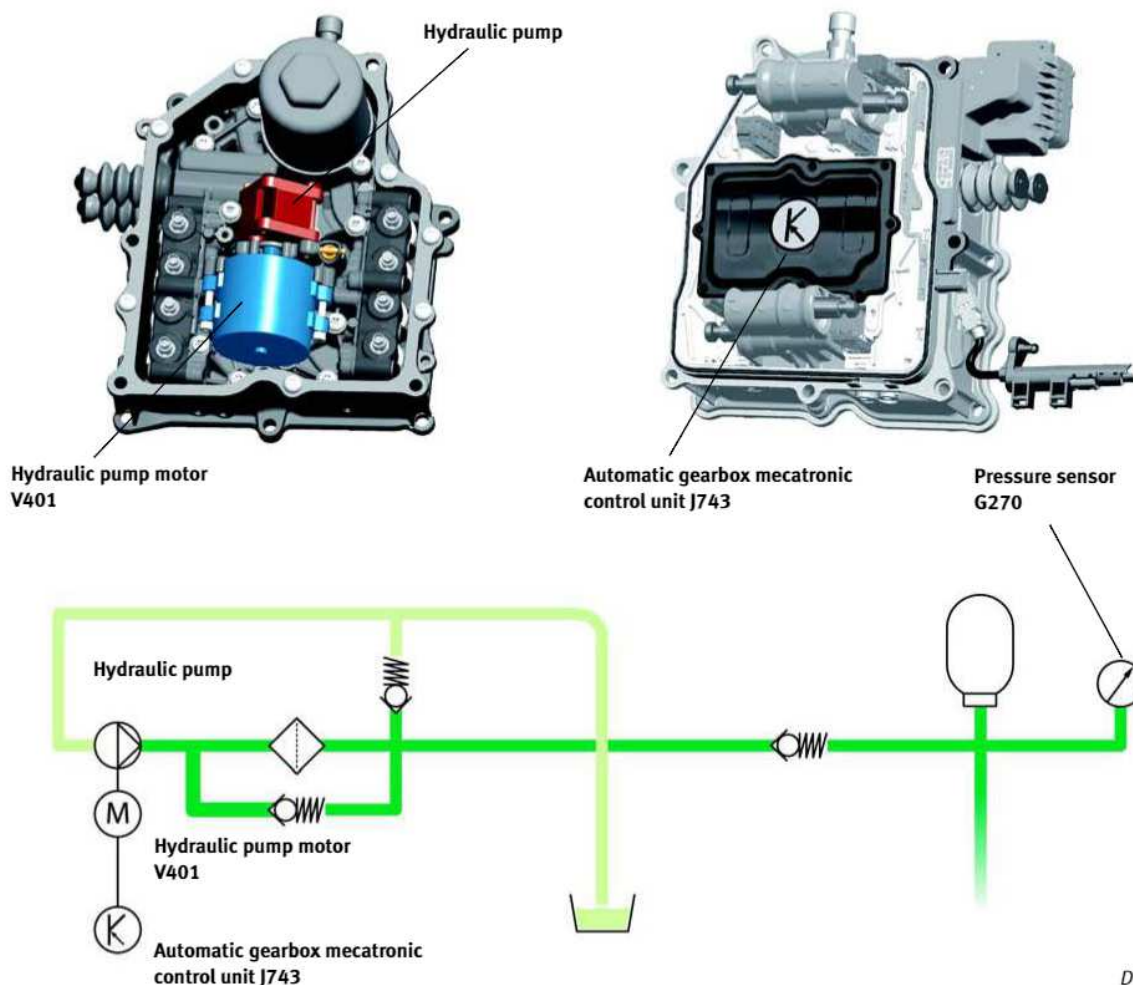
DOWN-SHIFTING WITH INTERMEDIATE ACCELERATION

This function is carried out in petrol engines when the shift lever is in position '**S**' or **Tiptronic** and the car is **braking**.

The engine management system increases the engine revs in the vehicle braking phase until it reaches the synchronisation revs. Clutches are briefly disengaged during this operation.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

erWin



D126-55

PRESSURE GENERATION

The gearbox control unit J743 manages the hydraulic circuit pressure generation.

The **hydraulic pump generates the pressure** in the hydraulic circuit **when the electrical motor V401 is in operation**. The hydraulic pump and the V401 motor are mechanically linked.

The gearbox automatic control unit J743 **energises** the pump motor V401 to maintain the pressure in the hydraulic circuit between **42 and 60 bar** and **monitors** the hydraulic pressure through the hydraulic pressure sensor **G270**.

HYDRAULIC PUMP OVERCHARGE PROTECTION

The gearbox control unit J743 controls the operation of the hydraulic pump motor V401 in order to detect possible **overload**. When such an overload situation occurs, the gearbox mecatronics control unit J743 **limits the number of gearshiftings**, therefore reducing the motor and the pump's working load.

This document is a technical document. It is not intended for use in any way other than for the purposes, in part or in whole, is not guaranteed or accepted any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

ASSUMED FUNCTIONS

CLUTCHES MANAGEMENT

The automatic gearbox mecatronics control unit J743 **assumes the clutch related functions** from the sensor signals and from the other control units, the functions related with the clutches are the ones explained next.

HYDRAULIC ACTIVATION OF CLUTCHES

The automatic gearbox mecatronics control unit J743 analyses the data received and determines the **degree of energising** of the valves:

- Valve 3 in partial transmission 1 N435 and valve 4 in partial transmission 1 N436 for the clutch **actuator K1**.

- Valve 3 in partial transmission 2 N439 and valve 4 in partial transmission 2 N440 for the clutch **actuator K2**.

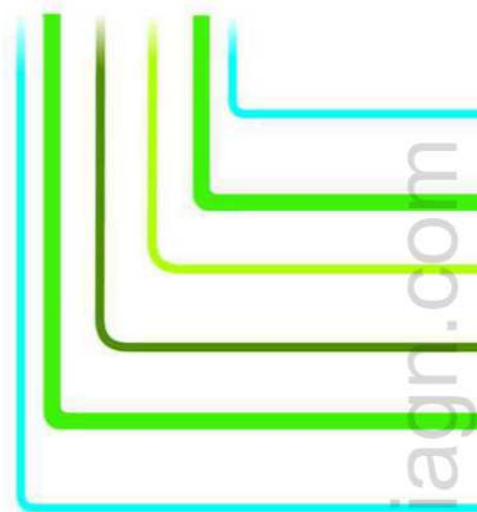
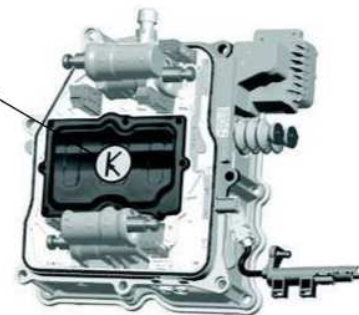
Valve 3 of partial transmission 1 N435 closes the hydraulic oil passage to the K1 clutch actuator in shift lever positions 'P' and 'N', and when a partial transmission 2 gear is engaged. Valve 4 of partial transmission 1, N436, allows for more pressure to reach the partial transmission 1 when the K1 clutch actuator is activated.

Valve 3 of partial transmission 2, N439, closes the hydraulic oil passage to the K2 clutch actuator in shift lever positions 'P' and 'N', and when a partial transmission 1 gear is engaged Valve 4 of partial transmission 2, N440, allows for more pressure to reach the partial transmission 2 when the K2 clutch actuator is activated.

REGULATION WHEN MANOEUVRING

This function controls the activation of the clutches when manoeuvring at **low speed** and without pressing the accelerator pedal, for instance when parking or starting off in moderate hills. The control unit activates this function when the engine is idling, a gear is engaged and the accelerator at rest, then the gearbox mecatronics control unit J743 send the ideal engine torque for each moment into the drive CAN-Bus and obtains a similar result to that of automatic vehicles with torque converter, that is a smooth and precise starting off.

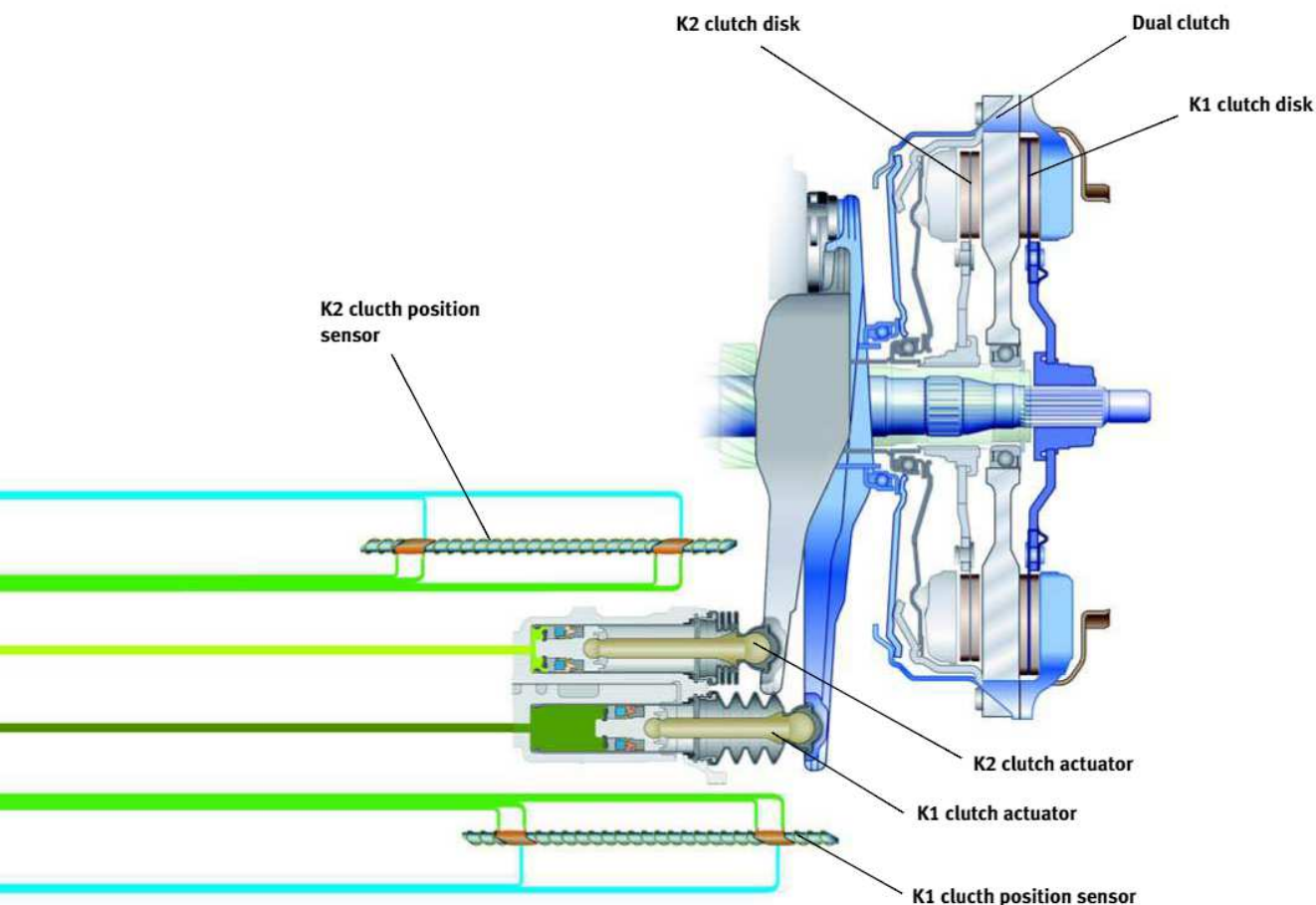
DSG gearbox control unit J743



CLUTCH SELF-ADAPTING

The clutch has to be **uniformly regulated** during its useful life. This is why the automatic gearbox mecatronics control unit J743 is continuously updating the energising of the partial transmissions 1 and 2 valves 3, N435 y N439, the K1 and K2 clutches, de energising of partial transmissions valves 4, N436 y N440, and the signal received from gearbox input revs sensors 1, 2 and 3, G632, G612 and G641.

This is necessary because the friction torques of the clutches vary depending on the brake disks conditions of operation and wear.



D126-56

REGULATION OF MICROSLIPPAGE

The slipping of the clutches is **constantly regulated** to achieve a good performance of the clutch. This regulation is carried out with a minimum slippage of approximately 10 rpm. Because of the minimum rate of slippage, it is described as “microslippage”.

This is why the automatic gearbox mecatronics control unit J743 is continuously updating the energising of the partial transmissions 1 and 2 valves 3, N435 y N439, the K1 and K2 clutches, de energising of partial transmissions valves 4, N436 y N440, and the signal received from gearbox input revs sensors 1, 2 and 3, G632, G612 and G641.

DOUBLE CLUTCH HEATING WARNINGS

The DSG automatic gearbox control unit J743 is constantly calculating the temperature of the clutches with the help of a mathematical model and informs about the warming up of the double clutch by means of **visual warnings** on the instrument panel and by activating a **buzzer**. These warnings take place during 5 seconds when the double clutch surpasses 350°C and they repeat every 10 seconds at over 390°C. Visual and acoustic warnings stop when the double clutch cools down to 330°C.

Protected by copyright. Copying for private or commercial purposes, in part or in whole, is not permitted unless authorised by SEAT S.A. SEAT S.A. does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT S.A.

ASSUMED FUNCTIONS

ENGAGING OF GEARS

The DSG automatic gearbox mecatronics control unit J743 determines the **gears that have to be engaged** after analysing the data received.

Depending on the selected driving program, the DSG automatic gearbox mecatronics control unit J743 engages the different gears.

- In the 'P' and 'N' programs it engages **1st gear and reverse gear**.

- In the 'R' program it only engages **reverse gear**.

- In the 'D' and 'S' programs, when the car is stopped, it only engages **1st. gear**.

- In the 'D' programs, when the vehicle is running, it engages **the most appropriate gear** according to torque demanded.

- In the 'S' program, when the vehicle is running, it engages **the most appropriate gear** according to torque demanded, but it allows the engine to run at higher revs.

- In 'Tiptronic' position it engages the gear selected **according to the pulses of the shift lever**, although the control unit can shift gears under certain conditions and the gearbox will behave as if it were in program 'S'.

To engage the different gears the DSG automatic gearbox mecatronics control unit J743 acts on the following solenoid valves:

- Valve 1 in partial transmission 1 N433 and valve 4 in partial transmission 1 N436 for the 1st. and 3rd. gears.

- Valve 2 in partial transmission 1 N434 and valve 4 in partial transmission 1 N436 for the 5th. and 7th. gears.

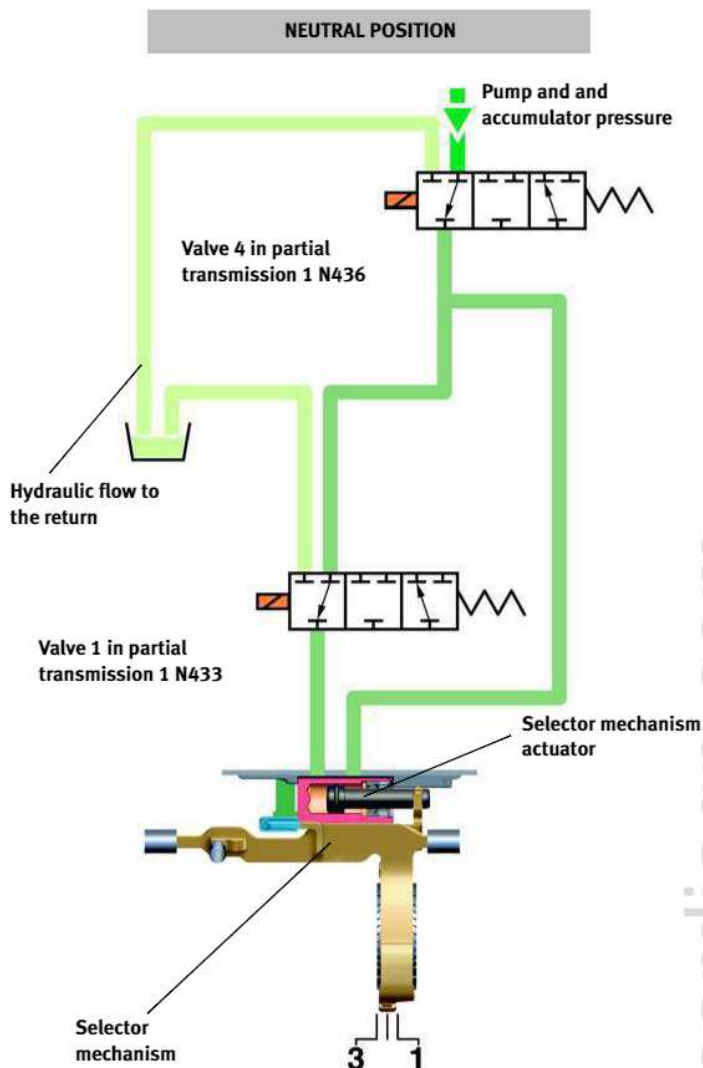
- Valve 1 in partial transmission 2 N437 and valve 4 in partial transmission 2 N440 for the 2nd. and 4th. gears.

- Valve 2 in partial transmission 1 N438 and valve 1 in partial transmission 2 N440 for the 6th. and R gears.

Next, engaging of 1st. and 3rd gears as an example. Operation in the rest of actuators is similar.

NEUTRAL POSITION

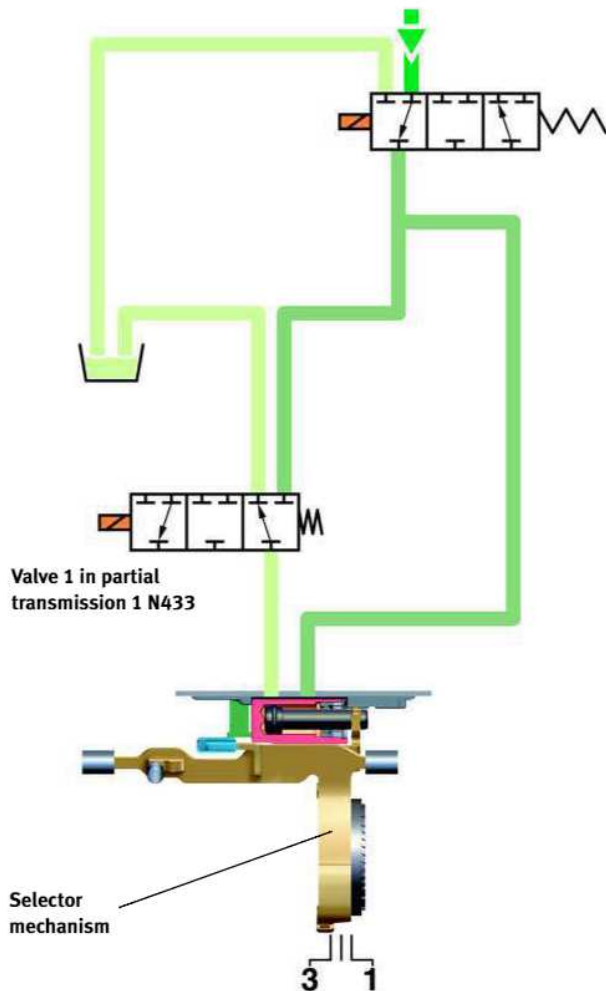
The DSG automatic gearbox mecatronics control unit J743 energises partial transmission



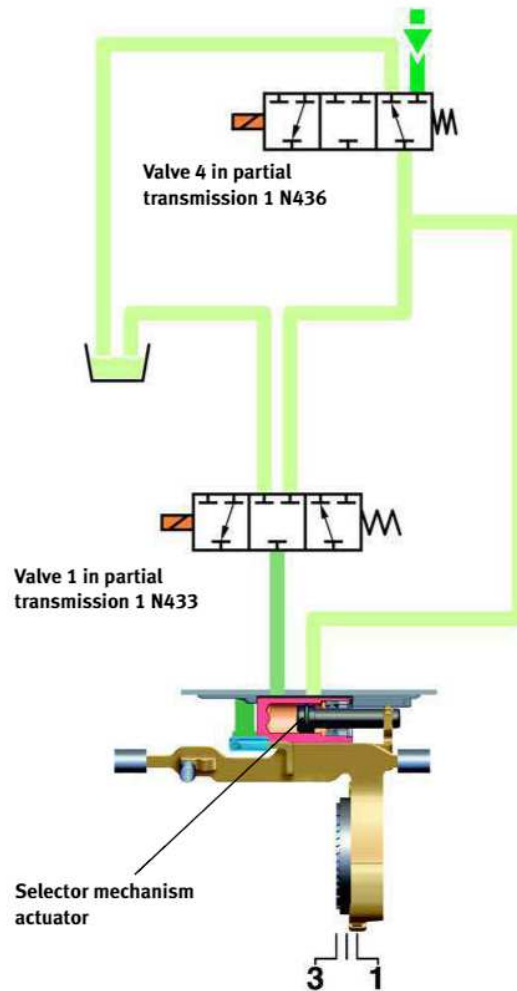
1 valve 4, N436, to **maintain** the same pressure in both chambers of the hydraulic actuator; in these conditions the actuator remains immobile in **neutral position**.

The DSG automatic gearbox mecatronics control unit J743 will also energise the valves in such a way **when the gears are engaged**.

ENGAGING 3rd. GEAR



ENGAGING 1st. GEAR



D126-57

ENGAGING A GEAR

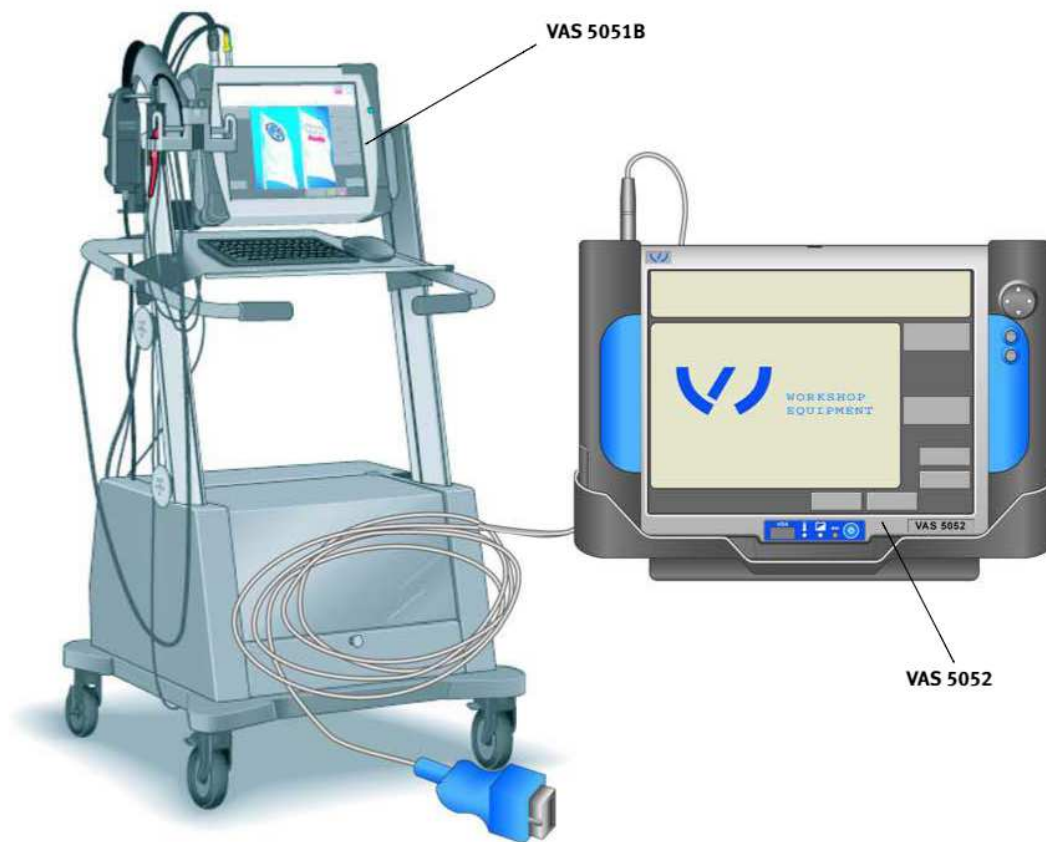
To **engage** the 3rd. gear, the DSG automatic gearbox mecatronics control unit J743 energises partial transmission valve 1, N433. This is how one of the chambers communicates with the return but the hydraulic pressure is maintained in the other chamber.

The actuator moves because more pressure has been applied to one chamber than to the other one.

DISENGAGING A GEAR

To **disengage the gear** and return to position 'N' or **engage** 1st. gear the DSG automatic gearbox mecatronics control unit J743 energises partial transmission valve 1, N433, closing the passage of hydraulic oil to one of the actuator chambers. At the same time, the energising of valve 4 of partial transmission 1 N436 varies to drop the hydraulic pressure of partial transmission 1. As there is more pressure in one chamber than in the other one, the actuator moves.

SELF-DIAGNOSIS



D126-58

Gearbox self-diagnosis can be carried out with the VAS 5051B and VAS5052 testers. Access to the different diagnosis operations related with the DSG 0AM automatic gearbox can be done from:

- Guided fault-finding.
- Guided functions.

COMPLETE BASIC SETTING

This function takes place after **replacing** the **mecatronics** unit **or** the **double clutch**. If a used gearbox is fitted into the car it is not necessary to carry out any basic setting, however a self adaptation drive is necessary.

NEUTRAL BASIC SETTING

This function places all the selector mechanisms actuators in the N position. This function must be run **before** proceeding to **towing the vehicle**.

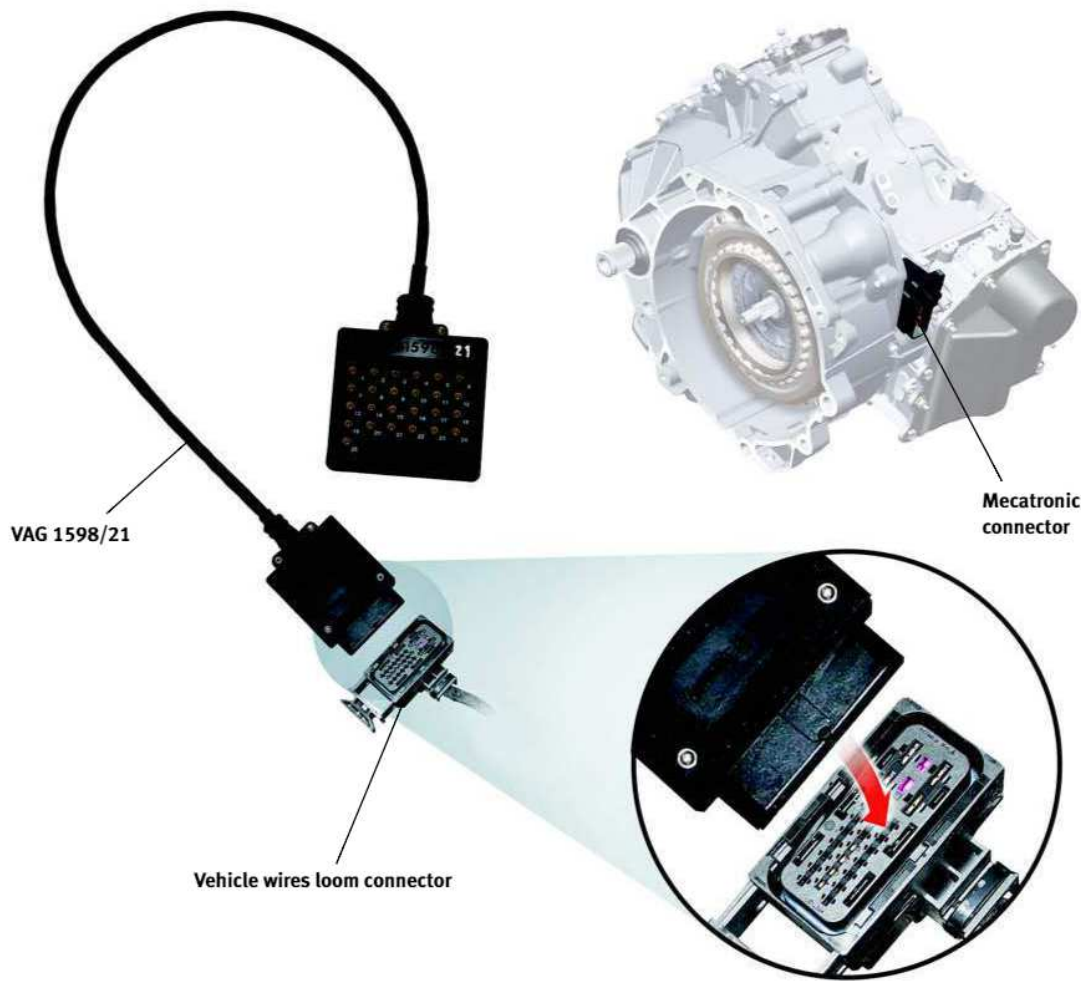
CODING CONTROL UNIT J104

Only one channel can be modified when coding the gearbox control unit J743. This coding replaces the **tiptronic** function carried out from the steering wheel tiptronic switches E438 and E439 when the shift lever is in the "D" or "S" program, and it only allows shifting from these switches when the lever is in Tiptronic program,

REPLACE MECATRONICS

This function positions the selector mechanisms actuators in the **removal position**. This is how the mecatronics unit can be removed. After installing a new mecatronics a self-adaptation test drive is needed.

MAINTENANCE AND REPAIR



D126-59

To find out about the the maintenance and repair jobs consult the ElsaWin application.

GEARBOX WIRING REPAIR

The wiring loom to the OAM gearbox can be diagnosed with the VAG 1598/21 test box. This test box allows confirming the signals that arrive to the DSG OAM automatic gearbox connector.

TOWING

To tow the car the following must be done:

- The **shift** lever should be in position "**N**".
- Driving at speeds higher than **50 km/hr** is not allowed.

- The maximum distance that can be travelled towing a car is **50 km**.

If, for instance, as a result of a breakdown or fault the car is moved with a gear engaged, the rotation of the wheels makes one of the layshafts move and in turn its respective mainshaft, which drags one of the clutch disks at too high a speed, and thus the rotation revs of the shafts and the clutches will be higher than the values for which they have been designed, meaning that they could reach the breakage point revs.



SEAT

Protected by copyright. Any reproduction or translation without the written permission of SEAT, S.A. is prohibited. SEAT does not guarantee or accept any liability with respect to the correctness of information in this document. Copyright by SEAT, S.A.

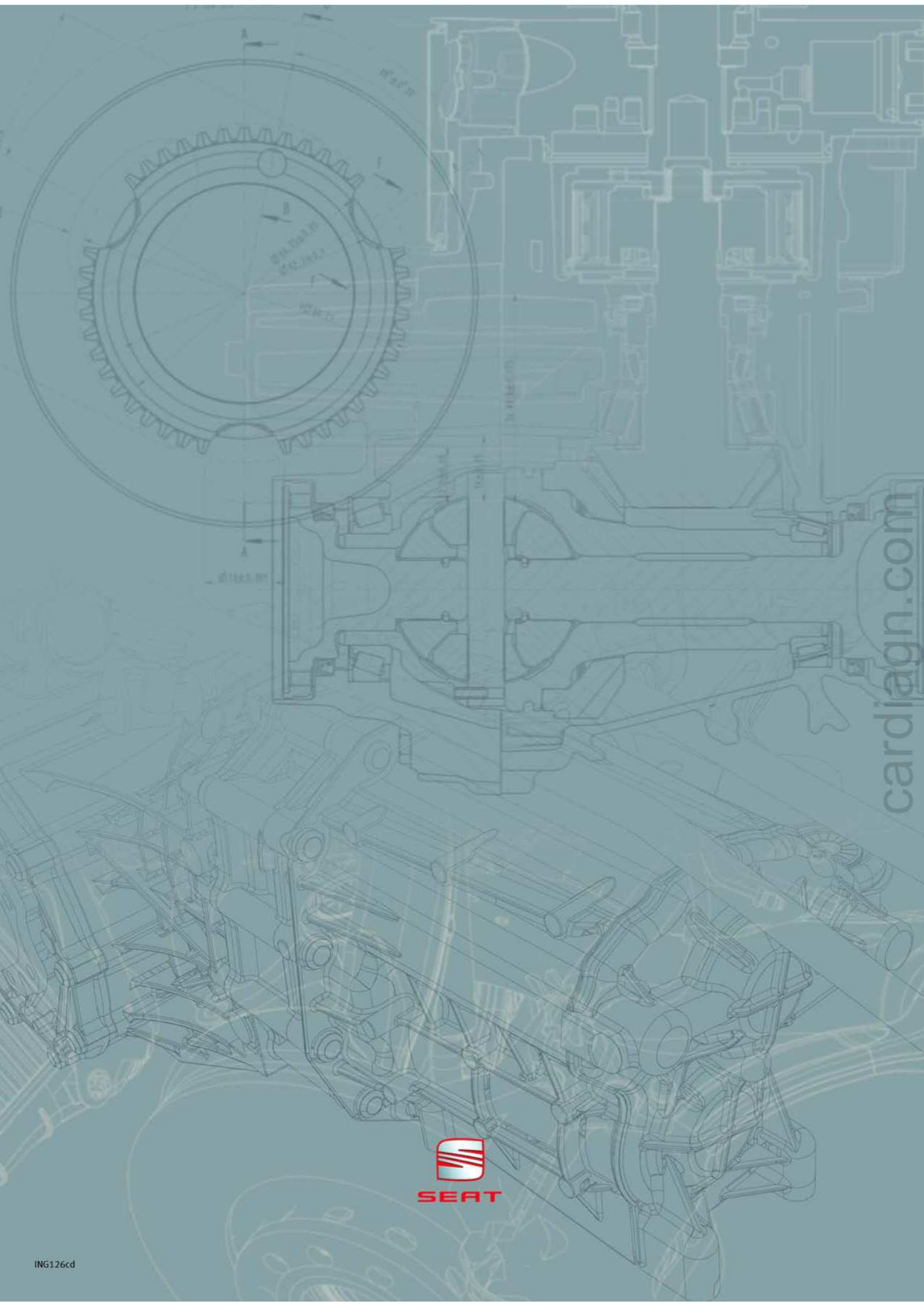
Technical status 10.08. Due to constant product development and improvement, all data displayed is subject possible changes

Any type of exploitation is strictly forbidden: be it copying, distributing, public communication or transformation of these self study programmes, by any means, whether mechanical or electronic, unless clearly stated and authorised by SEAT, S.A.

TITLE: DSG OAM automatic gearbox
AUTHOR: Service Institute
Copyright 2008, SEAT, S.A. All rights reserved.
Autovía A-2, Km 585, 08760 - Martorell, Barcelona (España)

1st. edition

DATE OF PUBLISHING: December 08
LEGAL REGISTER: B-54.842 - 2008
Preprinting and printing: GRAFICAS SYL - Silici, 9-11
Pol. Industrial Famadas - 08940 Cornellà - BARCELONA



cardiagn.com

