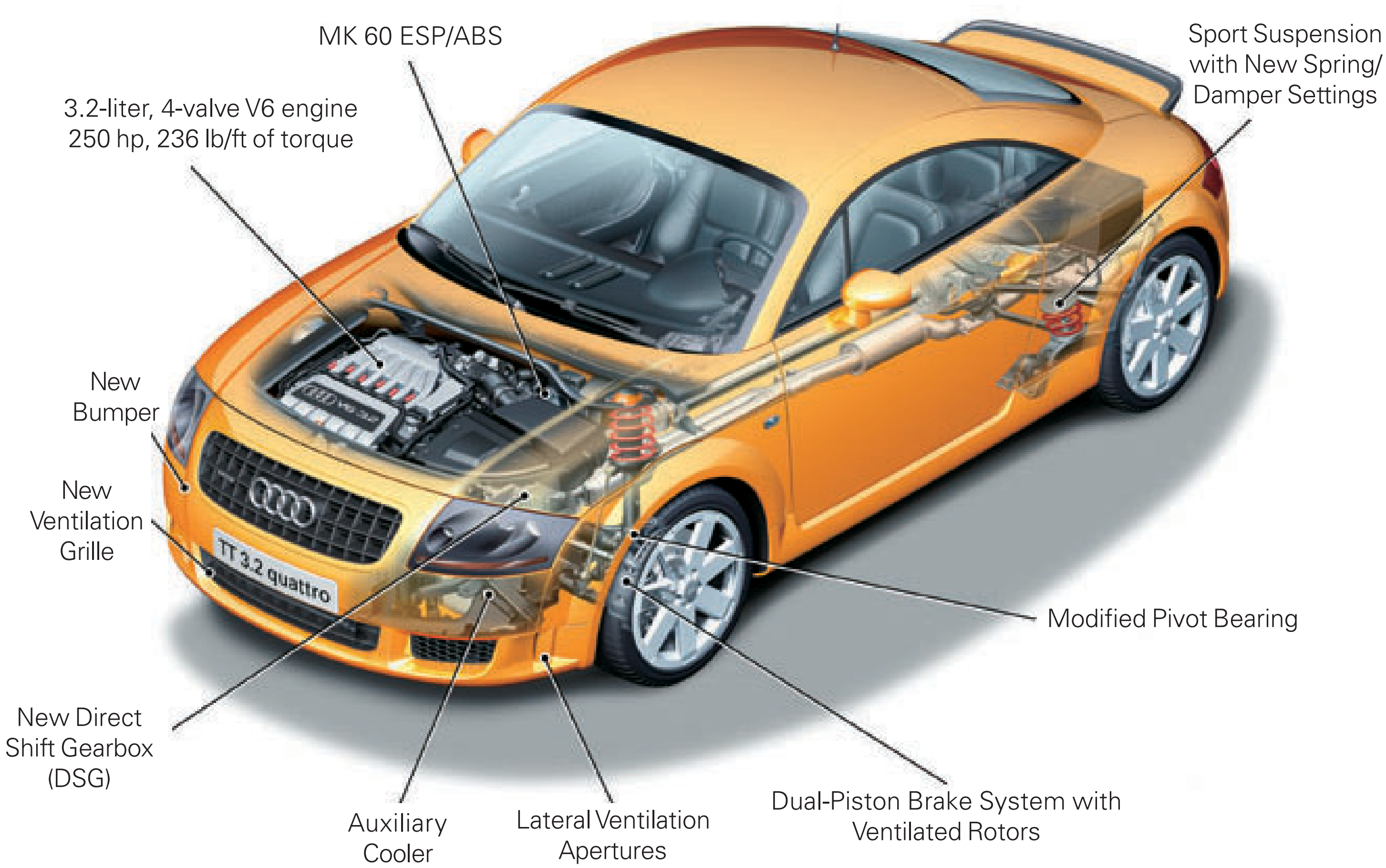
Introduction

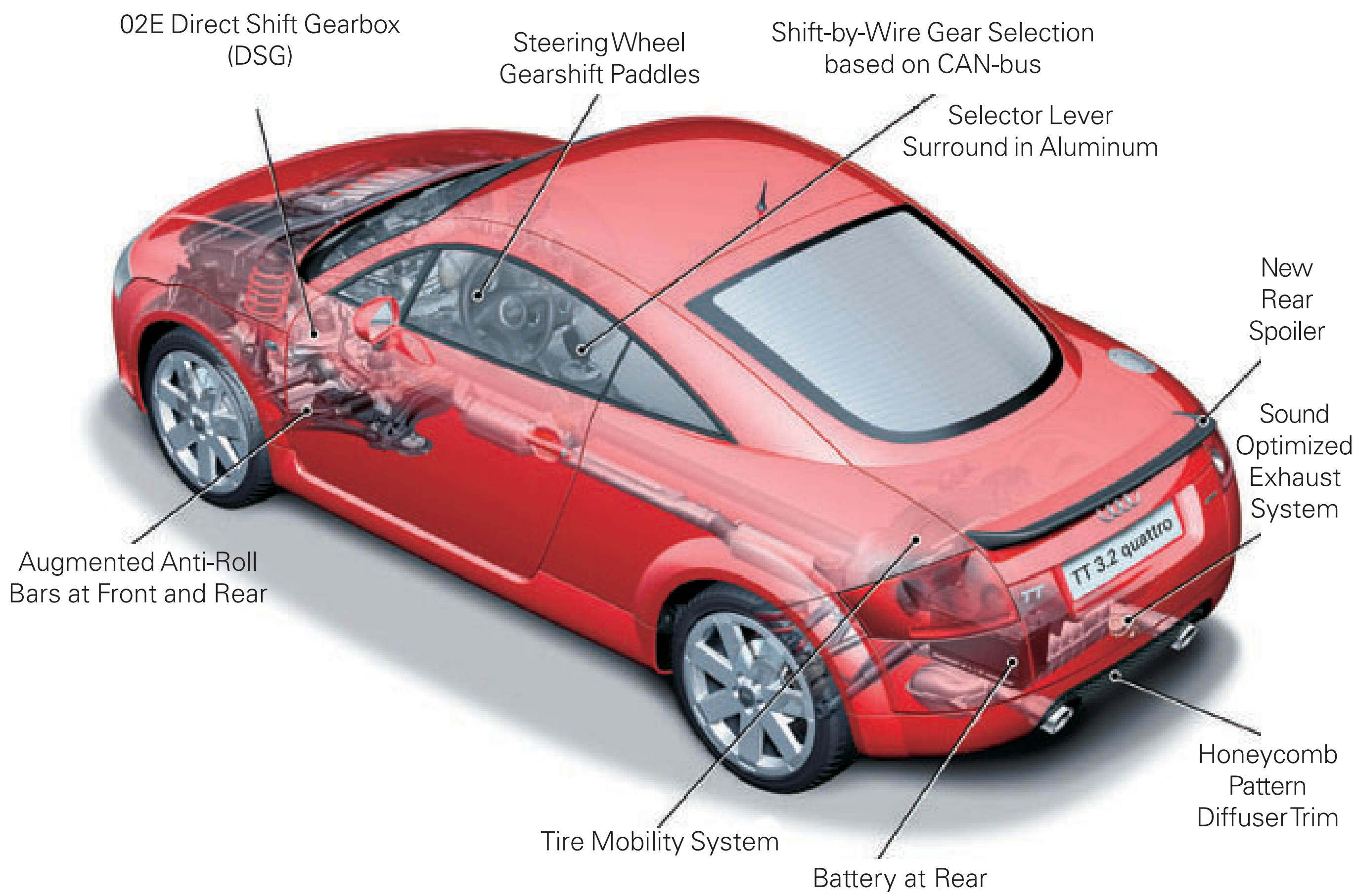
The 2004 Audi TT 3.2 quattro represents two firsts. It is the first-ever TT with a V6 engine, and the first Audi vehicle to use the 02E Direct Shift Gearbox (DSG), the revolutionary racing-derived six-speed transmission that combines the best qualities of both manual and automatic transmissions.

Also new or modified for 2004 are:

- Steering wheel gearshift paddle
- Electronic Stabilization Program (ESP) and Anti-Lock Brake System (ABS) with Electronic Differential Locks (EDL) and Electronic Rear Brake-Force Distribution (EBD)
- Larger dual-piston floating calipers with ventilated rotors
- Modified exhaust system
- Sport suspension
- Larger rear spoiler
- Lower front grille
- Rear diffuser with honeycomb pattern
- Xenon headlights
- Aluminum shift cover
- Tire mobility system



With this new V6 engine and quattro, the TT 3.2 covers 0-60 mph in 6.4 seconds as a Coupe, and 6.6 seconds as a Roadster. Top speed for both models is electronically governed at 130 mph.



3.2-Liter V6 Engine

Introduction

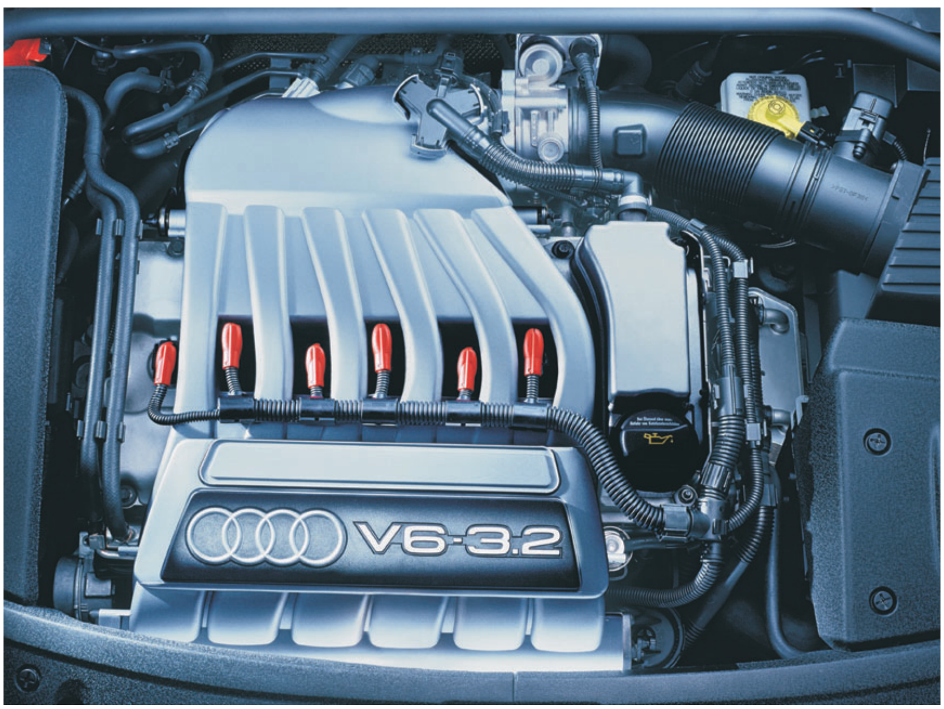
The new Audi 3.2-liter V6 engine is a proven design that has outstanding torque and power characteristics combined in an extremely compact package.

A cylinder angle of just 15 degrees makes the four valves per cylinder engine suitable for a transverse-mount application, as in the 2004 Audi TT 3.2 quattro.

Significant 3.2-liter V6 design features include a variable valve timing system that enables the intake and exhaust cams to be controlled independently.

Adjustable valve timing systems overcome the limitations of static valve timing by altering the points in the four-stroke cycle when the valves open and close. This allows the 3.2-liter V6 to produce higher torque throughout a wider rpm range.

In addition, the cylinder head represents an entirely new development that increases performance and efficiency.



This four-stroke V6 develops an impressive 250 hp at 6300 rpm, and has a broad peak torque range of 236 lb/ft at 2800 to 3200 rpm.

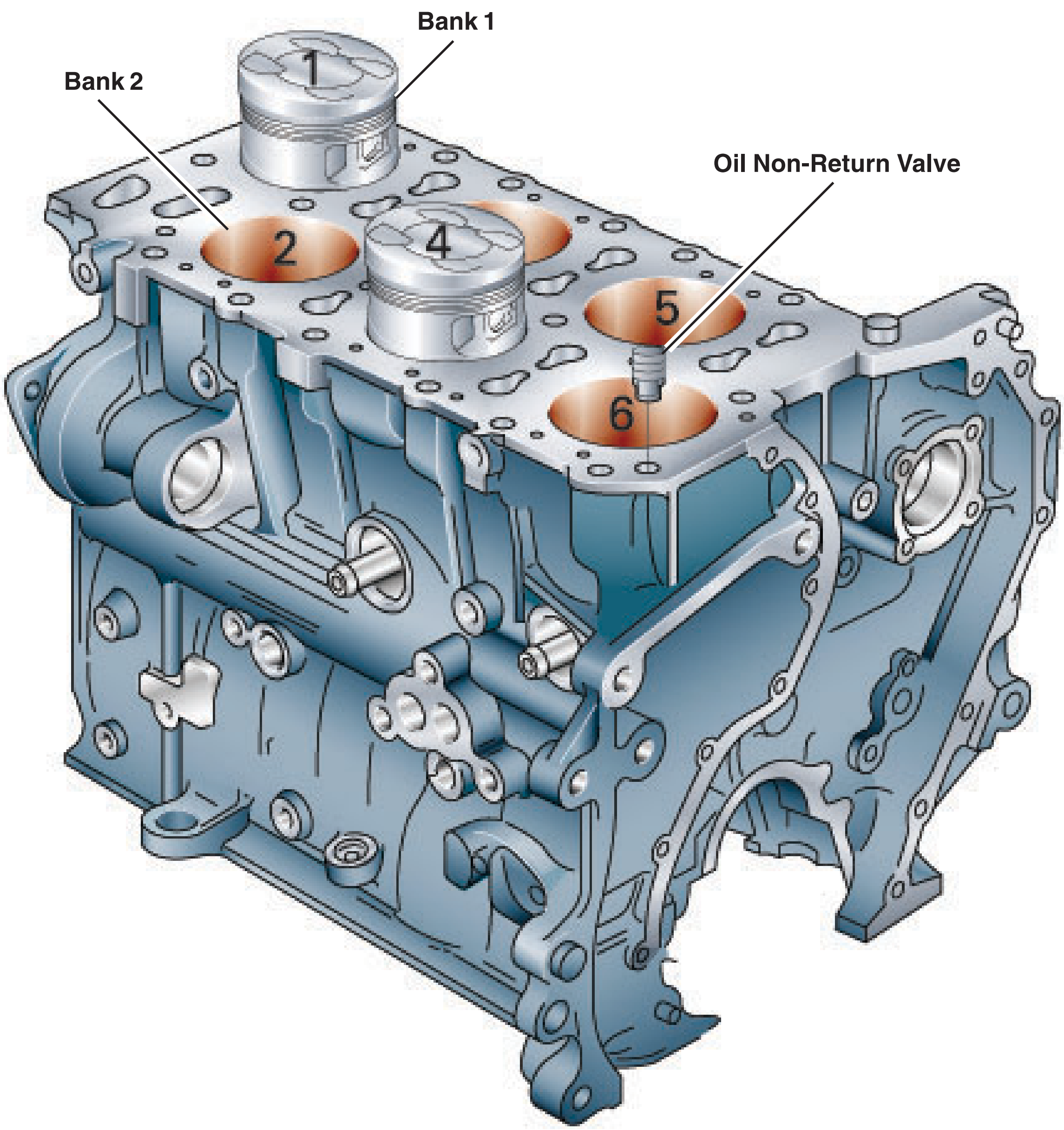
Technical Data

Engine Code	BHE
Design	6-cylinder four-stroke 15º V
Bore	3.31 in (84.0 mm)
Stroke	3.78 in (95.9 mm)
Displacement	195 cu in (3195 cm³)
Compression Ratio	11.3 : 1
Horsepower (SAE)	250 hp @ 6300 rpm
Maximum Torque	236 lb/ft @ 2800-3200 rpm
Fuel Requirement	Premium unleaded (91 AKI) recommended for maximum performance

Block and Pistons

The block is made from gray cast iron with six cylinders divided into two banks. The cylinder numbering begins at the side opposite the flywheel and on bank 1.

The combustion chamber is located in the cylinder head. The piston crowns have four recesses to prevent impact with the valves. The recesses for the intake valves are deeper than for the exhaust valves and should be installed facing the inside of the V on the block.



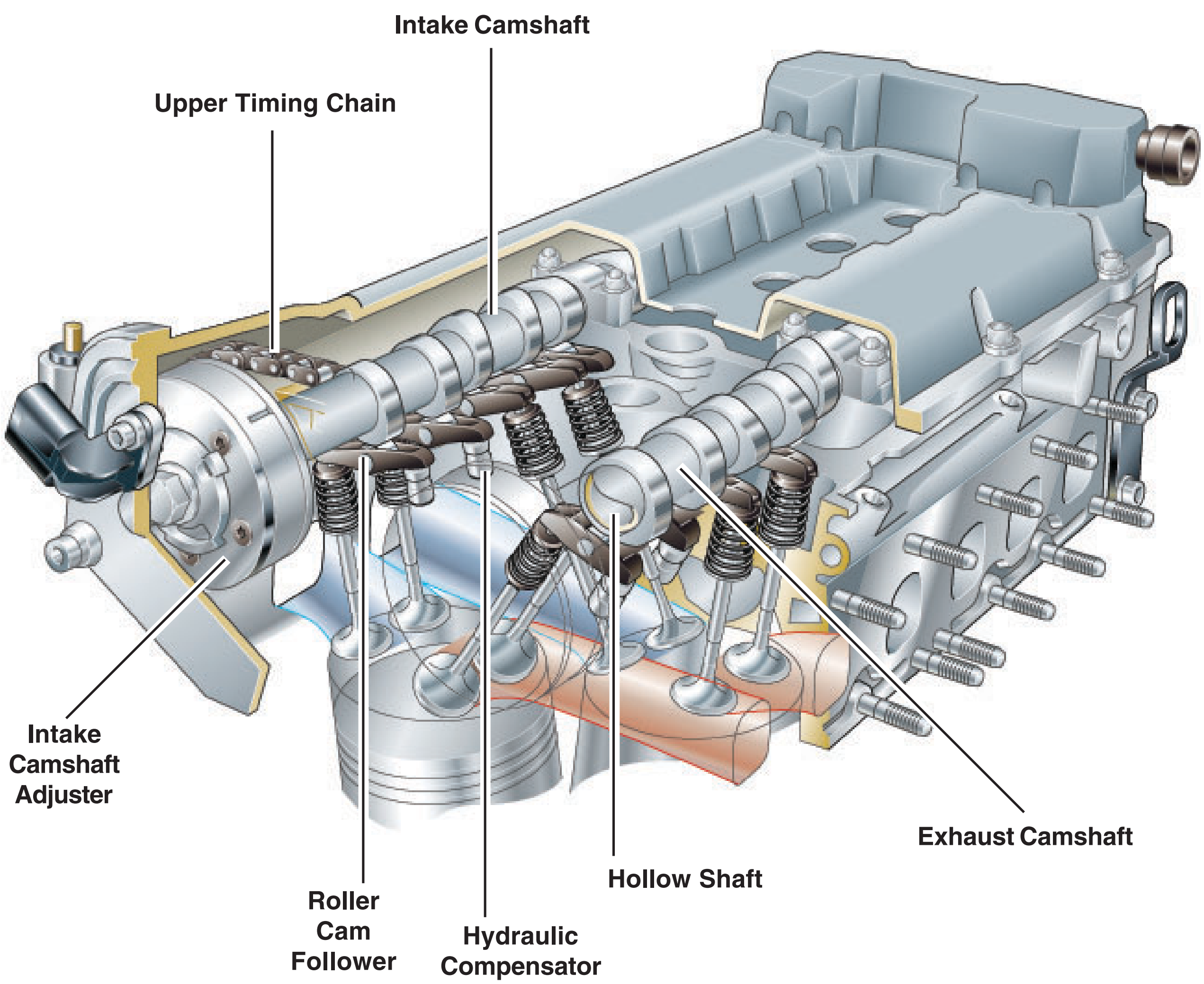
Cylinder Head

The cylinder head is a cross-flow type and has four valves per cylinder. It has two camshafts, one exhaust and one intake, connected by the upper timing chain.

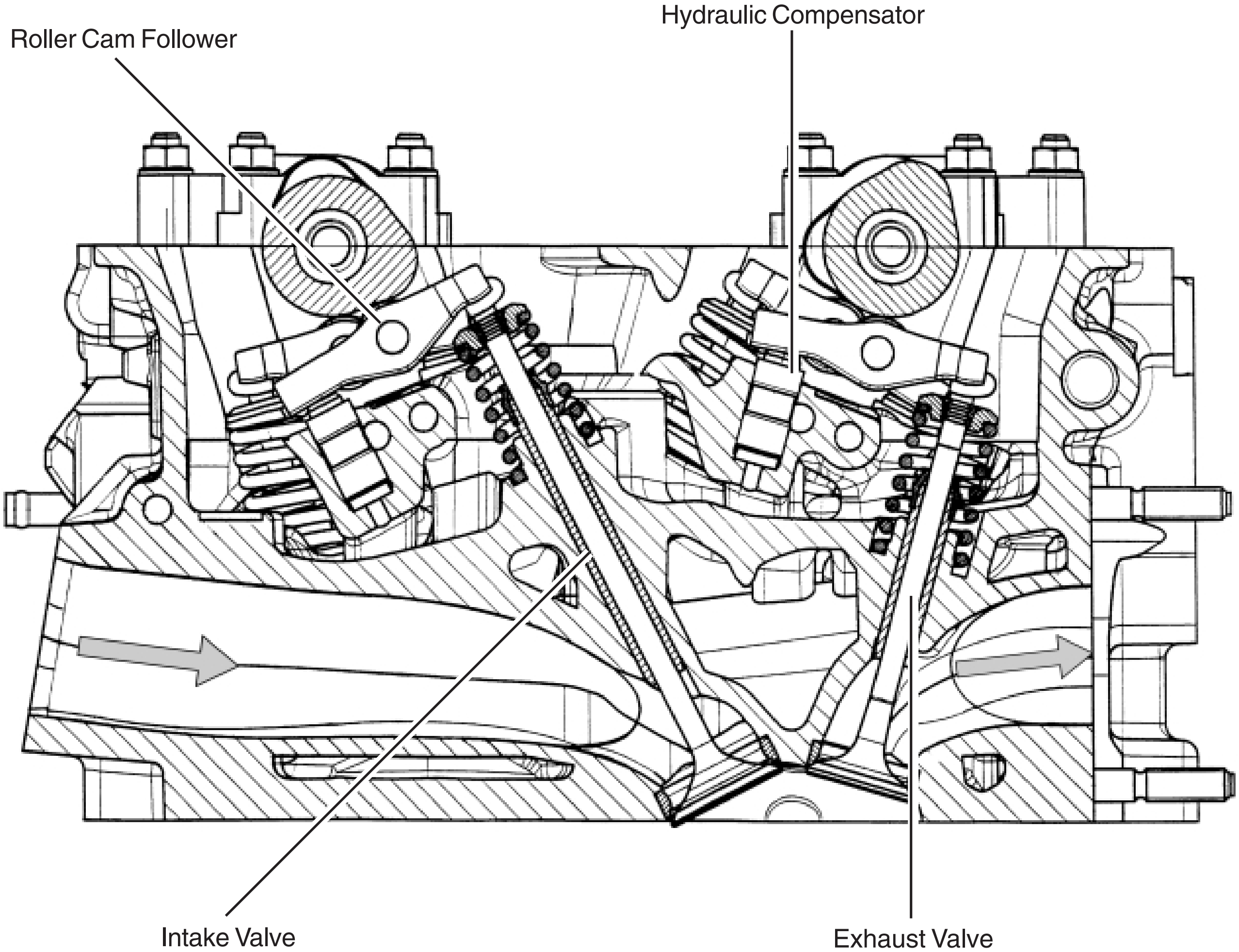
The camshafts are hollow with separate cam lobes. These are press fitted on the cam during manufacture using hydraulic pressure (hydro-forming).

The advantages of this camshaft manufacturing technique are:

- Reduction of weight due to the hollow shaft
- Use of material with resistance to bending for the shaft
- Use of material with specific friction characteristics for the cams



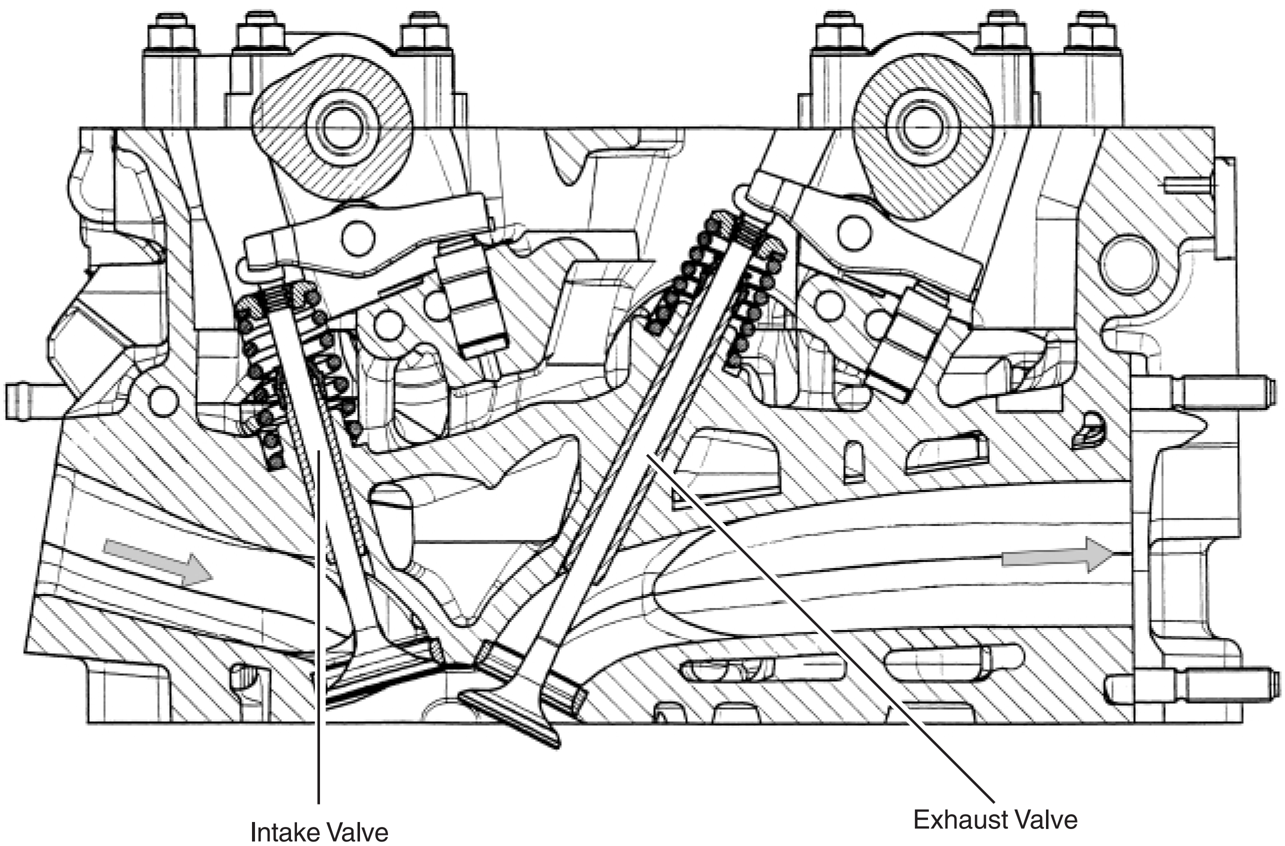
In order for each camshaft to operate valves in both cylinder banks, the valve stems have different lengths to compensate for the difference in the distance between the cams and the cylinder banks.



Cylinder Head Cross-Section View, Cylinders 1, 3, and 5

To lessen friction and heat, the engine controls the valves using integral roller cam followers, and hydraulic compensating units.

This V6 has continually adjustable inlet and exhaust camshafts, which improve efficiency. The intake and exhaust manifolds for each cylinder bank also have different cross-sections. This design ensures that both cylinder banks receive the same air speed and volume.



Cylinder Head Cross-Section View, Cylinders 2, 4, and 6

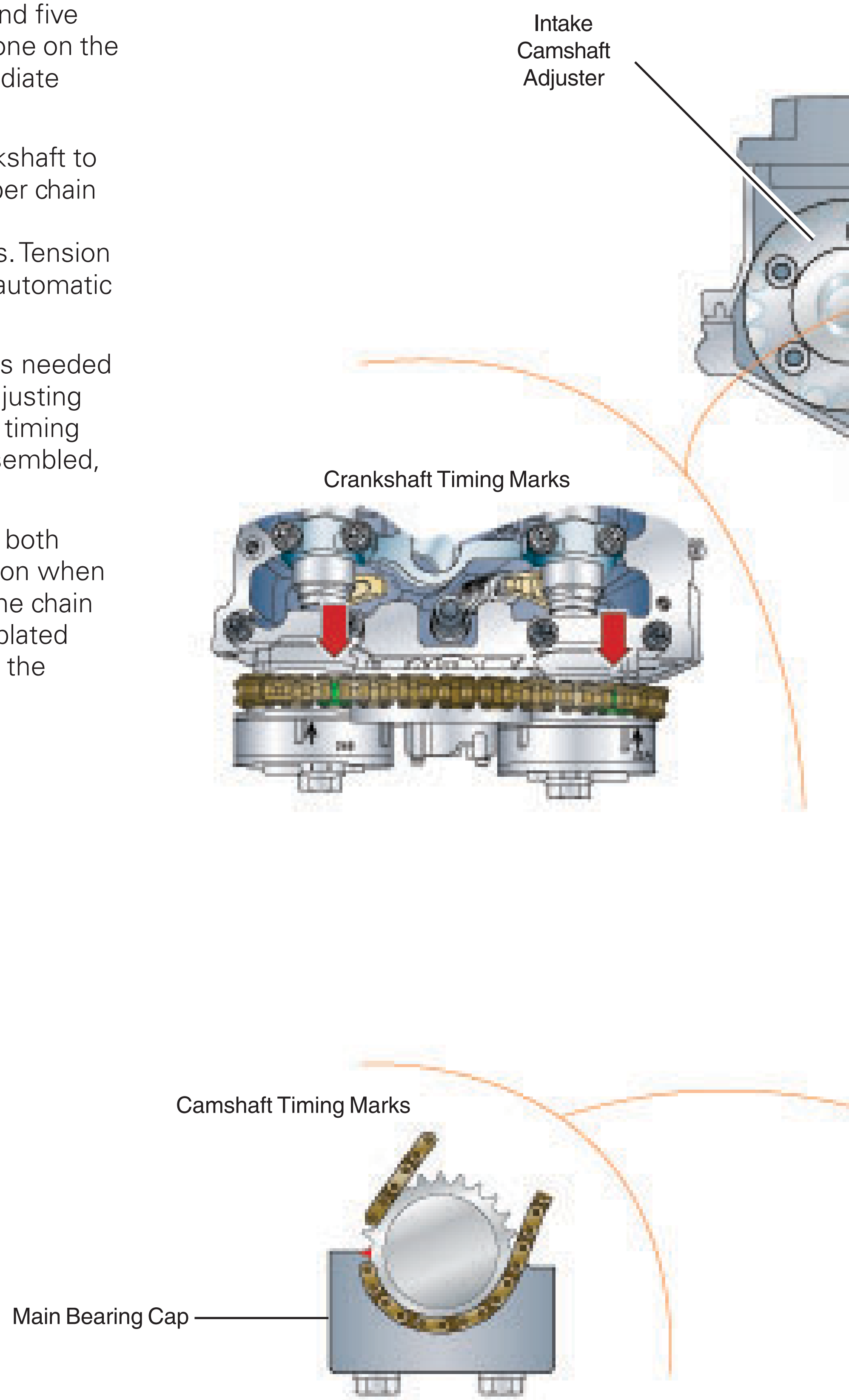
Valve Train Operation

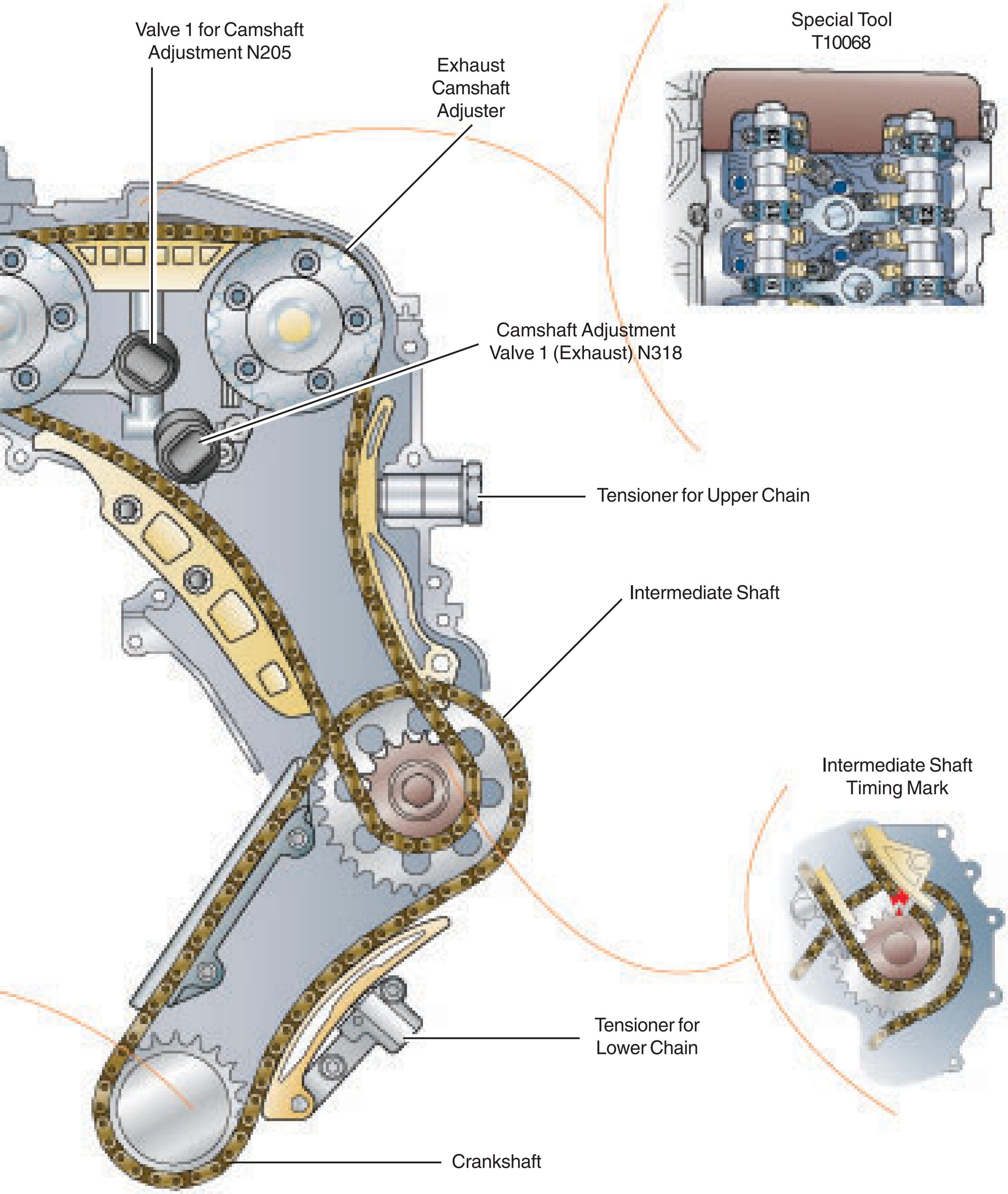
The timing mechanism is operated by two chains, two hydraulic tensioners, and five sprockets (one for each camshaft, one on the crankshaft, and two on the intermediate shaft).

The lower chain connects the crankshaft to the intermediate shaft, and the upper chain transmits the movement from the intermediate shaft to the camshafts. Tension on each chain is maintained by an automatic hydraulic tensioner.

Special tool T10068 Camshaft Bar is needed to lock the two camshafts when adjusting the timing. When the camshafts or timing adjusters are dismantled and reassembled, they must be synchronized.

Therefore, it is necessary to locate both timing adjusters in the setup position when installing them to the camshafts. The chain must then be installed so that the plated links of the top chain coincide with the marks on the sprockets.




Valve 1 for Camshaft Adjustment N205
Exhaust Camshaft Adjuster
Special Tool T10068
Camshaft Adjustment Valve 1 (Exhaust) N318
Tensioner for Upper Chain
Intermediate Shaft
Intermediate Shaft Timing Mark
Tensioner for Lower Chain
Crankshaft

Variable Valve Timing

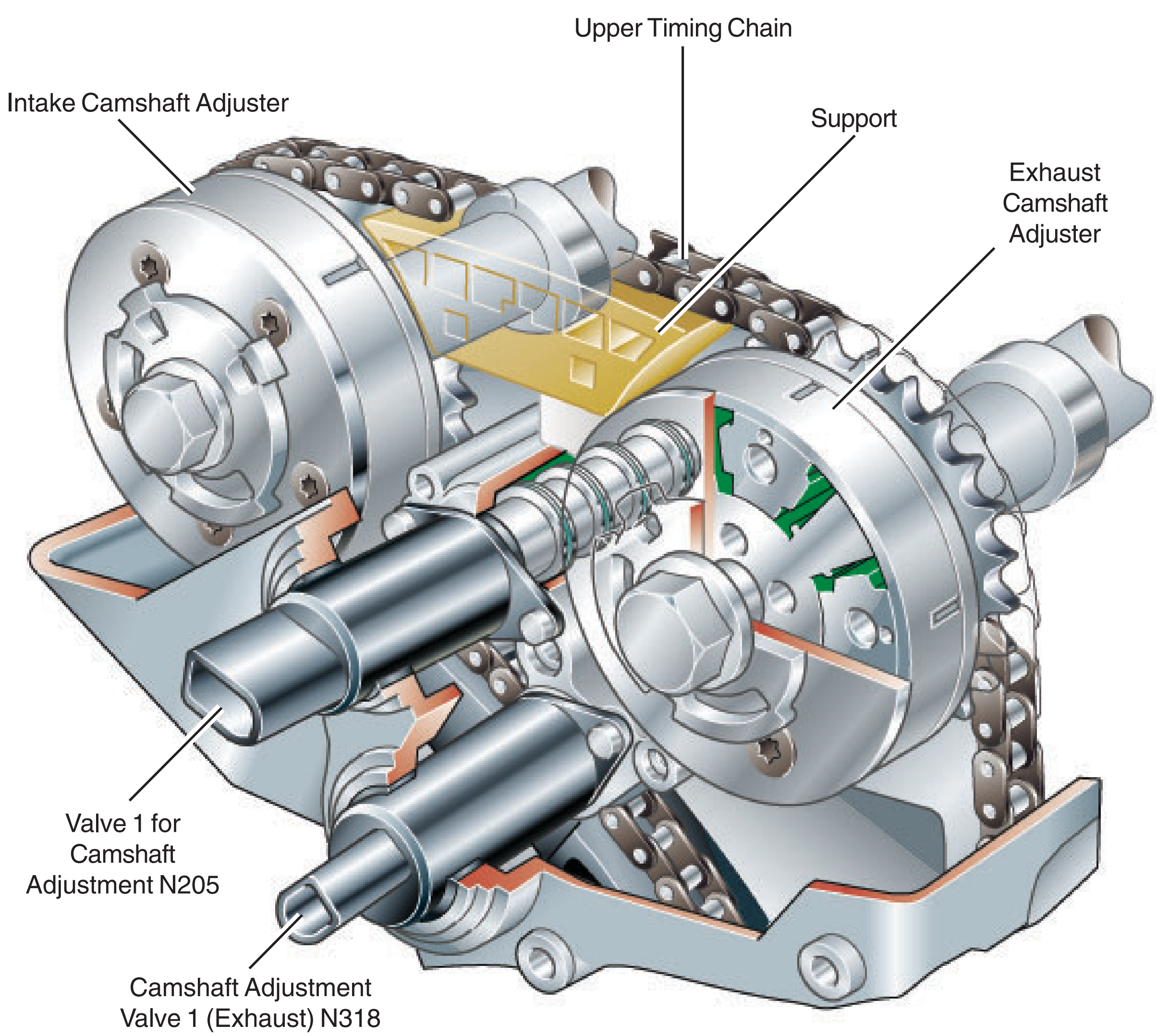
All the components relating to the variable timing system are located in the cylinder head, at the flywheel side of the engine.

The system is composed of a support, which houses the various oil passages, two camshaft adjusters, two solenoids (Valve 1 for Camshaft Adjustment N205 and Camshaft Adjustment Valve 1 [Exhaust] N318), and the upper timing chain, which transmits movement from the intermediate shaft to both camshafts.

The variable valve timing system allows the opening and closing points of the exhaust and intake valves to be modified independently.

The camshaft timing adjustment is accomplished using a hydraulic circuit which passes oil pressure to the timing adjusters. This is achieved with the aid of the two solenoids. Valve 1 for Camshaft Adjustment N205 controls the passage of oil to the intake cam, and Camshaft Adjustment Valve 1 (Exhaust) N318 controls the passage of oil to the exhaust cam.

The Motronic Engine Control Module J220 governs the operation of both solenoids.



Both timing adjusters consist of the same components:

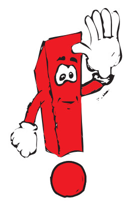
- Sprocket
- Base cylinder
- Rotor
- Cover
- Camshaft position sensor reluctor

The sprocket, base cylinder and cover are bolted together in a single assembly and driven by the upper timing chain.

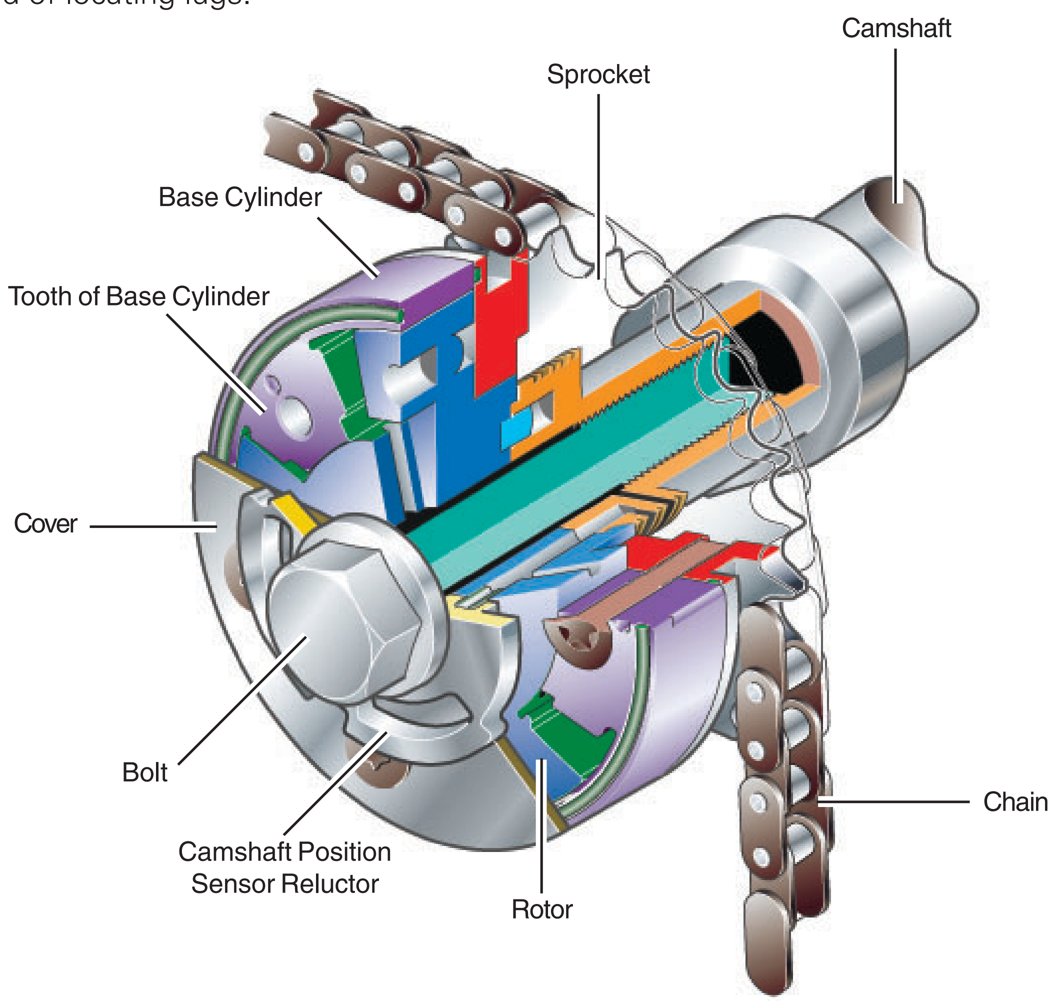
The rotor and the camshaft position sensor reluctor are fixed to the camshaft by the mounting bolt. The mounting position of these components is unique and set with the aid of locating lugs.

The position of the rotor in relationship to the base cylinder is modified by the oil pressure controlled by the two solenoids. The movement of the rotor, which also rotates the camshaft, is limited by the width of the chambers in the base cylinder.

The chambers for the intake and exhaust of the base cylinder have different widths, consequently the intake camshaft can rotate up to 26° (52° of crankshaft) while the exhaust camshaft can only rotate 11° (22° of crankshaft) from its initial position.



All camshaft specifications used here are for example only. Please refer to the latest service information for all specifications.



The oil pressure from the pump reaches the solenoids through different passages. To ensure proper system operation, a minimum oil pressure of 10 psi (70 kPa) is required.

The solenoids direct oil to the A or B chambers in the camshaft adjusters.

When there is pressure in the A chambers, the rotor will remain in its initial position.

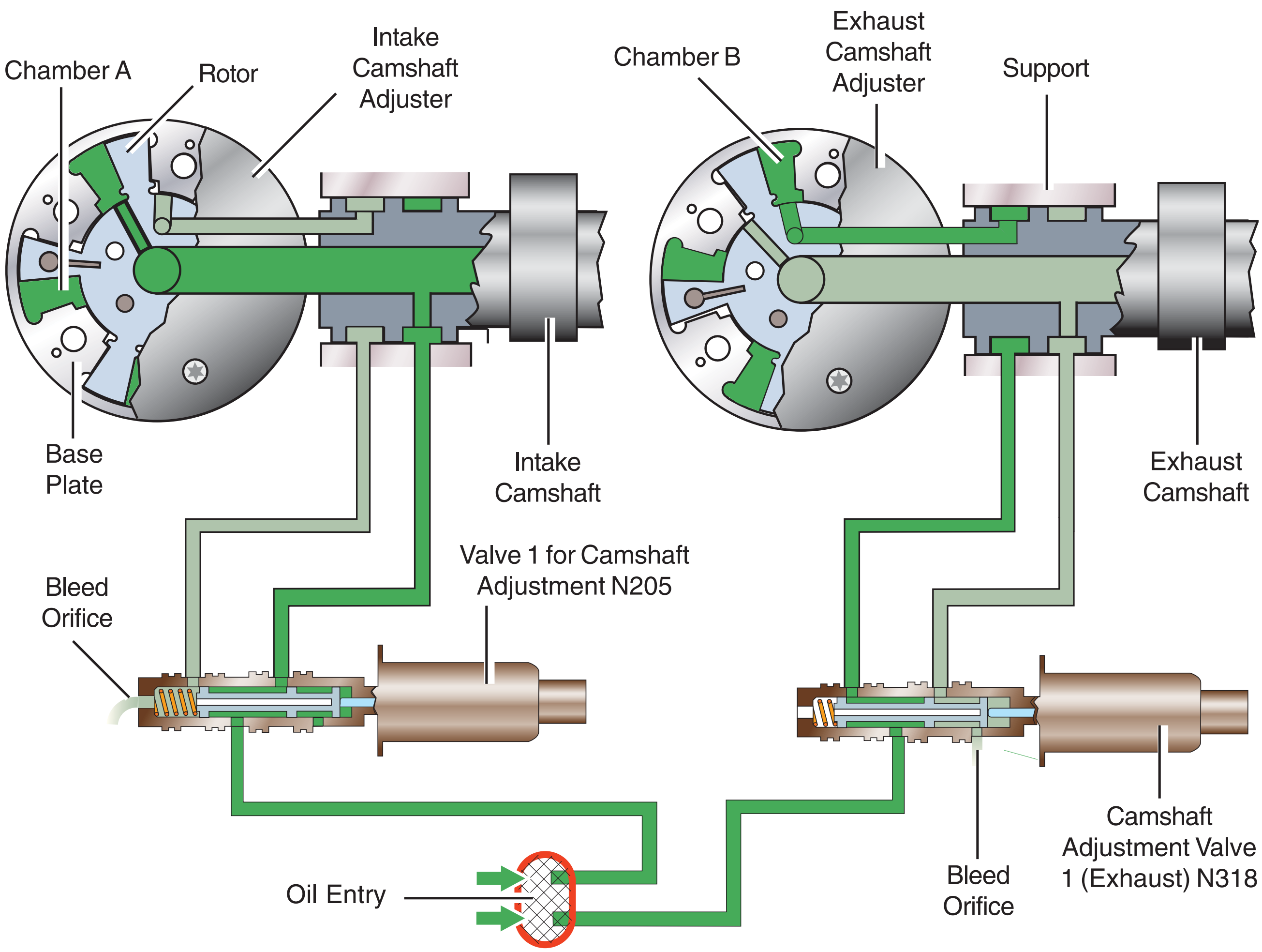
When the pressure is directed to the B chambers, the rotor moves and advances the opening and closing of the valves.

The solenoids have bleed orifices through which the oil from the non-pressurized camshaft adjuster chambers can escape during rotation of the rotor.

Idling Position

When the engine is idling or running at less than 1200 rpm and under light load, the Valve 1 for Camshaft Adjustment N205 will be in the rest position. It will direct oil pressure to the A chambers of the intake camshaft adjuster, to maintain the intake rotor in its initial position. Consequently, the intake valves will open 25° after the top-dead-center (TDC).

During this operating condition, when the speed does not exceed 1200 rpm, the Camshaft Adjustment Valve 1 (Exhaust) N318 is energized and oil pressure reaches the B chambers of the exhaust camshaft adjuster, causing the exhaust rotor to move. This provokes an advance of 22° in the closing of the exhaust valves, or in other words, closure 25° before TDC.



Working Position

When the engine is running above 1200 rpm and under load, the position of the intake camshaft will be gradually modified, while the exhaust camshaft is returned to its initial position of 3° before TDC.

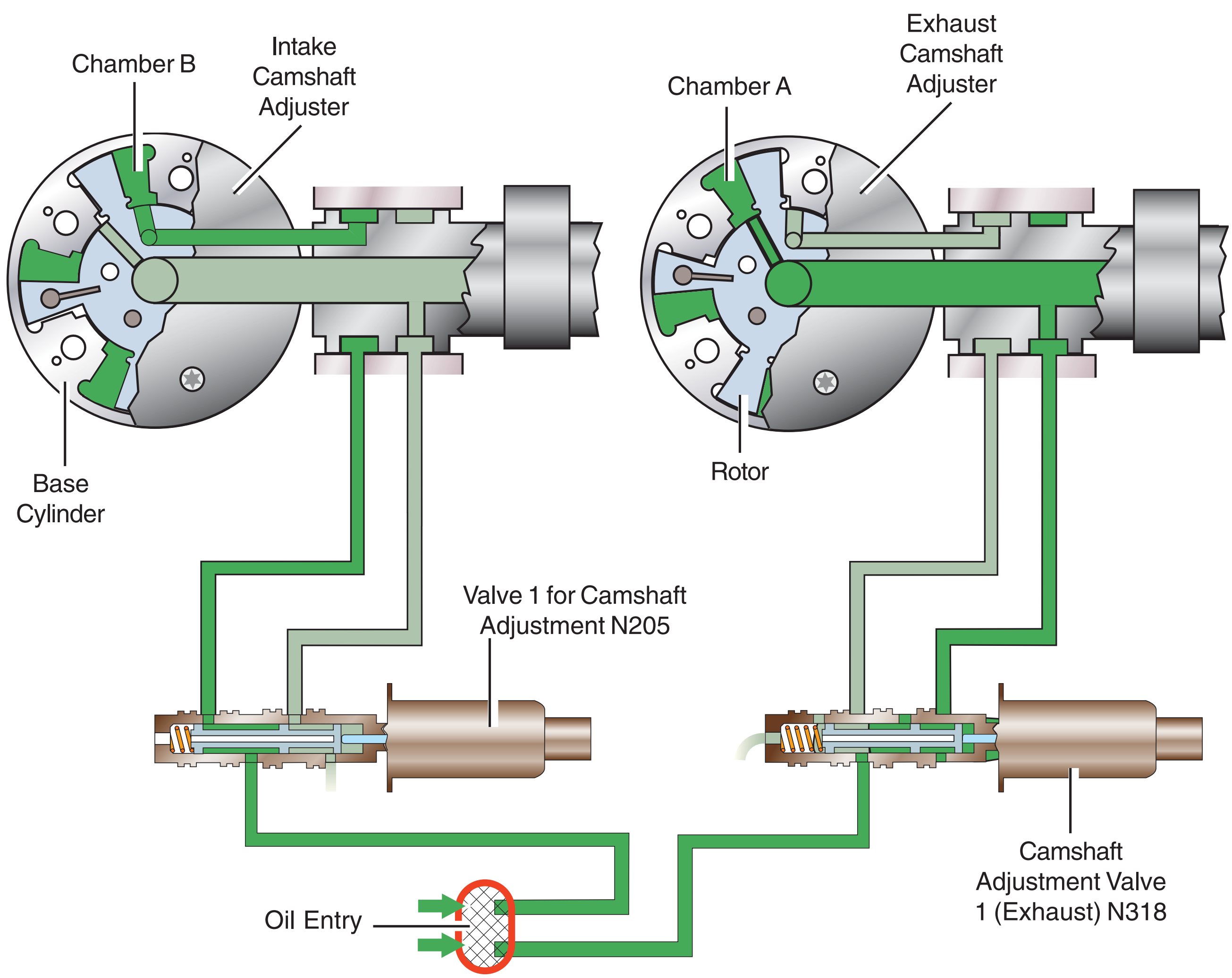
Valve 1 for Camshaft Adjustment N205 is energized and it opens the oil passages to the B chambers of the intake camshaft adjuster.

When the oil pressure reaches the B chambers, the rotor advances the intake camshaft and consequently the opening point of the intake valves. The maximum advance from the initial position is 52° or 26° before TDC.

The intake valves can operate at any point between the idling position of 25° after TDC and the maximum load position of 25° before TDC.

Whenever the engine runs above 1200 rpm, the Motronic Engine Control Module J220 will deactivate the Camshaft Adjustment Valve 1 (Exhaust) N318 and allow oil pressure to pass to the A chambers of the exhaust camshaft adjuster.

Under these circumstances, the exhaust camshaft adjuster rotor will remain in the initial position and the exhaust valves will close 3° before TDC.



Variable Path Intake Manifold

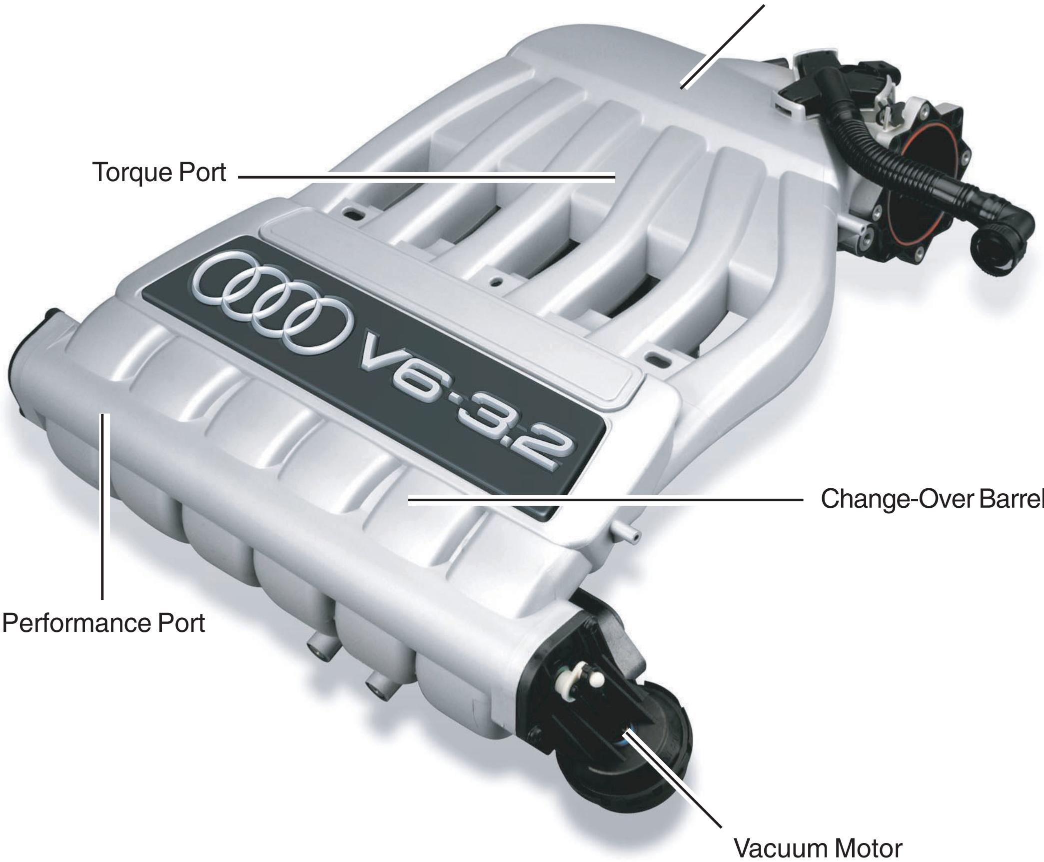
The variable path intake manifold design increases low rpm torque and high rpm power by taking advantage of the self-charging or "ram effect" that exists at some engine speeds.

By "tuning" the intake manifold air duct length, engineers can produce this ram effect for a given rpm range. A manifold that has two different lengths of air ducts can produce the ram effect over a broader rpm range.

The 3.2-liter V6 engine uses two lengths of air ducts but not in the same way as the dual path manifolds used on other engines.

Instead of using high velocity air flow in a long narrow manifold duct to ram more air into an engine at low rpm and then opening a short, large diameter duct for high rpm, the 3.2-liter V6 engine takes advantage of the pressure wave created by the pressure differential that exists between the combustion chamber and the intake manifold.

All air enters the intake manifold plenum and torque port, then is drawn down the long intake ducts to the cylinders.



A second plenum called the performance port, which is attached to a set of short manifold ducts, joins the long intake ducts near the cylinder head. A performance port valve, similar in design to a throttle valve, separates the performance port from the short ducts.

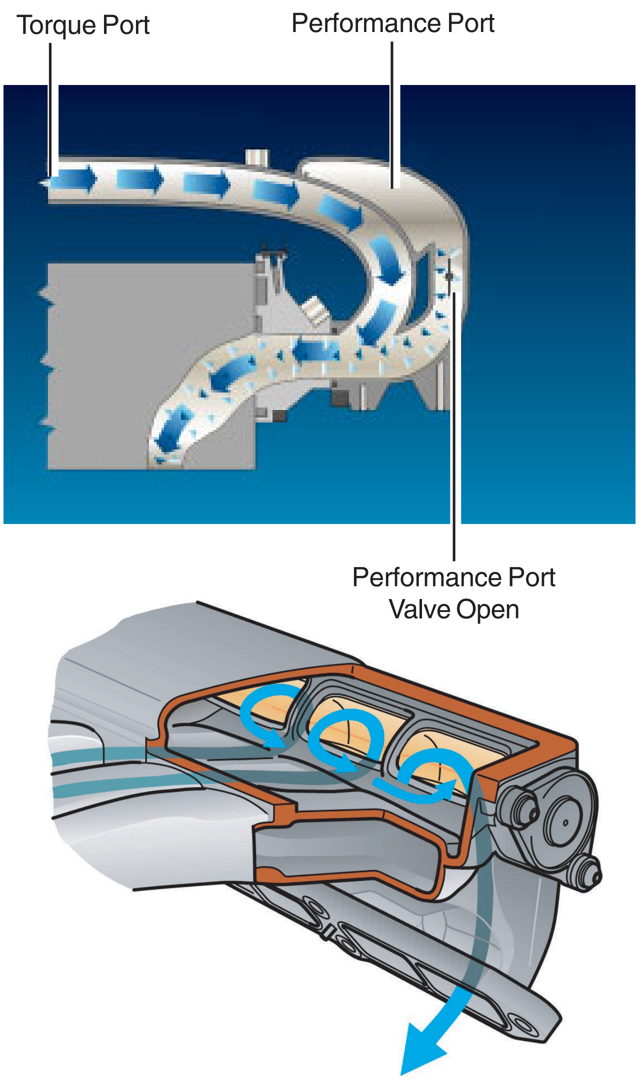
Note that the performance port does not have any other passages to the intake manifold other than through the performance port valve. It does not have access to the torque port and does not admit any more air into the cylinders than what is already drawn down the long intake ducts.

At engine speeds below 900 rpm the performance port is open for idling. The performance port valve is actuated.

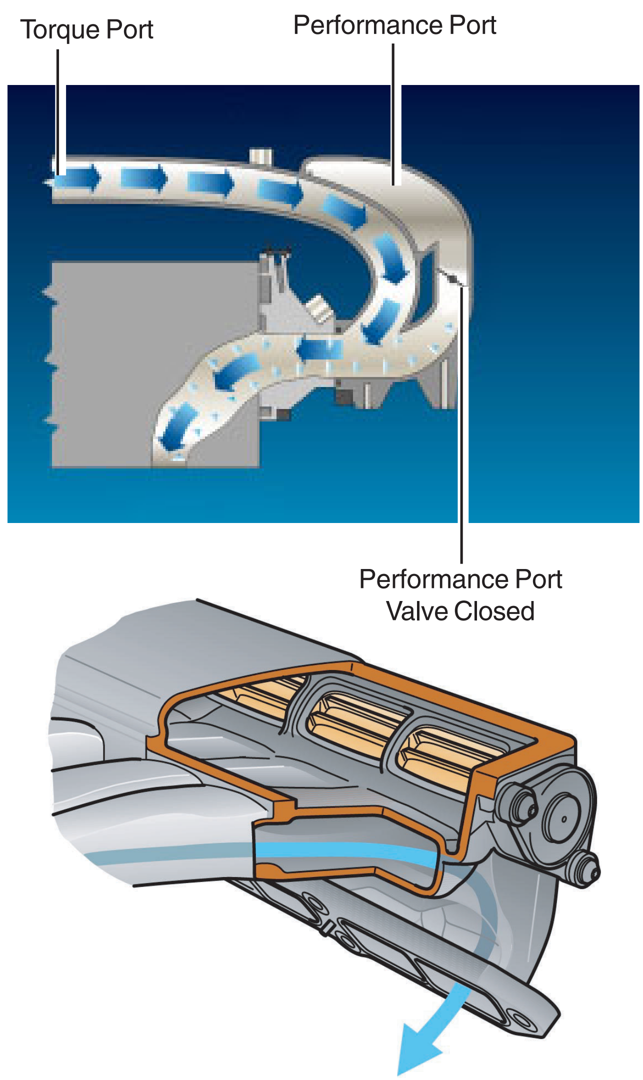
At engine speeds between 900 rpm and 4100 rpm the performance port is closed and the engine produces its maximum low end torque (the performance port valve is not actuated).

At engine speeds above 4100 rpm the performance port is open (the performance port valve is actuated).

Performance Port Valve Open



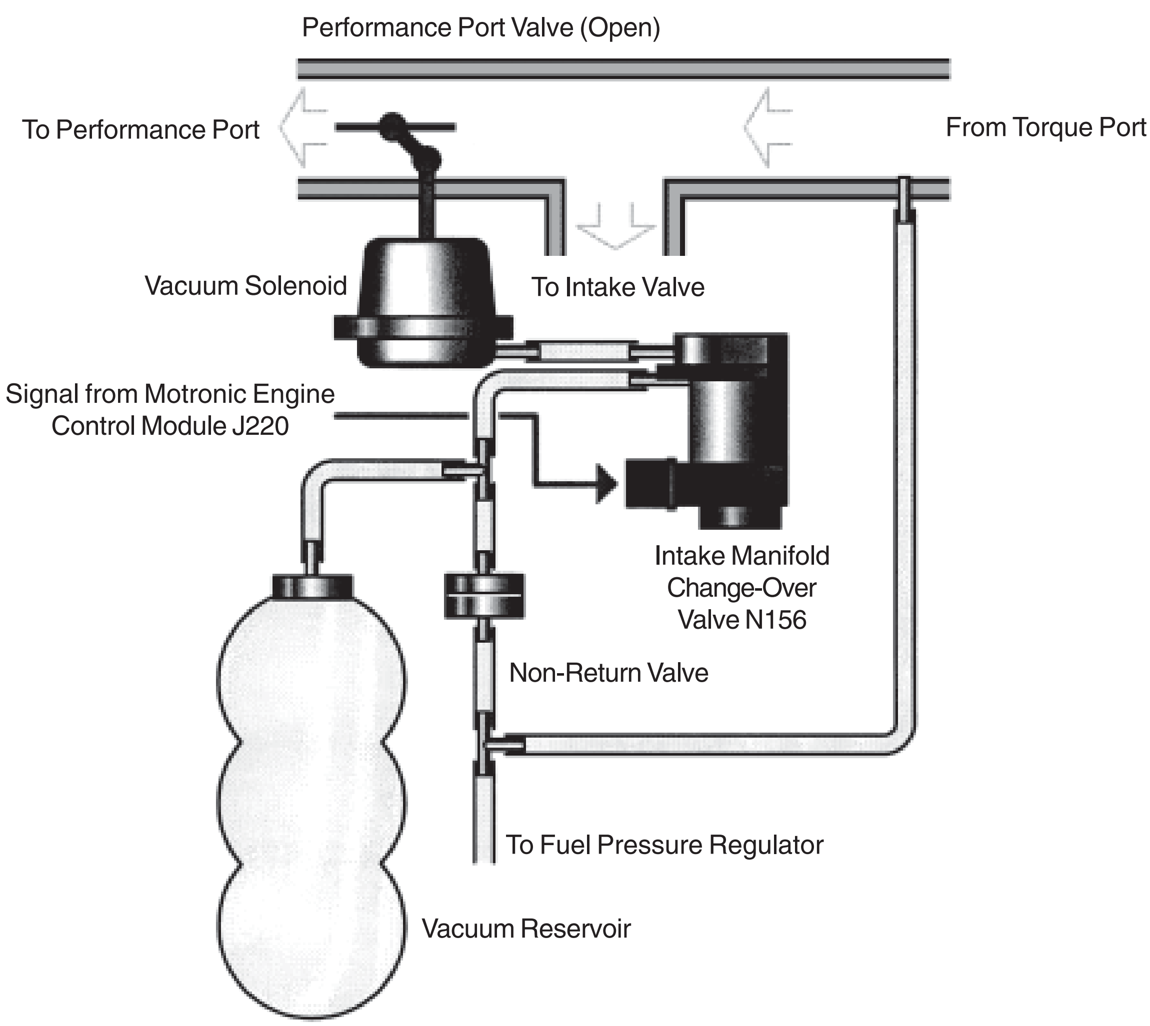
Performance Port Valve Closed



Performance Port Valve Actuation

Intake manifold change-over is engine speed dependent. The Motronic Engine Control Module J220 activates the Intake Manifold Change-Over Valve N156, which supplies vacuum to the vacuum solenoid that operates the performance port valve.

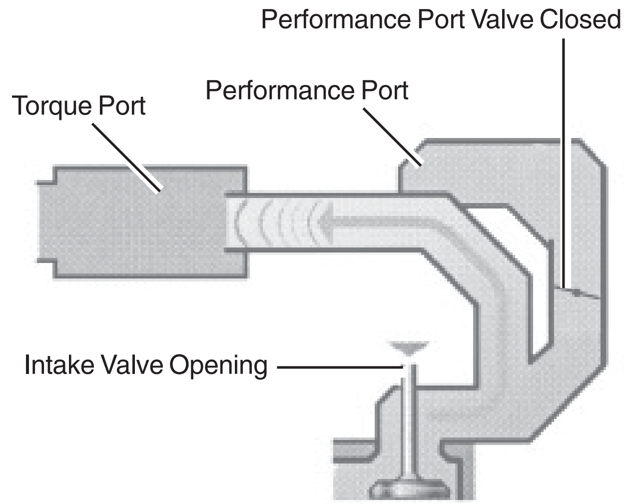
A vacuum reservoir with non-return valve is used to store a vacuum supply for the performance valve operation. This is necessary as manifold vacuum may be insufficient to actuate the vacuum solenoid at high engine speeds.



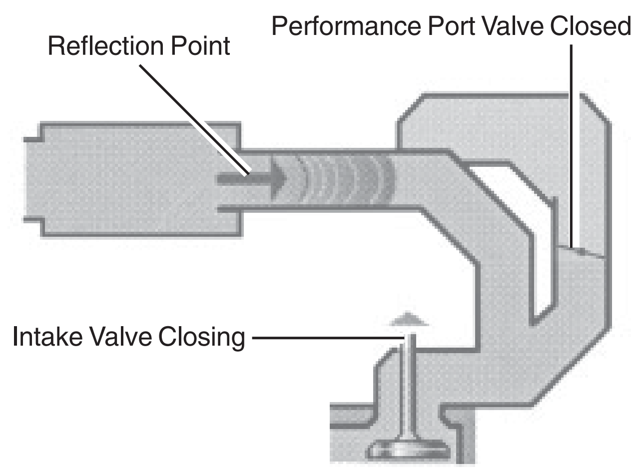
Principles of Variable Resonance Intake Manifold Operation

After combustion has taken place in a cylinder, there is a pressure differential between the cylinder combustion chamber and the intake manifold.

When the intake valves open, an intake wave forms in the intake manifold. This low pressure wave moves from the intake valve ports toward the torque port at the speed of sound.

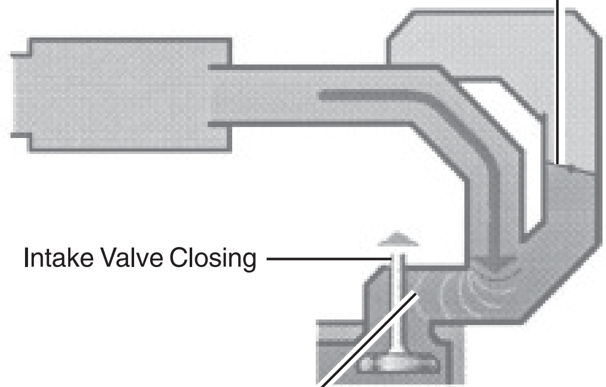


The open end of the intake duct at the torque port has the same effect on the intake wave as a solid wall has on a ball. The wave is reflected back toward the intake valve ports in the form of a high pressure wave.



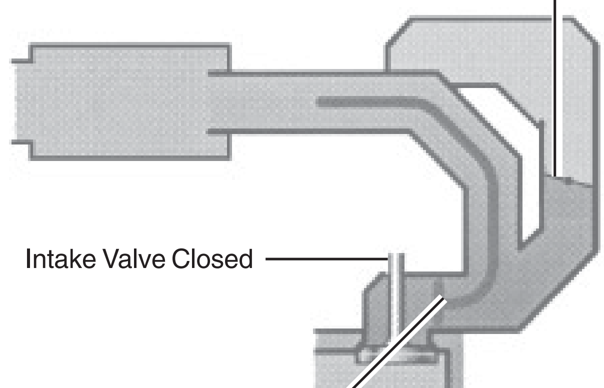
At an optimal intake manifold length, the maximum pressure reaches the intake valve ports shortly before the valves close. By this time the piston has started back up the cylinder, compressing the air/fuel mixture.

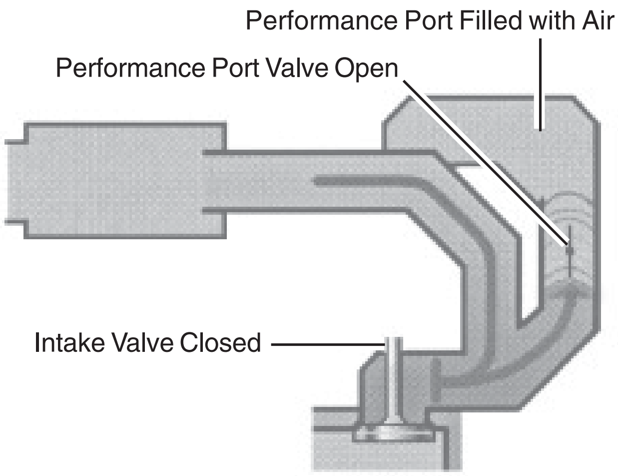
The pressure wave forces more air into the cylinder against this rising compression pressure, filling the cylinder with more air/fuel mixture than would be possible from just the piston moving downward on the intake stroke alone. This adds to what is called self-charging or “ram effect.”



As engine speed increases, the high pressure wave will have less time to reach the inlet port. Because the pressure wave is only able to move at the speed of sound, it will reach the intake valve ports too late. The valves will already be closed, and the “ram effect” cannot take place.

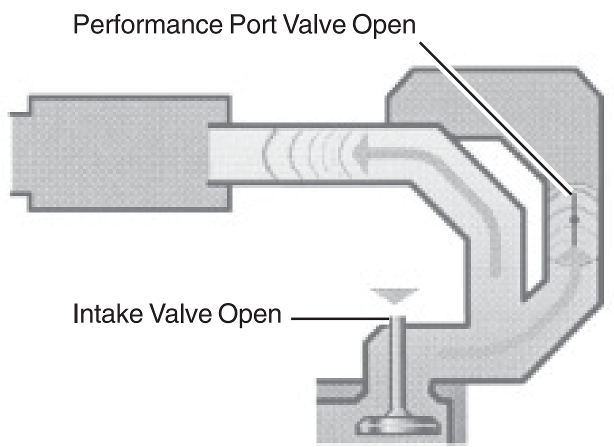
This problem can be solved by shortening the intake manifold.



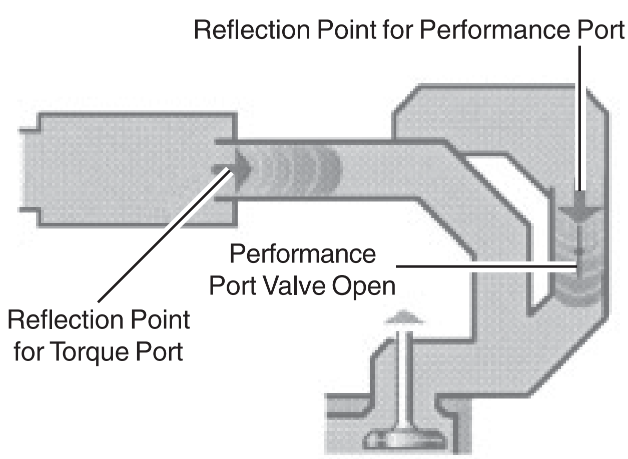


In the 3.2-liter V6 engine, the performance port valve turns to the performance position at engine speeds below 900 rpm and above 4100 rpm. This opens up the path to the performance port. The performance port is designed so that the intake and pressure waves will have a shorter path back to the intake valve ports.

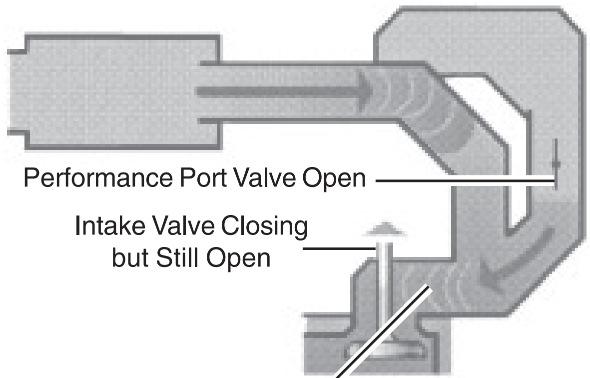
The performance port is filled with air when the intake valve ports are closed.



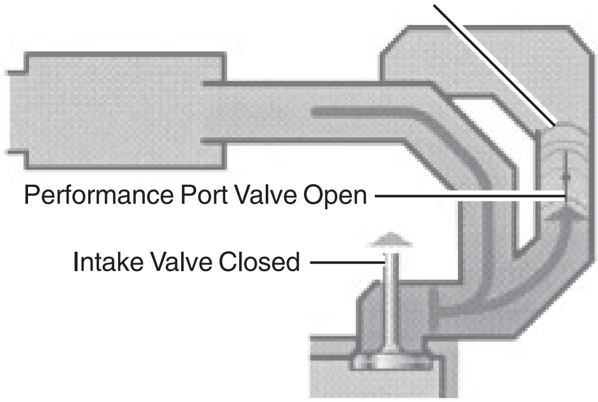
When the intake valves open, the intake wave moves up both manifold intake ducts toward the torque port and the performance port at the same speed.



Because the distance it must travel is shorter, the intake wave reaches the open end of the intake duct at the performance port before it reaches the open end of the intake duct at the torque port.



The performance port pressure wave is reflected back toward the intake valve ports, and that air is forced into the combustion chamber before the intake valves close.



The pressure wave arriving too late from the torque port is reflected by the closed intake valves and pushes its air charge up the intake duct, filling the performance port in preparation for the next cycle.

02E Direct Shift Gearbox (DSG)

Introduction

The new 02E Direct Shift Gearbox (DSG) is a compact six-speed transmission that combines the best features of both a manual transmission and an automatic transmission with Tiptronic.

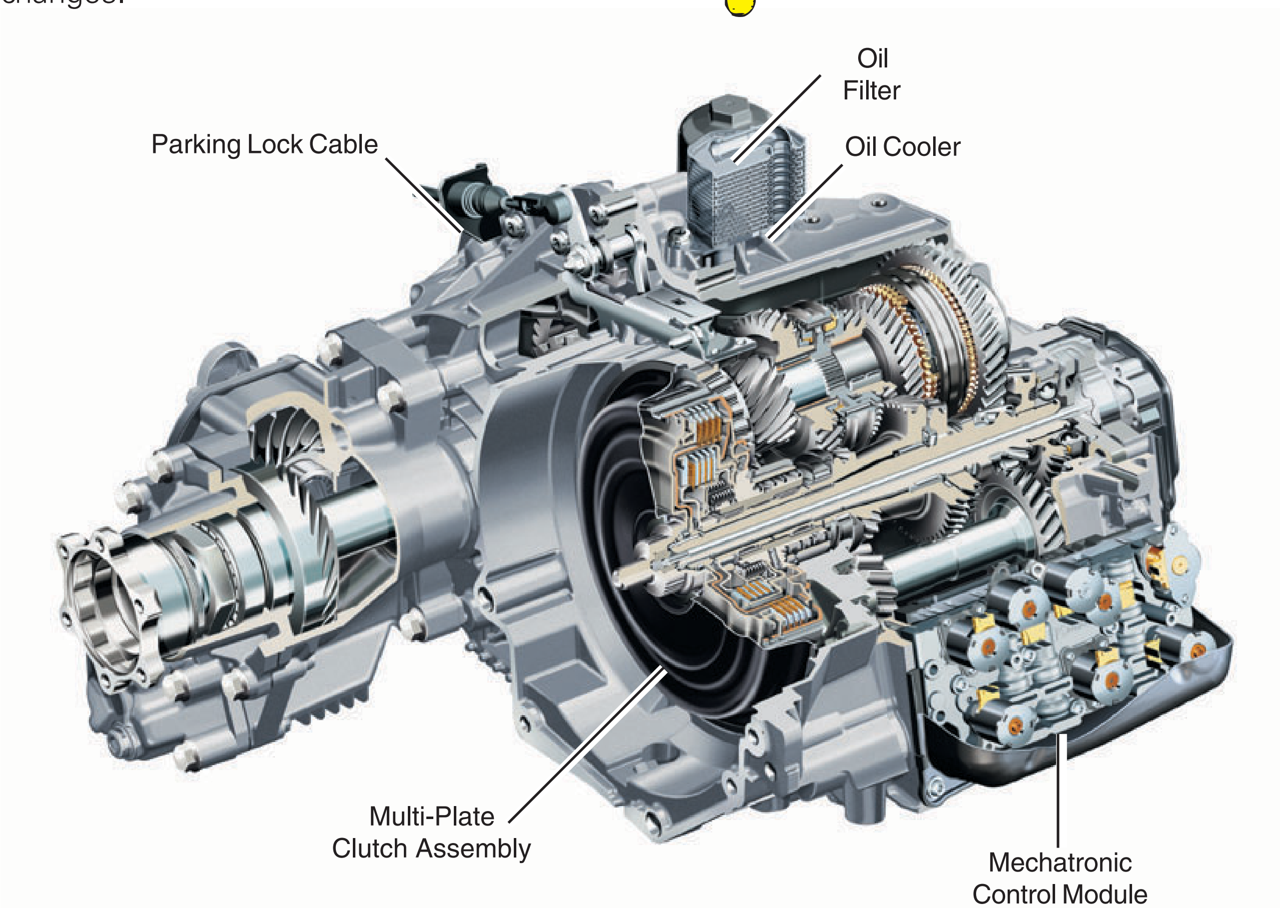
This design is an innovative “next step” for Audi, following the proven path forged by Audi’s Tiptronic (1994) and Multitronic (1999) transmissions. The DSG’s first production car application is in the TT 3.2 quattro.

Most importantly, the DSG delivers uninterrupted power flow during gear changes.

This was accomplished by replacing the conventional dry clutch with two multi-plate hydraulic wet clutches like those that control the shifting in an automatic transmission.

In reality, the DSG is actually two parallel manual transmissions built into one housing. They share a common differential. Engine torque is distributed to the sub-transmissions via the two wet clutches.

For more information on the DSG refer to SSP 951403.



Dry clutch: Usually a single plate clutch with dry friction surfaces.

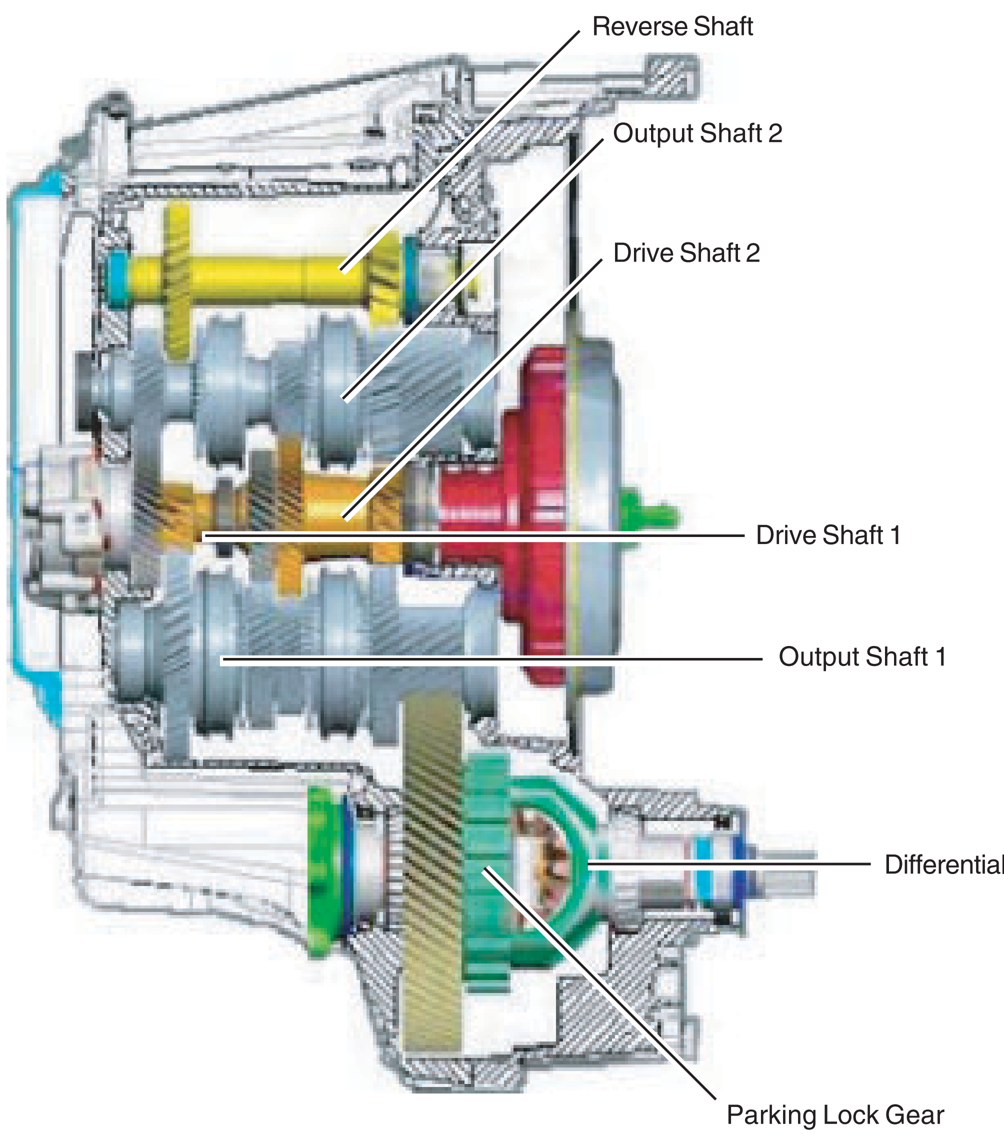
Wet clutch: Usually with multiple friction and steel surfaces running in oil.

DSG's dual multi-plate wet clutch design, which also offers greater thermal capacity and better regulation than dry clutches, has its roots in motor racing.

There is no torque converter, which is generally standard equipment on automatic transmissions.

Audi first tested the DSG concept in 1985, in its Sport quattro S1 rally vehicle that was victorious in the legendary Pike's Peak Climb.

Designed for a maximum torque capacity of 258 lb/ft, the DSG weighs only 198 pounds when filled with 6.8 quarts of specified transmission oil.

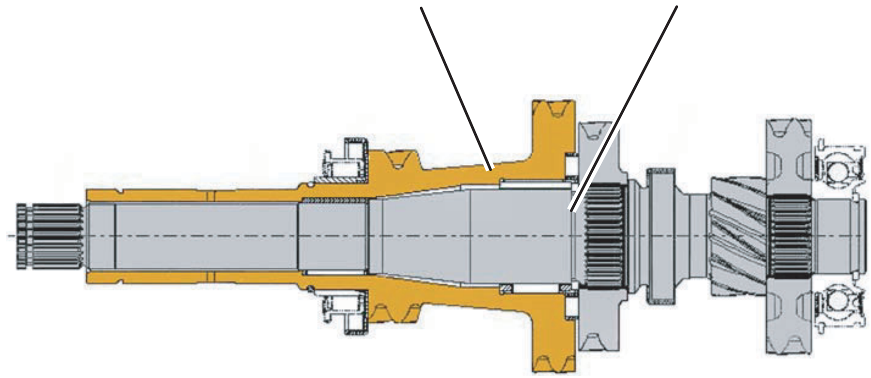


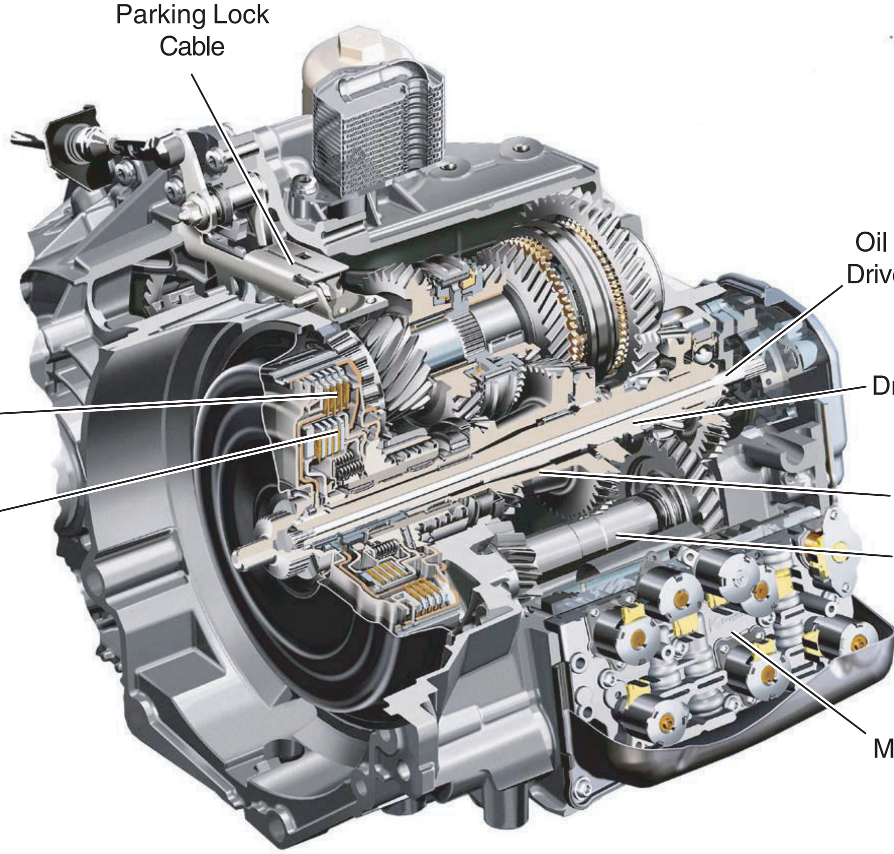
Design and Function

The DSG is a three-shaft, six-speed transmission, that is similar in design to the Audi 02M manual transmission. Its six forward gears and a reverse gear are fully synchronized.

The dual multiplate wet clutch with hydraulic control allows two gears to be engaged simultaneously.

As the DSG engages one gear, it pre-selects the next gear based on sensor inputs for engine speed and braking. Upshifts downshifts and even shifting from sixth to second gear are all done without power, torque, or engine speed interruptions. This is not possible with a purely automatic transmission.

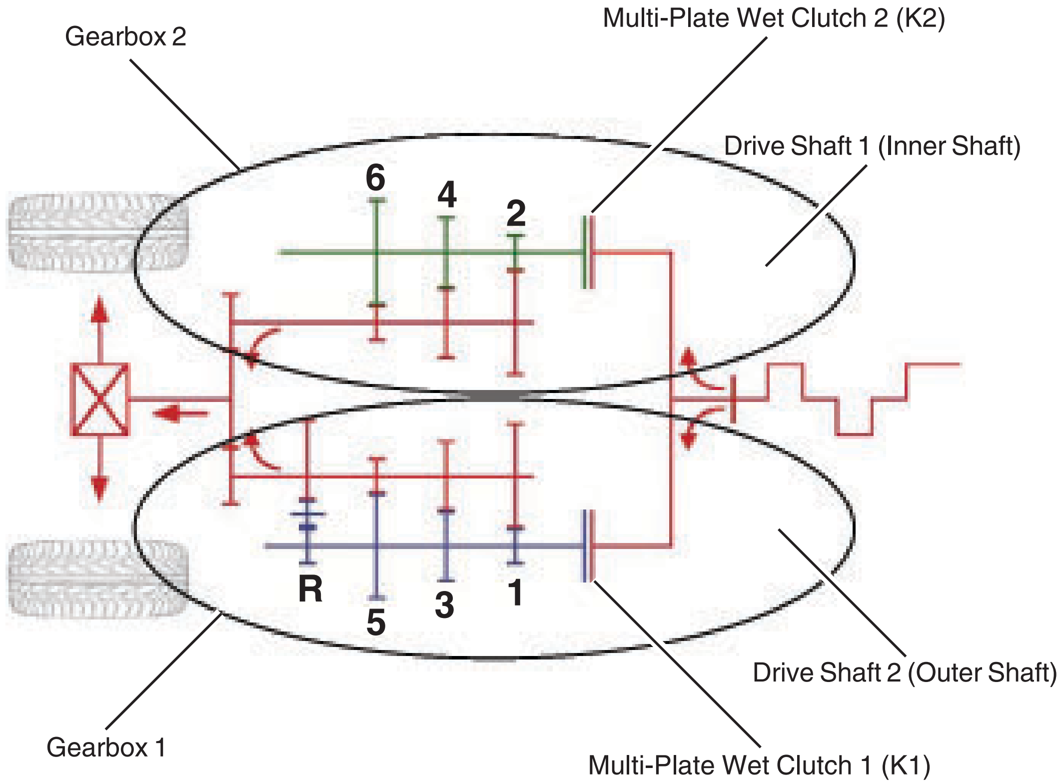


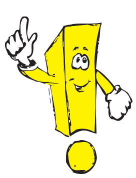


Engine torque is distributed to the two sub-transmissions via the two multi-plate wet clutches: one for even numbered gears and the other for odd numbered gears. A conventional Audi manual transmission synchronizer assembly is assigned to each pair of gears.

These shift units can be shifted independently of one another. This enables free gear selection from even to even or odd to odd numbered gears. The differential passes the torque to the wheels and rear axle (in quattro vehicles) via a bevel gear.

DSG Power Flow





The diagram shows power flow, not physical assignment of gears.

Gear Selector Assembly

The selector lever position is no longer transmitted mechanically to the transmission by way of the selector lever cable and multi-function switch (driving range sensor).

Instead, DSG uses a "shift-by-wire" control concept in which signals to initiate upshifts and downshifts are sent to the transmission Mechatronic control module via the drivetrain CAN-bus. No cable is involved in the gearshift operation. Only the parking lock is engaged mechanically by way of the selector lever cable for "P. "

At first glance, the DSG shift gate looks like a regular Tiptronic transmission with standard P, R, N and D plus an added "S" for sport mode with a gate to the right for manual shifting.

Place the DSG in "D" and it behaves just like a regular automatic for the most part, except that at a stop the car goes into neutral. When you start to ease off the brake, the clutch will smoothly engage just like a manual transmission.

In "D" mode, DSG shifts through the gears very quickly in city driving, making 6th gear to 2nd gear changes in 0.9 seconds. In these situations, the DSG downshifts immediately into the power band. Normal upshifts are quick and smooth, with no jerkiness.

DSG Shift Gate in the TT 3.2 quattro

Placing the transmission in "S" sport mode causes the transmission to hold the engine in the power band, 4000 rpm to redline.

This automatic mode anticipates the driver's need to downshift and upshift. Since the DSG control module already knows all the optimum shift points to keep the engine in the power band, the DSG will shift up and down through the gears automatically.

Tiptronic in the DSG operates as with other transmissions. The driver pushes the shift lever forward or back to shift manually. Also, as with other Tiptronic shift applications, Tiptronic will not allow shifting into inappropriate gears.

The engine electronics automatically raise the rpms to match engine speed with wheel speed. In the event that you shift into the wrong gear, sensors will prevent the engine from engaging the transmission.

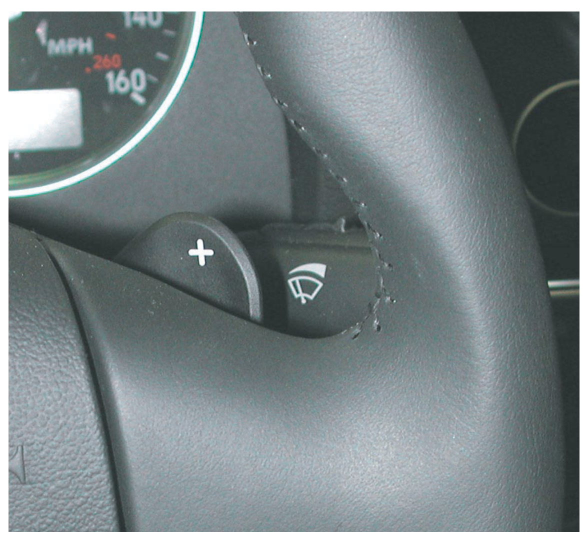
Steering Wheel Paddles

No matter which automatic mode you are in, you can use the "one touch" steering wheel paddles to shift through the gears manually.

Paddle shifting is easy. First, place your hands at nine and three on the steering wheel. Second, depress the accelerator, and start paddle shifting using your index fingers. The right "+" paddle is for upshifting, and the left "-" is for downshifting.

Shifts are immediate. If you are in Tiptronic mode, the DSG will stay in the selected gear until you shift again. If you are in "D" or "S" modes, and depending on conditions, the DSG will switch to "Automatic" mode after 10 seconds.

Steering Wheel Paddles in the TT 3.2 quattro

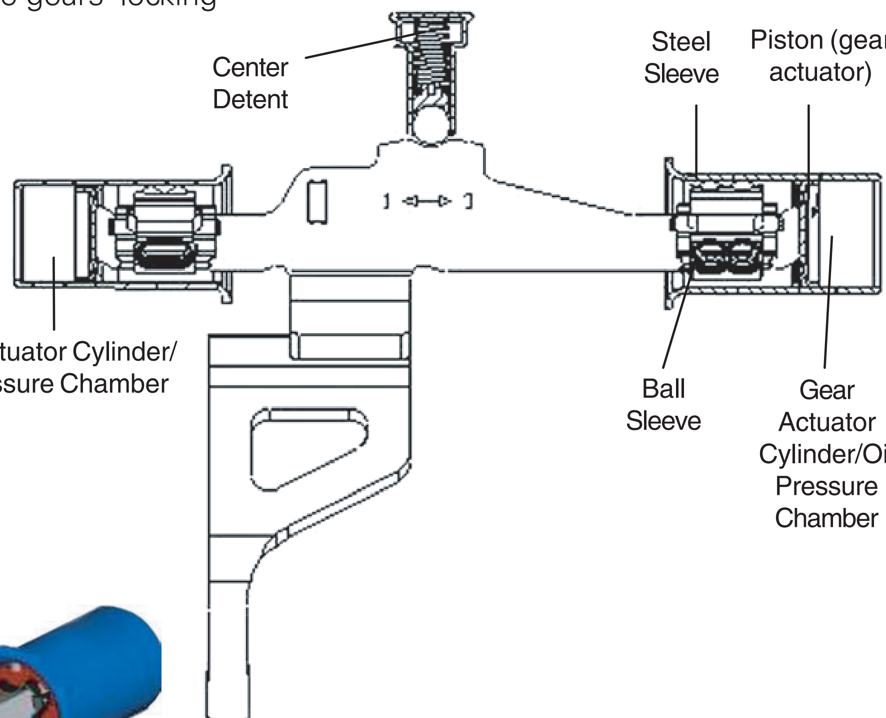


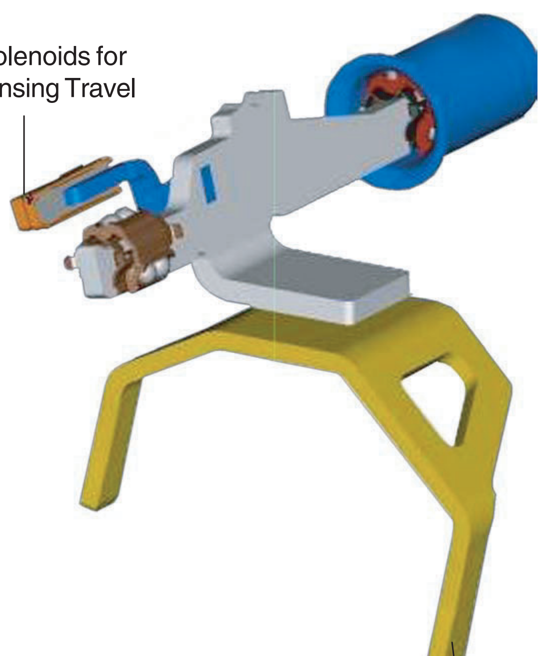
Shift Actuator System

The Shift Lock and "P" shift functions are carried out by solenoid valves that are directly connected to the Mechatronic control module. The selector lever Bowden cable actuates only the parking lock.

The six forward and one reverse gears are shifted via four hydraulically actuated selector forks in the transmission. These forks can be actuated independently of one another and act directly on the gears' locking collars.

The actuating pistons are moved precisely by oil pressure and spring-loaded locking balls. Hall sensors supply the travel signal for the relevant selector fork.



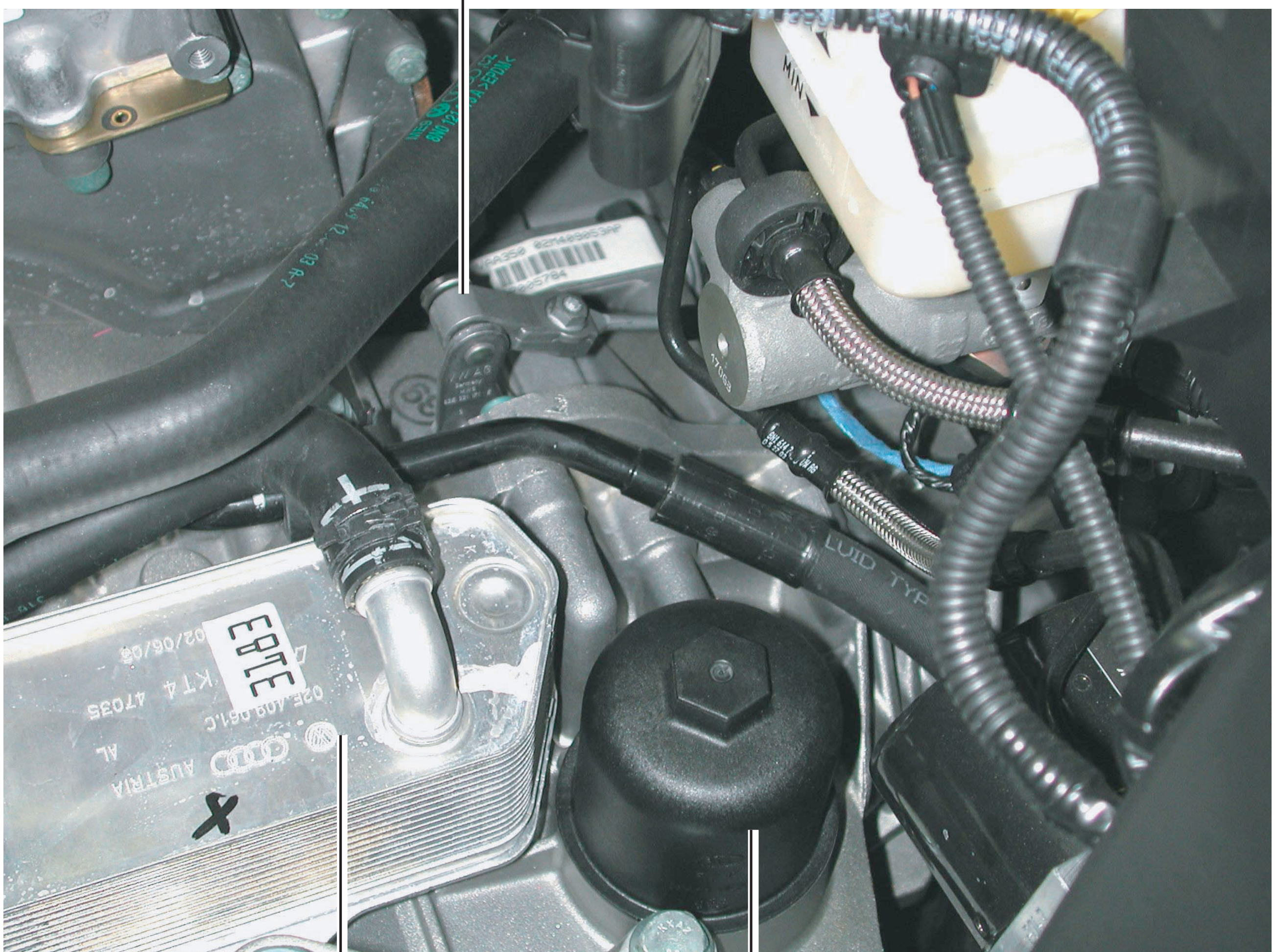


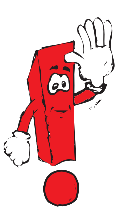
Parking Lock

The parking lock is located on the left side of TT 3.2 quattro's engine compartment, to the right of the transmission oil cooler and oil filter.

Oil Fill

Procedures for filling the DSG with fluids is the same as other Audi transmissions.

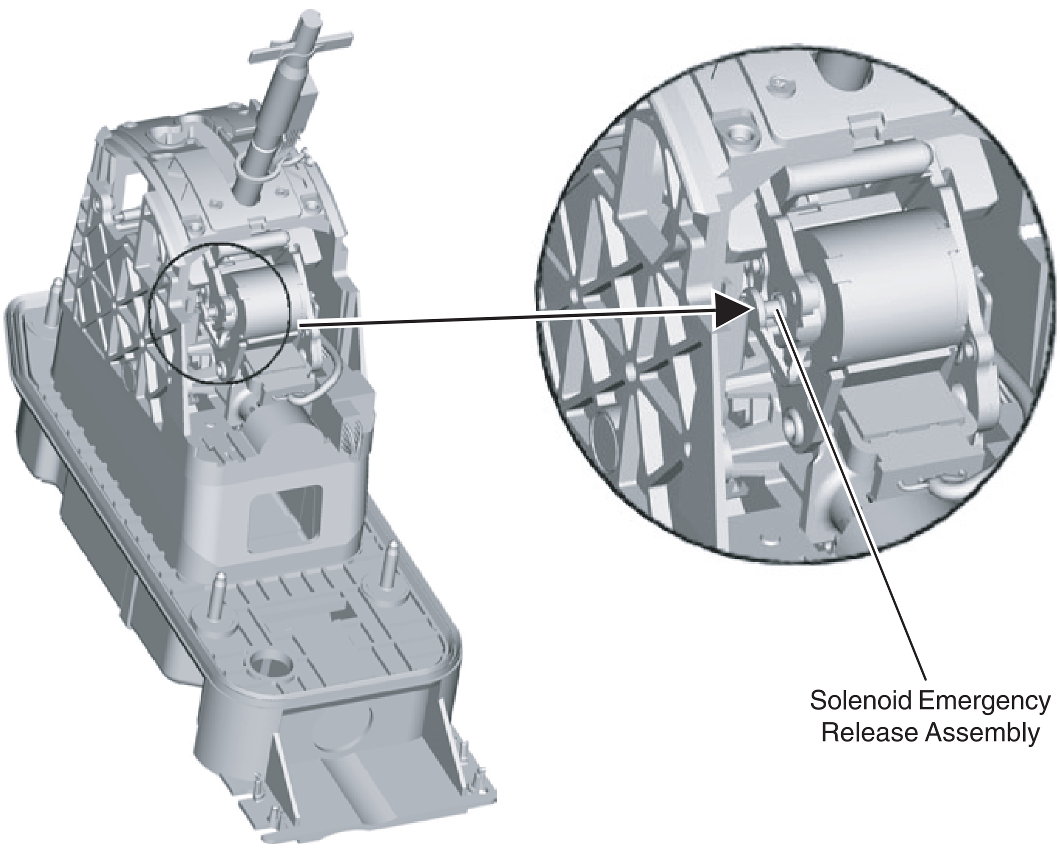


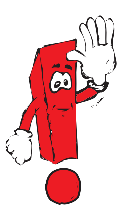


Consult service repair information for correct ATF fluid. Also, use eye protection and gloves when handling these ATF fluids. Failure to do so could cause eye and skin irritation.

In the event of vehicle electrical system failure, an accident or battery defect, the selector lever can be moved from “P” mode to “N” mode by mechanically releasing the shift lock solenoid.

This can be achieved by using a screwdriver or bone to press in the shift lock solenoid’s emergency release assembly.





When towing a vehicle with DSG, proceed according to the owner’s manual. The transmission can be severly damaged if these procedures are not followed.

Mechatronics Module

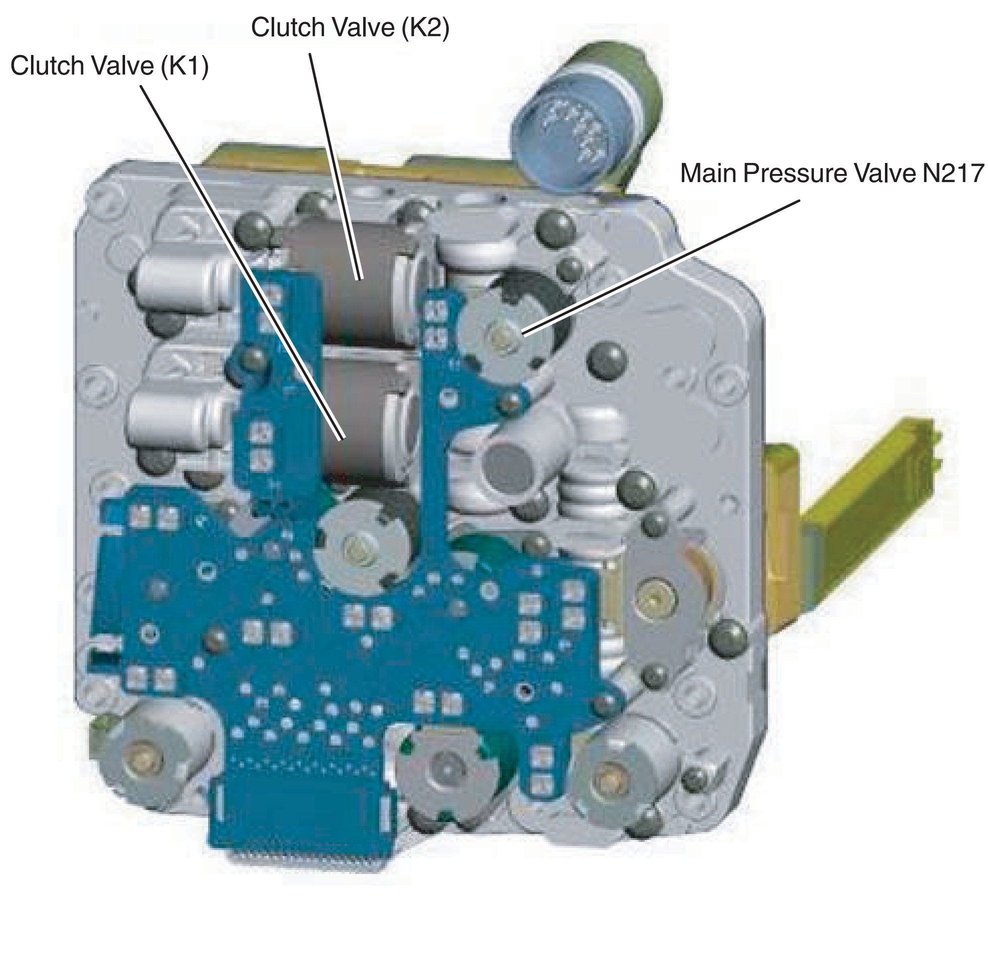
The most complex component of the DSG is the Mechatronics control module, which is located at the front of the transmission. The Mechatronics control module is the hub for the transmission's mechanical, hydraulic and electronic systems.

The Mechatronics control module controls 13 sensors and four actuators. It manages data for controlling the clutches, shift points, input and output shafts, cooling, individual gears, hydraulic pressures, and various malfunction programs.

To accomplish this, the control module regulates five modulation valves, five shift valves, and numerous hydraulic slider valves.

Located inside the transmission, the Mechatronics control module is immersed in oil that can heat up to 285° F. To protect the semi-conductor elements of the control module, a heat exchanger bolted on the outside of the transmission ensures the correct thermal condition.

Mechatronics Control Module



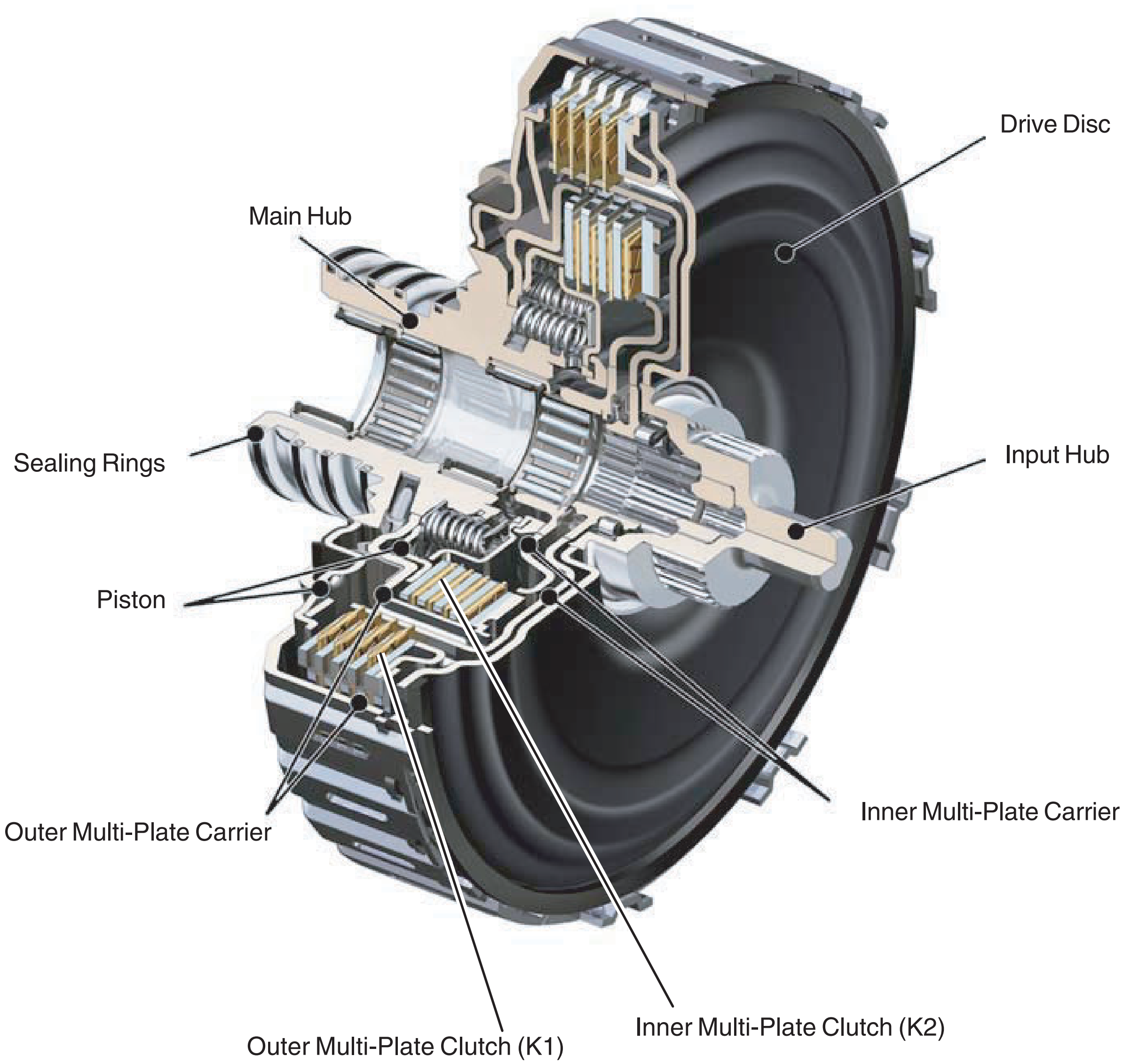
Dual Multi-Plate Wet Clutch

The dual multi-plate wet clutch, comprised of clutch 1 (K1) and clutch 2 (K2), is a complex and innovative component that has matured over many years of development.

The two electronically controlled, hydraulically actuated clutches are packed inside each other for maximum space economy.

DSG's dual clutch offers greater thermal capacity and better regulation than dry clutches. Its pressure is regulated hydraulically by solenoid valves that are controlled by the Mechatronic control module.

Just as in Audi manual transmissions, every DSG gear is paired with a conventional synchronizer shift (slider) unit. The performance of these synchronizers is further enhanced by friction layers, to achieve minimal synchronization times and smooth shifts.



Shift Operation

The illustration below shows acceleration in 1st gear.

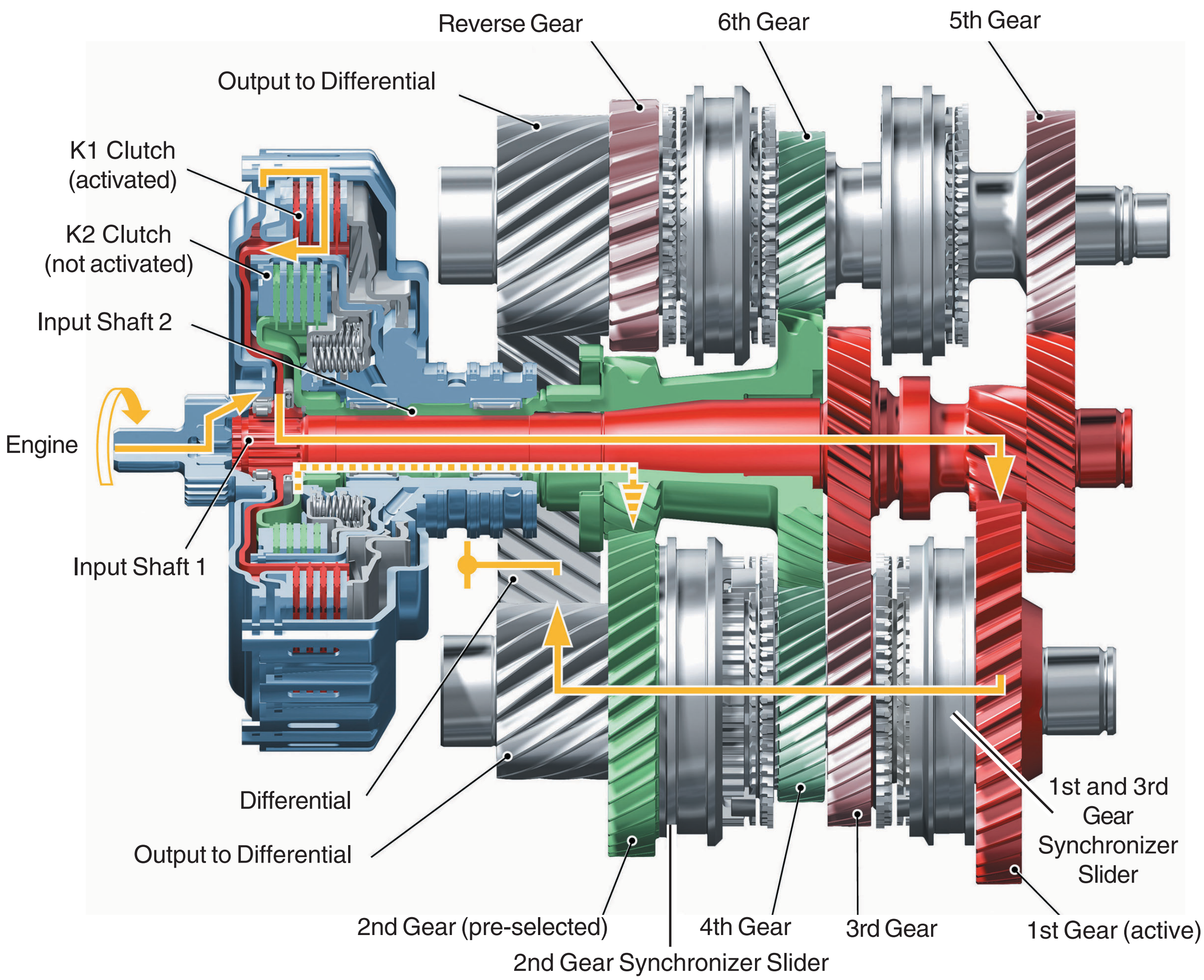
Power comes in from the dual mass flywheel, entering the clutch housing. This assembly contains the two clutches: K1 is connected to the inner input shaft (1) and K2 is connected to the outer input shaft (2).

Power goes through K1 (activated) to the inner input shaft to 1st gear.

The 1st and 3rd gear synchronizer activates 1st gear. Power then flows through the output shaft to the differential. At the same time, the 2nd gear synchro has engaged (pre-selected) 2nd gear, which is ready to be activated. K2 is not activated, so the outer input shaft spins freely.

If this was a typical manual transmission, there would be no power flow while two gears are engaged. However, the design of the DSG is predicated on having two gears engaged at the same time.

Acceleration in 1st Gear

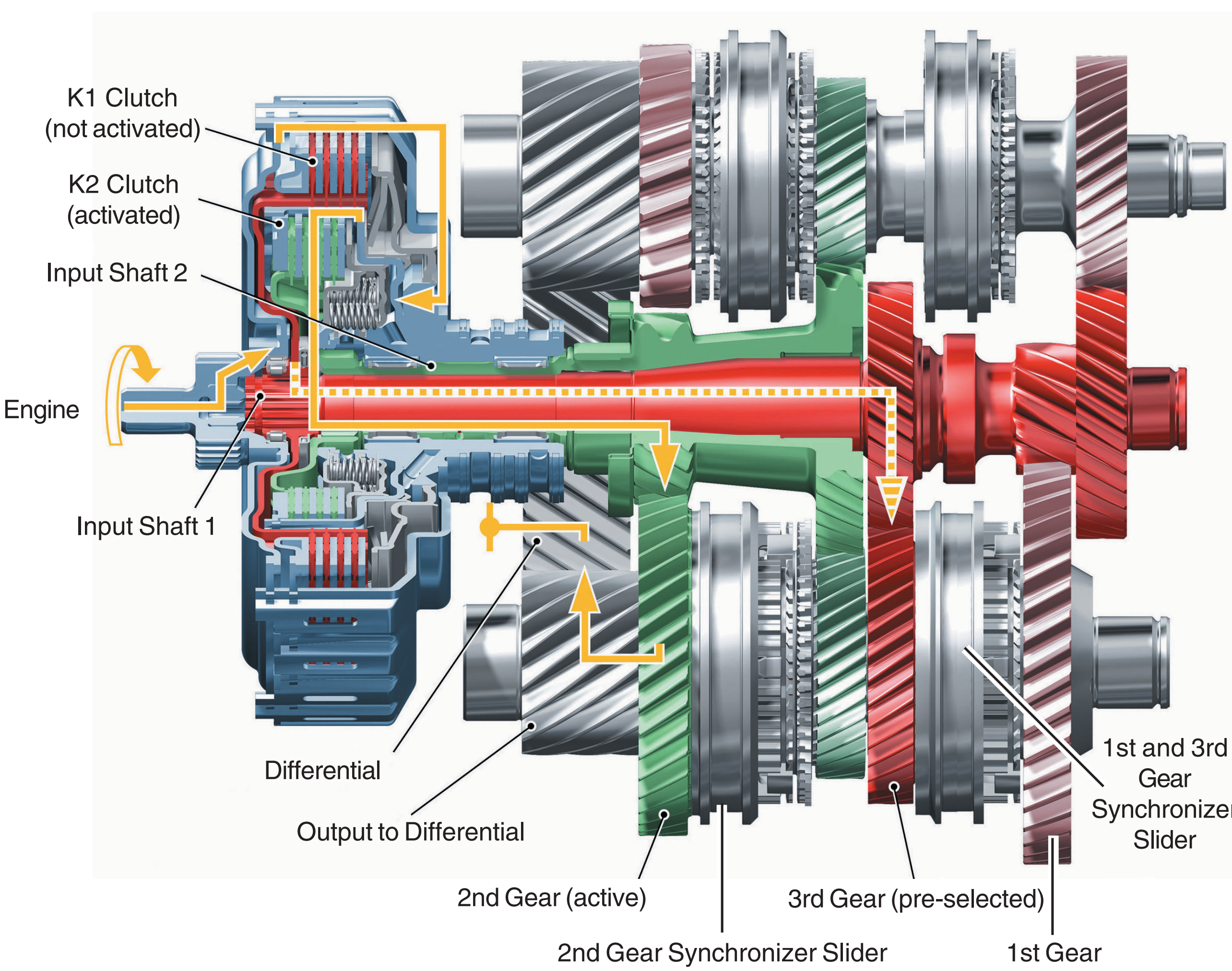


The illustration below shows acceleration in 2nd gear. K1 has been released and now K2 has been activated. The power flows through K2 through the outer input shaft into 2nd gear, which has been activated by the 2nd gear synchro.

The Mechatronic control module has now slid the synchro slider from 1st to 3rd gear, pre-selecting 3rd gear, which will be activated if the driver continues to accelerate.

But if the driver decelerates, the Mechatronic control module will detect the lessened load, sliding the 1st and 3rd gear synchro slider to 1st gear in anticipation of activating 1st gear.

Acceleration in 2nd Gear



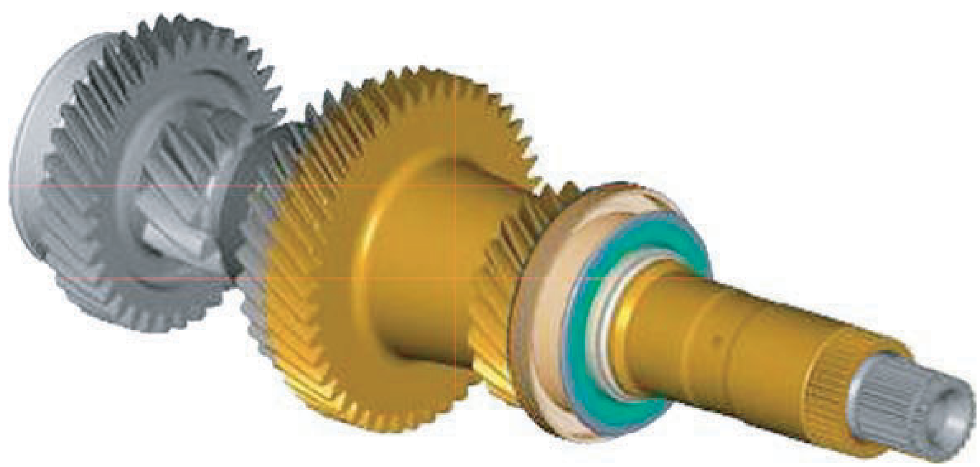
Drive (Input) Shafts

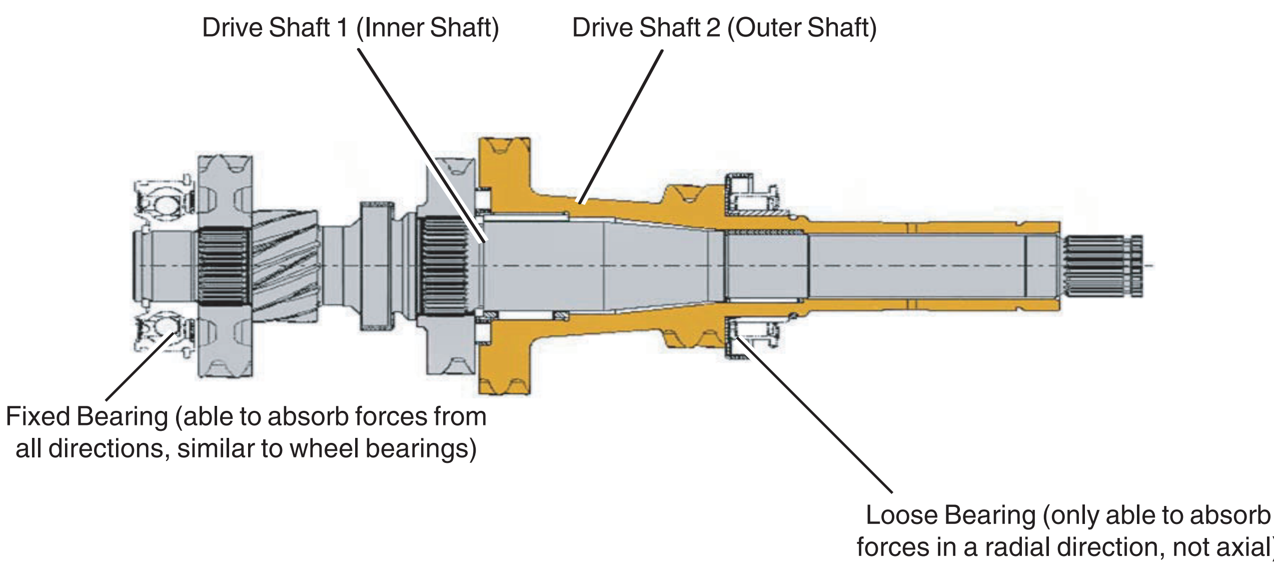
DSG's two drive (input) shafts are an excellent example of innovative manufacturing technology, and are key to the design of the transmission. They are inserted into one another.

Drive Shaft 1 is inserted into a hollow shaft, Drive Shaft 2. The outer shaft (Drive Shaft 2) handles the odd numbered gears plus reverse (1, 3, 5 and R), while the inner shaft (Drive Shaft 1) handles the even numbered gears (2, 4 and 6).

The concentric shafts rest on two needle bearings, with many existing component parts from Audi manual transmissions being used.

The oil pump is driven at engine speed by a shaft running through the inner drive shaft.





Three Fault Statuses

First Fault Status

A DTC is stored and a substitute running mode enables continued driving.

The driver is not informed of this status because it is not critical to driving safety.

The driver may notice the fault due to certain limitations of the substitute running mode.

Second Fault Status

The selector lever display indicates the presence of a DTC by showing the shift display in inverted form.

This status is critical to driving safety, and the driver should seek service as soon as possible to have the fault diagnosed.

Third Fault Status

The selector lever position display indicates the presence of a fault by flashing.

This status is critical to driving safety, and the driver should seek service immediately.

Emergency Running Mode

If a sub-transmission is shut off due to malfunctions, an emergency running mode is started by the transmission.

Shifting can only be carried out with force interruption in emergency running mode. One sub-transmission shifts gears 1 and 3, the other sub-transmission shifts 2nd gear.

Reversing is not possible.

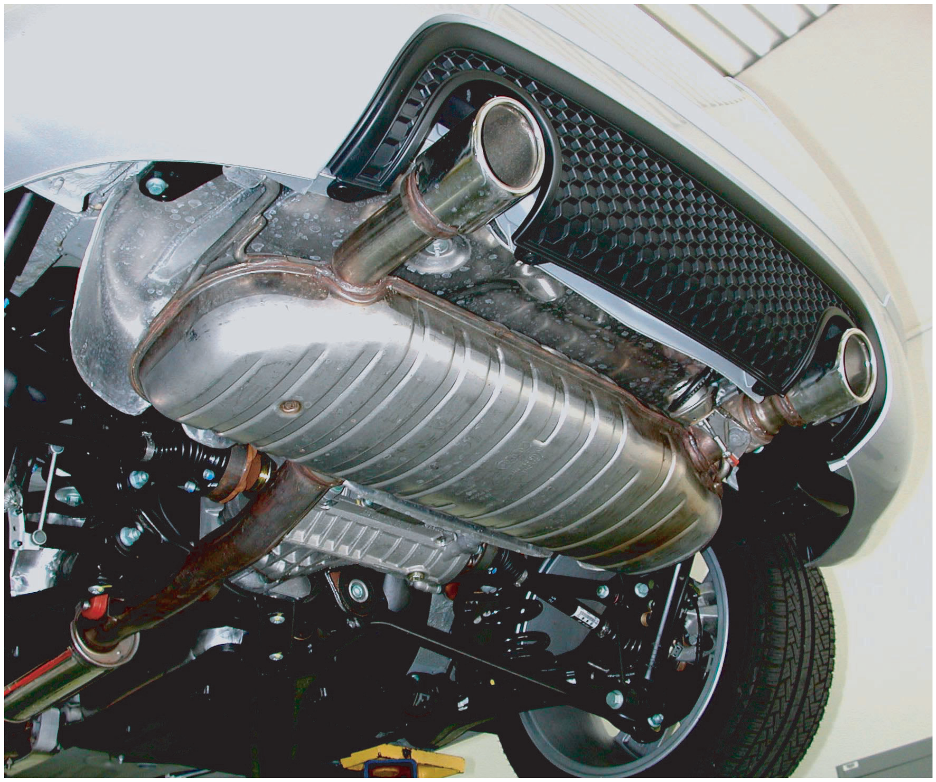
Other Features

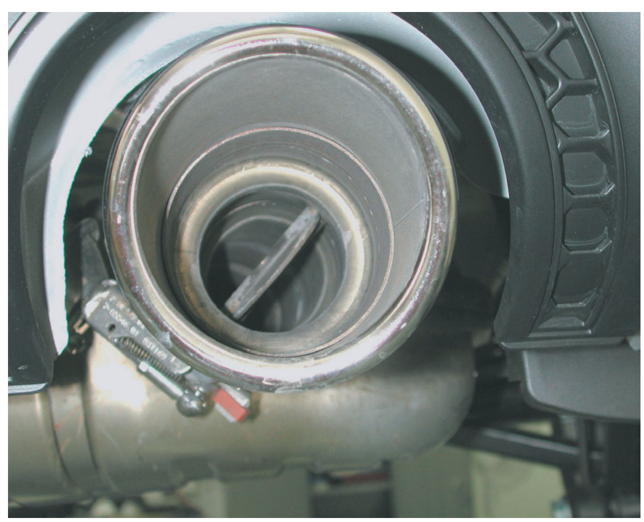
Exhaust System

The twin pipe exhaust system for the engine has been specially modified. Not only does it assist the engine in meeting emissions standards, but it also contributes a strong, throaty response when accelerating.

Twin catalytic converters are housed inside a one-piece welded stainless steel protective shield.

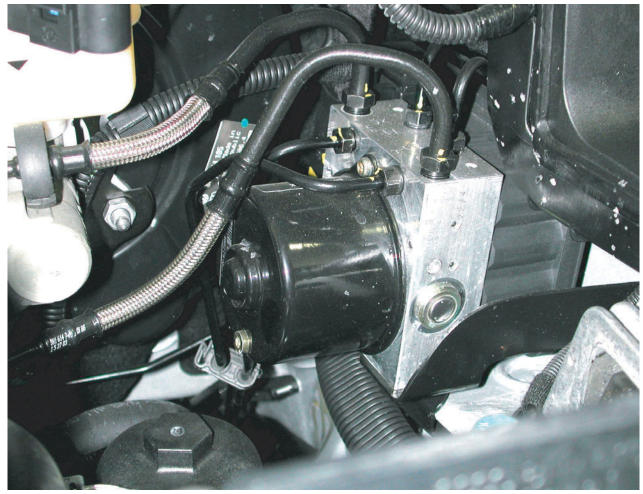
A flap in the exhaust system is opened or shut depending on engine speed, with the acoustics being influenced accordingly.





Brakes

The new MK 60 IE ESP/ABS replaces the MK 20 IE ABS.


MK 60 IE ABS Control Module

A 2FN dual piston brake system with floating frame calipers and two-piece ventilated directional rotors has been adapted from the version used on the Audi RS4. The front rotors are 334 mm, with 265 mm ventilated rotors for the rear axle.

The TT 3.2 quattro also features 7.5J x 17-inch cast alloy wheels of a six-spoke “Wing” design and 225/45R radials. Two 18-inch wheels, in either nine-spoke or seven-spoke design, are optional.

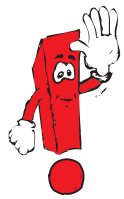

Front Wheel 2FN Dual-Piston Floating Frame Calipers


Front Wheel Two-Piece Ventilated Directional Rotors

Battery

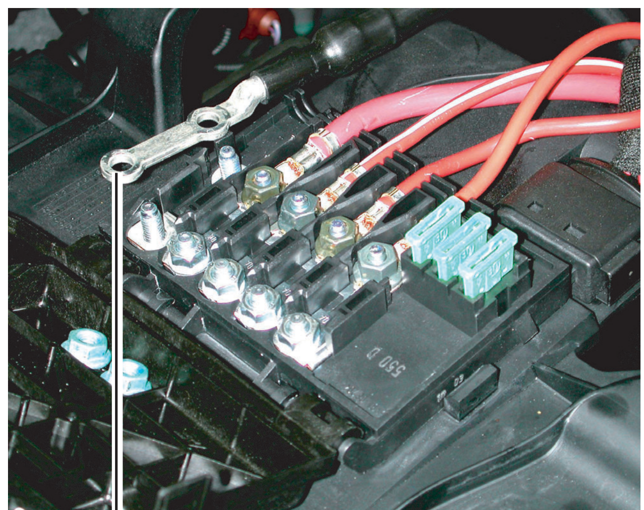
To ensure proper front-to-rear weight distribution, the battery has been removed from the engine compartment, and placed inside the trunk, on the left side. Fuse S138, the 150-amp main power supply fuse to the vehicle, is now connected to the positive terminal of the battery.

On the left side of the engine compartment, where the battery formerly sat, is the main fuse box. In place of Fuse S138 is a jumper to the positive bus.

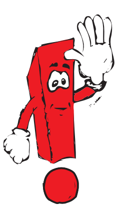


There are no lugs in the engine compartment of the TT 3.2 quattro. To jump start the car, connect to the battery in the trunk. Be careful not to damage the trunk interior.

Fuse S138 Connected to Positive Terminal of Battery in Trunk



Fuse S138 Jumper to Positive Bus



If the TT 3.2 battery loses its charge, the trunk and gas cap cannot be opened using the buttons located in the console. In the Coupe, the only way to release the trunk is to unscrew and remove the cup holder, then remove the hard panel below the cupholder to reveal a loop. Pulling the loop in the direction indicated by the arrow will release the trunk lid.

In the Roadster, a handle located in the storage compartment of the passenger seatback will open the trunk lid.

NOTES: