

International Driving Presentation

The new Passat Alltrack

Wolfsburg / Munich, September 2015

NB:

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Contents

To the point

Ten key facts about the Passat Alltrack	Page 03
The Passat Alltrack in brief	Page 03
Specific equipment of the Passat Alltrack – an overview	Page 07

Key aspects

Exterior and interior	Page 08
The exterior	Page 08
The interior	Page 10
Infotainment and connectivity	Page 14
Drive systems	Page 18
The petrol engine	Page 18
The diesel engines	Page 19
The automatic gearbox (DSG)	Page 20
The all-wheel drive	Page 21
The off-road mode	Page 22
Comfort and assistance systems	Page 24
40 years of Volkswagen with all-wheel drive	Page 34

With 4MOTION all-wheel drive and off-road mode:

New Passat Alltrack combines the best of on-road and off-road driving

Passat Alltrack with all-terrain design and 4MOTION all-wheel drive as standard

Ideal towing vehicle with towing capacity of 2,200 kg and innovative Trailer Assist

Ten important facts about the world premiere of the Passat Alltrack:

1. Equipped with 4MOTION all-wheel drive and Front Assist incl. City Emergency Braking function and Pedestrian Detection as standard.
 2. Distinctive all-terrain look with new bumpers, underbody protection, door sill and wheel arch trims.
 3. Ground clearance of 174 mm (27.5 mm increase) to optimise off-road handling.
 4. In off-road mode, a raft of assistance systems supports off-road driving.
 5. The Passat Alltrack combines outstanding off-road abilities with excellent ride comfort.
 6. High-torque engines (up to 500 Nm) with a performance range from 110 kW / 150 PS to 176 kW / 240 PS.
 7. Passat Alltrack can handle considerable trailer loads of 2,200 kg (braked on 8% and 12% incline).
 8. Innovative Trailer Assist greatly simplifies reversing manoeuvres with a caravan or all kinds of trailers.
 9. Personalisation system saves the driver's individual settings.
 10. Volkswagen has two crossover vehicles with all-wheel drive in its range – the Golf Alltrack and Passat Alltrack.
- **Wolfsburg / Munich, September 2015.** Volkswagen has developed the new Passat Alltrack for all frequent leisure and business drivers who do not only drive on paved roads

(27.5 mm more ground clearance, off-road mode, Area View), but who might also pull boat or horse trailers (2,200 kg towing capacity, Trailer Assist), who park right in front of the ski lodge (4MOTION permanent all-wheel drive), who want to cover long distances with effortless superiority (150 to 240 PS, innovative assistance systems), who value maximum networking (smartphone and tablet integration via “App-Connect” and “Media Control”), who transport the things needed in life (luggage capacity of up to 1,769 litres) or who may wish to make a statement with their car (side sills, flared wheel arches, individualised bumpers). This is a progressively designed “can-do” all-rounder – an estate and SUV crossover.

- **Built for every terrain.** The new Passat Alltrack is a car with features that keep what the design promises. These include modified bumpers with underbody protection, sill extensions (also fitted with underbody protection) and rugged flared wheel arches; all combine to make the body tougher while also lending the vehicle its own distinctive style. With a special off-road mode, that comprises a modified chassis (174 mm ground clearance) and permanent all-wheel drive, the Passat Alltrack effortlessly tackles terrain that is otherwise the preserve of SUVs. At the same time, the Passat Alltrack is a comfortable and fast long-distance cruiser.
- **Torque giants with 340 to 500 Nm.** A turbo petrol engine (TSI) and three turbodiesel engines (TDI) all comply with the Euro-6 emission standard. The TSI develops 162 kW / 220 PS and a powerful 350 Nm. The range of TDI engines starts at 110 kW / 150 PS and 340 Nm; two further engines in the next power ratings deliver 140 kW / 190 PS (400 Nm) and 176 kW / 240 PS (500 Nm). The 240 PS engine is the highest torque engine ever to be offered in a Passat. A stop/start system and energy recovery system are included in

the standard specification of every Passat Alltrack. Volkswagen offers the 150 PS TDI engine with a manual 6-speed gearbox. All other versions come equipped with an automatic dual-clutch gearbox (DSG).

- **Permanent all-wheel drive.** As already mentioned, the Passat Alltrack is equipped with 4MOTION all-wheel drive. Normally, only the front wheels are driven, saving fuel. But as soon as there is a risk of losing traction, the rear axle is smoothly engaged in a fraction of a second. Along with a Haldex coupling that acts as a longitudinal lock, the electronic differential locks (EDS) integrated in the electronic stability control system (ESC) act as transverse locks for all wheels. In addition, the Passat Alltrack TSI with 220 PS and TDI with 240 PS are equipped with the additional function XDS+ on both axles. This system that is available as an option for all other Passat Alltrack versions optimises the steering characteristic when accelerating out of bends.
- **Off-road mode.** The Passat Alltrack comes with driving mode selection as standard. In addition to the familiar “Eco”, “Comfort”, “Normal”, “Sport” and “Individual” driving modes (“Comfort” and “Individual” in combination with adaptive chassis control DCC), the additional “Off-road” mode is an exclusive feature of the Alltrack model series. Activating this programme with a push of a button adapts all relevant driving and assistance systems, the suspension and the engine and gearbox control to off-road use.
- **Towing capacity of 2,200 kg.** The Passat Alltrack offers significantly enhanced safety and dynamics with its alliance of EDS, XDS+ and 4MOTION. It is also an ideal towing vehicle: the Passat Alltrack can tow a permitted trailer load of 2,200 kg on an 8% and 12% incline (braked) via its electrically folding hook. In addition, new Trailer Assist

facilitates manoeuvring with a trailer as the car steers automatically when reversing.

- **Exterior features.** The extremely well equipped Passat Alltrack is an independent model. Standard exterior features include the new and particularly lightweight engine underbody protection, redesigned bumpers (at the front with custom fog lights, at the rear with integrated trapezoidal trims for the exhaust system), door mirror housings in “matt chrome” finish, Alltrack badges, anodised silver roof rails, custom 17-inch alloy wheels and rugged wheel arch and side sill mouldings in “anthracite” (side sills with trim in aluminium look).
- **Interior features.** Like the exterior, the interior of the Passat Alltrack has been specifically modified to express its independent character. Modifications here range from comfort seats in fabric/Alcantara, elegant trims and stainless steel sill tread plates to floor mats with flat felled seams. The rugged looking pedals come in brushed stainless steel. In addition, the infotainment menu has been customised for the Passat Alltrack (with off-road information).
- **High-tech all-rounder.** Moreover, a pioneering range of comfort, infotainment and driver assistance systems is available for the Passat Alltrack. These technologies include the latest radio/navigation systems, a head-up display, “App-Connect” (Apple “CarPlay™”, Google “Android Auto™” and “MirrorLink™”), “Media Control” (tablet integration), “Car-Net” with “Guide & Inform” (online services) as well as the ambient traffic monitoring system Front Assist including City Emergency Braking function with Pedestrian Detection that is a standard feature on board the Passat Alltrack.

Overview of the specific equipment of the Passat Alltrack (in addition to the standard equipment of the Passat Variant

Trendline):

- Storage pockets on the backs of the front seats
- Adaptive chassis control (DCC) with driving profile selector (standard for 162 kW TSI and 176 kW TDI)
- Door mirrors, electrically adjustable and heated, automatic anti-dazzle function on driver's side
- Door mirror housings in “matt chrome”
- Cup holder at front (2) with cover
- Chrome strips on side windows
- Anodised silver roof rails
- “Titanium” trim for centre console
- “Tracks” trim for dashboard and door panels
- Front door sill plates in stainless steel with “Alltrack” badge
- ergoComfort seat with seat inclination, seat depth and electric backrest adjustment on the driver's side
- Automatic switching of running lights, incl. daytime running lights, “leaving home” function and manual “coming home” function
- Driving profile selector incl. off-road mode and personalisation
- Interior lights with shut-off delay and dimming function, two LED reading lights each, front and rear with chrome rings
- Interior mirror with automatic anti-dazzle function
- Body covers on wheel arches and door sills
- LED number plate lighting
- Comfort seats at the front
- LED headlamps (176 kW TDI only)
- “Ancona” alloy wheels 8 J x 17
- Lumbar supports at front, electrically adjustable on driver's side
- Dynamic light levelling control (176 kW TDI only)
- Mobility tyres 225/55 R17 (self-sealing)
- Multifunction leather-trimmed steering wheel (3-spoke)
- “Premium” multifunction display
- ParkPilot – acoustic warning signals for obstacles in front of and behind the vehicle
- Brushed stainless steel pedals and footrest
- Rain sensor
- Leather gear lever knob
- “Alltrack” badge in the radiator grille, on the front side panels and on the luggage compartment lid
- Fabric seat covers, “7 summits” design, inside of seat side bolsters in Alcantara, front seat backrests with “Alltrack” emblem
- Bumpers in the body colour with trim strip in matt chrome, underbody protection in stainless steel look, trapezoidal trims in chrome
- Front and rear carpet floor mats
- Engine underbody protection
- 12 V socket in rear centre console and in luggage compartment

Passat Alltrack is based on the Passat Variant:

Custom bumpers, wheel arches and side sill extensions

Crossover with visible underbody protection at the front and rear

Seat system in fabric/Alcantara and up to 1,769 litres of cargo space

Wolfsburg / Munich, September 2015. The Passat Alltrack is an independent model within the model series – just like the Passat GTE that was also launched this year. This is why there are many features that have been designed especially for the Passat Alltrack.

The exterior

The second generation Passat Alltrack (generation I debuted in 2012) is immediately recognisable as an individually designed estate and SUV crossover. It comes with anodised silver roof rails while the ground clearance has been increased by 27.5 mm. The body therefore has a total height of 1,506 mm. The new Passat Alltrack is 1,832 mm wide (with door mirrors 2,083 mm), with a length of 4,777 mm; the wheelbase extends over 2,789 mm.

Front. The exterior of this charismatic model is distinguished from others in the Passat range by a bumper with a new design including a striking grille and custom fog lights. The headlights and radiator grille merge to create the appearance of a single unit. The design of the front section appears particularly striking in conjunction with new full LED headlights. Furthermore, Volkswagen has developed new and extremely effective engine underbody protection for the Passat Alltrack. The underbody protection, a standard feature, is no longer made of steel like the predecessor; rather, it is made of

extremely tough plastic. This new component results in a weight saving of 16 kg.

LED headlights. The Passat Alltrack features one of the most powerful and economical light systems: full LED headlights with reflector technology (standard for the 176 kW TDI), additionally incorporating LED daytime running lights. The main area of the daytime running lights also features the indicator function. The daytime running lights' unique signature is unmistakable in conjunction with the two “eyes” in the reflectors. At the second lighting level the Passat Alltrack has full LED headlights in projection technology on board. The centrepiece of these headlights is the outer multi-beam lens module. In addition to the main and dipped beams, the module also generates a dynamic cornering light while the inner flat-beam lens module is responsible for illuminating the road up ahead. A further highlight of the projection LED headlights are daytime running lights with 32 LEDs. The indicator is positioned below the daytime running lights (twelve LEDs). LEDs for the static cornering light are also positioned on the inner side of the headlight. As an optional extra, the all-LED projection headlights are additionally controlled via a camera. For the first time, Volkswagen is combining Dynamic Light Assist (automatic main beam control) and LED technology. The camera recognises both traffic in front and approaching vehicles and compares this data with the headlight electronics; utilisation of the cornering light and pivoting multi-beam lens module ensure optimum light distribution without dazzling other road users.

Side profile. The “matt chrome” door mirror caps, standard 17-inch “Ancona” alloy wheels and the robust, anthracite-coloured, door, sill and wheel arch cladding are particularly eye-catching features of the side profile. In addition, the sill cladding is upgraded with aluminium-look trim.

As an alternative to the standard wheels, Volkswagen offers 18-inch “Kalamata” alloy wheels and 19-inch “Albertville” aluminium wheels for the Passat Alltrack.

Rear. Like the front, the rear of the Passat Alltrack also features a customised bumper in an all-terrain design. To each corner of the bumper the trapezoidal trims of the exhaust system (in “chrome look”) catch the eye; these – like all other aforementioned details – are standard features on the Passat Alltrack. The new colour “Habanero Orange Metallic” is exclusive to this crossover model and matches the different body trims extremely well.

Rear lights. The Passat Alltrack is equipped with LED rear lights as standard. They extend in two sections from the tailgate into the side panel. The tail light and brake light functions are located in the upper outer section, and the indicators are beneath this. In the inner segment (tailgate), the rear fog lights and reversing lights are integrated along with the tail lights. The tail lights can optionally be ordered in “dark red”. The number plate lighting also works with LEDs.

Emblems. The car features the “Alltrack” badge on the front grille, on the tailgate at the rear and on the sides on the front wings (as an extension of the character line). The tailgate also displays the motor designation and the “4MOTION” badge as a reference to the standard all-wheel drive.

The interior

Exclusive and sporty. Like the exterior, the interior of the Passat Alltrack has been specifically modified to express the charismatic character of this all-terrain model. The high level of individualisation, the materials used and the extensive standard equipment create an exclusive and sporty ambience. One of the most important features setting the Passat Alltrack apart from other models in the series is the seat system with a new design with comfort seats at the front. The seats are visually distinguished by

Alcantara on the inside of the seat side bolsters, the new “7 Summits” fabric on the centre panels and the “Alltrack” emblem on the backrests of the front seats. In terms of function, the front seats feature pockets on the back of the backrests and adjustable lumbar supports. The driver's seat is an “ergoComfort” version (with features including electric adjustment of the backrest inclination, longitudinally adjustable thigh support and electric adjustment of the lumbar support). A folding centre armrest with cup holders is integrated in the asymmetrically divided backrest of the rear bench seat. Options include two different leather trims (“Vienna” and “Nappa”), two child seats integrated in the rear bench (on the outer sides) and – for the front seats – electric 14-way adjustment, seat climate control and a massage function.

Numerous individualised details. Further individualised features of the Passat Alltrack extend right down to the smallest details. For example, the pedals and footrest for the driver come in brushed stainless steel. Robust stainless steel sill tread plates with embossed “Alltrack” lettering and floor mats with flat felled seams match them. An independent welcome screen and additional information in off-road mode characterise the touchscreen of the infotainment system. The horizontal ventilation strip and the door panels are upgraded with custom trim in a “Tracks” design. Meanwhile, the centre console is enhanced with “Titanium” trim. Further standard equipment includes a coupling box for mobile phones; it connects a smartphone to the external vehicle aerial of the Passat Alltrack; “Alltrack” is embossed on the lid of the box. The gear knob and the multifunction steering wheel (also a standard feature) are trimmed in leather.

- **Active Info Display.** The Active Info Display is available as an option for the Passat Alltrack. All instruments – including the specific displays in the Passat Alltrack – are implemented virtually by software. For example, navigation information can be displayed between the rev counter and the speedometer as a map in 2D or 3D. In this case, the round instruments are

relocated to the side to make more room for the map display. Information on driving and assistance functions can be integrated into the graphic areas of the speedometer and rev counter as needed. Data that can be displayed on the centre console via the infotainment system (e.g. phone contact images or CD covers), can also be shown in the Active Info Display. The display is 12.3 inches in size. Its resolution of 1,440 x 540 pixels enables an extremely precise display with high-quality graphics.

- **Head-up display.** A new feature in the Passat Alltrack is the head-up display that is available as an option. It projects important information, such as vehicle speed, navigation pictograms or the parameters of the Adaptive Cruise Control ACC directly into the driver's primary field of vision. Thanks to this projection the driver's eyes remain focused on the road whilst taking in the information. Reaction time can also be significantly reduced by projecting warning messages directly into the driver's visual field. The head-up display of the Passat Alltrack is a "combined solution": the data is projected onto an extendable glass panel in front of the windscreen. The display quality corresponds to that of much more expensive windscreen systems. When it is not being used, the display panel is protected by lowering it into the dashboard, and the opening has a flush closure. The head-up display is activated by a separate control next to the rotary light switch. The driver can use the menu of the infotainment system to decide which information is displayed: the current speed, the permitted speed, navigation information, information from the assistance systems and warnings.

Flexible interior. The Passat Alltrack is based on the Passat Variant. This means that it offers ample space on all seats and also an extremely large and versatile luggage compartment. With five passengers on board 639 litres of stowage space is available; in this case the load-floor depth is 1,172 mm. If the full load capacity is

used, luggage space increases to 1,769 litres, and folding the asymmetrically split rear seat backrest enables extremely flexible use of the interior of the Passat Alltrack: items with a maximum length of 2,018 mm can be loaded in the luggage compartment (up to the backrest of the front seats).

Passat Alltrack offers maximum networking:

Volkswagen integrates apps for Apple and Android smartphones

App Connect integrates smartphone apps in the infotainment system

Passat Alltrack with new touchscreen menu item “off-road information”

Wolfsburg / Munich, September 2015. The systems of the second generation modular infotainment matrix (MIB II) offer a premium range of functions and connectivity (networking with smartphones and tablets). Four radio and radio-navigation systems are available for the Passat Alltrack: the 5-inch display device “Composition Colour” (standard in the Passat Alltrack), the 6.5-inch systems “Composition Media” and “Discover Media” (plus navigation), and the 8.0-inch radio navigation system “Discover Pro”. The systems can be expanded by digital radio reception DAB+, voice control and the telephone interface “Business” or “Comfort”. In addition, the sound system “Dynaudio Confidence” with total power output of 700 watts is available for “Discover Media” and “Discover Pro”. Last but not least, the menu structure of the infotainment systems in the Passat Alltrack has a special feature: the “off-road information”. In three digital round instruments the steering angle, a compass rose and an altitude indicator are shown.

Maximum connectivity. Thanks to their progressive design and the versatility of the “Volkswagen Car-Net”, the infotainment systems enable maximum connectivity for linking external devices. The various interfaces include integration of smartphones via “App Connect”. This is based on the “MirrorLink™”, “CarPlay™” (Apple) and “Android Auto™” (Google) applications. These platforms enable Apple and Android smartphones with important apps to be integrated into the infotainment systems of the Passat Alltrack. In addition,

“Guide & Inform” enables traffic information or news to be accessed online or free parking spaces to be found, while the Volkswagen “Media Control” app enables the integration of tablets.

MirrorLink™. “MirrorLink™” makes it possible to display contents shown on the smartphone and operate smartphone functions via the touchscreen of the infotainment system. This is done intuitively: simply connect a smartphone to the Passat Alltrack and use the app via the screen of the infotainment system. “MirrorLink™” makes use of an industry standard set by the “Car Connectivity Consortium” (CCC) to “mirror” smartphone apps onto the car’s touchscreen and link their operation to the infotainment system, as previously described. Since the smartphone apps are always up-to-date, “MirrorLink™” cannot become obsolete either. Volkswagen apps that can be used with “MirrorLink™” include “My Guide”, “Think Blue. Trainer”, “Shared Audio” and “Sound Journey”.

Apple CarPlay™. With “CarPlay™” from Apple anyone who owns an iPhone 5, 5C, 5S, 6 or 6 Plus can use a large number of their phone’s apps via the infotainment system of the Passat Alltrack. This system also “mirrors” the smartphone apps. “CarPlay™” feeds the iPhone’s “Phone”, “Messages”, “Maps” and “Music” apps into the infotainment system via a USB connection. The apps in the Passat Alltrack are then controlled either via the touchscreen of the infotainment system or by voice control with Siri (Apple). “CarPlay™” is child’s play to use: as soon as the smartphone is connected to the infotainment system via a charging cable “CarPlay™” appears in the menu structure.

- **“Phone”**: Everything operates just like an iPhone here. From the touchscreen users can perform these functions: answer call, end call, switch phone to mute, display the keypad, retrieve the phone book and retrieve voice mails. Alternatively, all this can also be done with Siri.
- **“Messages”**: Text messages are read aloud by Siri – a practical and safe feature whilst driving. Siri can also be

used to generate your own text messages whilst on the road for maximum convenience.

- **“Maps”:** “CarPlay™” makes the entire functionality of the “Maps” app available in the infotainment system. This includes detailed route descriptions (“turn by turn”), traffic information and the estimated journey time.
- **“Music”:** Access to the media library is available via touchscreen and/or Siri. “CarPlay™” also recognises other audio apps that are installed for playing back music, radio and podcasts on the iPhone. For instance: “Podcasts”, “Spotify” and “Stitcher Radio”.

Android Auto™. “Android Auto™” was developed by Google for Android smartphones. In exactly the same way as with “MirrorLink™” and “CarPlay™”, selected phone apps are displayed on the infotainment system’s touchscreen. Here, too, the interface is a USB port. The numerous apps that can be incorporated via “Android Auto™” include classics such as “Google Maps”, “Google Play Music”, “WhatsApp” and “Spotify”, but also countless new apps. Many of these apps can be operated via “Google Voice” voice control as an alternative to the touchscreen (the voice control function is activated on the multifunction steering wheel).

Guide & Inform. “Guide & Inform” enables numerous internet services to be used. These include “Online Traffic Information” (real-time traffic jam warnings), “Messages”, the “Vehicle Status Report” and “Weather”. Via “Online Destination Import”, it is also possible to send navigation destinations to the Passat Alltrack's infotainment system from the office, from home or from anywhere en route. With photos and satellite images, “Google Street View” and “Google Earth” help drivers to get their bearings by providing a particularly realistic view. Meanwhile, the integrated points of interest search function (“My POIs”) enables users to find restaurants, museums or cinemas in unfamiliar surroundings. The driver can also access information on free parking spaces in nearby car parks or on the cheapest filling stations (fuel prices); the

respective destinations are then incorporated in the navigation system's route planning in a matter of seconds.

Media Control. With the “Media Control” app many functions of the infotainment system can also be conveniently controlled from the rear with a tablet. Simply connect the tablet via Wi-Fi hotspot with the “Discover Media” or “Discover Pro” infotainment system and you're done. Controllable functions include those of the radio, all media sources (such as USB, CD, DVD hard drive and online song search) and navigation. Information/images shown on the menu include artist, album name and cover. In the case of the radio, the user has access to station icons and lists, the station search, and can display RDS information and the frequencies. On the navigation menu, besides the standard functions, it is also possible to conduct an Internet address search and then send it to directly input a destination. In addition, the rear passengers can send calendar events and address book entries to the infotainment system as navigation destinations. The volume control can be adjusted in any context, and the same applies to the balance and fader settings. The tablet can be used to select the available audio sources, to access the media library and to control basic operating functions such as start, stop, pause, forward and back.

Four high-torque engines with 340 to 500 Nm:

Turbo-charged direct injection and all-wheel drive as standard

Fuel-efficient and powerful engines deliver 150, 190, 220 and 240 PS

Dual-clutch gearbox is a standard feature with power output of 190 PS upwards

Wolfsburg / Munich, September 2015. Volkswagen is offering a choice of four efficient and extremely high-torque turbo-charged direct injection engines for the second generation Passat Alltrack: one turbo petrol engine (TSI) and three turbodiesel engines (TDI). The powerful TSI delivers 162 kW / 220 PS. The range of high-torque TDI engines starts at 110 kW / 150 PS; two additional engines in the next power ratings deliver 140 kW / 190 PS and 176 kW / 240 PS. A stop/start system and energy recovery system are included in the standard specification and, needless to say, every Passat Alltrack complies with the Euro 6 emissions standard. Volkswagen offers the 150 PS TDI engine with a manual 6-speed gearbox. All of the more powerful versions come equipped with a dual-clutch gearbox (DSG).

The petrol engine

2.0 TSI BMT 4MOTION with 162 kW / 220 PS. Volkswagen is currently offering a version of the Passat Alltrack with a 162 kW / 220 PS petrol engine. This power output is available between 4,420 and 6,250 rpm. The 1,984 cc engine delivers the maximum torque of 350 Nm from a low 1,485 rpm and it remains at this constant high level right up to 4,400 rpm. Combined average fuel consumption of the four-cylinder turbocharged direct-injection engine – always combined with a 7-speed dual-clutch gearbox (DSG) – amounts to 6.9 l/100 km (corresponding to CO₂ emissions of 157 g/km). The

coasting function of the DSG is a standard feature that contributes to the low fuel consumption as it disengages the engine from the drivetrain, for example on downhill stretches, so that optimum use can be made of the kinetic energy. This extremely refined turbo engine accelerates the Passat Alltrack to 100 km/h in a short 6.8 seconds. The car reaches a top speed of 231 km/h.

The diesel engines

2.0 TDI BMT 4MOTION with 110 kW / 150 PS. The Passat Alltrack's three 2.0-litre TDI engines each have two balancer shafts which make for very smooth running. In the first of the three power ratings the 1,968 cc TDI develops 110 kW / 150 PS; the engine with four valves per cylinder delivers this output between 3,500 and 4,000 rpm. Its maximum torque of 340 Nm is available from a low 1,750 rpm (up to 3,000 rpm). The 150 PS Passat Alltrack 2.0 TDI is equipped with a 6-speed manual gearbox, has a top speed of 205 km/h and accelerates to 100 km/h in 9.2 seconds. The combined fuel consumption is just 4.9 l/100 km (corresponding to 129 g/km CO₂).

2.0 TDI BMT 4MOTION with 140 kW / 190 PS. The Passat Alltrack's second 2.0 TDI develops power output of 140 kW / 190 PS (at 3,600 to 4,000 rpm). Equipped with a newly designed turbocharger, the four-cylinder engine sends an impressive maximum torque of 400 Nm in the direction of the standard 6-speed DSG from as low as 1,950 rpm with this level remaining constant up to 3,000 rpm. This Passat Alltrack 2.0 TDI BMT 4MOTION has a top speed of 220 km/h and accelerates to 100 km/h in just 8.0 seconds. This dynamic performance goes hand in hand with sustainable fuel consumption of just 5.1 l/100 km (135 g/km CO₂).

2.0 TDI BMT 4MOTION with 176 kW / 240 PS. The most powerful four-cylinder direct-injection turbodiesel engine ever to be offered by Volkswagen – a 2.0 TDI with output of 176 kW / 240 PS (at 4,000 rpm) and extremely high maximum torque of 500 Nm (1,750 to 2,500 rpm) – is a completely new development. In order to

realise this performance, a compact bi-turbo module was developed with a high-pressure and low-pressure turbocharger. Comfort at low revs is optimised by a new centrifugal pendulum absorber in the standard 7-speed dual-clutch gearbox. It enables further lowering of the gear shift points which reduces engine rev levels and contributes to the excellent fuel consumption figures of the TDI. With this high-tech engine the Passat Alltrack 2.0 TDI BMT 4MOTION reaches a top speed of 234 km/h; the Volkswagen speeds to the 100 km/h mark in just 6.4 seconds. The low average fuel consumption is impressive in view of the high power output of 5.5 l/100 km (144 g/km CO₂).

SCR catalytic converter. All three TDI engines in the Passat Alltrack are fitted with a SCR catalytic converter. The positioning of the oxidation catalytic converter, diesel particulate filter and SCR system (selective catalytic reduction) close to the engine makes the emission control components react especially quickly. Using a specially coated diesel particulate filter (the actual SCR catalytic converter), the SCR system converts the nitrogen oxides (NO_x) in the exhaust gas into nitrogen (N₂) and water (H₂O). This conversion takes place using synthetically produced AdBlue, which is carried in a 13-litre tank and in the Passat has to be topped up only every 9,000 kilometres via a separate filler neck under the fuel tank flap.

The automatic gearbox

6- and 7-speed DSG. The three most powerful engines in the new Passat Alltrack deliver their power to the all-wheel drive through a dual-clutch gearbox (DSG). The 6-speed or 7-speed DSG have two multi-plate clutches that run in an oil bath.

The all-wheel drive

4MOTION. As already mentioned, the new Passat Alltrack is equipped with 4MOTION all-wheel drive as a standard feature. It works with a fifth-generation Haldex coupling; the propulsion power distribution to all four wheels is activated even before slip occurs. This almost entirely eliminates any loss of traction. Normally, only the front wheels are driven, saving fuel. But as soon as there is a risk of losing traction, the rear axle is smoothly engaged in a fraction of a second. Along with the Haldex coupling that acts as a longitudinal lock, the electronic differential locks (EDS) integrated in the electronic stability control system (ESC) act as transverse locks for all four wheels. If a wheel starts to spin, they ensure that drive power is directed to the wheel on the opposite side within fractions of a second. In addition, the Passat Alltrack 2.0 TSI with 220 PS and 2.0 TDI with 240 PS are also equipped with XDS+ on both axles. This system – available as an option on all other Passat Alltrack models – brakes the wheels on the inside of the bend during fast cornering and thus optimises steering response.

Situation-based power distribution. A control unit continually calculates the ideal drive torque for the rear axle and controls how far the multi-plate clutch should be closed by regulating the oil pump. In this manner, the contact pressure on the clutch plates rises in proportion to the desired torque at the rear axle. The level of pressure applied to the clutch plates can be used to continuously vary the transmitted torque. Even when moving off quickly and accelerating, the wheels of the Passat are prevented from spinning, because the control unit regulates the torque distribution according to the dynamic axle loads. Actuation of the Haldex 5 coupling is based primarily on the engine torque demanded by the driver. Parallel to this, a driving status identification system within the all-wheel drive control unit evaluates parameters such as wheel speeds and the steering angle. If necessary, nearly 100 per cent of the drive torque can be directed to the rear axle.

Rear axle drive always available. When manoeuvring or taking tight bends any build-up of tension within the drivetrain is prevented by reducing the torque transmitted by the Haldex coupling. The opposite happens in the event of heavy and rapid acceleration; in this case the coupling torque is quickly increased. Meanwhile, at high speeds the pilot control of the coupling, which is dependent on engine torque, is reduced in order to minimise fuel consumption. In this case front-wheel drive dominates. However, even in this situation 4MOTION remains a permanent all-wheel drive system, as the rear axle instantly re-engages as soon as any slippage is imminent on the front axle or the Passat Alltrack is driven with increased lateral acceleration.

Four-wheel EDS and XDS+. Parallel to the Haldex coupling that acts as a longitudinal lock, electronic differential locks (four-wheel EDS) integrated in electronic stability control system act as transverse locks. If a wheel starts to spin, they ensure that drive power is directed to the wheel on the opposite side within fractions of a second. Furthermore, the Passat Alltrack is equipped with the additional function XDS+ on the front and rear axles which brakes the wheels on the inside of a bend during fast cornering and thus perfects the steering response (more precise steering angle), further improves the traction, increases agility and, last but not least, enables a higher speed when exiting bends. In technical terms, XDS+ is a functional extension of the electronic differential locks.

Off-road mode

Driving profile selector as a standard feature. All versions of the Passat Alltrack are equipped with a driving profile selector. A total of four driving programmes are available, or six in conjunction with DCC (adaptive chassis control): “Eco”, “Normal”, “Sport”, “Off-road” and, in combination with DCC, the additional “Comfort” and “Individual” modes. DCC including driving profile selector is a standard feature for the Passat Alltrack TSI with 162 kW / 220 PS and TDI with 176 kW / 240 PS. The “Off-road” driving profile is an

exclusive feature of the Alltrack model series. It assists the driver during off-road driving with a completely modified powertrain strategy; for example, among other features Hill Descent Assist is automatically activated. As soon as the driving profile switch in the centre console next to the gear knob is operated, the driving profile menu opens in the display of the infotainment system. Here the driver can select the off-road programme. The following systems are then immediately changed or activated:

1. Hill Descent Assist prevents unwanted acceleration on downhill slopes. When driving onto a downhill slope with a gradient of more than 10% the speed is limited to a minimum of 2 km/h and a maximum of 30 km/h. The driver can vary this speed within these limits at any time by accelerating or braking. The readiness of Hill Descent Assist is signalled by a function symbol in the display of the instrument cluster. This function indicator changes its colour from grey to white when the system actively brakes. Hill Descent Assist becomes inactive as soon as the downhill gradient is less than 5%. At a glance: Hill Descent Assist is automatically activated when the following conditions are met:
 - The driving profile "Off-road" is selected
 - The speed is ≤ 30 km/h
 - The driver does not operate the brake or accelerator
 - The engine is running
2. By changing the ABS regulation intervals in "Off-road" mode (off-road configuration), the tyres can build up a wedge of stones etc. on loose surfaces during emergency stops, thus reducing the stopping distance.
3. The accelerator can be operated more sensitively. In principle, the pedal travel becomes longer; despite pressing the pedal all the way to the floor the car only accelerates slowly. In addition, the speed is limited.
4. At the same time, gear shift points are higher and automatic upshifting is suppressed by an adapted gear programme.

5. If the Passat Alltrack is equipped with DCC, the Comfort setting of the suspension is automatically activated.

Standard in the new Passat Alltrack:

Front Assist with City Emergency Braking function and Pedestrian Detection

Trailer Assist facilitates reversing with a trailer

Emergency Assist becomes active when the driver fails to react

Wolfsburg / Munich, September 2015. A pioneering range of comfort and assistance systems is available for the new Passat Alltrack. These technologies include the ambient traffic monitoring system Front Assist including City Emergency Braking function with Pedestrian Detection that is a standard feature in the Passat Alltrack, Side Assist (lane change assistant), Adaptive Cruise Control ACC, the proactive PreCrash occupant protection system, Emergency Assist (stops vehicle in emergency), Traffic Jam Assist, Rear Traffic Alert (detects other vehicles crossing when reversing out of a parking space), Area View, a previously unrivalled level of personalisation and Trailer Assist (assisted manoeuvring with a trailer). The latest comfort and assistance systems in detail:

Trailer Assist. The Passat Alltrack offers significantly enhanced safety and dynamics with its alliance of EDS, XDS+ and 4MOTION. It is also an ideal towing vehicle: the Passat Alltrack can tow a permitted trailer load of up to 2,200 kg on an 8% and 12% incline (braked) on its electrically folding hook. Manoeuvring with a trailer has never been so easy because Volkswagen is offering the new Trailer Assist system for the Passat Alltrack, which is frequently ordered with a tow bar. This system makes manoeuvring with a trailer easier than ever before. This is how Trailer Assist works:

- **Reverse gear.** To back a trailer into an entrance from the street, all the driver needs to do is stop at a suitable spot and engage reverse gear. The system is activated by pushing a button.
- **Camera-based.** The current and possible steering angles are visualised in the instrument cluster. This is done based on image processing algorithms from the data from the rear view camera, which monitors and analyses the angle between the car and the trailer. The articulation angle that is optically recorded is used to calculate the steering wheel angle independent of any special types of trailers or draw bars.
- **Mirror adjustment controls as part of the system.** With the help of the mirror adjustment switch, which serves as a kind of joystick, the driver can adjust the desired driving direction of the car-trailer combination. The Passat Alltrack responds to the driver's steering commands via the mirror adjustment switch and steers the vehicle; all the driver needs to operate are the brake and accelerator pedals. The driving direction of the Passat is automatically controlled by the electromechanical power steering system. It is always possible to make a correction via the mirror adjustment controls.

Personalisation. The number of comfort and assistance systems is growing with every vehicle generation. This also holds true for the new Passat Alltrack. Many of these systems are individually adjusted by different drivers of a car. Therefore, drivers are constantly reactivating their personal settings. Volkswagen has designed a new generation of personalisation that simplifies this process significantly. This involves combining the individual settings for a driver into a user account, which is saved. Via user management each driver can activate their individual user account in next to no time, and call up their individual settings. Drivers simply identify themselves with their vehicle key; this is done when the vehicle is unlocked. This immediately activates initial settings such as adjusting the seat position on the driver's side. An overview of personalisation options in the Passat Alltrack, depending on the specific equipment version:

- Ambient lighting
- Adaptive Cruise Control ACC
- Infotainment system (incl. media library, navigation, telephone)
- Automatic climate control
- Instrument cluster/multifunction display
- Lane Assist
- Light and Sight
- Memory seat
- Park Assist
- Locking/unlocking
- Side Assist
- Mirror adjustment

Front Assist including City Emergency Braking function. Front Assist is a system that warns the driver and brakes automatically in case of an imminent collision. One component of the Front Assist system is the City Emergency Braking function with Pedestrian Detection. This ambient traffic monitoring system now comes as standard in the Passat Alltrack for the first time. While Front Assist warns drivers about insufficient distance to the vehicle in front and potential collisions at higher speeds and automatically brakes the vehicle if necessary, the City Emergency Braking system performs this role in slower urban traffic. Up until now, the City Emergency Braking system detected vehicles only. In the latest generation, the more advanced system now also recognises pedestrians. This is how the system works:

- **Safety on the motorway.** Front Assist uses a radar sensor integrated in the front of the car to continuously monitor the distance to the traffic ahead. The system assists the driver in critical situations by preconditioning the brake system and alerting the driver to any required reactions with visual and audible warnings, and in a second stage with a brief warning jolt. If the driver fails to brake hard enough, Front Assist generates sufficient braking force to avoid a collision. If the driver fails to

react at all, Front Assist automatically brakes the vehicle. One component of the Front Assist system is the City Emergency Braking function.

- **Safety in the city.** The City Emergency Braking function with Pedestrian Detection is an extension of the Front Assist system. At speeds of up to 65 km/h it monitors the area in front of the Passat. In an emergency, the system instantly and automatically applies the brakes. The enhanced combination of Front Assist and City Emergency Braking function with Pedestrian Detection also links the radar with the Passat Alltrack's front camera so that, in addition to vehicles, it can detect pedestrians at the edge of the road or on the carriageway. If City Emergency Braking with Pedestrian Detection detects a risk of the Volkswagen potentially colliding with a pedestrian, it alerts the driver with a visual and audible warning. If the driver fails to react to these warnings, the system automatically triggers emergency braking. From 2016, Emergency Braking with Pedestrian Detection will be taken into consideration in the Euro NCAP star rating system.

Traffic Jam Assist. Volkswagen developed Traffic Assist based on Lane Assist and Adaptive Cruise Control (ACC). The system makes driving in traffic jams or stop-and-go traffic much more comfortable. Lane Assist forms the basis here by offering adaptive lane guidance also at speeds below 60 km/h. The system then not only countersteers to make corrections when the car leaves the lane; in addition the active adaptive lane guidance of Lane Assist keeps the Passat Alltrack in the middle of the driving lane or “learns” the driver's preferred position. The Adaptive Cruise Control ACC (available in two versions for the Passat Alltrack up to 160 or up to 210 km/h) is a further assistance system integrated in the Traffic Jam Assist. When ACC is active, braking and accelerating is automatic even in stop-and-go traffic. ACC and Lane Assist combine to create Traffic Jam Assist: the system enables assisted lateral and longitudinal guidance. The car steers, accelerates and brakes automatically, but only on condition that the driver's hands are on

the steering wheel and participating in steering, so that the driver can intervene at any time.

Emergency Assist. Emergency Assist is a further system combining Lane Assist and ACC to create a new assistance system: as soon as the sensors detect that the driver is not performing any steering, braking or acceleration activities, the system initiates various escalating actions to rouse the driver, and if the driver remains inactive, it initiates an emergency stop. The hazard lights are automatically activated, and the Passat Alltrack also performs slight steering manoeuvres to make surrounding traffic aware of the hazardous situation. ACC prevents the vehicle from colliding with the traffic ahead. Emergency Assist from Volkswagen is a world first. Incidentally, every model of the series that has an integrated mobile phone interface enables an SOS emergency call to be made via the infotainment system with the “Euro Emergency Call 112” function to notify the emergency services in the event of an emergency. The prerequisite for this is a telephone linked via Bluetooth to the infotainment system or an enabled SIM card in the “Premium” mobile phone interface.

DCC adaptive chassis control. The new Passat Alltrack is equipped with second generation adaptive chassis control (DCC). Compared with the normal chassis the vehicle body is lowered by 10 mm with DCC. The Passat Alltrack 2.0 TSI with 162 kW / 220 PS and the Passat Alltrack 2.0 TDI with 176 kW / 240 PS come equipped with DCC as standard. The system offers three driving modes: “Comfort”, “Normal” and “Sport.” The “Sport” mode enables a very agile driving style, while the “Comfort” mode makes travelling in the Passat exceptionally comfortable. Via the driving profile selector in the “Individual” profile it is also possible to assign any other driving profile properties to the DCC mode. The system adaptively controls the damper valves via the Volkswagen control algorithm and thereby sets the damper characteristic. In cycles of one millisecond DCC acquires the input signals from suspension travel sensors and accelerometers as well as vehicle bus information from the chassis

CAN, in order to compute and adaptively adjust the optimal damping force for every driving situation. Furthermore, the damping forces are individually regulated and selectively applied to each wheel.

Area View. The camera-based surroundings visualisation system Area View was developed to enable a 360-degree overview of the close surroundings and traffic situation. The latest generation Area View offers extended functionality, better camera resolution and new 3D bird's eye view perspectives. How Area View works:

- **Four cameras.** Area View utilises four cameras located in the tailgate (1), door mirrors (2) and radiator grille (1). With an aperture angle of more than 180 degrees per camera, Area View captures the entire surroundings and projects this onto the screen of the infotainment system.
- **Full or split screen.** On the display, the driver can select the camera views (front, rear, side or bird's eye view) as either a full or split screen. In conjunction with the "Discover Pro" radio-navigation system, the control unit takes the four camera images and generates an overall view of the Passat Alltrack and its surroundings: 3D bird's eye view. In contrast to the normal bird's eye perspective, the view of the surroundings is projected onto a hemisphere. The system permits a total of 17 different virtual camera positions. They are arranged so that all conceivable perspectives can be displayed around the vehicle.

Park Assist. Park Assist enables semi-automatic parking in parking spaces parallel or perpendicular to the road. It can also back the car out of parallel parking spaces. In the case of perpendicular parking spaces, not only is reversing into a parking space supported; it is also possible to drive forwards into a parking space semi-automatically.

- **Park Assist 1.** The first generation of Park Assist made its debut in 2007; thanks to automatic steering this feature facilitated reversing into parking spaces parallel to the carriageway – a technological highlight.

- **Park Assist 2.** The second generation of Park Assist, presented in 2010, made it possible to reverse into parking spaces perpendicular to the carriageway with the assistance of automatic steering; parallel parking spaces could also be smaller now (80 cm plus the car length sufficed). In addition, automatic exiting from parallel parking spaces was now also possible.
- **Park Assist 3.** The newly developed third generation of Park Assist adds the new feature of semi-automatic forward parking into spaces perpendicular to the road. The wide variety of functions of Park Assist 3 optimally supports the driver in difficult traffic situations, because it makes parking faster and, for less experienced drivers, easier.
- **How it works.** After pressing the Park Assist button, the driver only needs to operate the accelerator and brake pedal as well as the gear lever (together with the clutch for a manual gearbox) while Park Assist automatically steers the Passat Alltrack into the parking space. The system automatically recognises the type of parking space and initiates the necessary manoeuvre; at the same time, the driver is informed and given instructions via the multifunction display. The driver can use the Park Assist activation button to manually select a parking space from the parking spaces that were automatically detected. The basic functions of Park Assist have been further improved by the use of a surroundings map. The system has sensors in all four wheels that detect the turning direction; this enables precise locating of the Passat so that it can be parked more precisely than ever.

Side Assist. Volkswagen has extended the functional range of its Side Assist driver assistance system with the new Rear Traffic Alert. The system can help to prevent serious accidents – particularly in two situations. Firstly, on the motorway, because it detects both vehicles overtaking quickly and slow vehicles in the blind spot, warning the driver and thereby making overtaking safer. Secondly, when reversing out of a parking space, because the sensors even

detect vehicles approaching from the side that are not yet visible to the driver. This is how Side Assist works:

- **Radar sensors.** Automatically activated at speeds of 10 km/h and above, Side Assist with Rear Traffic Alert uses two new-generation radar sensors (integrated in the rear bumper) to monitor the surroundings up to 70 metres behind the Passat Alltrack. The system alerts the driver to vehicles driving alongside the Passat or approaching from behind by activating an LED in the door mirror housing. When the driver operates the turn indicator in the direction of a detected vehicle, the Side Assist indicator flashes as the next warning stage, which draws the driver's attention to the mirror.
- **Countersteering.** If the camera-based Lane Assist is installed in addition to Side Assist, the system responds to a steering movement towards the hazardous side with a warning (even if the turn indicator is not set), and the vehicle actively countersteers when a lane change is initiated. Of course, the driver can override the assistance system in this case too with active steering intervention.
- **Rear Traffic Alert.** Rear Traffic Alert revolutionises reversing out of parking spaces that are perpendicular to the carriageway. The system detects vehicles that are approaching from the side. The radar-based sensor module of Rear Traffic Alert detects objects up to 50 metres away. Rear Traffic Alert is activated by engaging reverse gear or by the optional Park Distance Control (PDC) when moving off. If a collision is imminent, Rear Traffic Alert first gives a visual warning, then an acoustic warning. If the driver does not react appropriately to the situation and there is an immediate risk of a collision, Rear Traffic Alert automatically initiates a braking intervention that can reduce the severity of the accident.

Easy Close. Easy Open – the counterpart to Easy Close – was introduced with the seventh generation Passat Estate in 2010. If the car is equipped with Keyless Access (an automatic locking and

starting system), a well-directed movement of the foot at the back of the vehicle is all that is needed to open the boot. The human-machine interface here is a proximity sensor near the bumper, which detects the virtual kick movement. In the new Passat Alltrack, this automatic tailgate opening function is supplemented by the Easy Close closing function. This is how the system works:

- **Extended function.** Easy Close is an extension of the Easy Open function that closes the tailgate of the Passat Alltrack as soon as the person with the car key moves away from it. The vehicle is also automatically locked. The closing function is activated by a double button in the tailgate. Via the button, the Passat Alltrack user can choose between the usual immediate closing of the boot lid or the new delayed closing option.
- **Key as an interface.** With delayed closing, the aerials at the rear of the vehicle search for the car key. The person with the key receives a status response that the function has been activated via an LED integrated into the Easy Close button. If the key is found, the system locks the vehicle's doors. However, the tailgate remains open so that both hands can be used to comfortably unload items such as drink crates. If the person with the Passat key moves away from the vicinity of the tailgate, the aerials recognise this. The tailgate is then automatically closed and locked. If the person returns to the vehicle with the key during the closing process, the process is aborted and the tailgate is reopened. If after activating Easy Close the person with the key stays near the tailgate for longer than 20 seconds, the function is aborted. In this case the tailgate is not closed and the abortion of the process is displayed on the LED integrated in the button.

40 years of Volkswagen all-wheel drive

From the T2 to the Passat Alltrack:

First Volkswagen with all-wheel drive was a T2 “VW Bus” in 1975

In 1978 Volkswagen commenced series production of the first all-wheel drive vehicle named “Iltis”

First Passat with all-wheel drive launched in 1984 as a “syncro”

Wolfsburg / Munich, September 2015. It is only since the 1980s that all-wheel drive has been regarded as an effective means of improving traction on asphalt. The trailblazer here was Volkswagen's sister brand Audi, which brought all-wheel drive to passenger cars and at the same time excelled with success in motorsport. Prior to this, two or more driven axles were always designed for harsh off-road conditions.

At the Volkswagen brand, the history of 4x4 started in 1975 – 40 years ago – with the T2 Transporter. Back then a handful of prototypes were created with 70 PS two-litre flat engines, a 4-speed gearbox and an upstream torque converter providing the additional front-wheel drive, which was solely recommended for off-road use. This increased the hill-climbing capacity of the Transporter to 94 percent. The wading depth was 50 cm, which later became the standard figure for such vehicles.

Meanwhile, series production of Volkswagen all-wheel drive vehicles commenced with the Volkswagen Iltis, which succeeded the DKW Munga in the German armed forces in 1978. The Iltis had a simpler all-wheel drive system than the syncro system that was later introduced, namely rear-wheel drive with front-wheel drive that could be manually activated. The 1.7-litre petrol engine with 75 PS from the South American Passat was initially used; between 1987

and 1988 the 1.6-litre turbodiesel with 70 PS adopted from the Golf and Passat was also fitted. From the spring of 1979, a civilian version of the Iltis was also available, designed as a robust off-roader for use in forestry and agriculture, but also for off-road leisure use. Two doors, carpet, sports seats, an upgraded dashboard, a large tailgate, 15-inch wheels plus an optional hardtop, a wider body and a modified front apron enhanced the appearance. But it was first and foremost the high price that prevented market success: at DM 39,300 the Iltis cost as much as three Golfs with basic equipment.

At Volkswagen all-wheel drive was introduced in the passenger car range from 1984 in the Passat B2, which was, however, already fitted with a permanently active system. It used the bevel gearing familiar from the former Audi 80 quattro with pneumatically activated differential locks. A prototype shown a year before at the IAA still carried the designation Passat Variant Tetra, but this name had to be changed due to legal objections. The all-wheel-drive Passat models of the B2 model series (with 2.2-litre five-cylinder engines) were initially marketed under the name syncro – they represented the premium models from Volkswagen. In early 1985 – i.e. 30 years ago – a syncro variant of the T3 Transporter with the same system was added with hill-climbing capacity of up to 73 percent.

Unlike the Passat with a longitudinally mounted engine, the 1986 Golf A2 synchro with its 90 PS transverse 1.8-litre engine had an extended system with viscous coupling – developed by Steyr-Daimler-Puch Fahrzeugtechnik. The system was based on a cylindrical cell filled with silicone oil, in which discs arranged on a rotor or stator were incorporated. If speed differences occurred whilst driving, for example on loose surfaces or during cornering, the discs in the cell rotated at different speeds and automatically established a frictional connection between both axles. Selectable differential locks ensured forward movement in the event of reduced grip, too much power or very slippery surfaces.

25 years ago, the 1990 Golf Country, a 98 PS Golf CL syncro with a martial exterior subsequently raised by 120 mm by Steyr in Austria, played a special role in the second Golf generation. It was the trailblazer for the surge of SUVs later to come. Since then, all Golf, Passat and “VW Bus” generations have always also been available with permanent all-wheel drive. The Passat B5 syncro – with a longitudinal engine – already used the Torsen system from Audi, while the Golf syncro – that always had a transverse engine – initially kept the viscous coupling.

With the name change from “syncro” to “4MOTION” in the second half of the 1990s the technical concepts also changed. Depending on the installation position of the engine, a distinction was now made between Haldex and Torsen technology. For vehicles with a longitudinal engine (Passat B5), a Torsen differential supplied by the manual gearbox distributed the drive forces to the front and rear axle by locking itself in the event of speed differences between the powered axles. By contrast, a Haldex coupling on the rear axle was fitted in vehicles with a transverse engine (Golf A4, Bora). It transmitted the engine power to the rear wheels without the driver having to take any action – the power distribution was permanently adjusted to the driving conditions. The most important part of the system is the electronically controlled, wet-running multi-plate clutch, similar to the viscous coupling, but with a much faster response thanks to the electronics and able to transmit higher torque. Whichever variant you drove – you drove safely because in both cases the electronic control ensured full ABS and ESP functionality. EDS (electronic differential lock acting as transverse locks on both axles) and XDS (brake-torque vectoring even before a wheel starts to spin for better steering behaviour) are additional functions of the brake regulation system.

But since the new millennium Volkswagen has also had a professional SUV for heavy-duty off-road use in its range. The permanent all-wheel drive in the Touareg, which ensured propulsion

even in the most difficult terrain, was called 4MOTION Terrain Tech. The Touareg got a lockable central differential with a multi-plate clutch and reduction gear. In normal operation there was a slip-dependent and seamless distribution of power between the front and rear axle. In addition, it was possible to lock the central differential for a fixed distribution of power. A gearbox reduction step (low range) for heavy-duty off-road use could be activated electrically via the chassis switch. It enabled maximum propulsion at a low speed. This means that the Touareg has a climbing ability of up to 100 percent (corresponding to 45 degrees). Furthermore, a rear axle differential with transverse lock and a 100 percent locking effect could be ordered as an option.

Meanwhile, within the course of hybridisation the “electric propshaft” has now become a focus of attention – it has been presented in concept cars based on the modular transverse matrix (MQB). Here an electric motor drives the rear axle so that the distribution of power as required can be regulated even faster fully electronically. But this is a look at the future.