



## **Mercedes-Benz Sprinter 4x4:**

**engageable all-wheel drive for professional commercial-vehicle users**

- **Wide range of variants to suit virtually every application**
- **CDI diesel engines up to V6 with 140 kW (190 hp)**
- **Engageable all-wheel drive and ESP – a perfect combination**

It has given its name to an entire class of vehicles: vans around 3.5 tonnes gross vehicle weight have long been underway on the roads of Europe and further afield in the so-called Sprinter class. Yet the Sprinter is now also making its mark off-road: in the guise of the Sprinter 4x4, it presents itself as a commercial vehicle with high tractive power for applications in ice and snow or rough terrain, either solo or with trailer – a vehicle designed especially for the professional user, yet also for the adventurer en route in out-of-the-way places in a camper van.

### **Wide range of variants to suit virtually every application**

Gravel, earth, rain, ice and snow – this is the world of the Sprinter 4x4, which is equally at home transporting hotel guests to their Alpine resort as it is conveying the service technician to a wind turbine in a field. The Sprinter 4x4 can pull a construction machine out of a pit or deliver mail to a mountain farmer. Extra reserves of traction are vital in these and many other applications.

The Sprinter 4x4 comes from an excellent family: just like its brothers and sisters with rear-wheel drive, it meets the highest standards in terms of safety and comfort. Optimum driving stability, also in critical situations, and a perfect workplace – the Sprinter 4x4 is the Mercedes among all-wheel-drive vans.

### **CDI diesel engines up to V6 with 140 kW (190 hp)**

Equally, the Sprinter 4x4 is the professional among all-wheel-drive vehicles. Its all-wheel drive can be engaged at the press of a button, whereupon the 4ETS Electronic Traction System makes life extremely easy for the driver, who simply needs to make well-judged use of accelerator and steering wheel while 4ETS takes care of the rest. The all-wheel drive is integrated into the standard-equipment ESP Electronic Stability Programme – all-wheel drive and safety systems complement each other perfectly.

The same is true of the engine: CDI diesel engines from the four-cylinder unit with 95 kW (129 hp) to the V6 with 140 kW (190 hp) are responsible for the vehicle's effortlessly superior traction.

Equipped with a particulate filter, they all meet the Euro 5 emissions standard or optionally even the currently most stringent voluntary EEV standard. The power from the engine is transmitted either by an extremely economical six-speed manual transmission or by a comfortable automatic transmission.

There is a fascinating range of model variants: just the engines, bodies and weights add up to over 80 model variants of the Sprinter 4x4.

### **Sprinter 4x4: engageable all-wheel drive, optional low-range gear reducer**

The Sprinter 4x4 is an all-wheel-drive van for the professional. On the construction site or in the mountains, in snowy regions or natural landscapes – the Sprinter 4x4 covers a wide range of different applications. No less diverse are its users: tradespeople and utilities, forestry workers and adventurers, hotels and building contractors – to name just a few of the many possibilities.

Designed with the professional in mind, the all-wheel drive of the Sprinter 4x4 is based on the Mercedes-Benz 4ETS Electronic Traction System, a technology that is employed also in the Vito 4x4 and Viano 4Matic and which has proved highly effective in Mercedes-Benz passenger cars up to the ML-Class. In contrast to the permanent all-wheel drive in the Vito and Viano, however, the Sprinter's 4x4 drive is engageable in line with the van's exceptionally versatile operating environment. The all-wheel drive is engaged with the engine running and with the vehicle stationary or at low speeds up to 10 km/h. It involves an electric motor engaging a spur-gear pair on the transfer case.

In contrast to other systems of this type, the engageable all-wheel drive in the Sprinter does not result in a rigid through-drive. Power is transmitted variably; all elements of the standard-equipment ADAPTIVE ESP, including ASR acceleration skid control, remain operational while the all-wheel drive is engaged.

That the Sprinter 4x4 has been designed with the professional in mind is apparent from an additional extra: the all-wheel-drive van is optionally available with an additional low-range gear reducer. Activated at the press of a button with the engine running, the vehicle stationary and 4x4 drive engaged, the low-range gear reducer reduces the transmission ratio by a factor of 1.42, i.e. by 42 percent, with a corresponding reduction of the maximum road speeds in the individual gears and a commensurate increase in torque. This allows the driver of the Sprinter to proceed with anticipation at low speed in off-road conditions with sparing use of the clutch. The low-range gear reducer comes in handy for reducing use of the clutch in case of frequent manoeuvring or where there is a high percentage of driving in mountainous regions and also in cases where the vehicle is often used with a full payload or for towing a trailer in off-road situations.

## **The 4ETS traction system takes the place of up to three differential locks**

The rest of the all-wheel-drive technology in the Sprinter 4x4 is identical to that in the Vito 4x4 and Viano 4Matic. With all-wheel drive engaged, under normal driving conditions the power from the Sprinter 4x4's engine is transmitted to the front and rear axles in a ratio of 35:65. This guarantees a handling performance which, in everyday situations, does not differ significantly from that of the conventional rear-wheel-drive Sprinter.

Instead of using mechanical differential locks, the all-wheel drive employs the 4ETS Electronic Traction System. If one or more wheels lose traction on a slippery surface, 4ETS automatically brakes the spinning wheels by applying a series of short pulses while consequently increasing the drive torque at the wheels with good traction by an identical amount. The 4ETS system uses the ABS wheel sensors for this purpose. Automatic application of the brakes by 4ETS is capable of simulating the effect of up to three differential locks: interaxle differential lock, rear-axle differential lock and front-axle differential lock.

The transfer case is flanged directly onto the main gearbox. The front-axle drive, which is of highly compact construction, is provided with a lifetime's oil fill and is maintenance-free, as are the additional front-axle drive shafts.

## **Full integration into the ADAPTIVE ESP stability programme**

The 4ETS system is fully integrated into the ADAPTIVE ESP Electronic Stability Programme. While its control characteristics are specially matched to the all-wheel drive, all the functions of the ADAPTIVE ESP are retained: ABS anti-lock braking system, ASR acceleration skid control, EBV electronic brake-force distribution, BAS brake assist and AAS start-off assist.

In view of the diverse range of different bodies available for the Sprinter, it is especially important to detect the load as well as the centre of gravity (Load Adaptive Control LAC). For example, where the Sprinter is equipped with a special-purpose body, ADAPTIVE ESP registers a high centre of gravity on the basis of the vehicle's movements and adapts the control characteristics accordingly. Particularly in off-road conditions, ADAPTIVE ESP thus guarantees enhanced safety in situations such as when the vehicle is being driven along a steeply angled embankment.

In combination with a factory-installed trailer coupling, the system is rounded off by Trailer Stability Assist, which counteracts oscillating movements of the trailer by means of selective application of the brakes on individual wheels. The interaction between all-wheel drive and ESP functions to perfection: the vehicle/trailer combination is stabilised and brought back onto course.

## **Raised body for improved off-road performance**

Although the Sprinter 4x4 is not an off-roader, its raised body (raised by 110 mm at the front and by 80 mm at the rear) endows it with characteristics similar to those of a cross-country vehicle – depending on wheelbase and body. Thus, the approach angle of the Sprinter with 3.5 tonnes gross vehicle weight is 28 degrees instead of 18 degrees in the conventional rear-wheel-drive Sprinter while, in the panel van with short overhang, the departure angle is 27 degrees (conventional drive: 22 degrees). The breakover angle – which is important for driving over humps – is 25 degrees in the standard-wheelbase Sprinter 4x4 and is otherwise 17 degrees. Depending on engine version, the slope climbing ability is around 20 percent higher than in the Sprinter with conventional drive. Equally impressive, at 610 mm, is the Sprinter 4x4's fording depth (Sprinter 4x2: 500 mm).

Because the body is raised, the familiar additional turn signal lamps in the exterior rear view mirrors would be above the maximum statutory height. For this reason, the Sprinter 4x4 is provided with side turn signal indicator lamps in the front side panels of the body. For the same reason, the panel van and crewbus versions have their rear fog lamp and rear reversing light integrated in the bumper.

### **Two weight variants to suit every application**

The additional weight of the all-wheel drive in the Sprinter 4x4 comes to just 115-35 kg depending on version. The comparatively low additional weight is attributable to the 4ETS system, which dispenses with the need for mechanical differential locks. To meet the needs of users with particularly high payload requirements, the Sprinter 4x4 is available with not only 3.5 tonnes but also 5.0 tonnes gross vehicle weight.

On the road, the Sprinter 4x4 impresses with its excellent control and perfect traction. It conveys an air of safety and effortless superiority typical of the brand as well as the same comfort as a Sprinter with conventional drive. As the vehicle starts off, the rear wheels first spin briefly if there is limited traction. The warning lamp flashes at any speed if at least one tyre has exceeded the grip limit. For optimum traction, the driver should select an increased accelerator position at lower speeds despite the flashing warning lamp. The 4ETS system automatically controls the wheel slip and optimum locking power on each individual wheel.

### **ASR disengageable for certain driving situations**

Depending on the driving situation, it may be advisable to disengage the ASR acceleration skid control on the Sprinter 4x4, which can be done at the press of a button. This briefly raises the control thresholds so as to increase the traction by increasing the wheel slip, which is of advantage, for example, when snow chains are in use or when the vehicle is being driven on a

gravel road. The ASR system is automatically reactivated at speeds between 40 and 60 km/h. The same is true if the wheel slip is impermissibly high or after more than ten seconds in ASR Off mode. ESP remains active even when ASR has been deactivated.

In any case, 4ETS stops critical driving situations from arising. For instance, with increasing vehicle speed, the locking effect on the axle is reduced in order to prevent yaw (rotation about the vertical axis) in the interests of driving stability. Also, the braking torque on all wheels is so controlled that braking torque is almost always applied on no more than three wheels. If the total slip of all wheels exceeds the computed slip, 4ETS reduces the drive torque from the engine. Despite such interventions, there is no possibility of the braking system overheating: if, under extreme off-road conditions, the temperature of the brakes rises to impermissibly high values, 4ETS automatically reduces the locking effect until the brakes have cooled down again. The driver is made aware of this by an indicator lamp.

### **Powerful diesel engines with four or six cylinders**

Clean and fuel-efficient with outstanding performance thanks to excellent pulling power: the Mercedes-Benz Sprinter 4x4 is powered by the new generation of diesel engines from Mercedes-Benz, which made its debut in vans in the spring of 2009 in the Sprinter and has since proved an outstanding success. One of the special things about the Sprinter 4x4 is that it can be ordered not only with the particularly economical CDI four-cylinder units with 2.15-litre displacement but also with the especially powerful CDI V6 diesel engine with 3.0-litre displacement and outstanding performance. The V6 enjoys a unique position in this vehicle class and is the right choice for vehicles that constantly carry a high payload or are required to tow a trailer, or simply where the customer demands superior performance under all conditions.

### **Clean, smooth-running engines**

All engines are compliant with the Euro 5 emissions standard. Low fuel consumption means reduced CO<sub>2</sub> emissions. The engines are equipped with an oxidizing catalytic converter, particulate filter and cooled exhaust gas recirculation. The Sprinter 4x4 comes in three engine variants:

- Sprinter 313/513 CDI 4x4  
4 cylinders, 2.143 litres displacement  
Output 95 kW (129 hp) at 3800 rpm  
Max. torque 305 Nm at 1200-2400 rpm
- Sprinter 316/516 CDI 4x4  
4 cylinders, 2.143 litres displacement

Output 120 kW (163 hp) at 3800 rpm  
Max. torque 360 Nm at 1400-2400 rpm

- Sprinter 319/519 CDI 4x4  
V6 cylinders, 3.0 litres displacement  
Output 140 kW (190 hp) at 3800 rpm  
Max. torque 440 Nm at 1400-2400 rpm

All the diesel engines impress with their high tractive power. Two overhead camshafts operate a total of 16 inlet and exhaust valves, while the V6 even has two camshafts per cylinder bank and a total of 24 valves. The drive to the camshafts is by a combination of gearwheels and a short chain, a basis for virtually indestructible durability.

### **Especially wide usable engine speed range**

A common-rail system takes care of fuel injection, which is done with extreme precision by solenoid valves and seven-hole injection nozzles (V6: piezoelectric eight-hole injection nozzles). The four-cylinder engines feature two series-connected turbochargers, while the V6 engine has a single turbocharger with variable turbine geometry. A striking feature of all the engines is their high pulling power with a high maximum torque already at exceptionally low engine speeds.

The combination of this high tractive power and a rated speed of 3800 rpm results in an exceptionally wide usable engine speed range between approximately 1000 and 4000 revolutions per minute. This is highly advantageous especially in off-road conditions as it means that the Sprinter 4x4 can be driven with extremely few gear-changes, which reduces the risk of traction loss. An added benefit is that the driver is free to concentrate fully on the road ahead.

The combination of common-rail injection, rear camshaft drive and two counter-rotating balancer shafts results in outstandingly smooth running already in the four-cylinder engines. The V6 takes this even one stage further, thanks to its inherent design principle. This engine additionally includes offset crank pins and a balancer shaft.

### **Innovative technology reduces fuel consumption**

Although the focus with all-wheel-drive vans is on high traction, Mercedes-Benz simultaneously employs innovative technology to reduce fuel consumption. Feedback-controlled oil and coolant pumps, feedback-controlled alternator and on-demand splash cooling of the pistons – all these

technologies, which made their debut in vans alongside the new generation of Mercedes-Benz engines in the spring of 2009, also help to reduce diesel consumption in the Sprinter 4x4.

### **Choice of manual or automatic transmission**

Two variants are available for transmitting the power from the Sprinter 4x4's engine: the economical ECO Gear six-speed manual transmission or the especially comfortable Mercedes-Benz five-speed automatic transmission, which has been tried and tested a million times over.

The ECO Gear manual transmission impresses with its wide gear ratio spread. The low-ratio first gear with its correspondingly high traction caters for typical situations such as starting off on an incline or in cases where traction is difficult. The high-ratio sixth gear lowers the engine revolutions for speedy driving along main roads, highways and motorways.

### **Automatic transmission and all-wheel drive – a perfect combination**

The combination of all-wheel drive and automatic transmission is a highly attractive proposition for off-road driving: while life for the driver could already scarcely be easier thanks to the Sprinter 4x4's engageable all-wheel drive with 4ETS Electronic Traction System, the combination of all-wheel drive and automatic transmission allows the driver to make effortless progress even in challenging terrain: having engaged the 4x4 drive, the driver simply needs to make well-judged use of the accelerator and – thanks to the perfect tuning of the drive – is then free to concentrate fully on the road ahead.

### **Something for everyone: the Sprinter 4x4 and its special-purpose bodies and extras**

As a commercial vehicle that has been designed for the true professional, the Mercedes-Benz Sprinter 4x4 is also capable of meeting special customer requirements. Users in search of special-purpose bodies will find what they are looking for in the "Van Solution" programme. Three-way tippers in steel or aluminium are just the answer for the building trade or for gardening and landscape contractors, while there is a range of box bodies for dry freight. Refrigerated bodies are available for transporting temperature-sensitive products.

### **Selected individual options for customising the Sprinter 4x4**

The numerous individual options also deserve more than just a passing glance. Customers wishing to protect the environment will prefer a diesel engine compliant with the EEV standard (Enhanced Environmentally Friendly Vehicle). This is currently the most stringent voluntary

emissions standard. The tried-and-tested automatic transmission provides enhanced comfort while at the same time assisting the driver. A fuel tank with 100 instead of 75 litres capacity will considerably increase the range of the vehicle.

In the interests of improved traction, there are several tyre options: M+S tyres on the rear axle, all-weather or M+S tyres all-round. A full-size spare wheel instead of the standard repair kit makes for greater safety in off-road situations. Equipped with a ball-neck or jaw-type coupling, the Sprinter 4x4 presents itself as a highly respectable towing vehicle for trailer loads up to 3.0 tonnes.

On both panel van and crewbus with raised body, a step at the rear-end door affords easier access to the load compartment. Auxiliary heating systems bring driver's cab and passenger compartment to a pleasant temperature. An optional factory-installed navigation system directs the driver reliably to his destination.

### **Sprinter 4x4: a wide choice of over 80 variants**

Three lengths, three heights, two weight classes with 3.5 and 5.0 tonnes gross vehicle weight, numerous body styles: the Mercedes-Benz Sprinter 4x4 comes in a multiplicity of variants. The extensive ex-factory product range is complemented by bodies from the "Van Solution" programme. Customers unable to find what they are looking for ex factory can opt for a chassis with cab to which to add a special-purpose body.

### **Open and closed bodies to suit every application**

Especially the Sprinter 4x4 panel van is available in a host of different variants. It can be ordered in the standard wheelbase with flat roof and 9 m<sup>3</sup> cargo volume, in the long wheelbase with three different roofs or in the extra-long variant with long overhang and 17 m<sup>3</sup> cargo volume. The crewbus for passenger transport comes in two lengths and two heights. Various seating layouts are also available.

The Sprinter 4x4 pickup also comes with a choice of two wheelbases. Depending on weight class, the pickup body is available in different lengths and widths, with the cargo area ranging from 6.9 to 9.2 m<sup>2</sup>. Equally, two wheelbases and various pickup bodies form the basis of the double-cab

pickup with cargo area ranging from 5.5 to 7.7 m<sup>2</sup>. Two wheelbases, two weight classes and single or double cab add up to a total of eight chassis variants for special-purpose bodies.

Adding in the three diesel engines and getting out their pocket calculator, keen mathematicians will work out that a total of over 80 variants are available ex factory – not counting the different seating layouts or the wide range of optional extras.