



Support for everyday life

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MAN and NEOPLAN coaches are equipped with a wide range of assistance and safety systems which are designed to support coach drivers in their work.

- **MAN EfficientCruise with EfficientRoll**
- **MAN Comfort Drive Suspension (CDS)**
- **MAN AttentionGuard**
- **MAN Lane Guard System (LGS)**
- **MAN Adaptive Cruise Control (ACC)**
- **MAN Emergency Brake Assist (EBA)**
- **MAN Tyre Pressure Monitoring (TPM)**
- **Automatic light and windscreen wiper system**

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MAN Truck & Bus provides a complete range of assistance systems to reduce driver stress and make coach journeys safer and more comfortable. These functions additionally help to protect the environment and also contribute to optimising the Total Cost of Ownership (TCO).

Utilising topography with MAN EfficientCruise and EfficientRoll

For MAN and NEOPLAN coaches, MAN offers an anticipatory cruise control system called MAN EfficientCruise, the latest generation of which includes even more enhancements. The assistance system takes into consideration upcoming uphill and downhill sections along the current route and adjusts the drive position and vehicle speed wherever possible for a more cost-effective driving style. Optimisations incorporated into the new MAN EfficientCruise include a speed adjustment function which anticipates the route and actively intervenes in gear selection. For example, the system now prevents the MAN TipMatic from shifting into a lower gear when appropriate and selects the optimal gear ahead of inclines, thereby avoiding gearshifts on uphill gradients which cause extended interruptions

MAN Truck & Bus is one of Europe's leading manufacturers of commercial vehicles and supplier of transport solutions, with revenues of approximately €9 billion a year (2015). The product portfolio includes trucks, buses and diesel engines, as well as services related to passenger and cargo transport. A subsidiary of Volkswagen Truck & Bus GmbH, MAN Truck & Bus employs more than 35,500 people worldwide.



in traction. An additional innovation is provided in the shape of the EfficientRoll freewheel feature, which delivers added efficiency even on slightly downhill gradients by automatically switching the gearbox to neutral position "N" and allowing the bus to roll with the lowest possible driveline friction loss. Fuel savings of up to 6% were already possible with the previous generation of MAN EfficientCruise, and these new functions will enable further increases in fuel efficiency.

MAN EfficientCruise is automatically activated whenever the engine is started. Out of the four available basic parameter settings, the default setting is ECO Level 3 which has a speed tolerance of plus 5 km/h and minus 6 km/h around the set speed. The driver can use the four levels to adjust the speed tolerance, and thereby the degree of fuel saving, to suit the traffic situation. The currently selected ECO Level is shown in the display along with the respective upwards or downwards maximum speed deviation.

The MAN EfficientCruise functions also prevent vehicles from exceeding set speed limits. On long downhill stretches, a maximum permitted speed of 100 km/h is permanently set, regardless of the desired or set speed. Excess speeds of up to 104 km/h are only permitted for a maximum of 30 seconds. If the continuous brake output from the retarder and the enhanced MAN EVBec engine brake is insufficient, then the driver is given a visual and audible warning that the speed is too high. The driver can then also use the service brake to slow the vehicle without cruise control being deactivated.

Improving handling with MAN Comfort Drive Suspension

The active, electronically adjustable MAN Comfort Drive Suspension (CDS) damping system contributes equally to safety and comfort. Thanks to situation-dependent, infinitely variable electronic control of the damper hardness, CDS is able to achieve both safe handling and maximum suspension comfort simultaneously. The system takes into consideration the load status of the bus as well as driving activities (pedal position, speed etc.), the presence of side winds and the road surface characteristics. MAN CDS thereby maximises vehicle stability and improves vehicle handling in critical driving situations. It also provides a considerable improvement in comfort in normal driving operations. Both the vehicle and the road are protected thanks to the resulting reduction in dynamic loads. MAN especially recommends this system for vehicles with a high centre of gravity and in general for applications where the road conditions are very



challenging. The NEOPLAN Skyliner is therefore equipped with MAN CDS as standard.

Complete concentration with MAN AttentionGuard

MAN has recently developed the MAN AttentionGuard attention assistant especially for applications which include long motorway stages. The objective of this assistance system is to recognise when a driver's attention is waning, and to warn them if necessary. MAN thus envisages this system being used predominantly on long journeys where a substantial amount of the time is spent on motorways. This is because driving at a relatively constant speed and without any major curves in the road substantially increases the risk of the driver becoming inattentive.

The AttentionGuard gives the driver both a visual and audible warning when it detects a loss of alertness; however, it does not actively intervene in driving activity. The system requires the LGS (Lane Guard System) lane-departure warning system to be installed as MAN AttentionGuard uses data from the LGS camera, amongst others. A conspicuous change in steering behaviour compared to the beginning of the trip is an indication of inattentiveness, distraction or fatigue. If MAN AttentionGuard detects the driver's focus is waning, then the message 'Break recommended' appears in the central display. An acoustic signal is also sounded once for the driver via the speaker located in the cockpit. In this way, MAN AttentionGuard is actively contributing to safety. A warning in the form of a haptic signal via the driver's seat is also possible.

Keeping on track with MAN Lane Guard System

MAN Lion's Coach, MAN Lion's Intercity and MAN Lion's Regio as well as all NEOPLAN coaches have been available with the latest generation of the Lane Guard System (LGS) lane-departure warning system since the middle of 2015. LGS helps the driver to stay in lane on well-constructed roads. Compared with the previous system, the new generation of LGS features a new camera system with improved software, as well as extended functions. For example, one new function is that LGS is only now activated when both lane markings on the right and left side are detected. In addition the system deactivates itself in narrow lanes and takes the typical, slightly to the outside driving style of commercial vehicles into account. This all contributes to a marked reduction in unwanted warnings which has considerably increased driver acceptance of the system.



MAN Lane Guard System is automatically activated when the engine is started. A video camera behind the windscreen records the lane markings. If the bus leaves the lane without the driver activating the indicators, then an acoustic warning signal is emitted from the loudspeaker in the door on the corresponding side. As an option, a warning can be given by vibrating the corresponding side of the seat cushion. LGS therefore helps to prevent the vehicle from unintentionally leaving the lane due to inattentiveness, a typical cause of accidents on monotonous sections of road.

Keeping your distance with MAN Adaptive Cruise Control

The distance-regulating MAN Adaptive Cruise Control (ACC) automatically ensures a constant safe distance from the vehicle in front. The radar sensor, which is behind the front panel, records distances of up to 150 metres in front of the vehicle and the relative speed of any vehicles ahead in the same lane. Based on this data, the lane direction, the vehicle's own speed and the driver's actions, the ACC control unit calculates the optimum approach strategy and controls the acceleration and/or deceleration by utilising the retarder or service brake.

The ACC system is activated via the multi-function steering wheel, the toggle switch can be utilised for specifying the target distance from the vehicle ahead. The desired speed, speed of the vehicle ahead, and the selected target distance will be indicated in the display. Depressing the accelerator pedal while ACC is activated overrides the system. Using the brake or retarder lever automatically deactivates it.

In the first instance, adaptive cruise control is designed to reduce driver stress in long convoy journeys as the legally required safe distance is reliably maintained for the driver. At the same time, it contributes to road safety by helping to prevent emergency braking situations and rear-impact crashes – even when weather conditions reduce visibility, thanks to the use radar technology. Optimum regulation of speed adjustment additionally reduces fuel consumption and thereby also emissions.

Quicker braking in emergencies with MAN Emergency Brake Assist

The second generation of the MAN EBA emergency brake assistant enhances safety for all road users, passengers and drivers thanks to improved traffic environment monitoring which uses radar and cameras to identify moving and stationary objects in the vehicle's lane earlier and more



safely - even complex traffic scenarios are interpreted more reliably. If there is an impending collision, then MAN EBA 2 warns the driver visually, acoustically and, as an option, haptically. At the same time, engine torque is reduced or limited, and the brake lights are activated. If the driver does not react, then the system will implement a braking process on its own, even bringing the vehicle to a standstill if required. If the risk of collision ceases to exist because, for example, the slow-moving vehicle ahead pulls over into the emergency lane, then MAN EBA 2 will cancel the braking process and terminate the warning. Full engine torque will be available again once the driver has quickly released the accelerator and then depressed it again.

The emergency brake assist function helps to prevent serious rear-end collisions or reduce their consequences. MAN's EBA already today fulfils the legal requirements for EU Regulation 347/2012 which will come into force for all newly-registered buses as of 2018.

Keeping tyre pressure under control with MAN Tyre Pressure Monitoring

The MAN TPM (Tyre Pressure Monitoring system) provides the driver with a system that constantly monitors the tyre pressures, and issues a warning if a pressure drops below a defined minimum. To this end, a pressure sensor is attached to every tyre rim and transfers the pressure signal to the control unit via a wireless signal. A warning is automatically shown in the combined instrument display when the tyre pressure is 20% below or 40% above the target pressure. The driver can also call up the tyre pressures manually at any time. As a result, virtually all breakdowns caused by slow losses in tyre pressure can be prevented, thereby increasing safety and simultaneously reducing downtimes. Optimum tyre pressure also contributes to lower fuel consumption and considerably reduces tyre wear. The compressed-air hose and pressure gauge, which are included in the system package, enable the driver to check the air pressure at any time and anywhere.



Great visibility with the automatic light and windscreen wiper system

MAN Truck & Bus offers an automatic headlight system with light sensor for all its bus model series. When the rotary switch is set to "Auto", then the vehicle automatically switches the low-beam headlights on and off according to the surrounding brightness levels, for example as dusk draws in or when driving through a tunnel during the day. The low-beam headlights are also activated in the rain if the windscreen wiper is switched on for longer than five seconds. The rear lights, front running lights (front parking lights), front and rear peripheral lights, side-marking lights, number plate light as well as dashboard illumination will also be activated. The windscreen wiper can also be controlled via a rain sensor. The sensitivity of the automatic windscreen wiper system can be set to four different levels by the driver via a switch on the steering column stalk. The higher the level of sensitivity, the earlier the windscreen wiper will react and the shorter the wipe intervals are.

Both automatic systems reduce driver stress, leaving the driver to concentrate on the road and traffic conditions. By always being appropriate for the prevailing conditions, the bus lighting improves visibility and thereby increases safety.