

TopoDyn in Customer Tests – Performance Successfully Confirmed!

In the course of customer tests, ZF has already impressively proven that possible fuel savings can be realized through the application of TopoDyn, the intelligent shift strategy. Evidence was provided for varying topographies and in realistic everyday, tough city and suburban bus operations.

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Now, Ups and Downs are
Good for Your Business



TopoDyn – the intelligent shift
strategy for modern city and
suburban buses



Customer tests in	Fuel savings recorded of up to
Trier	8 %
Frankfurt	3 %
Stuttgart	3 %
Lisbon	5 %
Dresden	7 %

In average: 5%



Driveline and Chassis Technology

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Now, Ups and Downs are Good for Your Business

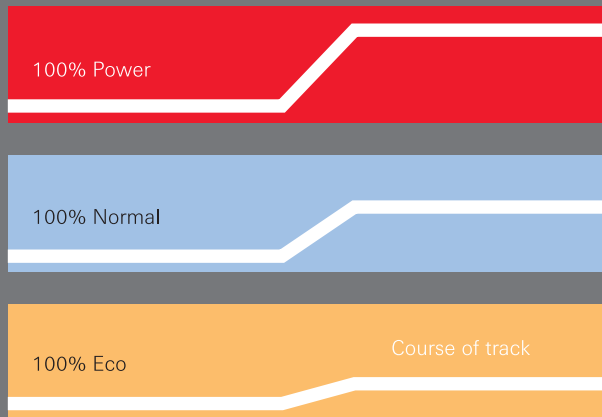
Thanks to TopoDyn, the intelligent shift strategy for modern city and suburban buses, you will automatically master demanding topographies with considerably reduced fuel consumption.

Today's driving programs: Spoilt for choice

Today, in modern buses, up to six driving programs are made available by transmission via the transmission's electronics e.g. Eco, Normal, or Power. Two of these are chosen by the vehicle manufacturer, but only one is active. And, correct choice of the pre-set driving program is primarily dependent on the route's topography which is run by the bus during daily operation.

The problem of today's driving programs

Usually, the driver has no possibility to change the driving program. However, only a 100 meter-long gradient suffices for having to set the pre-activated driving program, either Normal or Power, although the entire rest of the route is totally flat and can be run in the Eco mode. In a nutshell: In order to cope with this single up-hill gradient, the bus must be operated continuously in the higher fuel consumption range.



State-of-the-art technology

TopoDyn – Saving Fuel Intelligently & Automatically

Thanks to TopoDyn, you have the freedom of thinking about all and everything – but no longer about choosing the correct driving program! TopoDyn is a highly flexible driving program which comprises all standard driving



programs. And the best: In relation to the corresponding terrain requirements, the optimal program is activated – automatically! When leaving the depot, the bus starts in e.g. the Eco driving program. Once the slopes become steeper, the electronics automatically change over to the Normal, and in the case of major gradients/inclines, even into the Power program.

Also when traveling downhill in steep terrain, TopoDyn proves to be a reliable partner: Here again, the unit changes to the Power program, thus opting in favor of high shift points and thus a high retarder and engine brake torque. Benefits: There is significantly less strain on the service brake.

Back on the flat section of the route, the electronics automatically go back to the Normal, and later on, to the Eco program.

Once again, in a nutshell: Thanks to TopoDyn, the flexible driving program, and in relation to the respective topography, you save 5 percent fuel in average.

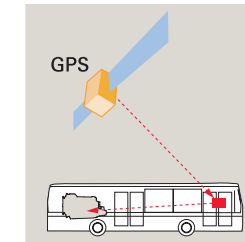


This is How You Can Save Fuel With TopoDyn

The principle

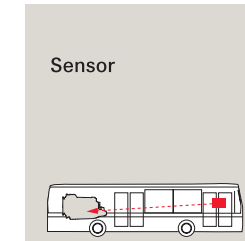
Calculation of the track's gradient by means of determining road/driving resistance on the basis of current, real-time vehicle data.

TopoDyn advantages in comparison to standard systems



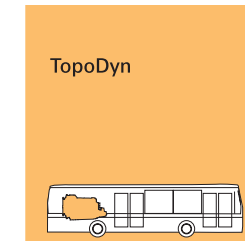
GPS / Information on the route

- Works only where GPS is available
- Different variants on the market
- Further, electric interfaces
- Systems must be compatible
- Load cannot be taken into consideration



Solution with additional sensors

- Additional inclination sensor required
- Determination of mass via air spring pressure is inaccurate
- A reinforced level of networking is required



TopoDyn

- + Already today, TopoDyn is ready for volume production.
- + The fuel consumption advantages generated by TopoDyn have been successfully verified during customer tests.
- + TopoDyn does not require additional components.
- + TopoDyn obtains the necessary input information also in unknown areas of operation.
- + There is no need to teach-in TopoDyn.

TopoDyn – the independent solution all around the globe