

VOITH

With Braking Faster
to Your Destination.
Retarder





We agree with our development partners and customers: maximum transport output is only possible with a high-performance braking system.

Increase Your Transport Performance Safely. With Retarders from Voith

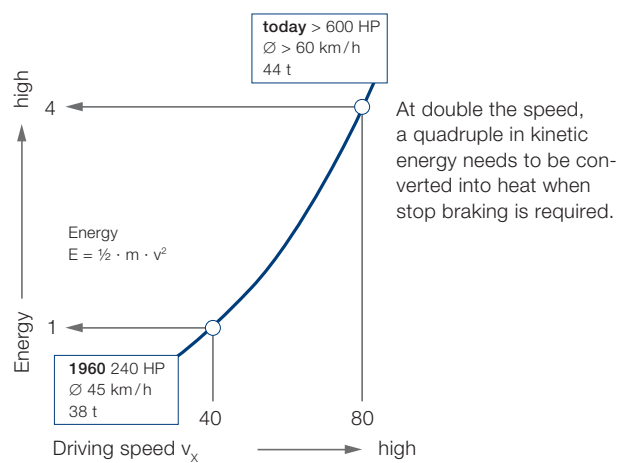
The commercial pressure on the transport industry has been consistently going up in recent years: higher payloads, higher mileages and higher average speeds are requested. Engine outputs are continuously increased. As a result, service brakes are also pushed to their limits. The consequence: the safety for drivers, vehicles and loads falls by the wayside.



Voith Retarder offer you definite advantages: they brake virtually wear-free and are fully operational even on long descents. As a result, they increase both the safety and the transport performance of your vehicle – and, in the end, also your economy.

As long-term, close partner of vehicle manufacturers (OEMs), haulage companies and coach operators we know where the resources for higher user economy lie: in the reduction of complexity, service and material costs. Our retarders fulfil these prerequisites in an exemplary manner. This is why our development partners and customers can rely not only on the reliability of our products, but also on their long service life and service friendliness.

The energy in proportion to the vehicle speed





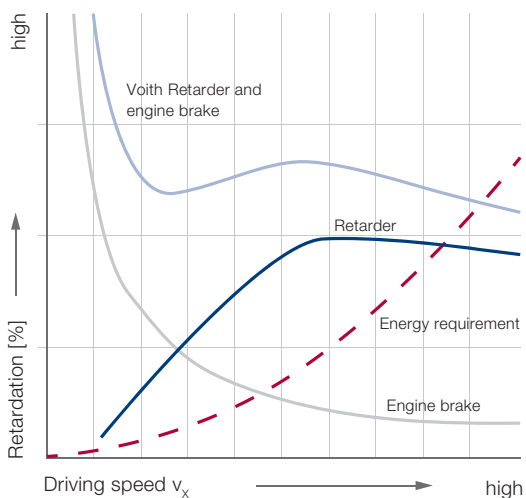
This is How You Can Increase Safety and Reduce Operating Costs.

Especially where they are needed most, i. e. at high speeds, Voith Retarders produce enormous braking powers (up to 700 kW/950 HP). With their high braking torques and low unit weight, they are converting huge amounts of energy effectively in the shortest of times. And because the Voith Retarder has its own oil supply system, the operating medium can be utilized up to its highest permissible operating temperature range.

Safe continuous brakes that pay for themselves

When operated over longer periods, friction brakes reach temperatures of up to 1000 °C. As a result, their braking effect drops rapidly, fissures might develop, brake linings wear out. As genuine continuous brakes, Voith Retarders offer you enormous safety reserves where it really matters: on demanding downward gradients, on motorways and in urban start-stop traffic.

Combination of engine brake and retarder



Engine brake and Voith Retarder complement each other ideally, because their braking effect adds up. As a result, you have optimum braking power, both at low and at high speeds. With secondary retarders, the braking power is not interrupted during gear-shifting – a definite plus for your safety.



More Economy for the Operator. More Safety for the Driver.

Voith Retarders offer numerous benefits to operators and drivers

For the operator

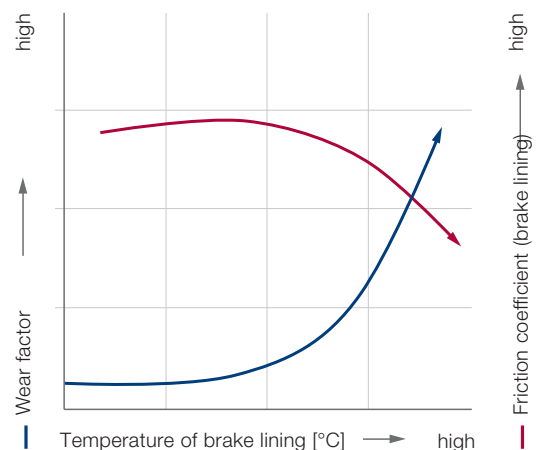
- The retarder pays for itself, often in less than 2 years
- Voith Retarders are the lightest in weight among continuous brake systems. As a result you can utilize your payload capacity to its fullest
- Higher and more even average speeds at increased safety reserves
- The service brake is protected. Brake linings last up to eight times longer
- Active retarder utilisation saves fuel and time
- Reliability and punctuality are improved
- Lower operating costs
- Increased availability of the vehicle

For the driver

- More safety on descending routes and during adaptation braking
- Cold, fully operational brakes in emergency situations
- High driving comfort
- Constant driving speed (cruise control on downward gradients)
- Smoothly introduced, continuously effective braking power

With increasing brake lining temperatures

wear and costs increases rapidly



With Voith Retarders, Trucks Reach Their Destination Faster.

Heavy truck with Voith Retarder

Test route: Guadix – Granada (Spain)

The maximum downward gradient of the 4.8 km test route Guadix – Granada is 7 %, the difference in altitude 290 m.

- 85 % reduction of service brake operations
- 56 % increase of average speed

Conclusion

On downward gradients, the retarder allows noticeably higher average speeds while the service brake is activated less – hence lower wear.

Heavy truck with Voith Retarder customer application: long-distance haulage

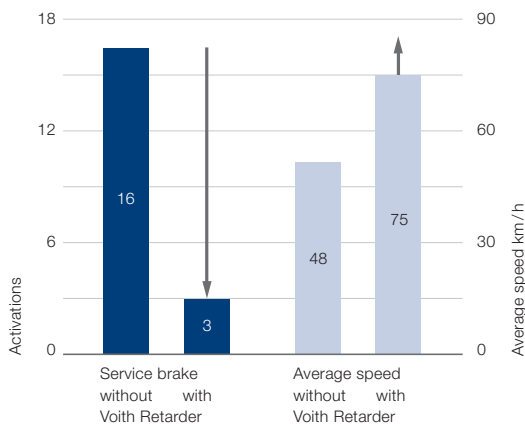
Route: Italy – Germany, Total route: 3 164 km

- 70 % reduction of service brake operations
- 36 % fewer shifting operations
- 5.9 % increase of average speed

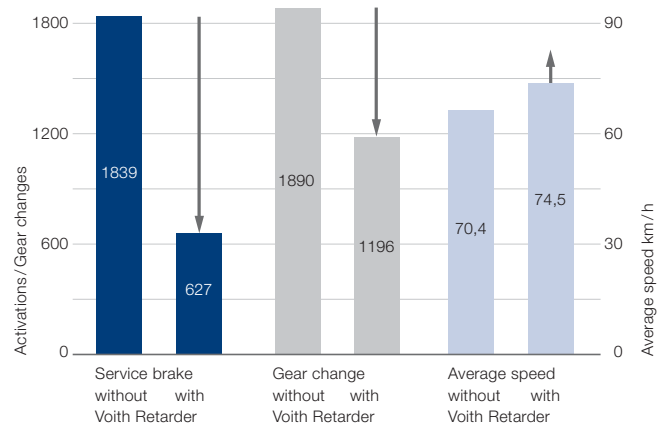
Conclusion

The retarder also convinces in long-distance traffic by reduced service brake operations, fewer gear changes and noticeably higher average speeds. Driving economically, safely and comfortably means: driving with a Voith Retarder.

Test route* 4,8 km: Guadix – Granada (Spain)



Test route* 3 164 km: Italy – Germany



*During comparative driving tests with and without retarder, clear differences emerged in terms of speed, gear-shifting comfort and brake wear.

Safety – Hands on or Foot-operated.

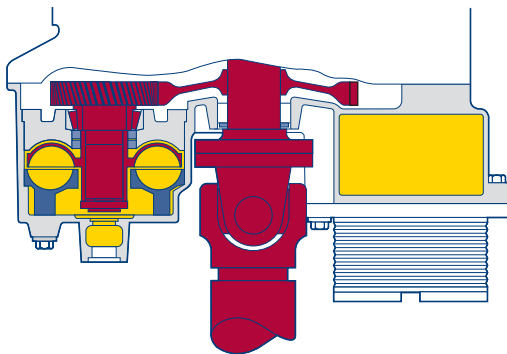
Easy, reliable, effective: This is how the Voith Retarder works

In a hydrodynamic retarder, two bladed wheels face each other. The rotor is connected to the propshaft of the vehicle via the retarder input shaft, the stator is rigidly connected to the retarder housing. During braking, oil circulates between the bladed wheels. The oil is accelerated by the rotor and decelerated (retarded) in the stator. As a result, the rotor is also decelerated and the vehicle is slowed down. Braking heat that is generated in this process is fast and effectively dissipated via the vehicle cooling system – without negatively affecting adjacent components.

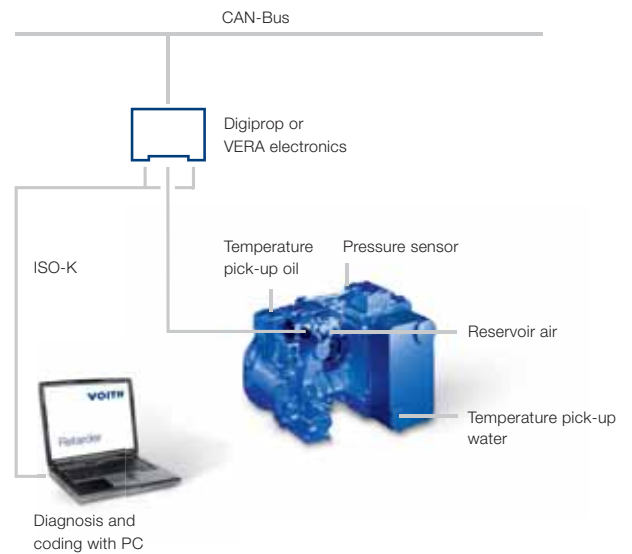
Perfectly integrated into the vehicle brake management

Today, retarders are integrated into the brake management of a vehicle via the vehicle electronics as an integral part of braking systems. The activation of the retarder occurs automatically via the foot brake pedal or alternatively via a hand lever at the steering wheel. The v-constant function (cruise control on downward gradients) keeps the vehicle constantly at a speed selected by the driver on descending routes. The ideal scenario would be to couple the v-constant function of the retarder with the cruise control function of the vehicle.

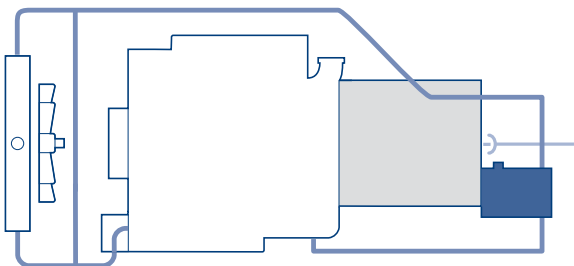
Voith Retarder E 115 cross-section



Electronic retarder control system



Integration of the retarder in the vehicle cooling system



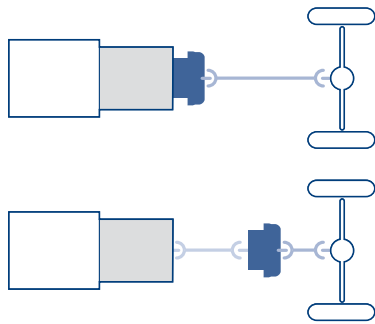
Logical, Flexible and Comprehensive.

Based on a wealth of experience, we have developed a retarder programme which offers the optimum solution for all known commercial vehicle types. We are the only manufacturer whose product range features both inline and offline retarders.

Voith Inline Retarders

Voith inline retarders are directly mounted to the transmission or freely installed in the driveline; they are connected with the propshaft of the vehicle.

Inline principle retarders



Voith Retarder VR 120

For medium-class long-distance buses and touring coaches as well as trucks: car transporters, solo vehicles in distribution traffic, drinks delivery vehicles, vehicles for the transport of large-volume goods and mobile cranes.

Voith Retarder VR 123

This retarder has been developed especially for applications in trucks, city- and midibuses with a permissible weight of up to 18 t.

Voith Retarder VR 133-2

For heavy-class coaches and commercial vehicles, as well as for special vehicles: the most powerful hydrodynamic retarder with high braking torques yet low weight.



VR 120



VR 123

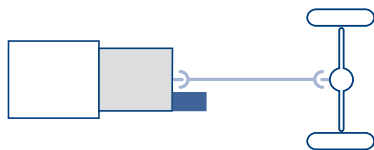


VR 133-2

Voith Offline Retarder

With step-up retarders, the speed is increased in relation to the propshaft speed with a step-up gear. They are extremely compact and provide enormously high braking outputs even at low driving speeds. As with all Voith Retarders, their oil supply is independent of the transmission.

Offline principle retarders



Voith Retarder 115 E

In co-operation with Daimler AG, the GO/VR 115 E transmission-retarder-system was developed especially for coach applications.

Voith Retarder 115 HV

This retarder has been developed further for the Mercedes-Benz commercial vehicles Actros and Axor and is installed to the Mercedes-Benz transmission PowerShift.

Voith Retarder 3250

The VR 3250 Volvo compact retarder is used in the Volvo FH and FM truck series. It is also available in a coach version exclusively for Volvo coaches with Volvo transmissions. In connection with the Renault Truck transmission Optidriver + the VR3250 is used for Renault Magnum, Renault Premium, Renault Lander and Renault Kerax.

Technical data

	VR 120	VR 123	VR 133 - 2	VR 115 E	VR 115 HV	VR 3250
Max. nominal Retarder braking torque propshaft (Nm)	2000	1500	4000	3750	3500	3250
Max. speed at propshaft (rpm)	3400	3150	2800	2400	2480	2500
Weight without operating medium approx.(kg)	65	52.5	85	65	62	59
Specific braking torque (Nm/kg)	31	29	47	58	56	55



VR 115 E



VR 115 HV



VR 3250

Maximum Performance for All: Voith Retarders Convince in Vehicle Concepts Worldwide.

Voith Retarders have proven themselves in countless applications all over the world. Small or medium vehicles and heavyweights – Voith offers you the most powerful retarders in the market.

As the development partners of renowned manufacturers, we provide our customers with the certainty that they get the best solution for their vehicle concept. In partnership and cooperation with transmission and vehicle manufacturers, we are developing tailor-made solutions for your driveline. Voith Retarders are available ex works from the vehicle manufacturers.

Transmission manufacturers

DAIMLER, DATONG, DYMOS, EXEDY, FAST GEAR, FAW, HINO, ISUZU, MITSUBISHI FUSO TRUCK & BUS CORPORATION, QIJINAG, RENAULT, SINOTRUK, SPICER, TATA MOTORS, TUMZ, VOLVO, ZF

Vehicle manufacturers

AMAZ, ANKAI, ASHOK LEYLAND, CORONA, ELBA, EVOBUS, FOTON BUS, FUSO, GOLDEN DRAGON, HINO, HIGER, HYUNDAI, ISUZU, KABUS, KATO, KING LONG, KRAVTEX, MAHINDRA-NAVISTAR, MAN, MAZ, MCV, MERCEDES-BENZ, NEOPLAN, O.I.S.A. OMNIBUS INTEGRALES S.A., RENAULT, SILVERBUS, SOLARIS, SOR, SUNWIND, TADANO, TATA MOTORS, VAN HOOL, VDL, VOLVO, YAXING, YOUNG MAN, YUTONG, ZHONGTONG



Photo: Daimler AG

How a 3 000 kW Drive Turned into the Voith Retarder.

In the 1950s, up to 5 km long and 10 000 t heavy goods trains were towed across the Rocky Mountains in the USA. Ten standard diesel locomotives were needed to carry out this task. In order to improve the transport performance, Voith developed the drive of a 3 000 kW (4 000 HP) locomotive. This project went hand in hand with the search for an economical braking system for descents with downward gradients of up to 30 ‰ – the first retarder was born.

Initiated by Otto Kässbohrer, the father of the Setra coach series, developments for road vehicles followed at the end of the sixties: in 1978, already more than 1 200 retarders were in service in coaches. During the 90s, large-scale installations in trucks and coaches followed. With the Voith water retarder a quantum leap in retarder technology has been achieved.

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Engineered Reliability