Driventic

# Mobility beyond today.

driventic.com

EDITORIAL

# Driving the mobility transition

Driventic specializes in modern drive technologies for trucks, buses, and off-highway applications. With our integrated systems and digital services, we are completely redefining efficiency and sustainability for commercial vehicles. We see ourselves as a fast-paced, innovative driving force for manufacturers and fleet operators alike. And we pursue only one goal: mobility that doesn't leave any traces behind – except progress.



We are taking mobility into the future. We not only have the perfect answers but also are actively propelling the mobility transition forward with our pioneering drive solutions.

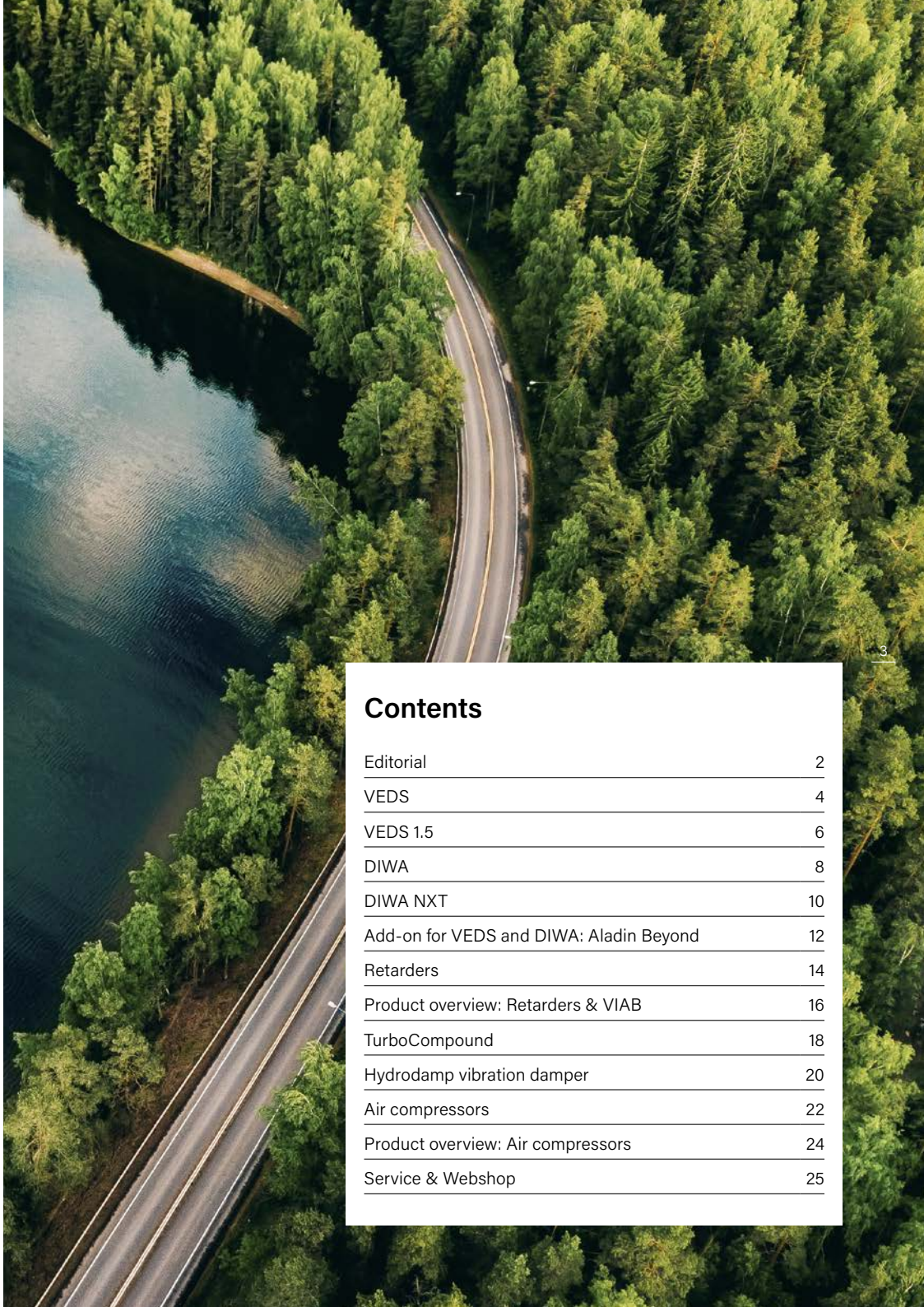
Whether for use in e-mobility or conventional drives, innovative products and systems, digital applications, and tailored service offerings give us the necessary power to change mobility for the better.

In 18 countries, our 1,400 employees live and breathe our mission as a genuine mindset: to combine ecology with technological progress in the service of efficiency. This benefits vehicle manufacturers and operators alike.

Our thinking doesn't end with commercial vehicles – this is precisely where it begins. By expanding our focus and deliberately steering away from individual products and toward system solutions, we are taking the drive technology for trucks, buses, tractors, and construction equipment to a whole new level.

**That's what we mean by**

## Mobility beyond today.





## Contents

# Best in class in efficiency

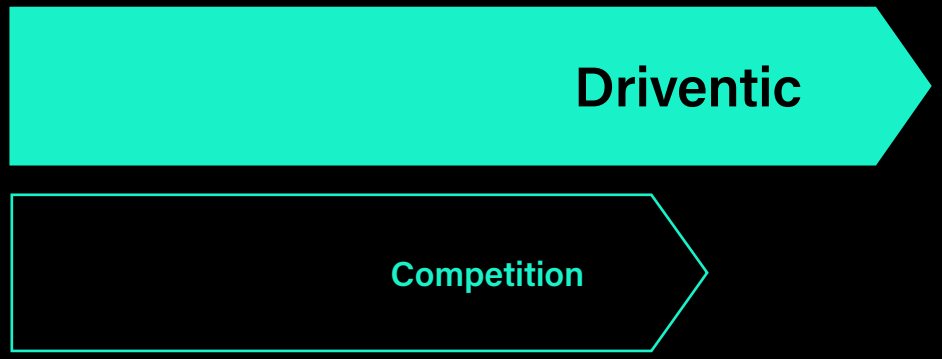
The future of mobility is electric – and Driventic is leading by example and actively helping to shape it. With our VEDS electric drive system, we offer highly efficient customized drive solutions that lower the $CO_2$ emissions from trucks, buses, and other commercial vehicles and help protect the environment. As your partner for integrated electric mobility solutions, we support the transition to more climate-friendly mobility – reliably, innovatively, and sustainably. Together, we are driving the future. And the future is electric.

Best in class in efficiency means we are offering you the most efficient drivetrain on the market. Because in practical use, the energy consumption of our VEDS is much more efficient than that of most competing products. This has already been officially confirmed multiple times in independent tests. As a result, we are enabling you to efficiently increase the range of your vehicles.

Another advantage is that our modular system is suitable for all kinds of drives – whether battery-electric or fuel cell-based. So what are you waiting for? Ensure your individual competitive edge now with Driventic.



## Main advantages of our VEDS




**Greater range:** System with low energy consumption and high recuperative capacity.

### Modularity

Modular motor concept, suitable for all bus classes; optimized range due to high efficiency and low system weight

### Transition

Reliable, simple transition to e-mobility. For environmentally friendly and citizen-friendly urban public transportation

### System

Complete system approach for ease of installation and maximum reliability

### Integration

Supports all common battery systems and is compatible with all vehicle types

### Noise

Minimal noise level inside and outside the bus thanks to direct drive and water cooling

### Emissions

Local emissions of NOx or particulates avoided through regenerative braking and energy management

# Still best in class and ahead of its time

With the new VEDS 1.5 electric drive system, Driventic presents numerous groundbreaking improvements that take into account and comprehensively meet all the current requirements of modern electric mobility applications. So that we remain best in class in the future.

The highlight is, apart from a new high in efficiency, the new DIS inverter system (drive inverter system) with integrated drive management unit (DMU). The system meets all common automotive cyber-security standards based on ISO 21434.

Other new features include the auto-motive-compliant connector system for faster installation and easier preventive maintenance and a smaller, lighter modular drive system that still delivers the usual best-in-class efficiency.

Peak outputs of up to 390 kW can be achieved without any compromises in efficiency.

The VEDS 1.5 comes in a small scope (basic) version and an extended scope version to cover various applications and requirements – configurable according to customer requirements. So that you stay efficient on the road to success in the future with Driventic.



## The HD and MD motors of the new VEDS 1.5

Peak output of up to

**390 kW**

## The new DIS inverter system (drive inverter system)

State-of-the-art

**Cybersecurity standards**

### HD motor technical data

- 390 kW max. output
- 320 kW continuous output (30 minutes)
- 3,100 Nm max. torque
- 3,800 rpm max. speed

### MD motor technical data

- 255 kW max. output
- 240 kW continuous output (30 minutes)
- 2,850 Nm max. torque
- 2,500 rpm max. speed (2,850 rpm at operating temperature)

### Main advantages of the VEDS 1.5

- Available in small scope (basic) and extended scope versions
- New DIS inverter system with integrated drive management unit (DMU)
- Meets automotive cybersecurity standards
- Based on ISO 21434
- Automotive-compliant connector system for faster installation and easier preventive maintenance
- Smaller and lighter modular drive system design
- No sacrifice in efficiency

# Making proven technology more efficient

Move off, shift, brake, shift: all these gear changes cause particular challenges for bus transmission systems in scheduled services. This is why bus manufacturers and operators are opting for Driventic's globally successful DIWA automatic transmission. You too can enjoy optimum performance thanks to intelligent gear shifts. At the same time, you'll efficiently reduce downtimes, preventive maintenance costs, and fuel consumption. For an overall higher availability.

Whether for diesel, CNG, HVO, B100, or $H_2$ drives, more than 400,000 city and regional buses have been fitted with DIWA automatic transmissions to date. As a result, millions of passengers worldwide enjoy a much more comfortable ride. Especially in speed ranges that require other transmissions to shift gears two to three times, the benefits of the stepless starting and braking functions are most noticeable. Because you don't notice them.

With DIWA automatic transmissions, fuel consumption and emissions are reduced just as efficiently as noise levels are. Driventic also offers numerous other advantages that pay off for you on the road. For example, the ease of installation and low maintenance costs combined with consistently superior service quality.



## DIWA automatic transmission

**TCO**

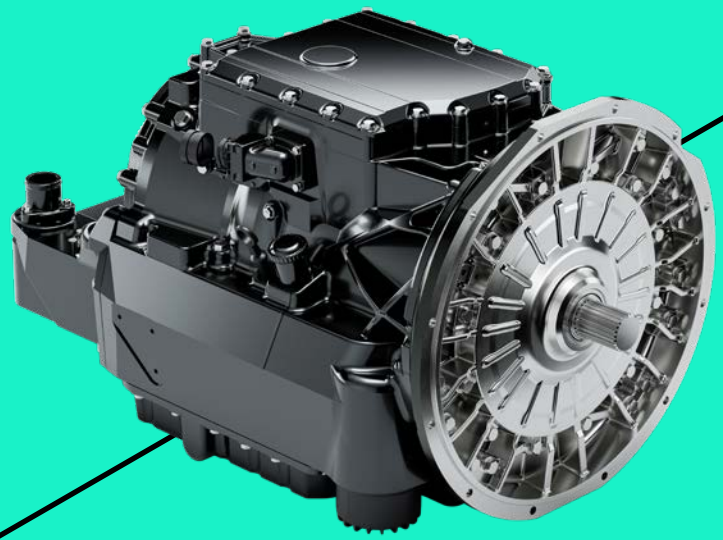
Optimized TCO thanks to low fuel consumption and low preventive maintenance costs

**Emissions**

Reduced pollutant and noise emissions

**Comfort**

Maximum comfort for passengers



**Efficiency**

Highest efficiency in CNG applications

**BRT**

Perfect for challenging BRT lines

**Installation**

Easy installation

# The right transmission at the right time

Make way for the DIWA NXT – the next generation of our proven DIWA automatic transmission. The standout feature of this groundbreaking mild hybrid system is its optimized efficiency: it features seven gears, a frequency inverter, and a secondary retarder.



The optional central recuperation unit (CRU) transforms the DIWA NXT into a fully functional 48 V mild hybrid system, improving fuel efficiency, enabling electric-assist functions, and recovering braking energy in both city and regional buses.

The entire system is developed and manufactured in accordance with the latest automotive standards, including ISO 26262.

DIWA NXT also offers additional practical features such as stop-start, coasting, recuperation during braking, or boost support. It thus bridges the gap between diesel drives and alternative technologies – and is Driventic's logical response to the continuously growing demand for efficient and environmentally friendly drive solutions.



ADD-ON FOR VEDS AND DIWA: ALADIN BEYOND

# Cloud-based fleet management

How modern fleet management is done today: With Aladin Beyond, Driventic has developed a new cloud-based solution for the intuitive, data-driven monitoring and preventive maintenance of its VEDS electric drive system and DIWA automatic transmission. It offers everything from a single source and in one report.

The centerpiece of our platform in the future will be a sophisticated monitoring system that continuously captures and evaluates your vehicle data. In the process, it not only registers current malfunctions but also monitors apparently rectified faults – a crucial advantage that allows you to create transparency and identify recurring problems in good time.

Due to the systematic evaluation of historical operating data, preventive maintenance is also taken to a whole new level. Thanks to Aladin Beyond, preventive maintenance needs are identified before critical failures can even occur. This results in much lower life cycle costs, optimized vehicle performance, and lasting protection of investment value.

Another key feature is that the preventive maintenance team is notified automatically whenever problems are identified. A detailed analysis of vehicle efficiency is also provided. For example, Aladin Beyond analyzes the braking behavior per kilometer traveled or the percentage of kick-down accelerations. With the help of this data, your fleet managers can identify wear-intensive driving styles in good time and take appropriate countermeasures as needed. Essentially, the new platform from Driventic marks a milestone in the digitalization of your fleet management.



**Monitoring**

Continuous monitoring of active and inactive faults

**Reporting**

Reports accessible at all times – on a PC, smartphone, or tablet

**Preventive maintenance**

Problems requiring preventive maintenance are automatically reported to the preventive maintenance team. The solution is quickly available

**Transparency**

Tracking of the average efficiency of the bus fleet as well as kick-down percentage and braking operations per kilometer helps you avoid wear and tear

**Prediction**

Predictive maintenance based on historical data enables you to reduce life cycle costs, improve vehicle performance, and preserve asset value

**Ordering**

Part replacement necessary? Simply click on the link in the report. You will be automatically redirected to the online store, where you can place the order

# Efficient, safe braking

With Driventic retarders, which were specially developed for commercial vehicles, up to 90% of all braking actions by heavy trucks can be performed without any wear. This is a significant safety advantage that pays off for you on the road in several ways. Our retarders protect the service brakes and thus not only increase safety, but at the same time lower the costs for replacement parts and preventive maintenance. In addition, your transport capabilities are increased due to higher average speeds.

It takes a lot of braking power to slow down a truck weighing several tons. In demanding uses, such as adaptive braking on highways or long downhill stretches, the temperatures of conventional friction brakes can reach up to 1,000 degrees Celsius, causing their braking efficiency to decline rapidly. Our retarders offer the ideal solution for this challenge, because the hydrodynamic endurance braking system brakes your vehicle safely and without wear. The service brakes are conserved efficiently, but are always fully operational in emergency situations.

It is hardly surprising then that all over Europe, endurance brakes are required by law in buses and trucks. In this context, the best thing to do is to put your trust in Driventic's efficiency and expertise.



## Main advantages of our retarders

**Consumption**

Less consumption due to more uniform speeds

**Constancy**

Constant driving speed thanks to v-constant function

**Emissions**

Up to 80% lower brake dust emissions

**Payload**

Optimal use of payload limits due to low net weight of retarder

**Operation**

Lower operating costs thanks to much longer service brake operating life and thus lower preventive maintenance costs

**Transport**

Greater transport capabilities due to higher average speed

# Product overview

Another highlight is our VIAB Turbo Retarder Clutch (TRC): With this wear-free integrated starting and braking system, even heavy-duty trucks can start up powerfully, maneuver with millimeter precision, and brake safely, sustainably, and without wear. This results in considerably longer service lives for friction clutches and service brakes as well as greater safety and ride comfort.

## Retarders for commercial vehicles




**Technical data**

| Type | R 115DT | R 115CT | R 115HV | R 3250 |
|---|---|---|---|---|
| **Max. rated braking torque at the prop shaft** | 4,000 Nm | 3,500 Nm | 3,500 Nm | 3,250 Nm |
| **Max. retarder speed** | 5,300 rpm | 5,300 rpm | 5,300 rpm | 5,000 rpm |
| **Aggregate weight without operating medium** | approx. 55 kg | approx. 54 kg | approx. 57 kg | approx. 60 kg |
| **Operating medium** | Oil | Oil | Oil | Oil |
| **Application** | Truck | Truck/Coaches | Truck | Truck/Coaches |

Based on our broad experience from daily practice, we have developed a retarder program that offers you an optimal solution for any well-known commercial vehicle type.

## VIAB Turbo Retarder Clutch for trucks

| VIAB Turbo Retarder Clutch | |
|---|---|
| **VIAB is a starting and braking system** | |
| **Max. engine torque*** | 3,000 Nm |
| **Max. retarder braking torque*** | 2,400 Nm |
| **Engine speed*** | 2,500 rpm |
| **Weight excluding oil*** | 130 kg |

*Mercedes-Benz Truck Application

# Reduce fuel consumption efficiently

How smart is that? Driventic offers you a pioneering, emissions-reducing transmission solution with an economical turbo clutch – developed specifically for highly efficient TurboCompound systems with low-loss torque transmission. Because while your commercial vehicles need to meet increasingly more stringent emission regulations such as the current EURO VI standard, as a customer, you require ever more efficient engines with the lowest fuel consumption possible.

It's a fact that in most trucks, maximum 44% of the fuel's energy reaches the drivetrain. The rest dissipates as thermal, friction, and exhaust gas energy. Modern TurboCompound engines therefore convert the thermal energy from exhaust gases into mechanical energy.

Our innovative transmission solution with its hydrodynamic coupling transfers this energy effectively to the engine's crankshaft. The result is up to 6% lower fuel consumption and $CO_2$ emissions. This simple yet energy-efficient solution from Driventic pays off for you across the board in several ways, as your commercial vehicles are much more cost-efficient and environmentally friendly.



# Decreased vibrations, longer service life

Whether in tractors, construction machinery, buses, or trucks, modern high-torque, consumption-optimized engines stress the drivetrains of your commercial vehicles a lot more than engines used to in the past. The Hydrodamp vibration damper series from Driventic therefore efficiently protects the drivetrain from overload – and, because of the decrease in vibrations, sustainably extends the service life of the individual components.

The Hydrodamp is a highly elastic vibration damper with a spring mass system and a separately arranged hydraulic damping system. The low spring stiffness combined with favorable mass ratio shifts critical resonances into areas below the operating speed range. Independently of this, the hydraulic operation principle for vibration damping and isolation is designed to match your vehicle's operating speed ranges.

The vibration damper is available in three vehicle- and application-specific series for engine torques of up to 3,700 Nm. A special feature is that each one can be customized in terms of damping and suspension characteristics to suit your individual requirements and areas of application. Thus, Driventic not only noticeably enhances the comfort, but also significantly improves the economy of your commercial vehicles.



**Wear**

The damping is wear-free

**Vibration**

No stick–slip phases followed by breaking free, i.e., no vibration excitation as experienced with conventional friction damping

**Damping**

The damping force is proportional to the velocity, which means that high frequencies or amplitudes will result in greater damping

**Effect**

The damping effect can be systematically adjusted to different operating ranges by means of the torsional angle, gap geometries, and viscosity of the damping medium

# High pressure for more efficiency

Driventic air compressors, which were specifically developed for commercial vehicles, are the leading technology worldwide. The two-stage compression with intercooling makes this possible. Because compared with single-stage air compressors, it allows much higher outputs in delivery mode with significantly lower energy consumption. But that's not all: Even in non-delivery mode, our air compressors with innovative technologies ensure maximum energy efficiency and low-emission operation of your buses and trucks.

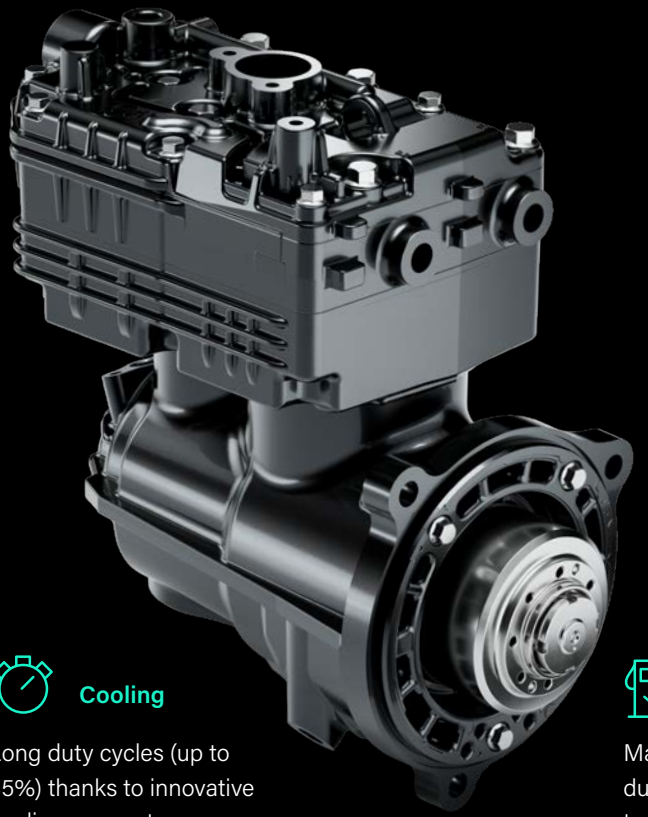


With our air compressors, we are making a significant contribution to the economy and sustainability of your commercial vehicles. The two-stage compression with intermediate cooling is a crucial aspect, as it results in a substantial reduction of power uptake in delivery mode. Moreover, the reduced compression temperature allows longer duty cycles and therefore increases the maximum delivery capacity with the same cylinder displacement. In addition, the engine oil no longer "cracks" thanks to the lower temperatures.

This means that compressor, engine, compressed air system, and the environment are protected due to fewer harmful by-products.

What is more, smart technologies such as the SLS idling system, TwinSave, or integrated clutch reduce energy consumption in non-delivery mode. As does the low weight of the systems thanks to their lightweight aluminum construction in volume production. Your best bet is therefore to work with Driventic to achieve the next step in energy efficiency.

## Main advantages of our air compressors



### Cooling

Long duty cycles (up to 85%) thanks to innovative cooling concept

### Efficiency

Maximum fuel savings due to use of clutch technology

### Energy

Low energy consumption in non-delivery mode thanks to innovative idling and clutch systems

### Effect

Better air quality, resulting in higher availability of air system

### Weight

Significant weight reduction due to use of die-cast aluminum leads to higher load capacity

# Product overview





**Technical data**

| Type | LP 560 | LP 490 |
|---|---|---|
| **Cylinders** | 2 | 2 |
| **Compression** | Two-stage | Two-stage |
| **Cylinder displacement** | 560 $cm^3$ | 490 $cm^3$ |
| **Maximum pressure** | 15 bar | 15 bar |
| **Idling system** | ■ | ■ |
| **Clutch** | ■ | ■ |
| **Drive-through, e.g., for PTO (power take-off)*** | ■ | ■ |

*Not for clutch solutions





# Always one step ahead

Whether you need preventive maintenance, repairs, system updates, or replacement parts, Driventic offers customized service concepts for commercial vehicles that will give you a major competitive edge. So you will always be one step ahead. Because by using approved original parts, you benefit from maximum safety, longer service lives, and greater value retention. Our digitalization solutions make the operation of commercial vehicles even more efficient and sustainable.

SERVICE

# Key benefits for our customers

### #1 Digital services

With digital services from Driventic, you will always make the right decision. At any time, you have flexible, on-demand access to in-depth operating data analysis, permanent status monitoring and customized servicing recommendations. Based on the data collected, we can work with you to optimize your maintenance processes, maximize fleet availability and minimize operating costs.

### #2 Spare parts

Driventic expertly combines certified quality with the latest technology, from the smallest exchangeable unit to complete assemblies and functional units. You can also take advantage of our exclusive spare parts kits.

### #3 Reman products

When it comes to exchanging components and systems as quickly as possible, Driventic will always be the right option. We offer remanufactured products on short notice – reliably ensuring minimal downtime for your commercial vehicles.

### #4 Service network

Whether in our workshops or at your site, Driventic's worldwide service network guarantees short distances and fast response times. Thanks to our regional locations, our experienced experts speak your language and can provide you with the best possible advice. This means you receive exactly the support you need from our wide range of professional services.



### #5 Consulting & training

Driventic leads by example to ensure that the mobility transition continues to gain momentum in the commercial vehicle segment. Whether in theory or practice, we are happy to pass on our knowledge to you. With cross-product training concepts and our technical support, we assist you with your challenges.

### #6 Modernization

To ensure that your vehicle fleet continues to meet the highest standards in the future, Driventic offers you various optimization options. We would be happy to advise you comprehensively on modernization with a focus on a sustainable increase in the efficiency, reliability and comfort of your commercial vehicles.

WEBSHOP

# Register online now

**What are you waiting for? Driventic's extensive online store now offers even faster response times, less administration, enhanced security and convenient access to replacement and wear parts – around the clock.**

Register today and benefit from all the advantages our online store has to offer.

Scan the QR code and get started!

Driventic



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