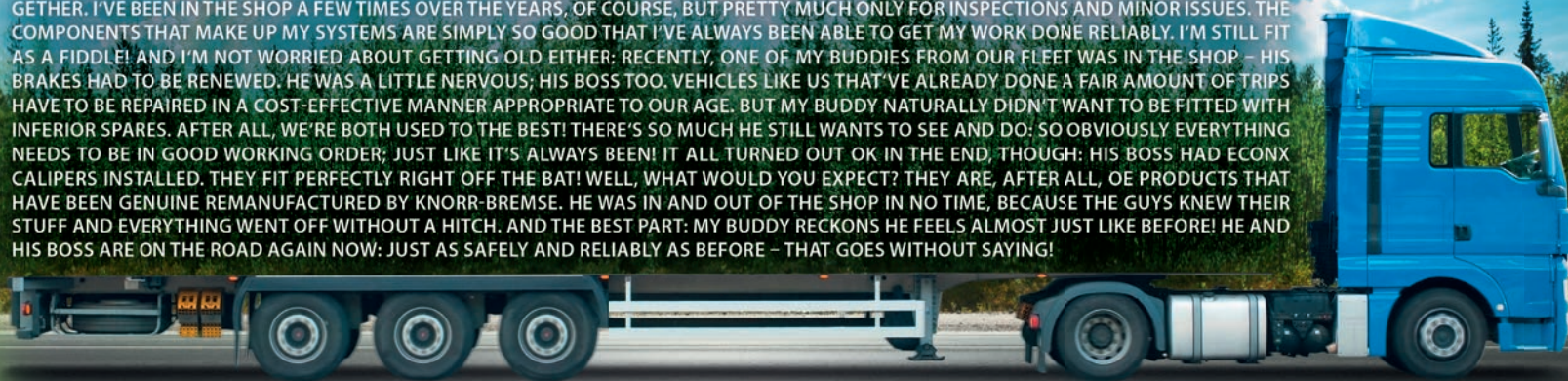


MY BOSS AND I HAVE DONE MANY, MANY TRIPS TOGETHER OVER THE YEARS. WE'RE LIKE A WELL-OILED MACHINE: I'M RUN IN AND MY BOSS KNOWS EXACTLY HOW I TICK. I'M IN MY PRIME AND LOOK FORWARD TO OUR NEXT ADVENTURE JUST AS MUCH NOW AS ON OUR FIRST DAY TOGETHER. I'VE BEEN IN THE SHOP A FEW TIMES OVER THE YEARS, OF COURSE, BUT PRETTY MUCH ONLY FOR INSPECTIONS AND MINOR ISSUES. THE COMPONENTS THAT MAKE UP MY SYSTEMS ARE SIMPLY SO GOOD THAT I'VE ALWAYS BEEN ABLE TO GET MY WORK DONE RELIABLY. I'M STILL FIT AS A FIDDLE! AND I'M NOT WORRIED ABOUT GETTING OLD EITHER. RECENTLY, ONE OF MY BUDDIES FROM OUR FLEET WAS IN THE SHOP - HIS BRAKES HAD TO BE RENEWED. HE WAS A LITTLE NERVOUS; HIS BOSS TOO. VEHICLES LIKE US THAT'VE ALREADY DONE A FAIR AMOUNT OF TRIPS HAVE TO BE REPAIRED IN A COST-EFFECTIVE MANNER APPROPRIATE TO OUR AGE. BUT MY BUDDY NATURALLY DIDN'T WANT TO BE FITTED WITH INFERIOR SPARES. AFTER ALL, WE'RE BOTH USED TO THE BEST! THERE'S SO MUCH HE STILL WANTS TO SEE AND DO: SO OBVIOUSLY EVERYTHING NEEDS TO BE IN GOOD WORKING ORDER; JUST LIKE IT'S ALWAYS BEEN! IT ALL TURNED OUT OK IN THE END, THOUGH: HIS BOSS HAD ECONX CALIPERS INSTALLED. THEY FIT PERFECTLY RIGHT OFF THE BAT! WELL, WHAT WOULD YOU EXPECT? THEY ARE, AFTER ALL, OE PRODUCTS THAT HAVE BEEN GENUINE REMANUFACTURED BY KNORR-BREMSE. HE WAS IN AND OUT OF THE SHOP IN NO TIME, BECAUSE THE GUYS KNEW THEIR STUFF AND EVERYTHING WENT OFF WITHOUT A HITCH. AND THE BEST PART: MY BUDDY RECKONS HE FEELS ALMOST JUST LIKE BEFORE! HE AND HIS BOSS ARE ON THE ROAD AGAIN NOW: JUST AS SAFELY AND RELIABLY AS BEFORE - THAT GOES WITHOUT SAYING!



# EconX<sup>®</sup>

GENUINE REMANUFACTURED PRODUCTS FOR OLDER COMMERCIAL VEHICLES  
GENUINE, ECONOMICAL, SUSTAINABLE

**TRUCKSERVICES**



[GENUINE NEW](#)

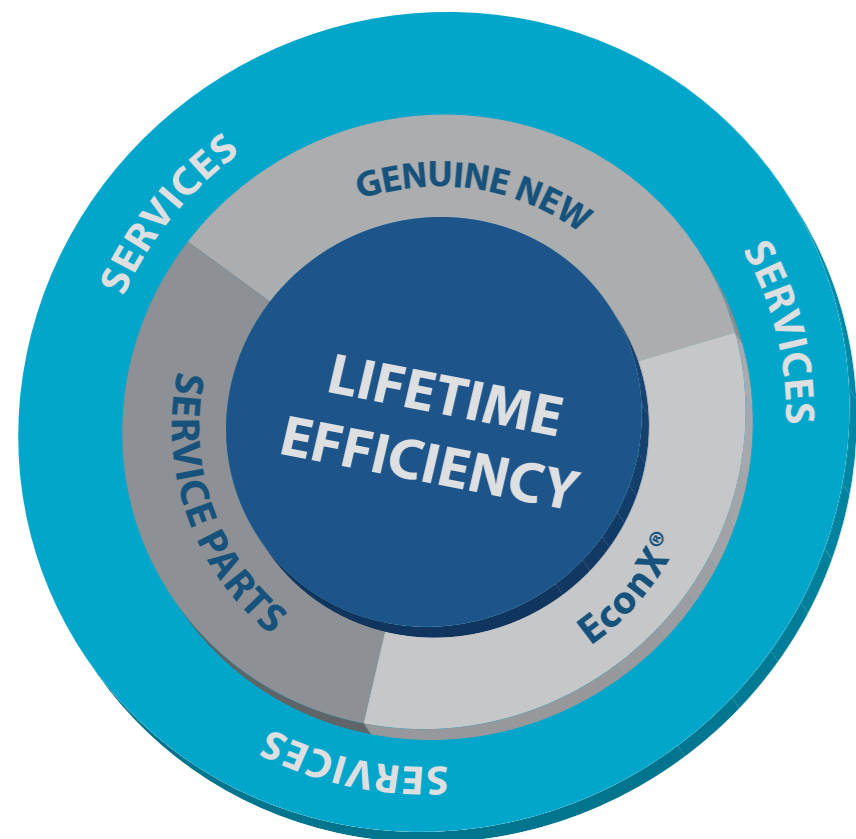
[EconX<sup>®</sup>](#)

[SERVICE PARTS](#)

[SERVICES](#)

» OUR LIFETIME EFFICIENCY PRINCIPLE

## A PROMISE FOR A VEHICLE'S ENTIRE LIFETIME



We believe that commercial vehicles belong on the road because that's precisely what they are made for. It makes no difference how many miles a vehicle has already travelled: what is required is maximum driving performance, short downtimes and the safest conditions – because this is the only way to keep business thriving and the company competitive.

In order that drivers and commercial vehicle operators can be sure that this story continues, no matter how old the vehicles in a fleet are, we provide them with everything they need: genuine new service products for young vehicles, genuine remanufactured EconX products for the repair of older vehicles, service parts for vehicles in all stages of operation, and continuous service through our Expert Network, the Alltrucks workshop network and our branch operations in many parts of the world.

This keeps every vehicle on the road for a long time – always cost-effectively, with the latest technology and fully geared towards safety.

**We call this Lifetime Efficiency.**

ECONX  
LIFETIME EFFICIENCY

» THIS IS EconX

## THE IDEAL SOLUTION FOR OLDER VEHICLES

EconX is the Knorr-Bremse brand for genuine remanufactured products that keep older trucks and trailers safely on the road.



### Quality of an original parts manufacturer

Older vehicles are just as safe driving with EconX products as they are with service new products. This is because despite their shortened life expectancy, the functionality of remanufactured EconX products is the same.

We ensure this by way of a special remanufacturing process that refers to the standards set for the OE products.



### Economical right up to the end

EconX products are the ideal solution for the economical repair of vehicles with a limited remaining service life. This is due to the fact that the lifetime expectancy of EconX products is tailored to the expected remaining service life of the vehicle: It's shorter than for service new products because the main components come from used products (cores).

That's exactly why they can be manufactured at a lower cost – and as a result contribute to reducing the total cost of ownership (TCO) of a vehicle.



### A sustainable second life

Using EconX products to repair vehicles that are »in their prime« is not only more cost-effective but also sustainable. The manufacturing of EconX products conserves resources, uses significantly less energy than manufacturing comparable service new products and, as a consequence, generates lower emissions.

The use of remanufactured components for the production of an EconX SN7 brake caliper unit, for example, results in a reduction of emissions equivalent to 44.9 kg CO<sub>2</sub>.

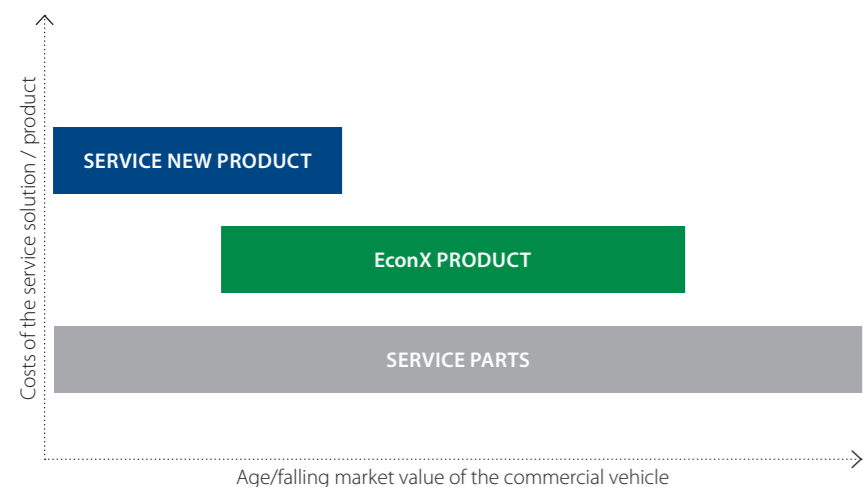


» REPAIRS BASED ON CURRENT MARKET VALUE

## A QUESTION OF ECONOMIC VIABILITY

Whether a vehicle is “ready” for EconX products depends on the vehicle’s current market value and its expected remaining lifespan, which does of course decrease as the vehicle gets older.

With a cheaper price and a shorter lifespan, EconX products help to optimise the total cost of ownership (TCO) of a vehicle – and are used whenever an older vehicle has already covered a number of kilometres and a new service part is not an economically viable option.



» ECONX AND GENUINE NEW

## AN OVERVIEW OF THE DIFFERENCES

	Service new product	EconX product
<b>Warranty</b>	12 to 24 months (dependent on product)	12 months(standard IAM warranty)
<b>Replenishment lead time</b>	Dependent on the availability class of the service new product	Usually 2 weeks longer than for a service new product
<b>Technology</b>	That of a new OE product: the latest series production technology	As close as possible to the latest series production technology, based on the remanufactured components
<b>Life expectancy</b>	In line with established OE product quality	Shorter than for a service new product, due to the remanufactured components
<b>Manufacturing process</b>	Assembled according to the same standards as for a new OE product	
<b>Testing</b>	Tested and inspected according to the same standards as for a new OE product	
<b>Quality management system</b>	The Knorr-Bremse Quality Management System	
<b>Appearance</b>	That of a new OE product	May have signs of use and include reconditioned parts
<b>Packaging &amp; identification marking</b>	White IAM packaging, standard product number suffix: N50, N00	Blue IAM packaging*, green product label*, standard product number suffix: X50, X00 <small>*in implementation for complete portfolio</small>
<b>Recommended for</b>	Vehicles of all ages	The current value related repair of older vehicles
<b>Available product types</b>	The complete Knorr-Bremse product portfolio	Over 500 different EconX products

» GENUINE REMANUFACTURING PROCESS

## A SECOND LEASE OF LIFE

Our many decades of OE experience are also incorporated into our remanufacturing process. A large part of the reconditioning takes place in our remanufacturing plant in Liberec in the Czech Republic – a 12,000 m<sup>2</sup> facility with state-of-the-art equipment, ESD workstations and specialist workers.

In addition, we continuously work on making further improvements to our processes to achieve the greatest possible reconditioning rates, for example as part of publicly funded research projects.

### 1. Core Returning

For each core (used product) that is returned, customers receive a surcharge back from us from the acquisition of a product from the surcharge program. The return window for cores is one year. For the users of the product, the (first) cycle is completed here – it starts afresh for us.

### 2. Core Sorting

Initially each core is carefully examined by us for any signs of wear, damage, the design level and product-specific ageing characteristics. Cores that no longer meet our quality requirements are disposed of in an environmentally friendly way.

### 3. Disassembling

Each core is now broken down into its constituent parts. A two-channel pressure control module of an electronic braking system, for example, consists of 80 individual parts which all need to be checked individually. Consumable parts are disposed of in an environmentally friendly way and, after being examined, the rest of the components undergo cleaning.

It is precisely defined for each component when it can be reused. We pay particular attention to the mechatronic and electronic components which are protected from static discharges at what are known as ESD workstations.

### 4. Cleaning

We utilise thermal, chemical, mechanical and combined cleaning processes to completely remove the dirt acquired from hundreds of thousands of kilometres on the road. The equipment includes spray washing systems, chamber washing systems, and pyrolysis installations for burning down old lacquers, blasting units with different media and ultrasonic baths.

### 5. Reconditioning

Some components must be reconditioned before they are reassembled: crankcases of compressors for example need to be honed and resized in order to keep oil emissions as low as possible during their second life as well.

Defective electronic components must likewise be replaced and resoldered. Software versions are also upgraded. We have incidentally patented some of the reconditioning steps that we have developed ourselves.

### 6. Testing

All components are fully tested before they are reassembled. Special test equipment and procedures are used to test their reusability and compliance with the specification. Here too we have patented certain test processes.

### 7. Reassembling

The reassembly follows similar processes to the production of the new OE products – and for some products is in fact carried out on the same assembly lines. The key element is the end-of-line tests for quality assurance for each individual product: In the case of an EBS module, for example, this means more than 90 individual testing and measurement steps.

**The remanufactured product is now available for its new application in older vehicles and trailers.**

» PORTFOLIO

# ALREADY OVER 500 PRODUCTS



Calipers for Truck and Bus



- EBS Components**
- › One- and Two-Channel Modules
  - › Foot Brake Module
  - › Trailer Control Module



Electronic Air Control



- Compressors**
- › Single und Twin Cylinder
  - › Split- and Monoblock
  - › Knorr-Bremse and competitor design



Turbocharger



Calipers for Trailer



Trailer EBS



Oil Separator Cartridge



- Clutch Actuator**
- › Electronic and pneumatic
  - › Knorr-Bremse and competitor design



**Continuous extension of our EconX portfolio**

» PACKAGING DESIGN

# VERY EASY TO IDENTIFY

EconX products are very easy to identify in shops and warehouses from their blue packaging design. This means it is always immediately clear whether a product is a new product or a remanufactured one.

In addition, you will also find clear identifying features on the respective products which make it very easy for you to differentiate, e.g. the green type plate on our EconX caliper.



**Label**

Green type plates for EconX products



**Packaging**

Blue packaging for EconX products, white for service new products

» CORE MANAGEMENT

## SIMPLE AND TRANSPARENT

Thanks to our fully digitised core return process, the return process is not only particularly efficient but is also completely transparent for our customers:

You can find detailed information about returning cores in our **Core Manual**



You can register all cores that meet our requirements for collection for example via your Knorr-Bremse ePortal log-in and then declare the pallet containing the cores (in their original box).



The collection will then be confirmed, your pallets collected and delivered directly to our central core sorting centre at the remanufacturing plant for diagnostics.



We then examine all cores for their quality and suitability for our genuine remanufacturing process. We e-mail you the result of this examination in a return report.

There you will see any quantity differences between the registered and received cores, the condition and, if present, details of any damage. All rejected cores are documented by us with photographs. Furthermore, you can see the status of your core account, the number of cores still to be returned and other details. This ensures that we and our customers have complete transparency at all times.



» SUSTAINABLE PRODUCTION

## THE HIGHEST FORM OF RECYCLING

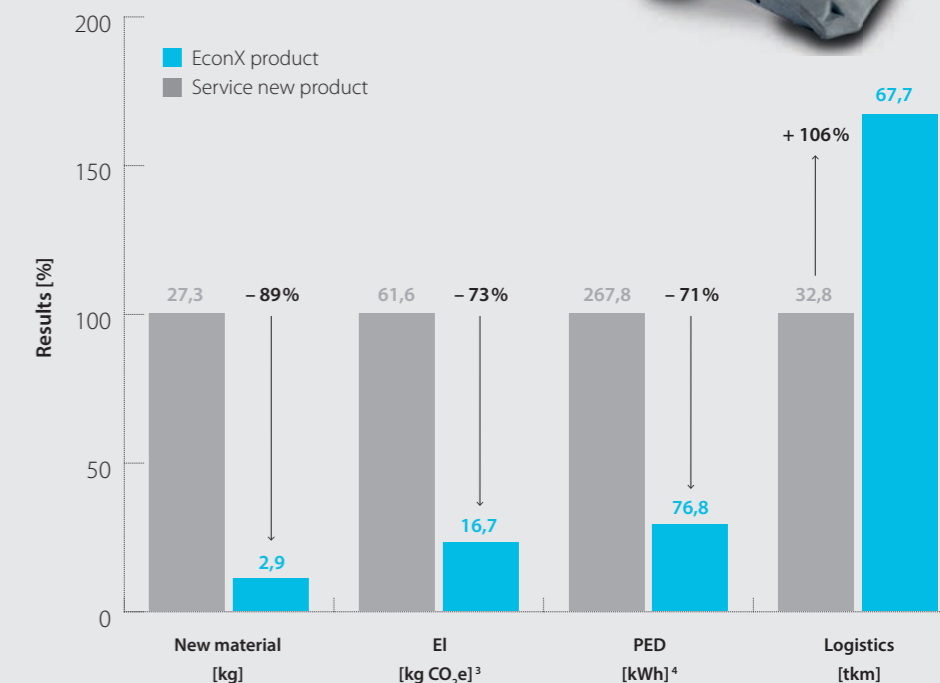
With EconX, repairing vehicles "in their prime" is not only more economical, but is also more sustainable. This is because manufacturing EconX products conserves resources, consumes much less energy than manufacturing similar service new products, and therefore also reduces CO<sub>2</sub>-equivalent emissions.

We are thus not only supporting the sustainability targets of Knorr-Bremse, but also very actively improving the ecological footprint of the vehicles which rely on our EconX products every day. We calculate the relevant savings (e.g. in terms of material and CO<sub>2</sub>e<sup>2)</sup> for every single product in regular studies in accordance with DIN EN ISO 14040 and 14044, known as life cycle assessments (LCA)<sup>1)</sup>.

The LCAs which we carry out on our EconX products have been audited and approved by the independent institute DEKRA<sup>5)</sup>.



Example: LCA-Study per SN7 Caliper



AUDITED BY  
**DEKRA**

1) Life Cycle Assessment (LCA) methodology according to DIN EN ISO 14040 and 14044; scope: cradle-to-gate study; impact category: climate change with characterization factor GWP100; major processes and its in-/outputs are measured and investigated with industry partners; additional processes modelled with ecoinvent 2.2 and Gabi 6 PE-international datasets; year of study 2015; functional unit: finished product SN7 rationalized caliper (compared to a complete Air Disc Brake ADB without brake pads and carrier) in saleable status 2) CO<sub>2</sub>e: category indicator result in kg CO<sub>2</sub>-equivalents; methodology uses Global Warming Potentials (GWP100) to calculate the potency of greenhouse gases over a timescale of 100 years; used in Kyoto-Protocol 3) Environmental Impact (EI); measured according to 1) + 2) 4) Primary Energy Demand (PED); quantity of energy withdrawn from hydrosphere, atmosphere, geosphere or energy source w/o any anthropogenic change; calculated with Gabi 6 (Modelling Principles 2013) 5) LCA Verification Statement issued by DEKRA Assurance Services GmbH; Critical Review of Knorr-Bremse CVS Life Cycle Methodology – Critical Review Report No. A16071012; Reviewer: Dr.-Ing. Ivo Mersiowsky; 14/12/2016



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