triscan·news

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ELECTRIC WATER PUMPS - NEW PRODUCT RANGE WITHIN THE WATER PUMP PROGRAMME

HOW DOES OUR NEW ABS TESTER WORK - AND HOW DO OUR CUSTOMERS BENEFIT FROM THIS INVESTMENT?

TRISCAN CABLE PROGRAMME: WE INCREASE, IMPROVE AND TEST!

40% EXPANSION OF THE CENTRAL WAREHOUSE CAPACITY

AVOID PROBLEMS WHEN REPAIRING THE POWER STEERING

NEWS: Can a defective strut mount bearing be dangerous? • In-house test equipment for EGR valves • More stringent quality requirements from automotive manufacturers – Triscan joins in • What has an error code regarding the ignition in the second cylinder to do with the ABS system? • On-site quality controls - also in Asia • and much more …

Who are we - and what can we do?

Triscan is a 100% Danish company who has gained a strong position in the Scandinavian market and achieved heavily increasing sales in the rest of Europe. This position has been reached through creation of concepts, marketing and distribution of automotive spare parts for the professional free aftermarket.

- Fast delivery of the right parts
- Spare parts for 52 car makes
- 50,000 references
- 25 product groups
- Complete delivery
- Online catalogue

When you buy spare parts from Triscan you will not only get a product of high and uniform quality but also a complete product supplied with all the necessary mounting parts in a user-friendly packaging with mounting instructions, reference number, application guide etc.

"Improved sales and earnings, increased efficiency, higher delivery rate, reduced stock value and greater customer satisfaction"

Every day goods are delivered from Triscan's 3 distribution centers in Brabrand, Glostrup as well as Iserlohn in Germany - to 35 markets in Europe.


Brabrand, DK


Glostrup, DK


Iserlohn, D

IN-HOUSE TEST EQUIPMENT FOR EGR VALVES • 4

To ensure a high level of service and quality, we continuously expand our in-house test facilities. Our latest acquisition is an EGR valve tester. In the following paragraphs we will explain why in-house testing equipment has high priority for us and how the EGR valvetester works …

40% EXPANSION OF THE CENTRAL WAREHOUSE CAPACITY • 8

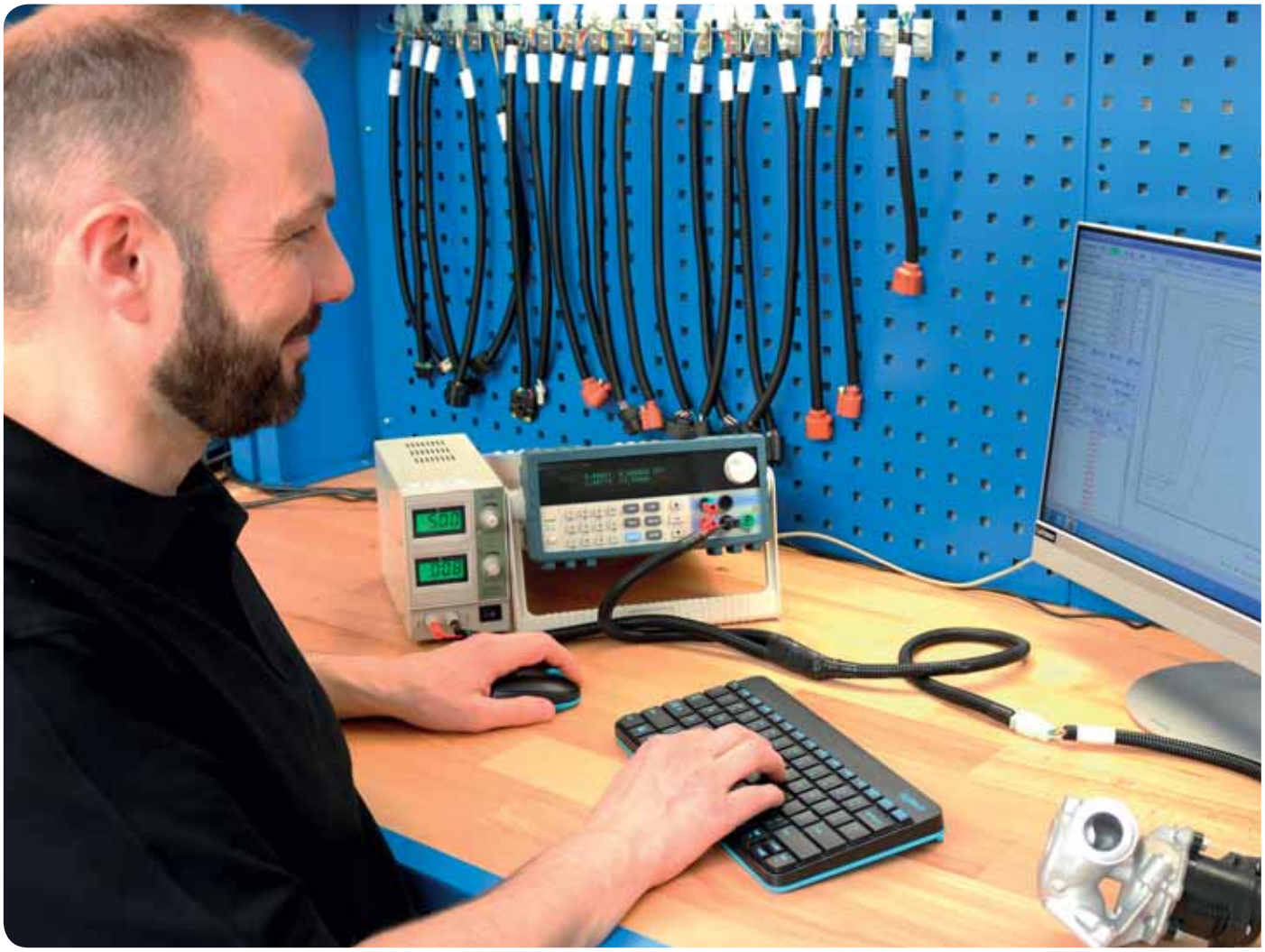
Once again, the storage capacity of the central warehouse is exhausted, and we have now decided to use the last free space of our plot of land in Brabrand to add a 2,820 m2 warehouse at a hight of 12 meters, which will be completed by the end of 2018 …

CAN A DEFECTIVE STRUT MOUNT BEARING BE DANGEROUS? • 20

Would you like to know more about whether a defective strut mount bearing can be dangerous? Would you like some tips for detecting a potentially defective strut mount bearing? Then read on, you will find answers to these questions as well as insights into the function of strut mount bearings …

IN-HOUSE TEST EQUIPMENT FOR EGR V

To ensure a high level of service and quality, we continuously expand our in-house test facilities. Our latest acquisition is an EGR v paragraphs we will explain why in-house testing equipment has high priority for us and how the EGR valve-tester works.



Product Coordinator Lars Berthelsen with the new EGR valve test equipment

Our in-house testing equipment is beneficial to us in several ways. It is of great help selecting manufacturers, developing new products, performing sample checks and processing claims. "During the development process, it is of great advantage, that we are able to carry out our own tests. we also use our facilities for comparative testing to ensure that the quality of our products matches OES-parts. Furthermore, we use it to provide our customers quick and accurate feedback when handling complaints, which is a priority to us" says Asger Thybo Geertsen, Product Manager at Triscan.

Selection of manufacturers and the new EGR valve test equipment

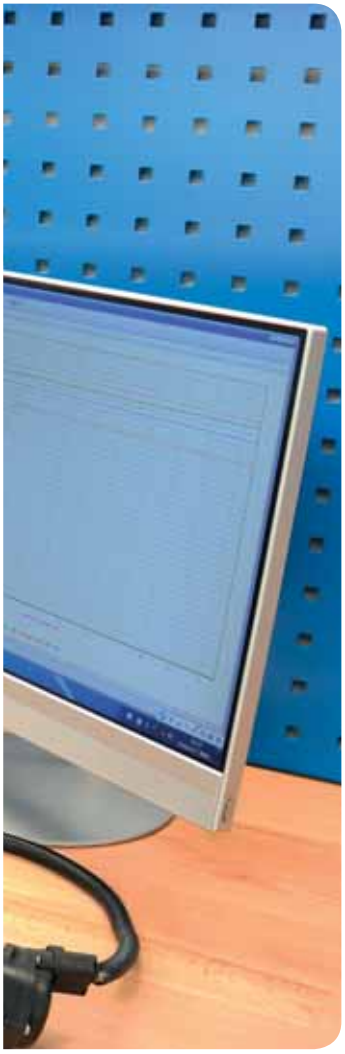
The EGR valve is an important product group within our ever-expanding program of sensors. The fact is that EGR valves

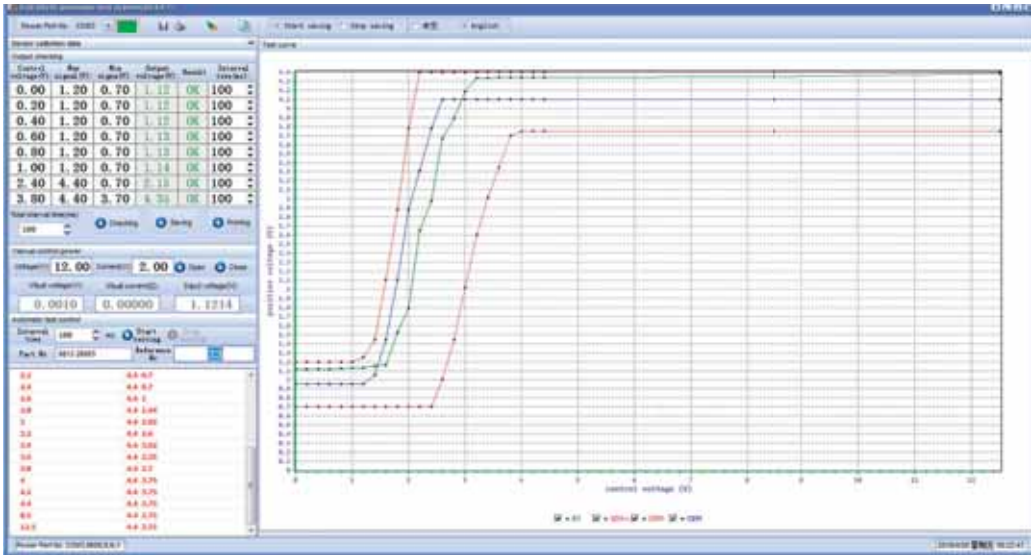
DID YOU KNOW THAT:

- ✔ We provide the aftermarket's widest range of sensors
- ✔ All our sensors are 100% function tested
- ✔ Gaskets in most cases are part of the EGR valve (where this is not the case, they can be ordered as a loose part)

VALVES

GR valve tester. In the following





The diagram shows in red the upper and lower tolerance (V) as specified by the car manufacturer and test results for OEM product (blue) and Triscan product (green)

Some of the hardware which is part of the new test equipment

are often very complex products and are subjected to heavy workloads. The process of choosing the right manufacturers is therefore very important, and our new EGR tests are a useful tool. "Part of our quality assurance process is the thorough selection of our manufacturers. We visit every potential manufacturer to see their production process for ourselves. During a visit we ask in-depth questions about production methods, materials selection/handling and quality assurance. We often find that the quality of the different manufacturers varies a lot. To ensure a high and uniform quality standard, existing manufacturers are also visited regularly. Despite our efforts, it is impossible to completely avoid complaints. Thanks to our test equipment, we can often examine the part in-house using our test equipment and, in a very detailed test report, document whether the part is working properly or is defective, "says Lars Berthelsen, Product Coordinator at Triscan.

How does an EGR test work?

To determine whether an EGR valve open/close function is functioning properly, the voltage (V) of the electrical valve control is tested. The OEM manufacturer indicates an upper and lower voltage tolerance for each EGR valve. Using our new test equipment, we can see if the valve control is within the determined tolerance and if the voltage applied and the valve's opening degree follow the OEM manufacturer's specification.

! Triscan's production of EGR valves is subject to the automotive industry's strict quality assurance standard IATF TS 16949: 2016

ADDITIONAL ELECTRIC WATER PUMPS

- NEW PRODUCT RANGE WITHIN THE WATER PUMP PROGRAMME

Triscan ref. 8600 11028

An increasing number of cars are no longer only equipped with a single water pump. To supplement the main pump, electrically powered additional water pumps may be included in the cooling system for different reasons. That is why we have expanded our water pump range with 35 references of additional water pumps.

Electric water pumps as such are not a new phenomenon. Since 2014 we have had several electric water pumps in our programme, those are however primary pumps. An example would be Triscan # 8600 11028 which is the primary water pump on several of BMW's models of the period 2004-2010, including 1, 3, 5, 6, 7, X1, X5 and Z4.

As mentioned above, electric additional water pumps apply to an increasing number of cars. They have, for example, already been used on the VW Jetta II, 1.6 TD from 1989 (Triscan # 8600 10082) and forward.

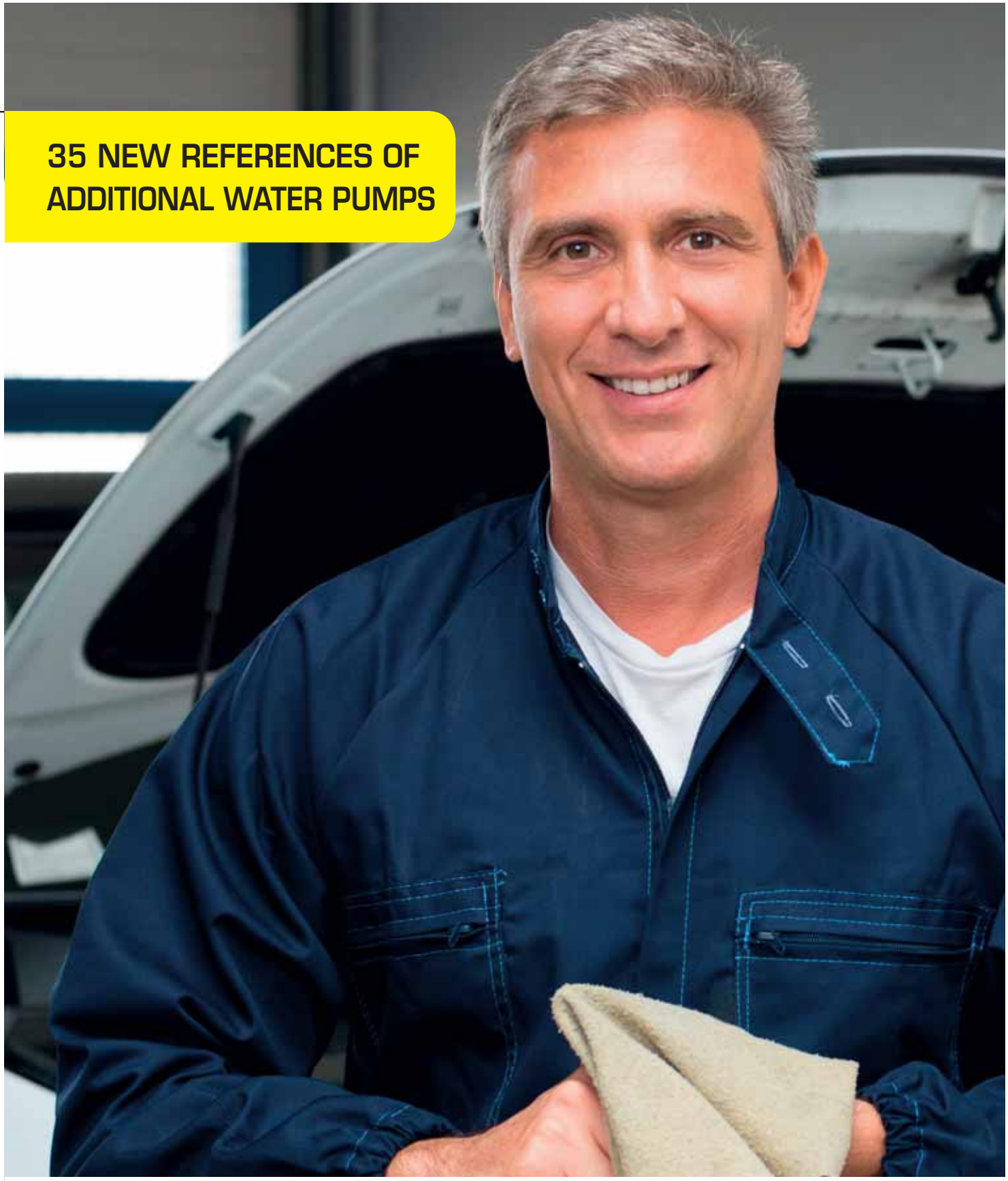
Additional water pumps are amongst other things used for separate cooling of:

- EGR valves
- Turbochargers
- Cabin heaters
- Engines with start/stop function
- Oil coolers
- Battery and power electronics cooling in electric and hybrid cars

An example of this is the Audi Q5 2.0 TDI from 2015 and onward, where the additional water pump is used to circulate coolant between engine and radiator/heater for heating the cabin.

Triscan ref. 8600 29080

35 NEW REFERENCES OF ADDITIONAL WATER PUMPS



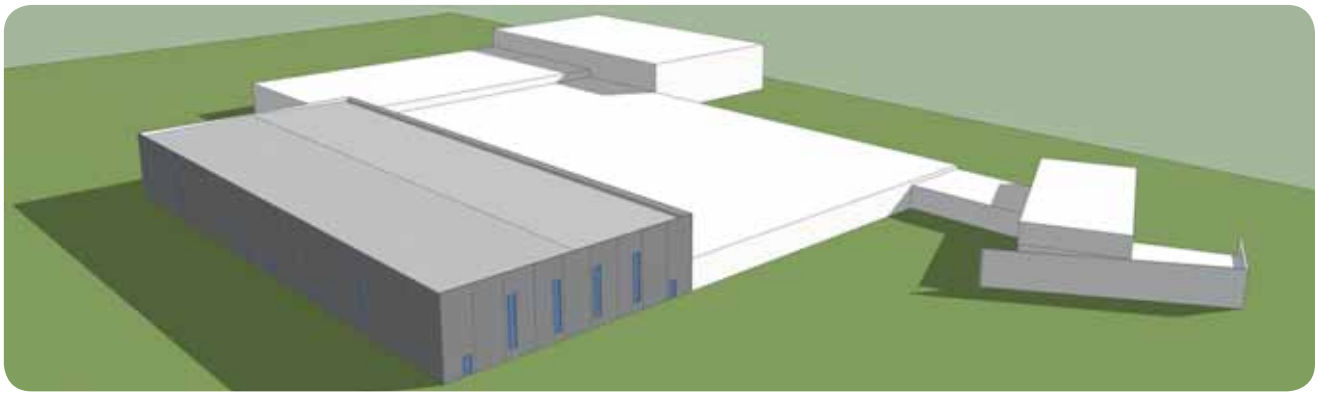
"All Triscan water pumps are manufactured according to the IATF TS16949 standard. For example, 100% control of pumps density, lifetime test, etc. is performed on test equipment specified by the car manufacturers"

40% EXPANSION OF THE CENTRAL WAREHOUSE CAPACITY

Off we go! The first sign of a new building - as well as 20 new parking spaces

Once again, the storage capacity of the central warehouse is exhausted, and we have now decided to use the last free space of our plot of land in Brabrand to add a 2,820 m^2 warehouse at a hight of 12 meters, which will be completed by the end of 2018.

It's not the first time we expand our facilities in Brabrand. The latest expansion of the storage capacity took place in 2011, where a 1,600 m^2 warehouse was put into use and in 2016, the administration in Brabrand was expanded. "With this expansion we will have reached the spatial limits here in Brabrand. To work as logistically efficient as possible while simultaneously facilitating further growth we need to expand once again" says Logistics and IT Director Morten Hallum, and continues: "Overall, we have nearly 23,000 m^2 of warehouse and administration when counting our departments in Glostrup and Iserlohn. "Because we are building at a height of 12 meters, the expansion allows us to provide additional 40% of storage capacity.



2,820 m2 are built to the already approx. 9,800 m^2 at the central warehouse in Brabrand

Logistic and IT Director Morten Hallum is in charge of the expansion of the central warehouse in Brabrand

Additional 40% storage capacity is provided with the extension

Furthermore, we have expanded our capacity abroad as well. In 2016, the storage capacity in Germany almost tripled when the warehouse in Hagen was moved to new and larger premises in Iserlohn, near Dortmund. "The German market is our biggest growth market and continues to develop in a very positive direction. To meet our German customers' demand for high delivery capacity and delivery rate, we simply had to expand" says Sales and Marketing Director Steen Ray Pedersen, adding: "We have very quickly realized that the decision was the right one - and our new setup in Iserlohn performs beyond expectations".

Triscan CEO Michael Juul Hansen (former CEO at FTZ Autodele & Værktøj A/S), who replaced John Iversen at the post in May 2017, welcomes the development."Triscan is on an exciting journey and has managed to evolve and adapt to the industry as well as outside forces. With solid growth in sales

In 2011, Triscan Brabrand expanded the warehouse by 1,600 m²

and a significant expansion of our warehouses in Denmark and Germany, Triscan has the right foundation. With the aim of creating solutions which create added value and contribute to growth among our customers and ourselves, other big projects, that I can not reveal yet, will be launched in 2018. After more than 1 year in my new job I must say that it is a great pleasure to experience the drive and commitment of my 120 new colleagues. It is with humility that I am looking forward to participating in our further development together with our business partners".

TRISCAN CABLE PROGRAMME: WE INCREASE, IMPROVE AND TEST

With more than 100 new cables, Triscan now offers no less than 3,430 references - covering more than 96% of the European fleet within the primary cable types.

However, the cable programme also includes gear shift cables, choke cables, accelerator cables, speedometer cables, bonnet and compartment cabels as well as trailer cables. In other words, we cover virtually every need.

Unless the OE-design leaves room for improvement, our cables are manufactured according to OE specifications. This means that all fittings, brackets, protection, etc. are 100% equivalent to the original cable. This ensures you the best possible solution regarding security and installation.

3.430 REFERENCES IN STOCK

Original aftermarket brake cable

Triscan improved brake cable

Improvement of OE Handbrake Cable 8140 251127/8140 251128
In cases where the OE spare parts construction proves to be inappropriate, we sometimes develop an improved aftermarket version. This is the case for our handbrake cable 8140 251127 and 8140 251128, which have been modified in several ways. Depending on which orignal or free aftermarket type you may encounter, one or both of the following inconveniences may occur:

- The cable can be mounted in reverse
- Metal locking ring (at caliber) rusts away

Reverse mounting
To avoid the penetration of water, one end of the cable is provided with a gaiter. If the cable is turned incorrectly – with the caliber end mounted to the equalizer and vice versa - water and dirt can quickly penetrate the cable, which significantly reduces the life span of the cable.

MORE THAN 100 NEW CABLES!

Correct assembly of original aftermarket brake cable

Correct assembly of Triscan brake cable

Triscan's improved brake cable has made incorrect assembly impossible

Product Manager Asger Thybo Geertsen

8140 251127/8140 251128 FITS:

- NISSAN PRIMASTAR BUS/BOX
- OPEL VIVARO CHASSIS/COMBI/BOX
- RENAULT TRAFIC II BUS/CHASSIS/BOX

Metal locking ring

The metal locking ring, which the caliber end of the cable is provided with, is not stainless and corrodes relatively quickly. As a result, the cable end slides in and out of the fitting of the caliber in which it is supposed to be held. This damages the gaiter that is supposed to prevent water penetration, thereby granting access to water and dirt to reach the cable.

The above issues do not occur with Triscan's enhanced version of the cable. With a simple design change, we have prevented the cable from being reversed. Furthermore, with the development of a plastic locking ring, it is now resistant to corrosion.

DID YOU KNOW THAT:

- ✔ Triscan conducts durability testing on its cables? The cables are subjected to a 100 kg tensile test. In addition, durability tests are performed with 1.5 million repetitions with 50 kg workload
- ✔ The corrosion protection of the cables is tested in salt chamber
- ✔ The rubber quality undergoes an aging test in an ozone chamber

ONGOING PROGRESS AND DEVELOPMENT WITHIN EUROPE'S LARGEST STEERING PART PROGRAMME

Sales and Marketing Director Steen Ray Pedersen

2017 was, in many ways, a fantastic year for Triscan. First, the year ended with us winning the award as supplier of the year at the Auto Awards, furthermore keeping pace with the expansion of the steering part programme was succesful as well. The programme is still the most comprehensive in Europe, the product group has made significant progress, and the expansion of parts for both electric and hybrid cars has been welcomed by our customers.

"We have expanded the steering part programme with more than 600 new references in 2017," says Product Manager Asger Thybo Geertsen and continues: "The total programme now contains 7,384 references and covering a total of 98.18% of the European car park, we can still claim the most comprehensive programme of steering parts in Europe.

Significant progress in sales and development of steering parts
Within traditional steering parts such as brackets, bearings, stabilizers and ball joints, demand in 2017 increased by more than 20%. The demand for steering parts developed and produced on Triscan's initiative has risen by 25% over the past year. "We are of course pleased that our initiative of developing steering parts that were previously not available to the professional aftermarket appeals to our customers," says Sales and Marketing Director Steen Ray Pedersen.

Steering parts for electric and hybrid cars
The first parts for electric and hybrid cars are already on our shelves and many new ones will be added in 2018. "With regard to steering parts for hybrid and electric cars, our program extension is already well under way. We have for example already parts for Nissan Leaf and Renault Zoe in stock, while parts for Tesla is on its way," explains Asger Thybo Geertsen, continuing: "We are, among other things, in the process of developing track control arms, stabilizer bars, tie rod ends, bushings for bodywork and wheel bearings Tesla models".

Developments in racks and pinions, steering shafts and servo pumps
Several technological innovations, including electric mechanical racks and pinions, electric steering columns and electric servo pumps, have come up over a period of time and are used in a steadily increasing number of car models. These racks and pinions and servo pumps are also part of Triscan's steering part programme.

A programme with many advantages for both wholesellers and mechanics
There are many advantages associated with choosing Triscan's range of steering parts. "With Triscan as a supplier, you can complete virtually all queries. In addition, parts are delivered in a high and uniform OE quality," says Sales and Marketing Director Steen Ray Pedersen, adding: "In both our catalogue and our ordering system TriWeb as well as in TecDoc/TecCom it is easy to find all relevant information about the products and of course order them".

DID YOU KNOW:

- That Triscan spare parts where special attention and e.g. special tools are needed, are clearly marked with a special label like this?
- That you can simply scan the QR code or go to smartrep.info and then enter the part number to get useful tips and tricks for correct and trouble-free repair?
- Try for example to go to www.smartrep.info and type in 8860 11013

Triscan smartrep.info - we make it easy to do it right!

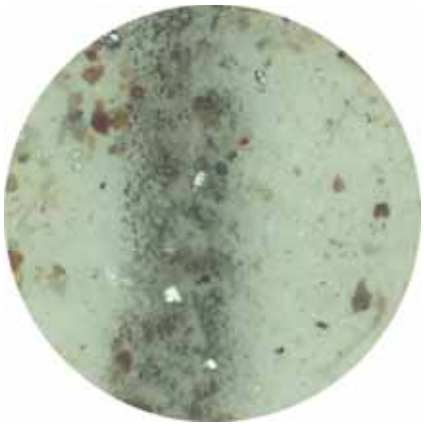
THE COMPLETE PROGRAMME NOW CONTAINS 7,384 REFERENCES...

"The first parts for electric and hybrid cars are already on our shelves and many new ones will be added in 2018"

AVOID PROBLEMS WHEN REPAIRING THE POWER STEERING

Replacing a defective rack and pinion or power steering pump is often a time-consuming and expensive repair. Therefore, it is particularly annoying if the power steering is broken again shortly after, especially if it turns out that this could have been avoided. Too often, cleaning the hydraulic system is forgotten when a new power steering pump or rack and pinion is installed. Thereby, the lifespan of the new spare part and the other components of the servo system is reduced greatly.

The contamination of the servo system is unavoidable. Over time, small amounts of particles - such as small plastic, rubber and metal parts - find their way into the hydraulic oil.



Contaminated hydraulic oil seen through a microscope

"In many cases, the pollution is so pronounced that the filter in the oil tank is completely blocked, I have seen many examples of this. Often the filter is not cleaned or replaced because the mechanic is unaware that there is a filter. A compromised filter hinders the pump's oil supply and the pump will begin to cavitate - generate air bubbles", says Troel Madsen, Product Coordinator at Triscan, continuing:" The problem with contamination is that it will cause wear and tear on e.g. packs, which over time become leaky. Therefore, it is important to always clean the entire hydraulic system when replacing a defective component".

The above procedure is recommended in cases where the impurities are limited. If a rack and pinion or a power steering pump has been severly damaged, another - and more comprehensive - approach is required (triscan.dk/en/products/steering-parts).

By cleaning the servo system, the optimal conditions for a long life and optimum operating conditions of the new servo pump or rack and pinion are given.

1. Drain existing fluid
2. Clean/replace filter
3. Clean the system for old liquid residues and other contaminants - if necessary, use a cleaning fluid/additive*
4. Install the new pump/rack and pinion
5. Fill in the new liquid

**(this can be done with a machine designed for this purpose)*

A leaking rack and pinion boot can be expensive

When referring to contamination of the servo system, usually, the contaminant described at the beginning of this article is ment. However, pollution can also come from outside. A defective rack and pinion boot has two negative effects: Firstly, it allows the ingress of dirt in the seals of the steering parts. Secondly, it leads to the ingress of water with subsequent corrosion, ultimately leading to a leaky and defective rack and pinion. Always check the rack and pinion boot and replace it if necessary. Whether you choose a vehicle-specific or universal boot is not important. What is crucial is that the boot is tight.

Vehicle-specific rack and pinion boot (Triscan No.: 8500 10021) - fits Ford S-Max and Galaxy

Duraboot Universal rack and pinion boot (Triscan No.: 8500 210)

Product Coordinator Troels Madsen from Triscan

Alternatives for the mechanical-hydraulic servo system
With the desire to simplify service and reparations, to save space and to reduce the fuel consumption of cars, various alternatives for the mechanical-hydraulic servo system have been developed in recent decades.

1

Electrohydraulically
On some models of Ford, Opel, Skoda, Seat and VW you will find electro-hydraulic servo systems. Roughly speaking, the only difference between this and the mechanical hydraulic system is that the power steering pump is electric and thus can be turned on and off as needed.

2

Electromechanical
Another option is the electromechanical rack and pinion. Here, the work of the hydraulic system is taken over by an electric motor mounted directly on to the frame. The electric motor is activated only in situations where a "helping hand" on the steering wheel is required. This type of rack and pinion is available for models of Chevrolet, Dacia, Mitsubishi, PSA, Renault, Smart, Suzuki, VAG.

3

Electric steering shafts - EPS (Electric Power Steering)
EPS technology is now widely used in micro, mini and mid-range cars such as the Fiat 500, Hyundai I10, Nissan Micra, Opel Corsa and Renault Scenic. The electric steering shaft is mounted in the vehicle and controlled by the ECU of the car. The steering shaft is attached to a manual rack via a collision-proof shaft.

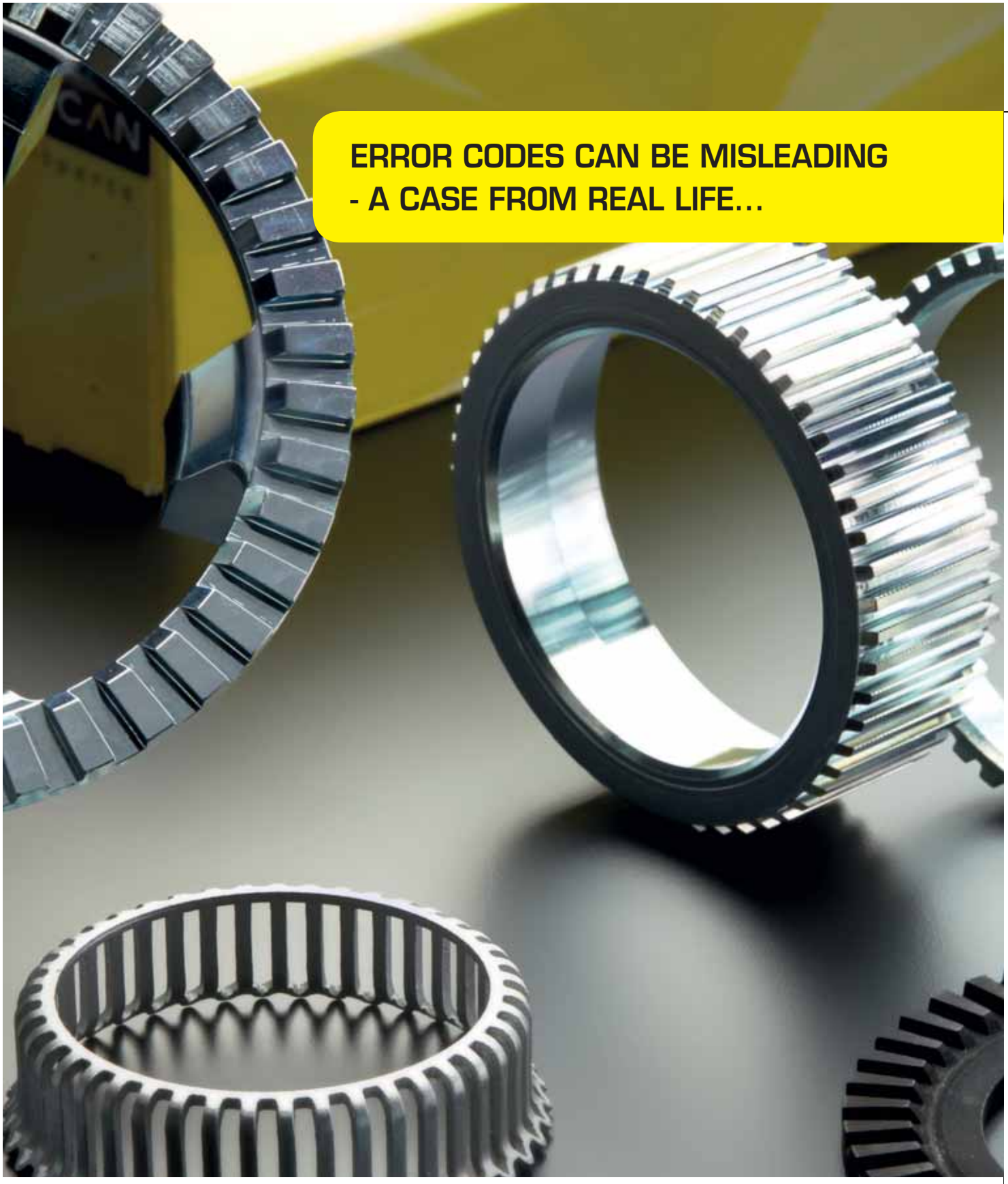
Electric power steering pump (Triscan-no.: 8515 24625) - suitable for Opel Astra and Zafira

Electrohydraulic rack and pinion (Triscan-no.: 8510 2400105) - suitable for Opel Astra and Zafira

Electromechanical rack and pinion (Triscan no .: 8510 29439) - suitable for VAG vehicles

Electric steering shaft suitable for the Fiat Punto

ERROR CODES CAN BE MISLEADING - A CASE FROM REAL LIFE...



"Often the reason for the incorrect signal is that the ABS-ring and the ABS sensor touch each other"

WHAT HAS AN ERROR CODE REGARDING THE IGNITION IN THE SECOND CYLINDER TO DO WITH THE ABS SYSTEM?

We have previously reported how error codes can be misleading and cause mechanics to falsely question the quality of a replaced part. Recently, our Product coordinator Søren Nielsen experienced himself how the error code reading on his BMW 320i (E90) pointed in the wrong direction.

Pictures of drive shaft with a defect and a functional ABS-ring (Autodata)

After a few times having experienced uneven engine running, he visited his local free car repair shop and asked them to take a look at the problem. An error code readout clearly showed that there was an error on the ignition in cylinder 2. The coil which is of the type "plug top coil" was replaced, but shortly after, he once again experienced uneven motor running.

Once again, the error code readout showed that there was ignition failure on cylinder 2 and it was therefore quite reasonable to question the quality of the replaced ignition coil. However, replacing the ignition coil for a second time did not solve the problem of the unevenly running engine either.

Søren Nielsen then contacted Frank Donslund, from Elektro Partner, who provides hotline and technical solutions for car repair shops in Denmark, Norway and Sweden (Autodata, TEXA, Delphi and Nextech) to hear if they were aware of similar episodes. Frank Donslund was able to explain that these models may experience sporadic dropouts or ESP errors in conjunction with a false signal from the rear ABS sensors. "Often the reason for the incorrect signal is that the ABS-ring and the ABS sensor touch each other. This typically occurs when rust over time has developed between the ABS-ring and the drive shaft joint, causing the ABS-ring (made of a thin metal plate) to grow", he explained and continued: "The ESP system interprets the erroneous signal as wheelspinn and reacts by reducing engine power, which to the driver may feel as if the engine cuts out while driving. The problem is especially noticeable when the cruise control is activated and can also result in increased fuel consumption equivalent to about 2 km less per. liter gasoline".

Frank Donslund, Elektro Partner

Plug Top Coil # 8860 11013

ABS-ring #8540 10403

Back at the repair shop, the rear axle ABS-rings were replaced and since then the car has run perfectly. The ignition coil which at first was proclaimed to be the culprit had nothing to do with the problem.

NEW QUALITY ASSURANCE STANDARD
• IATF TS 16949:2016...

"Quality assurance and the supply of quality products only, is just as important for Triscan as it is for car manufacturers"

MORE STRINGENT QUALITY REQUIREMENTS FROM AUTOMOTIVE MANUFACTURERS – TRISCAN JOINS IN

Suppliers to car manufacturers, have always been subject to very strict requirements with regard to internal quality assurance. The standard that all suppliers of European and North American car manufacturers must meet has recently been modified, updated and tightened. To be fully informed about the information relevant to us, we recently conducted an internal course for our colleagues in the product department with the support of the Danish Technological Institute.

According to Product Manager Asger Thybo Geertsen, there is always room for improvement - even for the big players in the market

Quality assurance and the supply of quality products only, is just as important for Triscan as it is for car manufacturers. "We invest a lot of time, effort and money in our quality assurance, so it's important that we keep up to date with the latest requirements of car manufacturers to their suppliers. The majority of our producers already supply car manufacturers, nevertheless, this course has been very informative, we now know even better what to look for and ask when visiting our producers", says Asger Thybo Geertsen, Product Manager at Triscan.

"With the new standard, we have been given the opportunity to incorporate special and more stringent quality assurance requirements into our supplier's quality assurance system. Moreover, the company's internal audit requirements were increased. This which means that in quality assurance, manufacturing process and product, namely persons responsible for understanding and explaining the specific requirements we have for the manufacture of Triscan parts to our suppliers - and that these are complied with", concludes Asger Thybo Geertsen.

The now replaced standard ISO/TS 16949, which was introduced in 1999, was created to establish a general standard for the design, development, production, assembly and maintenance of motor vehicle products. The standard, which is mainly used by European and North American car manufacturers, is a superstructure of the widely used ISO 9001 standard. It was developed in a collaborative effort between the International Automotive Task Force (IATF), a group of mainly European and North American automakers, including the BMW Group, Daimler AG, the Ford Motor Company, the General Motors Company, the PSA Group, Renault, Volkswagen AG as well as the Technical Committee of the International Organization for Standardization (ISO).

The new standard IATF TS 16949: 2016 has been developed and maintained by IATF but still requires ISO 9001: 2015 certification as before. The new standard is partially adapted to the current technological state but was also sharpened in several areas. By the end of 2018, another 103 requests will be added to the standard.

CAN A DEFECTIVE STRUT MOUNT BEARING BE DANGEROUS?

Would you like to know more about whether a defective strut mount bearing can be dangerous? Would you like some tips for detecting a potentially defective strut mount bearing? Then read on, you will find answers to these questions as well as insights into the function of strut mount bearings.

Defective strut mount bearings affect the driving behavior of a car in several ways. Depending on how badly the strut mount bearing is damaged, one experiences:

- Extended breaking distances
- Reduced driving and steering capabilities
- Tracking problems
- That the tires wear differently on the sides
- Increased wear of shock absorbers

For these reasons, there is no doubt that it is dangerous to drive in a car with defective strut mount bearings. In addition to the safety aspect, there is an economic incentive to replace defective strut mount bearings. Over time, they will cause consequential damage to other parts of the suspension - and thus additional and unnecessary repair costs for the car owner.

The strut mount bearing is an important part of the suspension and connects the strut with the body. The bearings on the front axle allow the strut to turn in the strut tower during steering movements, thus ensuring smooth and precise steering. In addition, the strut can change its angle to the body within the strut tower to a certain extent thanks to the strut mount bearing. The damping effect of the bearing also ensures that noise and vibrations of the suspension are not transmitted to the body.

Strut mount bearings are designed to last the lifetime of the vehicle. However, wear, high load or external influences such as frost, salt, humidity and temperature fluctuations can lead to a shortened lifespan.

How to recognize a defective strut mount bearing:

If you want to detect a defective strut mount bearing, there are several signs that you should keep in mind:

- A loud bang when driving over a pothole or a moderate bang when driving over bumps on the road may indicate a defective strut mount bearing.

- The steering is heavier, works sometimes even jerky; it has more play than usual or reacts with a delay on steering movements.

- Turn the steering wheel slightly in both directions with the engine started and the handbrake engaged. Outside the car, a person listens carefully. If there is a slight squeaking or creaking, one or both bearings are likely to be defective.

Comprehensive range of strut mountings
With our very extensive – and in fact Europe's widest – steering part programme for the aftermarket we can supply almost any kind of strut mount bearing. Among our more than 7,384 references, you will find more than 300 strut mount bearings/sets in premium quality. All parts can be found in our E-Catalog, TriWeb or in TecDoc.

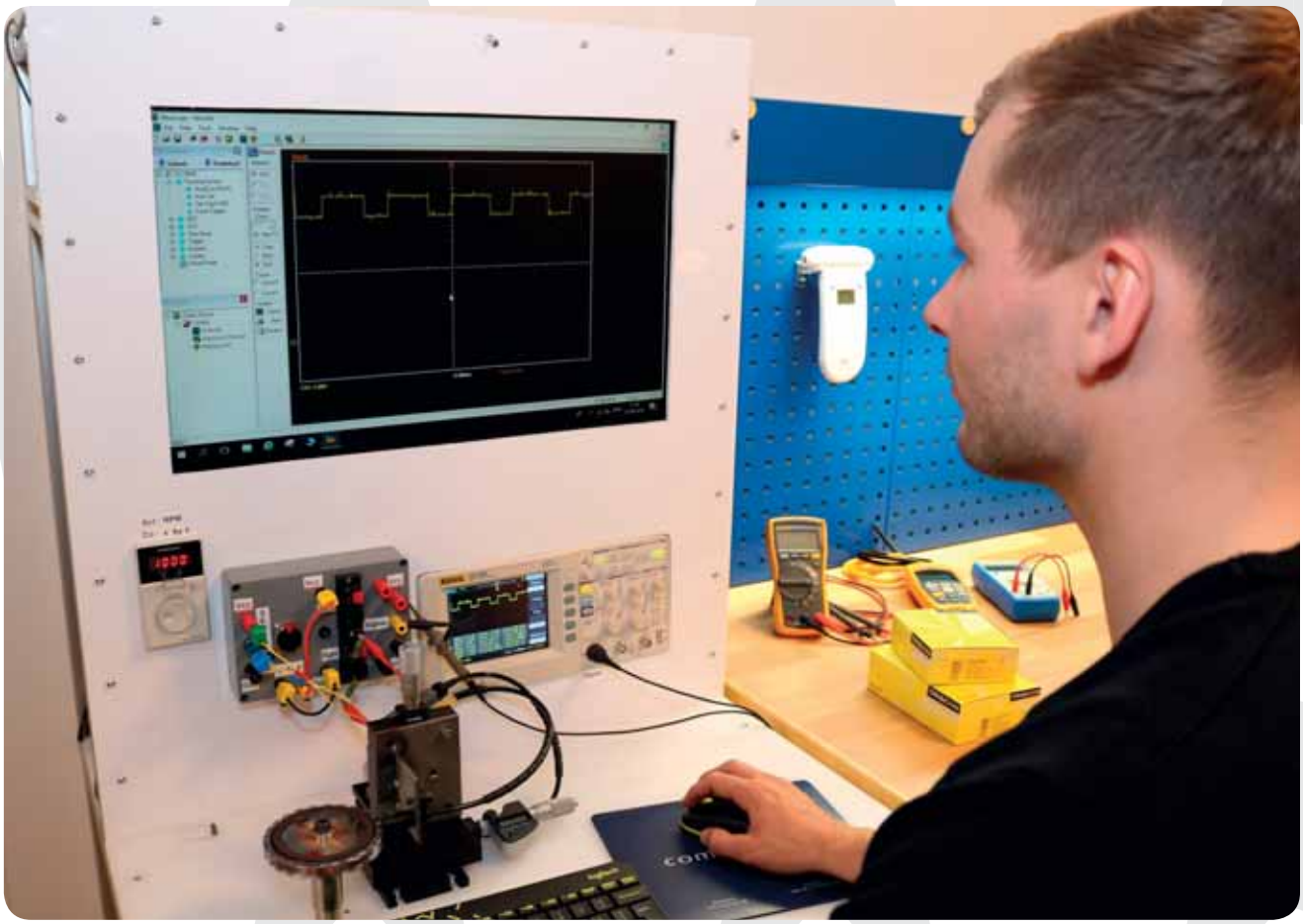
Triscan strut mount bearing

Examples of defective strut mount rings

COMPREHENSIVE PROGRAMME OF STRUT MOUNT BEARINGS...

"Among our 7,384 steering part references, you will find more than 300 strut mount bearings/sets in premium quality. All parts can be found in TriWeb or TecDoc"

HOW DOES OUR NEW ABS TESTER WORK AND HO INVESTMENT?



Product coordinator Frederik Ringby Rathje is testing an ABS sensor on the new in-house test equipment, which is developed and made by Triscan.

Due to the very positive effect our Triscan Test Center has on our customer service and internal quality assurance service, we continue to invest in expanding it. Our newly built ABS tester is the latest addition. Here we describe how this works and why it is so valuable.

In order to offer the widest range of ABS sensors on the market, we trade with more than 23 different manufacturers. "We supply around 1,500 different ABS sensors that undergo a 100% functional control in the manufacturing process. Among other things, we use our in-house test equipment in the development phase of new sensors to ensure that they meet the OE specifications. We also use the test equipment to provide properly documented and extensive responses to our customers in case of complaints", says Asger Thybo Geertsen, Triscan Product Team Manager, continuing:" The technology in an ABS sensor is the same as in camshaft and crankshaft position sensors. Our test equipment can therefore also serve the same purpose for these types of sensors".

Two types of ABS sensors

There are basically two types of ABS sensors: The simple type is a passive sensor with built-in solenoid. This type can often be recognized by a visible metal part on the sensor head. Together with a rotating toothed ABS ring, the sensor creates a sine wave when connected to an oscilloscope. This sensor type comes in 2- and 3-wire versions. In the 3-wire version, the third wire is for noise isolation only.

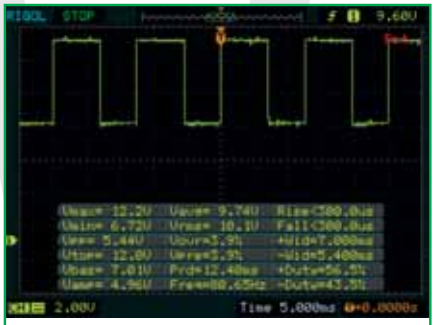
After an error code points to the ABS system, many mechanics are looking for the error only by measuring the resistance of the sensor with a multimeter. However, a complete test of the ABS sensor, in reality, also requires the measurement of the magnetic coil's ability to produce a magnetic field/induction which is not possible with a conventional multimeter. However, there are special multimeters that can measure the induction, which is measured in millihenry (mH). Troubleshooting based solely on

HOW DO OUR CUSTOMERS BENEFIT FROM THIS

resistance measurement may result in the mechanic falsely believing that other parts of the ABS system, such as an ABS ring or ABS module, are defective.

The other type of ABS sensors uses Hall effect chips and is available in two versions - active and inductive sensors. The active uses a magnetic ABS ring and the inductive uses a traditional toothed ABS ring. Both types provide a square wave signal on an oscilloscope and none of these types can be diagnosed with a multimeter. With an oscilloscope, however, it is possible to check the reading of speed and teeth. Not even a magnetic card reader can detect whether a tooth on the ABS ring is defective or missing.

Here you see a passive ABS sensor that works with a passive coil. This provides a wavy signal



Here you can see the square wave signal from an active or inductive ABS sensor (Hall effect chip). Active sensors work with magnetic ABS rings and inductive sensors with toothed ABS rings

Here you can see the square wave signal from an ABS sensor with a Hall effect chip capable of counting teeth and detecting the direction of rotation of the wheel

Features and Disadvantages of the Passive Sensor
Passive sensors are no longer widely used because they produce an irregular signal in the event of high temperature fluctuations. Modern auxiliary systems such as ESP, TPMS require a more stable signal than the passive sensor can provide. For passive sensors, the critical values are VPP (Voltage Peak to Peak), resistance and induction (Rising Edge and Falling Edge).

Features and Benefits of the Active Sensor
The active sensor, which in most cases uses a Hall effect chip, provides a more stable signal at fluctuating temperatures. It is therefore much better suited for use with ESP, TPMS systems. The critical values for this are: pulse width, Vmax, Vmin and frequency.

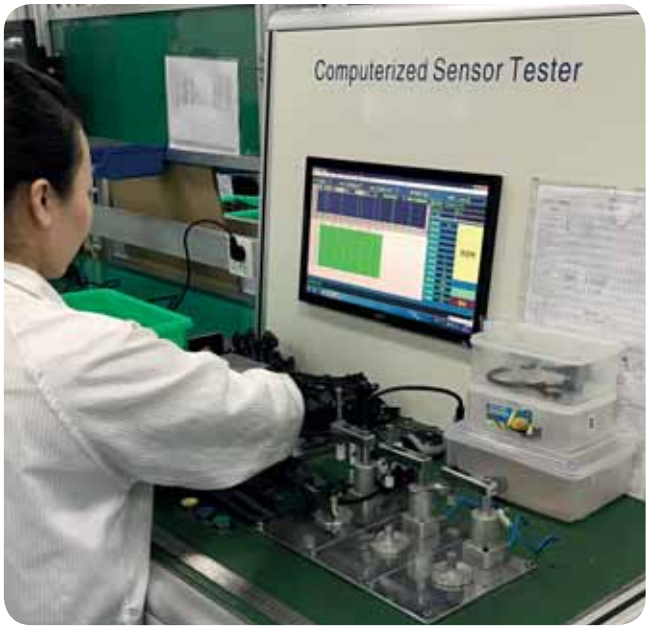
Vehicles with Parking Assist use special Hall effect chips that can count the teeth of the ABS ring and determine the direction of rotation of the wheel. This information allows the vehicle to accurately calculate how far it is moving and is also used to automatically park the car with the help of information from the parking sensor, amongst others.

How do we test ABS sensors?
To test whether an ABS sensor is working properly, we always compare it to an original sensor. Two of the most important parameters are voltage level and duty cycle. The voltage level determines whether the quality of the signal is strong enough and the duty cycle indicates whether the sensor measures the rotation correctly. The results of these measurements are included in the reports our customers receive in cases of complaints.

DID YOU KNOW:

- ✔ All OE sensor manufacturers use Hall effect chips manufactured by either Allegro, Infinion, Melexis or Honeywell?
- ✔ We use original Hall effect chips in our sensors? The make and article number of the chip in the original sensor is revealed by x-raying the sensor.

ON-SITE QUALITY CONTROL - ALSO IN ASIA



Each Triscan sensor undergoes a 100% quality control

Maybe you already know that our product managers visit our manufacturers during the selection and review process? You may also know that our product managers perform regular audits of our manufacturers and we carry out spot checks on incoming goods in our warehouses? But did you also know that we carry out a quality control on site - even if "on site" is far away from home?

The pursuit of more and more business can leave even super brands lagging behind in terms of quality control. With a strong brand name, it can be tempting to expand the product range, even if it means entering areas beyond one's core business and expertise. Sometimes this works out just fine, during testing in our Triscan test center we have, however, come across examples of how wrong such things can go.

The super brands of our industry can get away with a lot – consider how big manufacturers for example can continuously sell poorly designed parts that cause garages and car owners headaches. But for Triscan, that's a different story. For this reason, we have always taken quality assurance very seriously, which is reflected in our very low average complaint rate.

To be able to deliver spare parts at competitive prices, our products are manufactured in various parts of the world. The further away from home production takes place - the more quality assurance initiatives we carry out. In the Far East we have been collaborating closely with an engineering firm for more than eight years. In this firm we have four full-time employees that focus solely on Triscan and carry out on-site quality control at our manufacturers. This partnership, which works satisfactorily for both sides, will in the future be continued by Triscan Asia Ltd., which is under construction.

"In order to ensure high and consistent quality, we implement on-site quality controls that are focused on critical parameters," said Asger Thybo Geertsen, product manager at Triscan and continues, "Compared to the vast majority of our competitors, we show visibility at our distant producers, that way we're not just a customer in Europe for our producers, we're asking critical questions and have specific requirements for the production processes and quality control".

On-site quality control is a high priority for us. These processes prevent faulty products from even entering the warehouses of our customers or, even worse, the workshop.

James Zhao and Asger Thybo Geertsen on inspection

During the production of our sensors continuous quality controls are carried out. The process ends with a 100% functional test of each sensor. We ensure that the Hall effect chips used, for example, in our ABS, crankshaft and camshaft sensors are identical to those of the originals. By X-ray photography of the original sample, the article number and the brand on the chip can be determined. In addition, our on-site quality control includes inspection of dimensions, connections, cable length, material quality and any requirements for antistatic packaging.

Triscan is often represented throughout the production, where our people continuously are perfoming spot checks on the products and packaging

"In order to ensure high and consistent quality, we implement on-site quality controls that are focused on critical parameters"

CONVERT EFFORTLESSLY FROM CONVENTIONAL TO LED LIGHTS WITH TRISCAN LED RELAYS

TRISCAN
smartparts

DK **ELEKTRONISKE LED BLINKRELÆER**

Velegnet til de fleste biler, motorcykler, ATV'ere og scootere med 12 V elektrisk system.

Tekniske data
- Spænding: 11,5 til 14,8 Volt
- Strøm: 0,02A - 20A
- Mål: (L x B x H) 30 x 30 x 47 mm

Bemærk: Kan bruges til både dioder og glødepære, også blandet.

D **ELEKTRONISCHE LED-BLINKGEBER**

Für die meisten Autos, Motorräder, ATVs und Roller mit 12V Elektroanlagen geeignet.

Technische Daten
- Spannung: 11,5 bis 14,8 Volt
- Strohm: 0,02A - 20A
- Abmessungen: (L x B x H) 30 x 30 x 47 mm

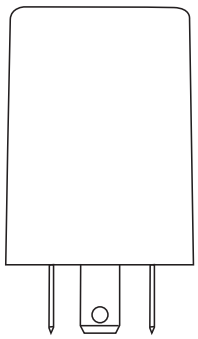
Hinweis: Kann für Dioden und für Glühlampen verwendet werden, auch gemischt.

GB **ELECTRONIC LED FLASHERS**

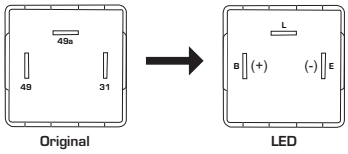
Suitable for most cars, motorcycles, ATV's and scooters with 12V electrical system.

Technical data
- Voltage: 11.5 to 14.8 Volt
- Power: 0.02A - 20A
- Dimensions: (L x W x H) 30 x 30 x 47 mm

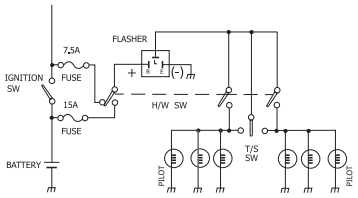
Note: Can be used for both diodes and incandescent bulbs, also mixed.



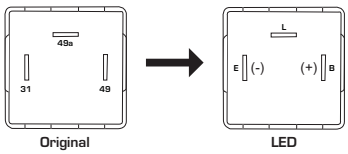
1020led13



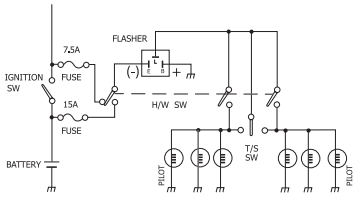
Original LED



1020led14



Original LED



The above data sheet can be downloaded from Triscan's webite: triscan.dk/en/products/flashers

At Triscan we continuously update and improve our product range. We have had flashers in our range for a long time, and in order to keep up with recent developments, we are now implementing electronic flashers for LED bulbs.

These special relays (1020led13 and 1020led14) are among others used for LED conversion, ie that the flashlight after switching from ordinary incandescent bulbs to LED bulbs flashes at normal speed without the use of interference resistors. The advantages of LED bulbs are that they last longer, consume less energy and are more durable than incandescent bulbs.

The LED flashers are suitable for most cars, motorcycles, ATVs and scooters with 12V electrical systems.

Can be used for both LED and conventional bulbs (also mixed)

TRISCAN'S WIDE PRODUCT PROGRAMME

All Triscan's products are manufactured in OE quality. Our product programme covers more than 97% of the European car parc. If you choose a product group from Triscan, you can do with just one supplier.

ENGINE

Air flow meters
Camshaft position sensors
Crankshaft position sensors
Diesel
- Common rail injectors
- Common rail pumps
- Pump and nozzle units

Engine gaskets
- Cylinder head gaskets
- Gasket kits
- Gasket kits w/o cyl. head gasket
- Oil-pan gaskets
- Valve cover gaskets

Engine parts
- Camshaft kits
- Lifters
- Top bolts

Exhaust
- Clamps
- Flexible connectors

Fuel hoses
Ignition coils
Ignition wire sets
Micro-V belts, kits
- Alternator pulleys
- Belt tensioner units
- Idlers
- Micro-V belts
- Pulleys
- Stretch fit V-belts
- V-belts
- Vibration dampers

Oil plugs & gaskets
Oxygen sensors
Timing belt kits
- Belt tensioners
- Idlers
- Micro-V belts
- Oil seals
- Timing belts
- Vibration dampers

Timing belts, Water pump kits
Timing chain kits
Throttle bodies
Vacuum hoses
Waterpumps + Timing belt kits

TRANSMISSION

Accelerator cables
Anti-friction spray
Bolt kits, flywheels
Bonnet cables
Boot kits
Choke cables
Clutches/clutch kits
- Clutch cylinders
- Clutch grease
- Clutch hoses
- Clutch release bearings
- Guide bearings
- Guide bushings, clutch bearings
- Hydraulic release bearings
- Oil seals

Clutch cables
Clutches, varíous
C.V. joints
Drive shafts
Grease
Oetiker clamps
Propeller shaft support
Shift cable
Speedometer cables
Trailer cables
Tripod joints
Tools
U-joint
Universal clamps

BODY

Gas springs
Refills for BOSCH flatblade
Steering dampers
Universal gas springs
Universal wiper refills
Washer pumps
Wiper refills

COOLING SYSTEM

ALU-flex duct hoses
Flushing tools - cooling system
Heater hoses
Radiator caps
Radiator hoses
Thermostats
Thermo switches
Waterpumps
Water temperature sensors

STEERING & SUSPENSION

Boots
- Mounting kits
- Protection kits

Bushings
Coil springs
Grease
Leaf springs
Power steering pumps
Rack and pinions
Shock absorbers
Spheres - suspension
Stabilizer rods
Standard bearings
Steering columns
Steering parts
Strut bearing kits
Strut bearings
U-bolts
Wheel bearing kits
Wheel hubs

BRAKE SYSTEM

Accessory kits
ABS-rings
ABS sensors
Bleed screws
Brake cables
Brake calipers
- Guide tube kits, brake calipers
- Pistons
- Rep. kits

Brake discs
Brake drums
Brake hoses
- Banjo bolts
- Clips for brake hoses

Brake pads
Brake pipes
- Idlers

Brake shoes
Pressure regulators
Wear indicators
Wheel cylinders

MISCELLANEOUS

Ear clamps
Flashers
Hose clamps
Standard bearings
Trailer cables
Universal gas springs

TRISCAN

smartparts

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