

MATRIX

THE WORKSHOP MAGAZINE

02/2024

AUTOMECHANIKA

HELLA and
Hella Gutmann
in Hall 9.0,
Stand A80

Platform

E-cars
from the model
kit

Revolution S

Diagnostics premiere of
mega macs S 20

Cyber Security

First CSM for
new BMW models



Seizing new opportunities

Dear Reader,

The countdown to the opening of the Automechanika in Frankfurt has begun. Even if its opening on September 10 cannot quite keep up with the opening ceremony of the 2024 Paris Olympics, the entire industry is really excited about this exhibition. The trade fair claim 'Driving Transformation' sums up what is important today. We also want to play a proactive role in this transformation and seize new opportunities.

In the OE area of FORVIA HELLA, this is clearly achieved by means of innovative technologies. Examples include Matrix LED lamps, the latest generation of which has just gone into series production in the Audi Q6 e-tron, electronic accelerator pedal sensors for drive-by-wire systems, the Coolant Control Hub for cooling electric cars and smart DC-DC converters for dual-voltage vehicle electrical systems. It goes without saying that this expertise is also being transferred to products intended for the independent repair market. But parts of the best quality would be worth nothing without the support of efficient workshops, i.e. our friends.

Hella Gutmann's presence at the Automechanika will once again focus on new solutions, which will enable automotive workshops to master existing and also future challenges. And this focus is always on their competitiveness, their quest, as far as possible, to be faster, more efficient and simply better than others. All of this is in the DNA of our top diagnostic device mega macs X. But now the new mega macs S 20 for Android end devices opens up very similar possibilities, even in the affordable diagnostics entry-level class. These include growing functions for the diagnosis of electric vehicles and communication with new protocols such as DoIP.

And we are meeting the challenge of cyber security with the Hella Gutmann CSM. Now also – and this is probably quite unique – for new BMW models. Our new, super-fast CSC-Tool X 20 is also sure to be a really special surprise for everyone. You can get a first glimpse of it at the trade fair.

So do enjoy looking forward to all this and to the warm welcome that's waiting for you.

And we are looking forward to seeing you there!



Adnan Cemal
CEO Hella Gutmann Solutions



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A shared wealth of data

AutoTeilePilot from Select AG now with Hella Gutmann Data Services



For the first time, vehicle-related diagnostic and repair data and also histories can be viewed and interpreted not only in the diagnostic unit, but also in a catalogue system at the touch of a button. We are talking about AutoTeilePilot (ATP) from Select AG, a purchasing co-operation comprising 14 parts wholesalers as shareholders. This is made possible by a link with Hella Gutmann Data Services. These include comprehensible error code descriptions and their AI-supported interpretations, OE-compliant inspection plans, technical data, labour rates, repair instructions, circuit diagrams and also diagnostic histories. The latter can

even be sent direct from a mega macs to the ATP. This means that work carried out on the selected vehicle in the past and also digitalised logs can be viewed.

"This kind of technology partnership is unique throughout the world," explains Stephan Westbrock, CEO of Select AG. "Never before have users of a catalogue system been able to access diagnostic and repair data and even historical vehicle information without disrupting the system. By offering access to Hella Gutmann Data Services, we are closing a major technical gap in the data pool of our shareholders and in that of the affiliated independent workshops."

Workshop flair in street art style

The 2025 large format HELLA / Hella Gutmann workshop calendar

On a visually stunning tour of twelve workshops around the world, professional photographers have succeeded in capturing, in a variety of ways, the fascination of the workshop almost up close and personal. And graphic artists of the street art variety take this to the next level: the 2025 workshop calendar is upbeat, bold and bursting with colour. It will fascinate

young and old alike and transport them to other dimensions in the world of cars.

A veritable eye-catcher in the workshop, in the office or adorning the customer area.

It pays to be quick:

The first 300 readers who contact us by email (matrix@hella-gutmann.com) will receive a 2025 workshop calendar as a gift. Please do not forget to state a contact person and address!



Nothing beats personal contact. The Hella Gutmann team is looking forward to seeing you again at these trade fairs!



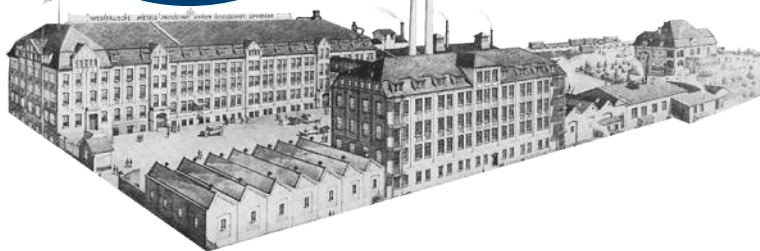
Trade fair planner 2024

Datum	Name	Website
10.–14.09.	Automechanika Frankfurt	www.automechanika.de
20.–21.09.	Berg Stendal	www.berg-autoteile.de
12.–13.10.	Neimcke Traunstein	www.neimcke.de
18.–20.10.	WM SE Munich	www.wm.de
26.–27.10.	Hartje Hoya	www.hartje.de
26.–27.10.	AAG Colertechnika Münster	www.aagtechnika.de
23.–24.11.	Stahlgruber Exhibition Nuremberg	www.stahlgruber.de
23.–24.11.	Coparts Frankfurt	www.coparts.de

125 years



The WMI factory building on Lüningsstrasse in Lippstadt/Germany around 1920



From a lamp manufacturer in Lippstadt to a global technological leader

125 years of HELLA – an anniversary to be proud of. It is June 11, 1899 when the entrepreneur Sally Windmüller has the 'Westfälische Metall-Industrie Aktien-Gesellschaft' (WMI) entered in the commercial register of the Lippstadt District Court. It is barely more than ten years since Gottlieb Daimler and Karl Benz undertook their first test drives with a motorised carriage and motor car. Although WMI's roots go back a few years further, the official history of the company begins on this day in June. What began as a specialised manufacturer of lamps, lanterns and bulb horns for carriages, bicycles and the first automobiles is today FORVIA HELLA, a global automotive supplier with around 37,500 employees at over 125 locations worldwide.

1965 Entry into the electronic age

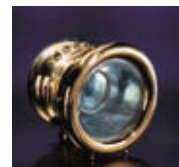
HELLA has grown up with lighting technology, but – what is somewhat less well known – has also been successfully active in the electronics business for almost sixty years. The company's entry into the electronics business via lighting electronics was an obvious choice when production of the fully electronic flasher unit started at the plant in Hamm in 1965. In this way HELLA was one of the very first automotive suppliers to take the daring step into the electronics age. Electrical switches and connectors/sockets for the vehicle trailer business made up the product range right at the very beginning. Today, FORVIA HELLA generates sales of more than three

billion euros in the electronics sector alone and is a leader in many products when it comes to autonomous driving and electromobility.

The course for the future was set on January 31, 2022. As a legally independent company, FORVIA HELLA became part of the FORVIA Group, the world's seventh largest supplier of automotive technologies with more than 150,000 employees.

www.hella.com/125years

In 1908 the acetylene lamp 'System Hella' was a groundbreaking innovation



The brake shines out in a new light

Extended all-round range under the HELLA brand

With the completion of the takeover of Hella Pagid by HELLA, all products of the brake specialist will, from October 1, 2024, be sold under the HELLA brand. This can only mean advantages for workshops and dealers. HELLA will continue to market the familiar product range unchanged, maintaining the same high product quality and the same part numbers. The only new thing is the logo. Thanks to the brake segment becoming integrated into HELLA's strong international sales network, customers can rely on maximum product availability, short delivery times and excellent logistics services.

HELLA also dovetails its OE expertise in the area of brakes, for example brake pedal sensors (brake-by-wire) and also the extensive IAM range of ABS sensors and brake boosters, with the range of brake-related wear parts and hydraulics. The result is that the complete range is perfectly rounded off. HELLA already scores high today with almost 100 per cent coverage for brake pads and brake discs and over 85 per cent coverage in the area of brake hydraulics. And in the case of e-mobility,



the brake range is right out at the forefront: when it comes to brake pads, HELLA covers over 90 per cent of all electric and hybrid vehicle models (and more than 85 per cent as regards brake discs).

Meeting point at the Automechanika



Highlights in Hall 9.0, Stand A80: vehicle technologies of the future dovetailed with future-oriented solutions for workshop equipment

'Driving Transformation' is the claim of the Automechanika. The world's leading trade fair for the automotive aftermarket wants to actively participate in the transformation of the automotive world and has virtually reinvented itself after the forced break caused by the Covid pandemic.

'Automechanika today' is not just a collection of exhibition stands, but a whole host of events such as workshops, panel discussions, awards and all kinds of experiences to enjoy and master. A wide variety of solutions are being put together around topics such as e-mobility, digitalisation, artificial intelligence and the supply chain. Some of them are already real, others are still at the idea stage. Everything is important if you want your changes to be successful.

Anniversary Looking back and looking ahead

A multifaceted range of topics colours and brings to life the FORVIA HELLA exhibition stand in Hall 9.0, A80. On the occasion of HELLA's 125th anniversary, historical exhibits from the past, alongside the latest technical developments, illustrate the company's innovative strength that has always continued to flourish. "The anniversary is an opportunity to join together with our customers and partners in looking back on significant innovations, successes and strong partnerships. Above all, however,



we want to look ahead," enthuses Marcel Wiedmann, Head of Independent Aftermarket & Workshop Solutions at HELLA. "So in future, too, we will continue to support workshops as a comprehensive solution provider and we will actively drive forward the transformation of the aftermarket."

OE expertise for electric vehicles transferred to the independent aftermarket

With countless innovative OE developments under its belt, FORVIA HELLA is certainly involved in the progress made in the electrification of the automobile. This expertise constantly flows into the burgeoning product portfolio for the independent aftermarket (IAM). The IAM product programme, with the extended range of brake spare parts now on offer under the HELLA brand, will be presented for the first time at the

trade fair stand. Moreover – how could it be otherwise? – the innovative workshop equipment from Hella Gutmann will also be showcased. Because only the combination of everything, i.e. intelligent diagnostics, measurement and calibration options, training and high spare parts quality, helps workshops to efficiently master the increasing technical complexity of vehicle repairs.

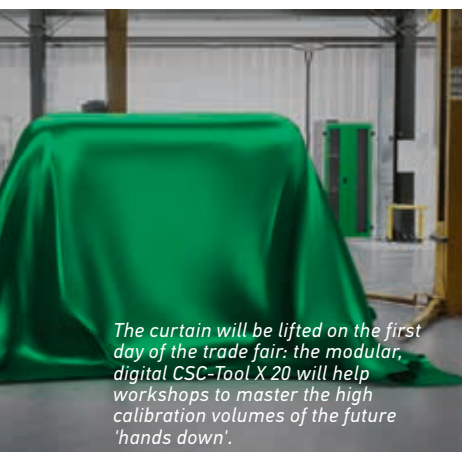
Premiere Diagnosis and ADAS calibration

With the mega macs S 20 diagnostic solution and the CSC-Tool X 20, two brand new Hella Gutmann products are



Dr Marcel Wiedmann,
Head of Independent
Aftermarket & Workshop
Solutions at HELLA





The curtain will be lifted on the first day of the trade fair: the modular, digital CSC-Tool X 20 will help workshops to master the high calibration volumes of the future 'hands down'.

celebrating their premiere at the Automechanika. Ten years after the market launch of the first multi-brand calibration tool for driver assistance systems (ADAS), the pre-series version of the completely new, digital calibration tool CSC-Tool X 20 is now going on display. From spring 2025, it will enable workshops to handle the increasing calibration volume much more efficiently. The Hella Gutmann team will explain exactly how this is done and why the CSC-Tool X 20 is THE solution for large and small workshops when all is finally revealed on the first day of the fair.

Those who make a quick decision can get started almost immediately with the new mega macs S 20 diagnostic solution. On the following pages, you can read about innovations in the new, diagnostic, entry-level solution and how much more this solution can do than its predecessor for Android systems, the mega macs

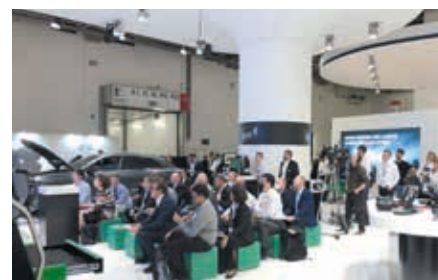
ONE. Visitors to the stand will not only encounter tried-and-tested tools together with new workshop equipment for vehicle and system diagnostics, battery diagnostics, ADAS calibration, exhaust emission testing and lamp adjustment. They will also meet a team of experts who are ready and eager to engage in discussion with them. This is an opportunity to find out more precise details about the workings and settings of state-of-the-art lighting systems, about the handling of HV vehicles and also information on the training courses offered by the HELLA Academy. And you never know your luck: it could end up as an interesting one-to-one discussion or as part of a presentation with your colleagues.

Live presentations from Hella Gutmann experts

"Our trade fair stand is not about promoting ourselves, but exclusively about workshops' need for information. Because that is the crux of the matter when we are talking digitalisation: the true innovations and efficient solutions cannot be recognised at a glance. We therefore try to create transparency and enable people to experience processes as much as possible," explains Mario Maaß of Category Management Training, who is a high-voltage specialist.

Six times a day, digital processes and functions will be vividly explained and brought to life in presentations and talks at the trade fair stand.

FORVIA and HELLA will be demonstrating their combined strength in Hall 9.0, as they did for the first time in front of a large audience at the 2022 Automechanika. And at the forefront in all of this: HELLA Gutmann.



DAILY PRESENTATIONS AND LIVE DEMOS

Sensors, security management and services for innovative workshops

- 📅 Thursday
🕒 10.00 am and 2.00 pm
- 📅 Friday
🕒 12.00 noon and 4.00 pm
- 📅 Saturday
🕒 11.00 am and 3.00 pm

New calibration tools and components for intelligent driver assistance systems

- 📅 Thursday
🕒 11.00 am and 3.00 pm
- 📅 Friday
🕒 11.00 am and 3.00 pm
- 📅 Saturday
🕒 12.00 noon and 4.00 pm

New Android-based diagnostics and professional assessment of the state of the HV battery

- 📅 Thursday
🕒 12.00 noon and 4.00 pm
- 📅 Friday
🕒 10.00 am and 2.00 pm
- 📅 Saturday
🕒 10.00 am and 2.00 pm



Revolution S for smart savers

The SDI user interface focuses on important functions at a glance and provides quick access to them.

The new slimline diagnostic solution mega macs S 20, which is just as flexible as its big brother mega macs X. Simply get started, change to it or extend it!

It has been almost four years since the new launch of the mega macs X was headlined here as 'Revolution X'. And it is indeed a fact that this high-end device for multi-brand diagnostics has revolutionised everyday workshop life. The developers ascribed special capabilities into its DNA, attributes which make it particularly flexible and future-proof. We are not only talking about extreme scalability, thanks to flexibly selectable SDI software modules and licences, but also about its DoIP capability and the innovative ability to determine the SoH of the traction

batteries of electric vehicles. Hella Gutmann has now transferred this highly developed DNA to the more cost-effective diagnostic entry-level class – and even enriched it. In other words, the brand new multi-brand diagnostic solution mega macs S 20 will also be pioneering in its class.

Speed and flexibility at a low price

mega macs S 20 is the diagnostic solution for anyone who wants a staggered, expandable range of services

at transparent and, above all, affordable conditions. Either for getting started with diagnostics, switching from an older diagnostic device or simply the wish for additional equipment for workstations at a flexible, state-of-the-art level.

In order to fulfil such requirements, Hella Gutmann has brought together existing experience from the software-based solution mega macs ONE with the previously mentioned mega macs X-DNA. Like mega macs ONE, the new mega macs S 20 diagnostic solution has been designed for flexible use with any Android



Bernd Schretter, Head of Sales for Germany, Austria and Switzerland (D-A-CH): "With mega macs S 20, we offer an entry-level diagnostic solution for Android end devices with an excellent price-performance ratio. Something like this actually belongs in every workshop trolley! And it pays off if you only use mega macs S 20 for high-voltage battery diagnostics. Or just for basic functions – which even have running updates, but absolutely no running costs."



mega macs S 20



The software-based diagnostic solution mega macs S 20 for the Android end devices of your choice.

device (Android 10 or higher) such as tablets and large smartphones.

Purchase HG-VCI and diagnostic software to get a tablet as required

The diagnostic expertise and the performance of the multi-brand diagnostics are included in the software and firmware provided, the use of which is licensed. The only hardware component included in the delivery of the mega macs S 20 product is the HG-VCI S 20 with a Bluetooth and USB-C interface.

mega macs S 20 is absolutely state of the art in terms of technology and content. The innovative SDI 'Smart Diagnostic Interface' software architecture ensures maximum clarity and a fast, intuitive sequencing of diagnostic steps, starting with vehicle identification, queries of all systems and fault diagnostics.

This smart SDI software was up until now reserved for Hella Gutmann's high-end devices. In addition, mega macs S 20 is compatible with the DoIP and CAN FD data transmission protocols so that even the most modern vehicles can also be diagnosed.

SDI software modules and licences up for selection

Mega macs S 20 is available in a variety of versions so as to allow maximum adaptability to suit the individual needs of a workshop and also to cater for any future changes. These are defined by staggered software scopes with the appropriate usage licences. The SDI software modules S1, S2 and S3 are each assigned licences of the same name. But it is not necessary to make a final decision straight away as there is always the option of a quick upgrade.

Even with the free **Licence S1**, basic settings are possible in addition to the basics such as reading/deleting error codes and service resets. Functions such as the mileage query, coding, parameter views, actuator tests and the use of the Hella Gutmann CSM are enabled from **Licence S2**. This means that the new mega macs S 20 can also be used to unlock manufacturers' cyber security locks. The prerequisite for this is a valid (free) Hella Gutmann CSM user account. The sending of OBFCM data to authorities is also integrated, a function that offers essential advantages for workshops as a result of certain regulations, particularly those in neighbouring countries such as Austria, the Netherlands and Denmark.

High-voltage battery diagnostics PRO and link up with HGS Data

The highest available **Licence S3** unlocks additional functions with financial benefits. These include the practical, error code-based solution suggestions for system diagnostics and the direct link to the HGS Data web application with automatic transmission of vehicle parameters. Licence S3 also opens up the additional benefit of battery diagnostics for electric vehicles, a benefit important for the future. As of now it is also possible to carry out Battery Quick Checks using the mega macs function HV Battery Diagnostics PRO with the mega macs S 20. This objective determining of the SoH of traction batteries was previously reserved exclusively for mega macs X.

GOOD TO KNOW!

- Licence S1 with basic functions is free of charge.
- All other licences are free of charge for the first six months.
- Once a Licence S2 or S3 has expired, the basic scope of Licence S1 can be used without restriction.
- All software updates are invariably free of charge, regardless of licence type.
- The first deliveries of the new diagnostic solutions will start from October 2024 with software Version 75.



Licence S3 and the Licence S-Battery with HV battery diagnostics PRO

Hella Gutmann offers the appropriately reduced Licence S-Battery for all those who only want to add elementary functions for HV batteries to their existing diagnostic device.



Fast transport for data and diagnostics

True or false?

Tracking down the biggest misunderstandings about DoIP and CAN FD.

DoIP equals 'Diagnostics via the Internet'



DoIP stands for 'Diagnostics over Internet Protocol'. The word 'Protocol' should be particularly noted. An Internet Protocol (IP) is a set of rules for forwarding and addressing data packets so that they can be transmitted over networks. DoIP therefore does not describe the concept of diagnostics itself, but a protocol that enables communication between vehicles and diagnostic systems and also external backends (e.g. for updates) via IP.

Vehicles with vehicle electrical systems, which are designed for DoIP, are also commonly referred to as Ethernet vehicles.



This is because DoIP is based on Ethernet technology, which enables faster and more efficient data transmission. Such vehicles use Ethernet networks at least in part – especially for applications that require high data rates. In addition to Ethernet, other networks such as CAN, LIN, FlexRay etc. are usually also on board.

Non-DoIP-capable diagnostic devices cannot establish any communication with Ethernet vehicles.



This depends entirely on how the vehicle electrical system has been designed by each individual vehicle manufacturer. It is quite possible that OE diagnostics via DoIP is provided with the vehicle, but that communication via the CAN bus can still take place with an older diagnostic device – possibly to a limited extent. The example of Jaguar/Land Rover.

DoIP and CAN FD are two designations for the one and the same technology



DoIP was developed with the aim of being able to use the latest IP technologies in the vehicle. CAN FD, on the other hand, is a further development of the classic CAN protocol. It enables a data transfer rate around eight times faster than CAN and supports larger data packets.

A separate RJ45 interface is required in the vehicle for diagnostics via DoIP.



The ISO13400-4 standard stipulates that DoIP must be anchored in the 16-pin OBD interface. This is where 4 defined pins for DoIP are assigned in two variants. Communication with certain control units that are networked via DoIP then has to be possible by means of these pins. In addition, manufacturers such as Tesla are moving towards installing an RJ45 interface with which their own diagnostic devices can communicate direct with the Ethernet network.

Older diagnostic devices can be made DoIP-capable by combining them with an appropriately equipped VCI.



Theoretically this would certainly be possible as the microchips required for the protocol can today even be accommodated in a really small VCI. However, the diagnostic software and firmware and also performance levels also have to be adapted to the evaluation of modern communication protocols. It is therefore not so easy to convert older devices to DoIP.

In modern vehicles, transmission technologies have to cope with ever-larger volumes of data. So, as is the case in industry and in the home IT sector, Ethernet comes into play.

Photo: Adobe Stock

Now CSM also for young BMW models

Cyber Security Management integrated in the mega macs diagnostic software has grown to cover 17 brands.



CSM now also unlocks four secured model series from BMW.

Despite all hopes that access blocks, aka 'security gateways', could one day be dropped, they are still on the increase. So in order to support independent garages in communicating with the latest vehicle generations in as unhindered a way as possible, back in 2020 Hella Gutmann implemented 'Cyber Security Management' (CSM) in the mega macs software – and continues to expand it. CSM allows verified users to diagnose access-secured vehicles without having to engage in detours via OE portals. Furthermore it constitutes an important element in securing the future of a workshop.

CSM for four of the newer BMW model series

Via a software patch for mega macs software Version 74, CSM has now been extended to include the BMW brand. This automatically benefits all mega macs devices and solutions, which are operated with an active,

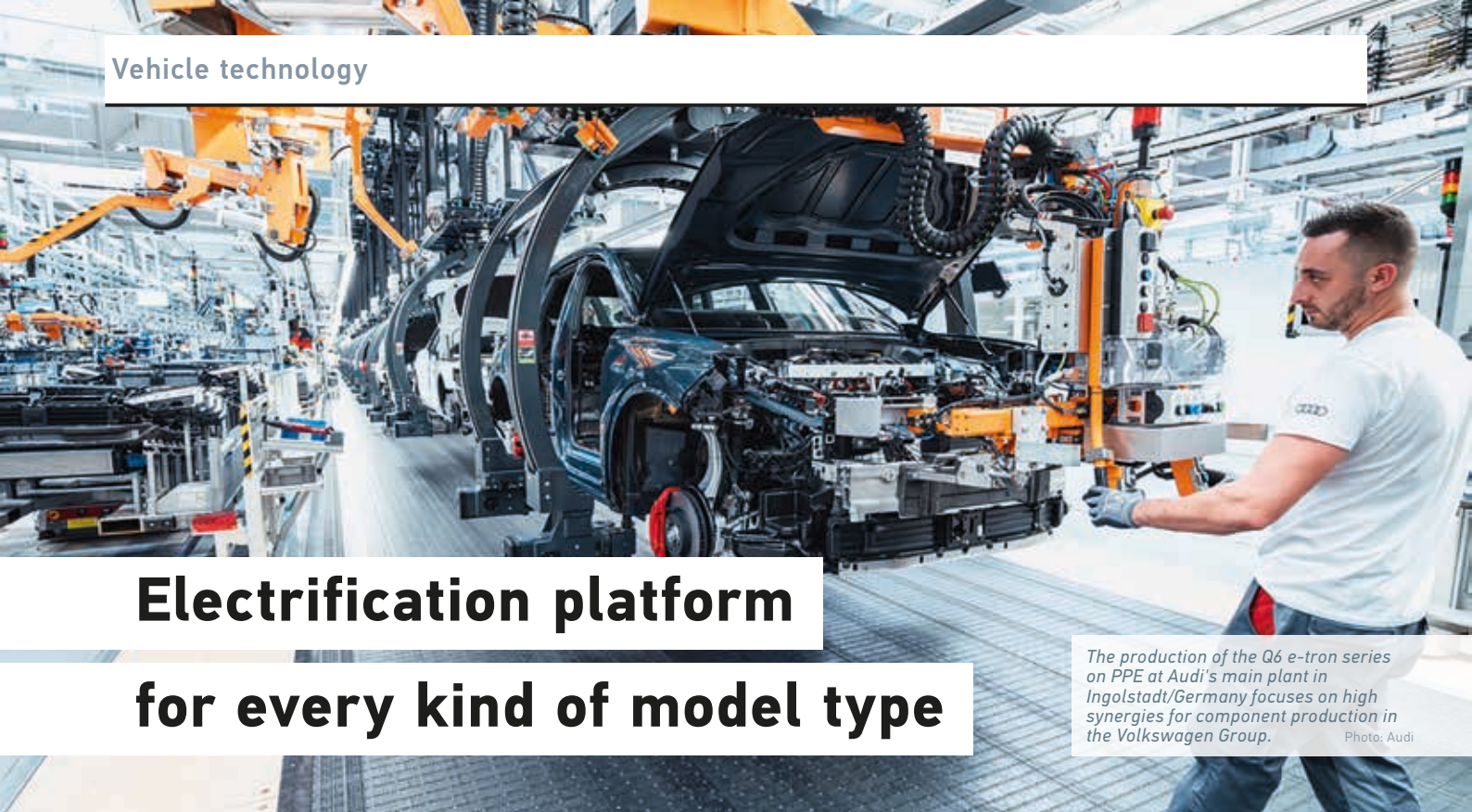
chargeable licence. At BMW, cyber security measures using SFA (Secure Feature Activation) began in 2022 in the luxury class (7 Series) and in the third-generation X1 compact SUV. And as of now, workshops are supported by the Hella Gutmann CSM when diagnosing these models and also the newer model series covering the 5 Series and the X2. Extensions to include future BMW models are planned.

Workshops currently benefit from largely unhindered diagnostic processes for young models from **Abarth, Alfa Romeo, Audi, BMW, Chrysler, Cupra, Dacia, Dodge/RAM, Fiat, Hyundai, Jeep, Kia, Mercedes-Benz, Renault, Seat, Škoda** and **VW**. In addition, almost any mega macs can use the required seed&key procedure to undo the cyber security locks of **Ford, Polestar** and **Volvo**. The result is that a total of more than 650 vehicle models profit from Hella Gutmann's cyber security unlocking functions.

Instead of registering individually in each OE portal, undergoing tests, following the relevant process steps for vehicle-specific diagnostic activations and then paying fees, mega macs users only need to authenticate themselves once with Hella Gutmann, a procedure which is free of charge.

Automatic unblocking of the gateway

Immediately after vehicle identification has taken place, either manually or via VIN, a mega macs recognises whether it is a secured vehicle or not. If a CSM user account is available, it automatically initiates all the activation steps for unlocking the vehicle gateway in a fraction of a second. This means that then the usual diagnostic functions such as reading/deleting error codes, viewing parameters, basic settings, calibrations, coding, actuator tests and service resets all become available.



Electrification platform for every kind of model type

The production of the Q6 e-tron series on PPE at Audi's main plant in Ingolstadt/Germany focuses on high synergies for component production in the Volkswagen Group.

Photo: Audi

Audi and Porsche have created a sophisticated, cross-segment model kit for electric vehicles. It is the basis for future models including all their derivatives – but nevertheless it retains the typical brand DNA.

Modular architectures, i.e. platform strategies in automotive engineering, are not a new invention. Saving costs by using identical parts was probably the original idea. The added flexibility for faster realisation of new model variants and derivatives (time-to-market) is a great advantage for the development engineers of all major automotive groups. The best-known pioneer of a platform in automotive engineering is the modular transverse toolkit or matrix (MQB) from VW. The modular, kit-style architecture of the body and key components introduced in 2012 enabled the Wolfsburg-based company to significantly accelerate the development of new models from the Polo to the Arteon with a transverse front-mounted engine. With the MLB (modular longitudinal toolkit), the

strategy also set a precedent for models with longitudinal engines: the fact that Porsche, as a pure-bred sports car manufacturer, was able to enter the SUV segment with the Cayenne without further ado can be explained by looking at the MLB platform siblings VW Touareg and Audi Q7. Other automotive groups, such as Stellantis, have long been working with platforms.

However, previous platforms have reached their limits when used for purely electric drives. Although multi-traction platforms that can accommodate both combustion engines and also purely electric drives are workable and, on balance, cost-effective, they definitely demand compromises from a technical point of view. A vehicle concept for a combustion front engine simply requires a longer front end than a vehicle that was designed from the outset for an all-electric drive. Conversely, the electric or fuel cell vehicle requires as much space as possible in the underbody to accommodate battery modules and hydrogen tanks. And the different vehicle centres of gravity and requirements for the cooling systems of combustion engines and electric cars also have to be

The battery, consisting of 12 modules, plays a crucial role as it is also part of the crash structure and of the cooling system. It is designed so that each module, including the cell module controller, is interchangeable.

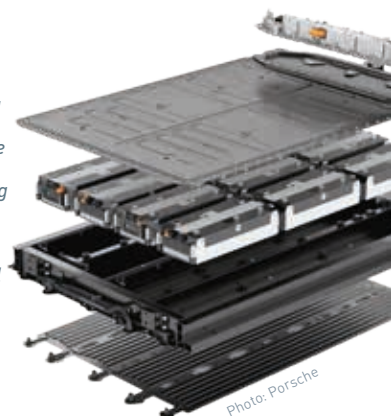
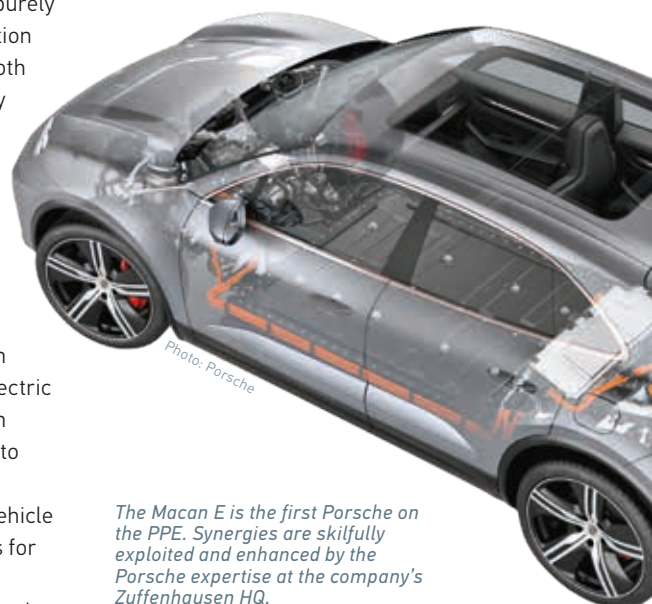


Photo: Porsche



The Macan E is the first Porsche on the PPE. Synergies are skilfully exploited and enhanced by the Porsche expertise at the company's Zuffenhausen HQ.

Photo: VW



VW's modular transverse matrix, introduced in 2012, is considered to be a pioneer among platforms. And it was already scalable from the outset.

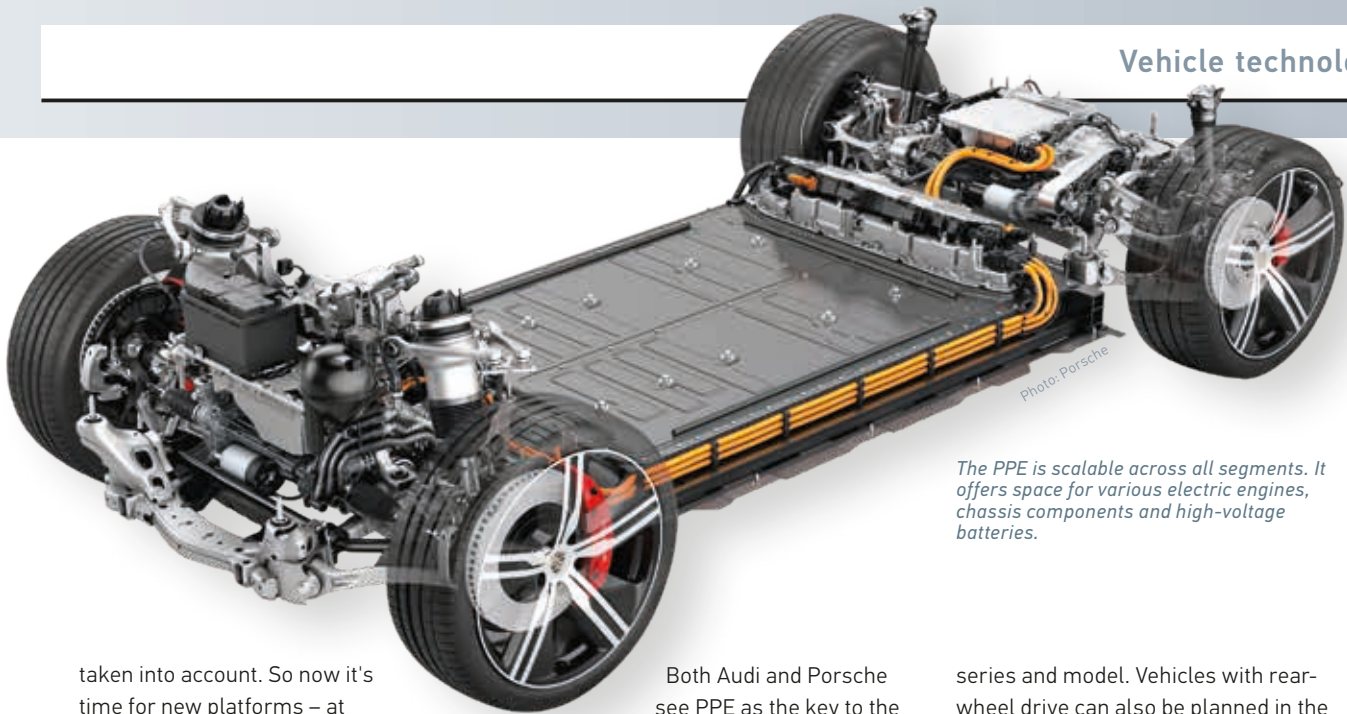


Photo: Porsche

The PPE is scalable across all segments. It offers space for various electric engines, chassis components and high-voltage batteries.

taken into account. So now it's time for new platforms – at least for the groups that work with high volumes of car production, such as the VW Group.

New premium platforms: PPE and PPC

In order to transfer the advantages of the MQB to electric vehicles, the Wolfsburg-based company created the MEB (Modular Electric Drive Kit) at an early stage. All ID. models are based on this. Nevertheless, the VW Group's two luxury brands, Porsche and Audi, joined forces to take the platform concept a step further. The result was the jointly developed Premium Platform Electric (PPE). The name says it all: Premium stands for a significantly extended range of applications and high potential for technologically very sophisticated derivatives.

And incidentally: in parallel to PPE, Audi is also focusing on a newly developed modular architecture for the large-scale production of future combustion models, Premium Platform Combustion (PPC).

This was designed to accommodate various advanced engines and their electrified derivatives as plug-in hybrids and ranks as the final development stage for conventional vehicles at Audi. Synergies can also be utilised with this dual platform strategy because both PPE and PPC use the same new electronic architecture called E3.

Both Audi and Porsche see PPE as the key to the rapid expansion of their technically sophisticated, all-electric fleet, starting with B- and C-segment SUVs, a trend which is certainly expandable. At the same time, it remains important to both brands to equip their future models with the typical brand DNA and to give them their own independent character. The first models that Audi and Porsche launched in series production at the beginning of 2024 based on PPE provide a sneak peak of things to come: the Q6 e-tron and Macan E. The brands have succeeded in differentiating the platform siblings not only visually, but also to some extent technically.

Scalable for several vehicle segments

The architecture of the new premium platform, PPE, is scalable. This essentially means that the lower assembly and chassis can be adapted to the vehicle segment by means of modulations. Such flexibility offers so much leeway in terms of wheelbase, track width and ground clearance that both high-bed and low-bed vehicles, i.e. SUVs, estate cars and saloons, can be built on one platform. All vehicles benefit from this one single platform designed to completely suit all needs: right from the start, the components are in the right places and are grouped together according to functional aspects. The PPE also offers space for the various electric engines, chassis components and high-voltage batteries of different shapes and sizes, depending on the

series and model. Vehicles with rear-wheel drive can also be planned in the same way as models with front-wheel or all-wheel drive.

Production also benefits from the shared platform because all variants and any other derivatives can, at least in theory, run on the same assembly lines. Even if there are fixed allocations of models to global production sites within the Group, the new modular system for electric vehicles opens up the possibility of expanding within the Volkswagen Group the competences of the plants specifically concerned with PPE operations. Audi is bundling body construction and battery assembly in Ingolstadt/Germany. The electric drives and gearboxes for all PPE models are produced in Győr/Hungary.

A chance for customised new developments of e-drives

The introduction of PPE (and PPC) eliminates the previous need for compromises caused by installation space.

The ASM with hairpin winding and oil cooling on the front axle of the Q6 e-tron turns without any significant drag losses.

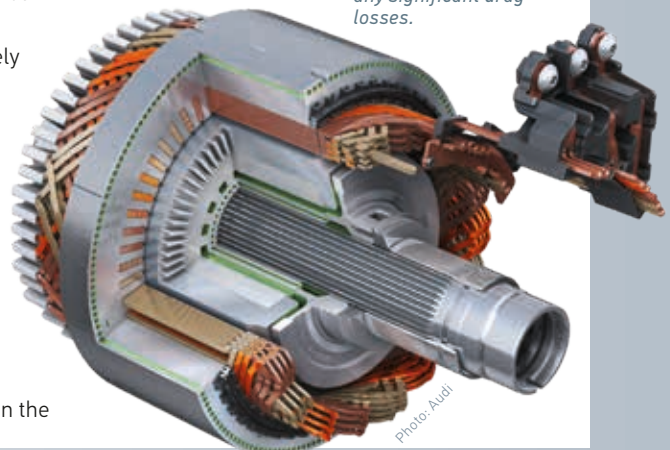


Photo: Audi

Porsche and Audi have seized this opportunity partly as a joint effort and partly on their own: both the electric machines with power electronics and transmission and also the new high-voltage batteries with all peripheral components have been newly developed. They are customised precisely to the requirements of a battery electric vehicle – with an impact on their compactness and efficiency.

A key advantage of the newly developed electric machines is their efficiency. This is primarily brought about by a new hairpin winding and direct oil spray cooling in the stator. Rotor cooling also means that the use of heavy rare earths is largely no longer needed. The power is simply scaled over the length of the electric machines; in the current standard versions of the PPE models, this is 100 mm at the front and 200 mm at the rear. Development work has also gone into the power electronics (pulse inverter, PWR). Porsche now uses silicon carbide semiconductors throughout and Audi only in the more powerful variant of the water-cooled pulse inverters (PWR), semiconductors whose efficiency is around 60 per cent higher than that of conventional silicon semiconductors, especially in the partial load range. Overall, the power loss of the electric drives is said to have been reduced by 50 per cent.

Differences in electric drives and steering

There are also different brand philosophies when it comes to electric

drives: the Ingolstadt-based company goes for a permanently excited asynchronous machine (PAM) at the front and a permanently excited synchronous machine (PSM) at the rear. In the Macan E platform sibling, on the other hand, Porsche works consistently and exclusively with PSM, as is the case with the all-electric Taycan. Although these are somewhat more expensive, they can be regulated comparatively faster and are thermally stable enough to enable high continuous performance.

In this way, the two high-end brands under the umbrella of the Volkswagen Group succeed in bestowing upon their models distinctive technical features. Thanks to the PPE and the very compact electric motors, the Zuffenhausen-based

company was able to create in the most powerful Macan E named 'Turbo' a so-called performance rear end. This is a subframe in which a larger electric machine, compared with the basic version, is installed horizontally and rotated by 180 degrees. This moves the weight of the drive system behind the axle and ensures the typical Porsche, rear-biased axle load distribution. In addition, the performance rear end houses a rear axle steering system that can turn the wheels a maximum of five degrees depending on the given situation. And also in the all-wheel drive and front-wheel steering, there can be found a great deal of Zuffenhausen expertise.

Both brands offer their customers sophisticated axle-specific brake blending between friction lining brake and energy recuperation as part of a variable recuperation system: if the foot is taken off the accelerator, the vehicle can recuperate to the maximum or glide freely without any drag torque, depending on the driver's wishes. Another variant, which is implemented in technically different ways by the brands, provides deceleration with moderate recuperation, as occurs in combustion vehicles caused by the drag torque.

800 volt batteries with bank charging function

There is agreement among the brands as regards 800 volt architecture and

In the Macan E Turbo, the PPE carries a performance rear end with a larger electric drive, which is installed horizontally rotated by 180 degrees and places its weight behind the axle.

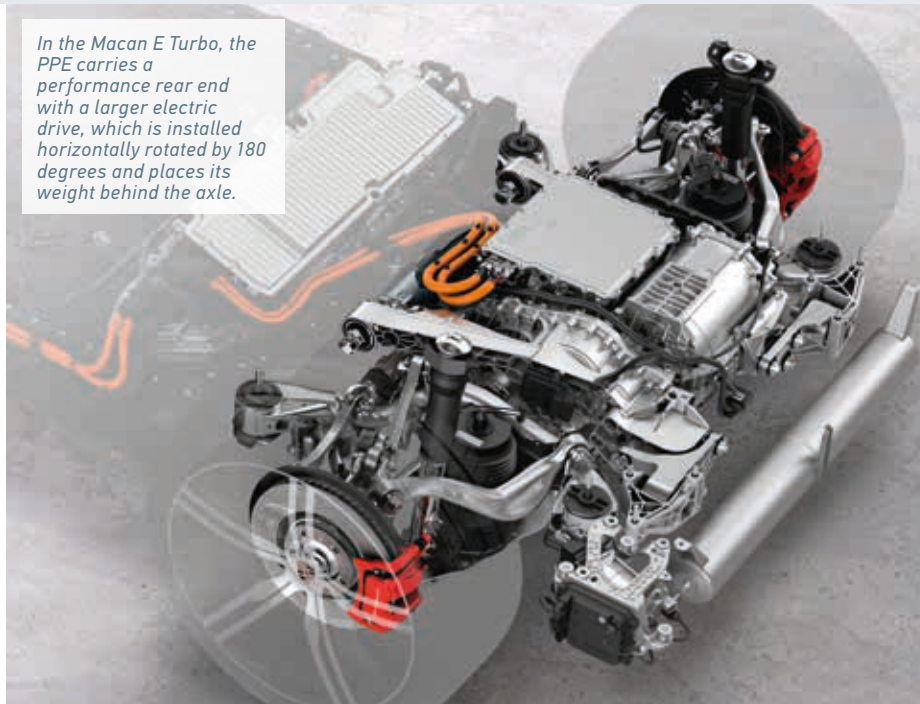


Photo: Porsche

Compared with the ASM, the PSM can be regulated more quickly and is so thermally stable that high continuous performance is possible. An absolute must on the rear axle of the PPE models – and also at the front for Porsche.

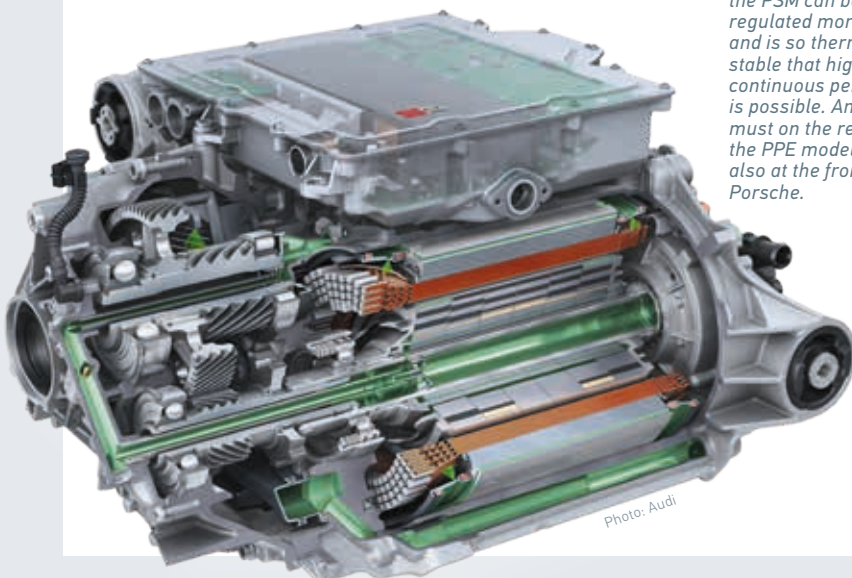


Photo: Audi

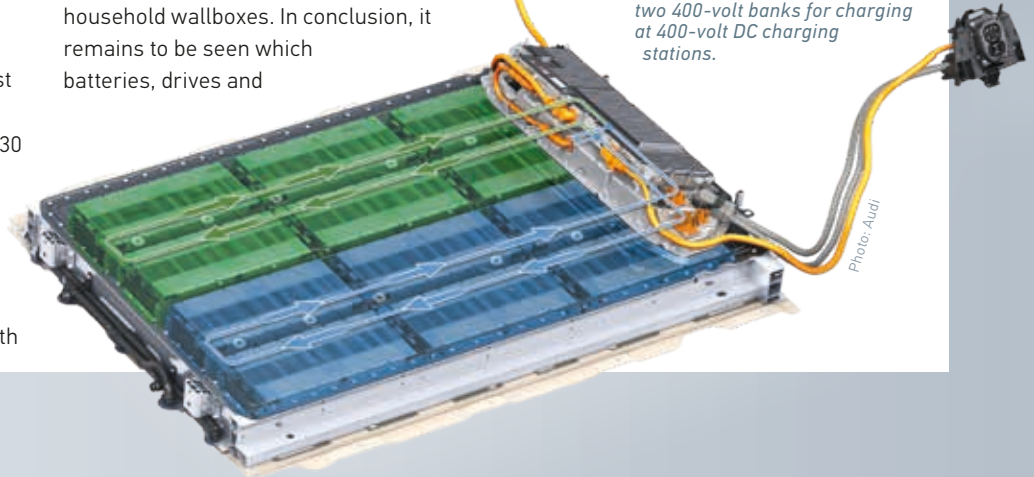
charging management. The electric engines draw their energy from a lithium-ion battery in the underbody, of which up to 95 kWh of the 100 kWh gross capacity is actively utilised. The 800-volt architecture scores points with comparatively thin cabling of the battery and the electric machines and is one of the decisive factors for the high charging performance of up to 270 kW (DC). The charge level of the battery can be increased from ten to 80 per cent in just over 20 minutes at a suitably powerful fast charging station – thanks to up to 30 minutes of battery preconditioning and an elaborate cooling concept.

However, the PPE models can also charge at the more common 400-volt charging stations. For this purpose, with

the so-called bank charging a high-voltage switch in the battery simply splits the 800-volt battery into two batteries, each with a rated voltage of 400 volts. This clever little trick enables efficient charging without an additional HV booster with an output of up to 135 kW. These first PPE models can also be charged with up to 11 kW (AC) at standard household wallboxes. In conclusion, it remains to be seen which batteries, drives and

management systems in future vehicles will operate on this premium platform. But one thing is the basis for their short time-to-market has already been created.

The 800-volt lithium-ion battery for PPE can be easily split into two 400-volt banks for charging at 400-volt DC charging stations.



HELLA ACADEMY

The knowledge workshop

MADE FOR PRACTICAL PEOPLE IN INDEPENDENT WORKSHOPS.

The technical training courses at the HELLA Academy are developed by Hella Gutmann practical experts precisely to meet the needs of practical professionals in workshops – and are, of course, constantly adapted to respond to the changing demands of further training. Here are some examples of such changes: the increasing levels of equipment required for driver assistance systems (ADAS), intelligent lighting systems and, not least, the growing number of hybrid and electric vehicles in the customer base of many independent workshops.

The high-voltage training area at the Hella Academy in Erwitte/Germany was recently extended to include two lifting platform locations. Because of the consistently high demand, more high-voltage training sessions for HV 1S, HV 2S and HV 3S qualifications are also being scheduled. The training courses for ADAS calibrations are similarly in high demand at the moment.

As a result of the complexity and diversity of the assistance systems, the contents have been divided into the courses FAS1 and FAS2. A third course, focusing on wheel alignment, will soon be added to the range of studies.

An overview of all training courses on offer with detailed content descriptions can be found by visiting the website

🔗 www.hella-academy.com.

After they have completed free registration, it is easy for registered users to view course dates and check availability of places, they can book online and also manage their workshop team's further training arrangements. Simply take a look!

A CLASSIC ALTERNATIVE
Inquire with the training team at
training@hella-gutmann.com
or +49 7668 99 00-888



The high-voltage training area at the Hella Academy in Erwitte/Germany was recently extended to include two lifting platform locations.



Highly qualified range of services for customers and workshops

Many of the approximately 80 CheckPoints in Germany and the neighbouring countries are preparing the gradual expansion of their specialised services – which will also include battery repairs for e-vehicles.



Martin Muffler,
responsible for
CheckPoint matters
at Hella Gutmann:
"It is becoming
increasingly important
to be able to offer end
customers all-round
e-services. That's why actively
committed CheckPoints will
increasingly become an important
point of contact for independent
workshops."

They are recognised as specialists who can perform particularly demanding services on new vehicles: CheckPoints, powered by Hella Gutmann. Their expertise is of benefit to them themselves and to their end customers and also to all independent workshops in the region. The reason is that these CheckPoints are equipped for those tasks for which the typical independent multi-brand workshop often lacks the time and the necessary routine. So very often the only unwelcome solution is to go to the relevant authorised dealer workshop.

But now, most definitely, that belongs to the past. For with all the CheckPoint specialist knowledge, first-class workshop equipment, remote setups to the Hella Gutmann headquarters and thanks to the

right connections to manufacturers and other experts, special challenges can now be professionally dealt with and mastered. Tasks like component and function activations, software updates and also many kinds of settings, codings and calibrations for which vehicle-related OE data must be obtained more and more frequently these days.

NEW The supreme discipline of battery repair

It is a fact that the list of challenges continues to grow dynamically – partly because of the increasing volume and the average age of the electric vehicle fleet. The first CheckPoints will therefore now gradually expand their expertise to include the increasingly sought-after services for e-vehicles.

The simple work tasks include the objective assessment of the state of traction batteries using mega macs X and the certified Battery QuickCheck. CheckPoints that are particularly future-oriented are now equipping themselves even for the supreme discipline of 'battery repair'. This range of services is made possible on the one hand by the good cooperation with the specialists at a

Refreshing Centre for defective high-voltage battery blocks, and on the other hand by the higher qualification of the CheckPoint employees involved, who are trained beyond the 3S high-voltage qualification. "Our service on offer for high-voltage battery repair is currently still in



WHERE IS THE NEAREST CHECKPOINT?



Customers, workshops and used car dealers can find what they are looking for on the constantly updated CheckPoint website @ www.checkpoint-hella-gutmann.com.

Simply enter your location and link up direct with the CheckPoint website.

CheckPoints that have already included the assessment of the state of traction batteries or that have HV battery repairs in their service portfolio are marked.

the start-up phase," reports Martin Muffler, CheckPoint Manager at Hella Gutmann. "But we can see that CheckPoint partners who already have services or body repairs on electric vehicles in their service portfolio are very open to the new expansion option or they have even been



waiting for such a chance. They want to seize the opportunity as soon as possible to develop for themselves a truly unique selling point in their region through battery repair."

In the current start-up phase, the range of services offered by the high-voltage battery repair and service centre is still limited to batteries for electric vehicles from the Volkswagen Group, i.e. Audi, Volkswagen, Seat, Skoda, Cupra and Porsche. But in future, CheckPoints will also be able to offer their customers – whether it is their own end customers or other workshops – HV battery repairs for other manufacturers. And, of course, the service package includes problem diagnosis, removal and installation, repair by means of module replacement and also the important balancing and fine balancing to produce the highest possible capacity in relation to the condition of the component at the time. An appropriate capacity certificate will verify the quality of the high-voltage battery repair.

THE BASIC RANGE OF SERVICES

- Camera and sensor calibration
- Component activation
- Lamp testing and adjustment
- Electronics check and system diagnostics

The location of the nearest CheckPoint and the services available there can be easily found by visiting the website.

www.checkpoint-hella-gutmann.com



WANT TO BECOME A CHECKPOINT? SCAN CODE!

There is information here for all those who want to set up a CheckPoint for their own businesses. Alternatively emails can be sent to checkpoint@hella-gutmann.com



The TecMotive fleet is on the road throughout Germany with the aim of minimising downtime for workshops.

tec motive
Workshop service

Cross-brand, mobile services on site in your workshop

Providing support with service and products of high quality there where regional technicians reach their limits. With all this as their aim, TecMotive's mobile technicians are on the road all over Germany. In this way they help to minimise downtime for workshop equipment.

If the workshop or the aftermarket commissions it, the qualified TecMotive specialists take over tasks that cannot or may not be done by the staff concerned in such establishments. And this support is not only intended for workshop

equipment from Hella Gutmann. The technical services of the TecMotive network include the most diverse kinds of assembly, maintenance, calibration and the repair of workshop equipment. And it makes no difference whether the job is to deal with individual devices or complete workstations, for example, lamp adjustment, exhaust testing, wheel alignment/chassis measurement or ADAS calibrations.

In addition, TecMotive sees to the tasks of the classic workshop customer service for Hella Gutmann products, starting with

device instructions and briefings through the installation of rail and ADAS calibration systems right up to their adjustment and certified verification of measuring accuracy. In close collaboration with certified partners, TechMotive, in addition to approving test stations in accordance with guidelines, also performs complete workshop audits if so required.

TecMotive services can be requested direct.

 www.tecmotive.com



About the author

Max* has been highly valued by Hella Gutmann and by workshops for many years. He is always ready to listen to joy and sorrow, to praise and criticism, to new ideas and clever solutions. He often accepts invitations and reports enthusiastically about what he finds there. In the new series 'Max on Tour', everyone can take part.

Where tradition and modernity meet

Surprising impressions from a visit to Autohaus Deusch, in the centre of the Black Forest. Also on offer: the Battery QuickCheck.



Tradition and modernity complement each other at the Deusch independent workshop. On request, customers can borrow and test drive an e-vehicle and receive an informative talk about e-mobility.

As soon as you arrive in Zell am Harmersbach, you realise that tradition is at home here. Wherever I look, charming half-timbered houses and signs of cuckoo clock manufacturing greet me: welcome to the Black Forest! Then we drive onto the premises of Autohaus Deusch and see its car showrooms. First impression: also charming and at the same time professional with its spacious direct reception area. At reception, I check in to the "home of modern technology". This is the claim in the company logo.

Then comes a warm welcome from workshop owner and guild master craftsman Sven Wangler and his

14-strong team. This is made up of a lot of family and four young people in training. We quickly get into a lively discussion. Terms such as specialisation, shortage of skilled workers, data protection, AI and business management come up. Also very definite statements such as "We introduced a four-day week for everyone eight years ago" – "We are well aware that we need to specialise in the strong brands, with a willingness to invest in tools, IT and software" – "Effective organisation and structure within the company is important." At the same time, my gaze falls on a red electric car marked 'Employee and Trainee Car'. I am

impressed and understand that people here are actively thinking about what is important today and in the future.

E-mobility as an opportunity for independent workshops

My question about the importance of e-vehicles in this rural, touristic region and in his own car dealership triggers a smile and a veritable flood of information from Wangler: "Do we want to market and repair e-vehicles? This question does not even arise for us! I see e-mobility as an opportunity for us as an independent workshop and also for our young employees, who all incidentally have HV qualifications." But the dedicated automotive expert also sees a need for action at grass roots level, i.e. in contact with the end customer: "Politicians are failing to deal openly and honestly with the issue of e-mobility. That's why it's our job to provide drivers with professional information. Every customer who gets an e-vehicle from us as a loan car gets out of the vehicle full of enthusiasm." The Deusch team actively educates its

customers about handling, charging, battery performance and quality in order to dispel their fears and prejudices about electric cars. And all this in line with their driving style and requirements.

The latest building block to Autohaus Deusch's high-voltage expertise is the determining of the battery status of

electric vehicles via mega macs X and Battery QuickCheck. "For

me, this certificate or protocol represents a very transparent advantage in the marketing and repair of e-vehicles. I

read about it in a report and immediately decided to go for it. Firstly, because I always want to be one of the first in terms of

technology and secondly, because I see clear advantages as regards trading in and marketing an

e-vehicle if I have an assessment of the battery

condition in my hand – especially as this process is also TÜV-certified (verified by the German Technical Inspection Association)." Of all this Wangler is convinced. The technical implementation in conjunction with the wallbox and the existing mega macs X diagnostic device is the perfect solution in the workshop process.

Team Deusch, including many family members and four young people in training, with guest Holger Fink from the Lorch company.



Determining the condition of the high-voltage battery via mega macs X is simply part of servicing e-vehicles for guild master craftsman Wangler (left) and his employees.

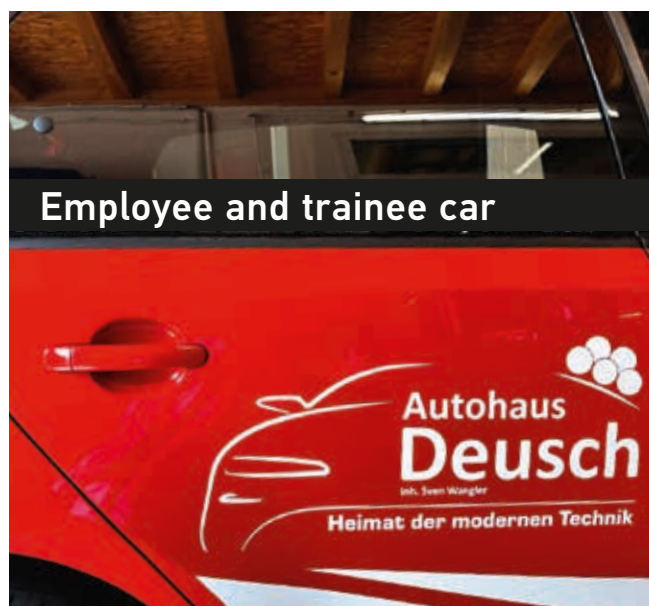
A shortage of skilled labour is not an issue at Autohaus Deusch – thanks to the excellent working atmosphere there.

Would I like to see it for myself? I gladly accept this invitation to a live demo.

Live demo Battery QuickCheck

The high-voltage battery can only be charged to a maximum of 45 per cent. And also no consumers such as air conditioning, lights, etc. can be switched on and (as with many basic settings and diagnostics) the power supply to the 12 V battery is to be secured. These are the prerequisites for starting a Battery QuickCheck, then off you go. As for a normal charging process, the vehicle is connected to the go-e wallbox and the mega macs X is plugged into the OBD socket. It allows the vehicle to be recognised and we select the "HV battery diagnostics PRO" function. We are then automatically linked to the Battery QuickCheck app. Then brief confirmation that the wallbox is connected, and it takes about a minute for the test procedure to start. The information "Test time 90

Employee and trainee car



minutes, do not interrupt communication" is displayed on the mega macs X tablet. This period may vary depending on the vehicle model and battery size. Time for the lunch break.

When we return, the test is complete and we receive the result by e-mail: the high-voltage battery has 98.00% of its original capacity – a pleasing result. A QR code also included gives the end customer the opportunity of checking the authenticity and correct classification of the result.

Wangler fully appreciates that the workshop or the end consumer has to pay for each protocol: "Our margin for the protocol is not the sales driver anyway, but rather the offer of a complete package for customers. We include the service in a flat-rate service fee for e-vehicles: checking the systems/ diagnosis and a flat rate for charging the battery after the service." Information about the battery's state of health as part of the service is well received by end consumers, according to Deusch's experience. And the costs are easy to communicate to most customers. After all, filling up the fuel tank as part of an inspection is not included for combustion engines either.

That's actually true, I think, and thank Team Deusch for the instructive insights into their workshop daily routine.





TRACKING DOWN THE FAULT

Providing workshops with efficient support when they are troubleshooting customer vehicles is a given at Hella Gutmann. With state-of-the-art, manufacturer-specific expertise, the team of experts, made up of around 90 people from the Technical Call Centre, takes at least 2,000 workshops a day through to a solution using remote diagnostics.

Workshops submit their queries on the telephone or by using the automatic mega macs help program, and are confident in the knowledge that they will be successfully and reliably guided through the repair procedure.

Here are two recent examples from the exciting day-to-day working lives of our Hella Gutmann experts.



Lots more troubleshooting can be found every month in the Hella Gutman newsletter. Register for this now at www.hella-gutmann.com/newsletter



Diagnostics case # 39

OPEL ASTRA-K 1.4i 16V TURBO

with engine identification letter B 14 XFT(LE2), manufactured in 2018



TRANSFERABILITY: All models with LE2 engine

PROBLEM: A replacement engine had been installed following engine damage. But there were starting problems and poor throttle response.

ERROR CODES: The error P006C was stored in the engine control unit. That means 'Fuel distribution pipe Bank 1 – fuel pressure too low during engine start'.

WORKSHOP MEASURES: No abnormalities were found on the fuel supply system. The filter was replaced – without success. After some basic adjustments were made, the engine ran well for a short time, then the problem returned. Further error codes for the fuel pressure regulator were now stored showing P0089 and P228C, then the drive of the high-pressure pump was checked, but without any result. In the final instance, the high-pressure pump was initially replaced from an available donor vehicle, then one after the other the pre-feed pump, fuel pump control unit and fuel pressure sensor. All to no avail.

EXPERT TIP: We recommend taking a look at the fuel lines, as there is a non-return valve in the supply line to the high-pressure fuel pump. Its defect would at least explain the starting problems because then the fuel would be able to flow back to the tank and the pressure build-up would take longer.

TROUBLESHOOTING: When the fuel line was checked, it immediately became clear why the engine was having problems: the line had simply been installed the wrong way round, recognisable by the coloured markings on the wrong side. This meant that the non-return valve was obstructing the fuel supply. After the correct assembly and renewed basic settings of the mixture adaptation, fuel pump and fuel pressure regulator, the engine ran without any complaints.



D

Diagnostics case #40

SKODA KAMIQ 1.5I 16V TSI

with engine identification letter DPCA, year of manufacture 2020



Photo: Škoda

TRANSFERABILITY: All Volkswagen Group models with 1.0i and 1.5i TSI engines.

PROBLEM: The engine warning lamp was activated.

ERROR CODES: In the engine control unit were stored the error codes 31403 (Orig. P04F000) and 34785 (Orig. P044100). Both signify 'Tank ventilation system – flow rate faulty'.

WORKSHOP MEASURES: After deleting the error entries, a test drive was carried out. Afterwards, no new errors were stored, nor did an actuator test and visual inspection of the active carbon filter system reveal any abnormalities. So after consulting with the customer, it was decided not to take any further action for the time being. But just a few days later, the vehicle returned to the workshop with the same faults again.

EXPERT TIP: The error pattern is known. It is caused by the combination of a defective active carbon filter solenoid valve and an active carbon filter (ACF) with deviating quality. Both should be replaced. An ACF of poor quality can be easily recognised by its heavy weight.

A new OE quality filter for this vehicle weighs approx. 1,200 g. If the installed filter weighs instead 1,600 g, this is a clear indication of deviating quality. In vehicles with 1.0i TSI engines, the correct filter weighs approx. 950 g, while the filter with a deviating quality weighs around 1,200 g.

TROUBLESHOOTING: In this case, the ACF actually weighed 1,600 g. After the installation of a correct filter and a new solenoid valve, the problem was solved.



D



Photo: VW

DID YOU KNOW?

Volkswagen has introduced an extended diagnostic filter from model year 2024.

As is well known, young Volkswagen Group vehicles are protected against unauthorised data access by the SFD system. Nevertheless, they can be diagnosed with a mega macs by persons with valid Hella Gutmann CSM (Cyber Security Management) access. But there are new restrictions: From model year 2024, an additional diagnostic filter is installed ex works, which provides different levels of protection depending on the setup/configuration level of the vehicle concerned.

If the error message 'Time-out/control unit not available' is displayed shortly after the diagnostic device establishes communication, the additional diagnostic filter is active. This must be deactivated before starting the vehicle diagnostics. From **software Version 74**, an additional menu item has been integrated into the 'Basic settings' menu for this purpose. It is listed at the top for all vehicles.

This is how it works:

- ❶ Open the bonnet when the mega macs is connected
- ❷ Switch on the ignition
- ❸ Select vehicle
- ❹ Select Basic settings > Deactivate/activate diagnostic filter
- ❺ Perform CSM login

Now the diagnosis works as usual, but there are exceptions.

If the required coding in control units is not possible with the mega macs, the only alternative at present is to use the macs remote service. Further customisations will follow from mega macs software Version 75.



Win shopping vouchers for the Hella Gutmann collection!

Merchandise, shop equipment, customer or employee gifts – you can find all these 24/7 online in the Hella Gutmann Collection hella.mycybergroup.shop/hella-gutmann. The selection of branded merchandising articles and promotional items ranges from promotional bags with Haribo mini cars through digital parking discs, thermal drinking bottles and gift vouchers right up to casual clothing. To mark the 125th anniversary, we are giving away in this competition **5 × €125 vouchers** for your online shopping in the Hella Gutmann Collection.

Taking part is as easy as pie, as always: answering the four questions correctly reveals the solution we are looking for. Our tip: the answers can all be found in this Matrix. Observant readers should be able to easily put together the right letters.

Simply send your solution with the subject line **“Matrix 02-2024 Gewinnspiel”** and your full address, phone number, date of birth and email address to gewinnspiel@hella-gutmann.com!

The closing date for entries is **October 31, 2024**. Good luck!

The correct solution for the competition in the 01-2024 Matrix issue was: **PHEV**. All winners have been notified in writing.

QUESTION 1

The FORVIA HELLA exhibition stand at the Automechanika 2024 is in

- Hall 8.0
- Hall 4.1
- Hall 9.0

- (B)
- (Q)
- (D)

QUESTION 2

The Hella Gutmann CSM now unlocks new models from

- 17 brands
- 13 brands
- 21 brands

- (O)
- (M)
- (J)

QUESTION 3

On the Premium Platform Electric from Audi and Porsche

- Combustion engines and electric vehicles are created
- Only SUVs are built
- Electric vehicles of several segments are created

- (Z)
- (V)
- (I)

QUESTION 4

The software updates for mega macs S 20

- are always included and free of charge
- Are only included with Licences S2 and S3
- End with the expiry of a licence

- (P)
- (C)
- (E)

Solution:



You must be 18 or over to participate in this competition. We assume no liability for the accuracy of this information. The judges' decision is final. Personal data is only transmitted for processing the competition and for notifying the winners. All of the data submitted to us will be deleted after the competition has been finalised. By taking part in the competition, the participant agrees to this arrangement.

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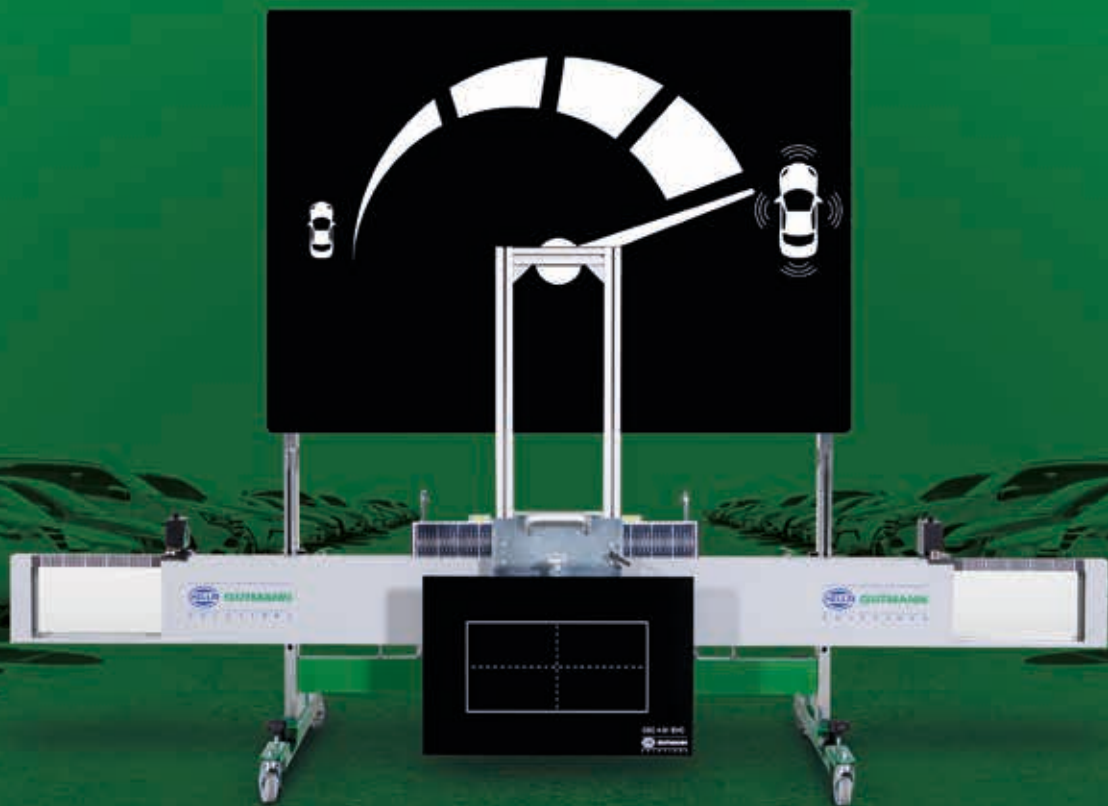
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CSC-Tool SE

Performance set 2024

The CSC-Tool SE performance set has been carefully put together to provide workshops with a comprehensive solution for calibration and adjustment work on vehicles.

It contains a selection of calibration panels with the widest possible vehicle coverage and also our Radar Kit I EVO, which offers far more than just the basis for the calibration of front radar sensors.