Competence Guide: Experts for new mobility solutions in Baden-Württemberg
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**Additional partners of Cluster Electric Mobility South-West and Cluster Fuel Cell BW**

**International partners of Cluster Electric Mobility South-West**

**Competence Field Index**

**Organisational Index**
Preface

The future of mobility is electric, networked and automated. The path to this mobility of the future is characterised by a complex, far-reaching process of change which, in view of the large number of possible development paths, poses major challenges for stakeholders in politics, business, science and society.

The change process has several dimensions: in the course of the technological change towards alternative drive systems, the increasing electrification of the drivetrain, the growing networking of vehicles with each other and with infrastructure, and the accelerating pace of evolution in automation bring about a fundamental change in products, generation and application processes. This leads to a change in the transport/mobility system as a whole: new technologies offer the opportunity of redesigning and optimising the entire transport and mobility system, which is absolutely essential in view of the pressure to act in response to climate and environmental policy objectives. A prerequisite for this is a change in infrastructures: new propulsion technologies will only develop their full potential if the energy supply is transformed towards renewable energies and is, therefore, an integral part of the energy revolution. Challenges also lie, to a large extent, in energy distribution. In addition, networking and automation are placing new demands on infrastructures, which can probably only be solved on the basis of integrated approaches at local and regional level.

All this also results in a far-reaching structural change: companies in the automotive and supplier industry are facing the challenge of a double structural change affecting the entire automotive industry. At the same time, companies are facing changes in mobility products, the digitalisation and rationalisation of manufacturing processes, the internationalisation of development and production sites and a possible decline in free trade. This will have a negative impact on the growing value chains and cooperation agreements, and will require the companies concerned to make massive efforts to adapt their own structures and business models.

One way to meet these diverse and complex challenges is through exchange, networking, collaboration and cooperation. The State Agency for New Mobility Solutions and Automotive, e-mobil BW GmbH, which was founded in 2010, has set itself the task of networking the relevant players from industry, research, society and the public sector in Baden-Württemberg, with a focus on products and solutions for sustainable and intelligent mobility of the future and supporting them on their way. Two central activities of e-mobil BW are the management of two important regional cluster initiatives, the Cluster Electric Mobility South-West founded in 2007 with more than 180 members at present, and the Cluster Fuel Cell BW founded in 2013 with more than 130 partners to date.

In general, clusters are regional concentrations of companies, research, education and knowledge transfer institutions, as well as other public and semi-public institutions in a sector or a field of technology and competence, which work together to achieve greater overall benefits within the value chain. The aim of the joint work is strengthening the innovative competitiveness and increasing the performance of the joint business location. In a cluster initiative, these innovation-oriented cooperative relationships are strategically and organisationally coordinated, and possible gaps in the competencies or the value-added chain are closed through joint targeted activities.

Today, Baden-Württemberg is one of the most successful locations in the automotive industry with a grown, fully developed cluster of manufacturers, suppliers, mechanical and plant engineering companies, equipment suppliers and an excellent research and university landscape. The successes of the past and present are no guarantee for the tasks of the future, yet the companies and research institutions in Baden-Württemberg have a wide range of expertise. These include electric motors, power electronics, batteries, fuel cell technology, charging and energy technology, vehicle networking, automation, information and communication technology, artificial intelligence or Industry 4.0, to name but a few examples – in short, the necessary conditions and knowledge for the electrical, automated and networked mobility of the future. And what is even more important: they are prepared to deploy their skills, knowledge, innovative strength and system understanding in forms of cooperation, projects and cluster work, in order to work together on the technologies, solutions and products of the future.

By cooperating with our members and partners in the Cluster Electric Mobility South-West and the Cluster Fuel Cell BW, we want to jointly seize opportunities, bundle competencies, exploit synergy effects and accelerate innovation processes through a culture of trust and cooperation. This Competence Guide provides an overview of the current members and partners of the Cluster Electric Mobility South-West and Cluster Fuel Cell BW, as well as their international cooperation partners, and is intended as a guide to potential (project) partners and as a supporting medium for presenting and communicat- ing the “concentrated competence” of both cluster initiatives to politics, business and science. Together, we share the vision of a sustainable, emissions-free, intelligent and economically successful mobility of the future. And through our joint work in the Cluster Electric Mobility South-West and Cluster Fuel Cell BW, we are shaping the steps and stages on the way to achieving this goal.
The Baden-Württemberg automotive industry

Every tenth job in Baden-Württemberg depends on the car

For more than 130 years, the automotive industry with its manufacturers and suppliers has been deeply rooted in Baden-Württemberg. Today, Baden-Württemberg is considered to be the world’s leading centre for the automotive industry: the entire value-added chain of automotive production, related services and associated equipment suppliers from mechanical and plant engineering is active in this location. The automotive industry is one of the core industrial sectors in Baden-Württemberg with an annual turnover of just over EUR 109 billion (2019). Vehicle construction alone accounts for around a tenth of the state’s total gross added value. At the same time, the automotive industry is considered to be the most research-intensive industrial sector in Germany and in Baden-Württemberg, accounting for almost half of the expenditure on research and development in the business sector in Baden-Württemberg. With direct and indirect employment effects, just under 1% of all employees dependent on national insurance contributions depend on the automotive industry: almost 470,000 employees can be attributed to the automotive cluster. This means that we can speak of a fully developed “automotive cluster”, which is made up of the direct automotive industry, its suppliers and equipment producers from the manufacturing industry, as well as the motor vehicle trade and retail sector, which spans the whole of Baden-Württemberg. Thanks to its network of well-established innovation and value-added chains in the automotive, energy, information and communications technology, mechanical and plant engineering sectors – and in conjunction with the excellent research and higher education landscape in the relevant technology areas – Baden-Württemberg has excellent prerequisites (including in alternative drive technologies, digital mobility solutions and offers) to be an internationally leading innovation and production region in the future.

Paradigm shift in times of a transformation process

The vehicle and mobility industry is under the greatest pressure for change in decades. A multitude of new technologies – from fuel cells to synthetic fuels and battery technology – must be newly developed and industrialised. The possibilities of digital networking and automation are changing usage and mobility behaviour. But production and distribution processes are also facing major upheavals: mobility offers that are as easy to use as possible are replacing large, fast individual vehicles. New mobility concepts and appropriate services that reduce fossil energy consumption and enable optimal individual route design with IT support should be seamlessly integrated in all aspects into people’s living environment.

Innovations through the cooperation of business, science and public authorities

It can be increasingly observed that innovations can be created especially through the cooperation of different industries. In Baden-Württemberg, there is a high level of innovative power due to the successful cooperation and integration of services from the automotive sector, mechanical engineering, IT and energy. The efficient cooperation between industry, science and the public sector is a key to driving innovation. Efficient research and technology clusters are valuable catalysts in this process. Therefore, the state government’s cluster policy contributes to the development of cluster initiatives in their effectiveness and efficiency in a sustainable manner. Furthermore, in recent years, the state government has provided funding for three state electric mobility initiatives and many other projects totalling EUR 215 million. The digital@bw digitalisation strategy will invest EUR 1 billion. In order to jointly launch new environmentally friendly, economically viable and socially just mobility solutions, the state government launched the “Strategiedialog Automobilwirtschaft BW” (“Strategic Dialogue with the Automotive Industry BW”) in 2017. It creates a platform for discussing necessary changes in development, production and sales, the energy system, digitalisation and data networks, traffic solutions, forward-looking research and social developments. There is a great deal of interest from industry, science, politics, trade unions, social groups and citizens in taking part in contentious discussions.

Pioneer of mobility change

The goal is to create a Baden-Württemberg that continues its mobile success story with sustainable mobility solutions and is an international leader in production and application. Baden-Württemberg has set out to transition from being the no. 1 automotive state to becoming the no. 1 mobility state. A central element is the State Agency for New Mobility Solutions and Automotive, e-mobil BW: it is the central contact point for all matters relating to new mobility solutions and supports this innovation process as a pioneer of mobility change in the state. Open to technology, e-mobil BW promotes the industrialisation, market launch and application of sustainable, climate-friendly and locally emissions-free mobility solutions. It sees itself as a knowledge manager, initiator and communicator between companies, universities, research institutions, ministries and associations. Always with the entire automotive value chain in mind, e-mobil BW coordinates the two cluster initiatives Electric Mobility South-West and Fuel Cell BW, bundles valuable competencies and designs important innovation processes.
Cluster Electric Mobility South-West –
Shaping sustainable and intelligent mobility

With more than 160 members from industry and science at present, the Cluster Electric Mobility South-West, founded in 2007, is one of the largest research associations for future mobility. The mobility industry’s complete value chain is covered by the cooperation of high-performance automotive manufacturers as well as leading global system suppliers and numerous renowned medium-sized companies with excellent research facilities and universities at their disposal. The Cluster Electric Mobility South-West thus provides the basis for new innovation processes.

Our vision
The cluster members are united by the common vision of working on energy-efficient, environmentally friendly mobility in an age of scarce resources. Innovative technologies and methods are used to lay the foundations for new, sustainable and economical products and business models that will secure our regional value creation and employment, both in the cluster region itself and throughout Baden-Württemberg, and place it on a new footing. The symbiotic cooperation makes the players behind the Cluster Electric Mobility South-West the world’s leading providers of mobility solutions and establishes Baden-Württemberg as a central stakeholder for new and sustainable digital mobility solutions with international appeal. The aim of the network is to advance the industrialisation of new mobility concepts in Germany and to position Baden-Württemberg as a central stakeholder for new and sustainable digital mobility solutions with international appeal. The aim of the network is to advance the industrialisation of new mobility concepts in Germany and to position Baden-Württemberg as a central stakeholder for new and sustainable digital mobility solutions with international appeal.

Our strategy
The strategic focus of the activities of the Cluster Electric Mobility South-West is on improving the innovative ability of its members through cooperation in working and project groups. The cluster succeeds in bringing together companies across sectors with research institutes in a unique, long-term and extremely stable cooperation network, thus accelerating research and development in the field of new mobility solutions. The cluster, therefore, makes a decisive contribution to the technological change towards low-emission, efficient and market-supported mobility. The Cluster Electric Mobility South-West is also well known beyond Baden-Württemberg. The cluster’s networking with relevant players in the national and international environment – particularly in Europe, but also in North America and Asia – plays an important role. An overview of our partners can be found on the partner page in this Competence Guide. By expanding the international cooperation network of the cluster and its members, the development of relevant sales markets for attractive mobility solutions of the future will be advanced. The services offered by the cluster are intended to make it easier for small and medium-sized companies, in particular, to find relevant international target markets and suitable cooperation partners abroad.

Promoting top clusters
In 2012, the Cluster Electric Mobility South-West was recognised as one of the 15 top clusters by the German Federal Ministry of Education and Research (BMBF) and thus received EUR 40 million in funding over a period of five years. Within the framework of the funding dedicated to promoting top clusters, 18 innovative projects were successfully implemented from within the cluster. In 2014, the Cluster Electric Mobility South-West was awarded the Baden-Württemberg Cluster Excellence Label and the European Cluster Management Excellence Label GOLD for the first time. Since the label was first awarded, the cluster successfully achieved recertification in 2016 and 2019. In addition, the cluster has been a member of the cluster policy excellence measure “Go-Cluster” by the Federal Ministry of Economics and Energy since 2014.

The added value for our members
Membership to the Cluster Electric Mobility South-West is open to interested and committed players from industry and research in the field of electric mobility with a research and development location in Baden-Württemberg. The members of the Cluster Electric Mobility South-West benefit from the many advantages and opportunities the cluster offers:

- Network of players along the entire value chain
- Joint projects and activities in the field of research and development
- Targeted innovation and exploitation of synergies
- Networking and exchange between actors from the business world, science and politics
- Targeted integration of medium-sized companies in innovation processes
- Intensification of national and international contacts for members and partners

The cluster is making a decisive contribution to technological change towards low-emission, efficient and market-supported mobility.

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- Networking and exchange between actors from the business world, science and politics
- Targeted integration of medium-sized companies in innovation processes
- Intensification of national and international contacts for members and partners

The cluster is making a decisive contribution to technological change towards low-emission, efficient and market-supported mobility.
Regional distribution of members of the Cluster Electric Mobility South-West
Cluster Electric Mobility South-West: members and partners
Version as of May 2020 (chronologically according to date of recording).
The members of the cluster can be found at www.emobil-sw.de/en.
The Cluster Fuel Cell BW is an association of many players in the field of hydrogen and fuel cell technology based in Baden-Württemberg. It is made up of companies, research institutions, public services and associations, and aims to accelerate the market ramp-up and market maturity of various hydrogen technologies.

The cluster was founded in 2013 with the participation of four state ministries and has since been working on the market ramp-up of various hydrogen technologies. At the same time, it acts as an important source of impetus for research institutions and ministries in the state of Baden-Württemberg. The cluster now consists of over 115 organisations (as of mid-2020).

Aim and working areas of the cluster
The members have jointly set themselves the goal of achieving market maturity for hydrogen mobility and fuel-cell-based stationary systems with marketable and customer-friendly series products.

These topics have been broken down into five thematic areas:
- Hydrogen production and infrastructure
  Topics related to electrolysis, hydrogen distribution and filling stations.
- Transport
  Mobility issues such as cars, commercial vehicles, trucks and ships.
- Energy
  Issues relating to energy supply where conventional technologies are not efficient or sustainable enough.
- Production
  Topics related to the production of the components for all the above-mentioned technologies.
- Vocational, further education and training
  Topics relating to vocational, continuing and further training in the field of fuel cells and hydrogen within the scope of in-house training programmes and at universities.

In addition, the cluster offers includes a number of cross-cutting topics that link the individual subject areas: education and internationalisation, as well as knowledge transfer and management.

The cluster management
The coordination of the Cluster Fuel Cell BW has been taken over by e-mobil BW as the State Agency for New Mobility Solutions and Automotive. In terms of cluster management, it offers, among other things, professional network management, project management and innovation management.

As a cluster partner, you benefit from the following offers:
- Organisation of cluster meetings, working group meetings and information events
- Coordination of joint projects
- Impulses for funding opportunities
- Support in applying for funding programmes at EU, federal and state level
- Study publications
- Educational activities
- Professional PR work

Membership in the Cluster Fuel Cell BW
In principle, membership is open to all users and players with research and development activities in the field of hydrogen and fuel cell technology in Baden-Württemberg.
Regional distribution of members of the Cluster Fuel Cell BW
Cluster Fuel Cell BW: partners
As of July 2020 (alphabetical). The partners of the cluster can be found at https://www.e-mobilbw.de/netzwerke/cluster-brennstoffzelle/partner.
Profile pages of the partners and members of both cluster initiatives
The Competence Guide aims to provide an overview of the competencies within the respective cluster initiative, the Cluster Fuel Cell BW and the Cluster Electric Mobility South-West. Particularly in times of structural change and new technological challenges, previous thematic and industry-related boundaries must be broken down in order to make the best possible use of synergies. The fields of work being pursued by the two cluster initiatives are, therefore, increasingly merging and various opportunities for cooperation are materialising. This is also reflected in the active participation of companies and research institutions in both cluster initiatives.

The two cluster initiatives have subtle differences in their respective structures.

The Cluster Fuel Cell BW names all its stakeholders as partners. It makes no difference as to whether the respective organisation is a manufacturer of vehicles and components, a researcher, a user or an association. In order to be able to structure the fields of competence in the present Guide, it is nevertheless necessary to make a classification. For a complete profile, a research and/or production activity (or at least the activity of prototype construction in Baden-Württemberg) is a prerequisite. Those entities that are exclusively users, associations, business development agencies, as well as non-researching and non-producing companies, will find their place in the chapter “Additional partners of Cluster Electric Mobility South-West and Cluster Fuel Cell BW”.

Membership of the Cluster Electric Mobility South-West is open to interested and committed players from industry and research with research and development activities in Baden-Württemberg. In this Competence Guide, the cluster members are each presented with a profile page. Furthermore, there is the possibility to participate as a partner in forms of cooperation with the Cluster Electric Mobility South-West. Our partners mainly comprise intermediaries, associations or users, as well as international and national clusters and networks with which there is closer cooperation. The partners are presented in the chapter “Additional partners of Cluster Electric Mobility South-West and Cluster Fuel Cell BW” and in the chapter “International partners of Cluster Electric Mobility South-West”.

The Competence Guide makes no claim to completeness. Participation with a profile is on a voluntary basis. In addition, the number of members of both cluster initiatives is continuously increasing. The Competence Guide reflects the current status as of 16 June 2020.

Due to the heterogeneity of the members/partners of both cluster initiatives, it is difficult to draw up a uniform picture of the existing competencies. For this reason, the approach pursued in the Competence Guide is deliberately placed at a higher level (macro perspective). On the basis of the fields of competence, the common features of all members are to be presented in a bundled form. The Competence Guide is aimed at a broad public, so that not only experts in the field but also representatives from politics and society can gain an insight into the two cluster initiatives. The specific competencies or unique selling points are illustrated in the respective profile texts. The fields of competence were developed by cluster management and represent a major focus of the members’ competencies. Due to the constantly growing network and the developing content focus, this cannot be seen as conclusive, meaning that, in the future, further topics, e.g. in the area of software and artificial intelligence, will be added. The present Competence Guide locates the joint competencies of the members/partners of the two cluster initiatives in nine different competence fields under three headings (cf. fig. above Fields of competence) Under the heading “System integrator/system manufacturer”, the competence fields automotive and stationary systems are listed. The components are primarily subdivided into “Drivetrain”, “Interior” and “Exterior”, and these themselves are further subdivided into several subcategories. The heading “Service” covers the four competence fields “Software”, “Testing”, “Energy” and “Development.”

The members/partners themselves have selected which of these fields of competence are shown on the respective profile page. The headings are nevertheless included on each profile page to ensure clarity.

Search within the Competence Guide

The members/partners of the two cluster initiatives are sorted alphabetically so that you can search by name in the table of contents. The Organisational Index can be used for a general search for research institutions/universities/colleges, companies or intermediaries. If you are looking for a specific competence in the cluster initiatives, you can use the Competence Field Index to find specific stakeholders based on their competence fields.

Components

<table>
<thead>
<tr>
<th>System integration/system manufacturer</th>
<th>Subarea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivetrain</td>
<td>Automotive</td>
</tr>
<tr>
<td>Static systems</td>
<td>Software</td>
</tr>
<tr>
<td>Chemical storage, electrical storage, vehicle electrical system, inverter (electric) electrical, motor/generator, thermal management, gearbox, fuel cell system (hydraulic/electrical inverter)</td>
<td>Stationary systems</td>
</tr>
<tr>
<td>Interior</td>
<td>Testing</td>
</tr>
<tr>
<td>Equipment, electronics/electronics, thermal management</td>
<td>Energy</td>
</tr>
<tr>
<td>Exterior</td>
<td>Development</td>
</tr>
<tr>
<td>Electric/electronics, chassis, vehicle cover</td>
<td></td>
</tr>
</tbody>
</table>

Partners and members of both cluster initiatives

Fields of competence
Sensomotor. Performance tests under highly standardised conditions in the (night) driving simulator

The Competence Center ‘Vision Research’ deals with the visual system and its dysfunctions, as well as the development and validation of examination/therapy procedures. The Aalen Mobility Perception & Exploration Lab (AMPEL) comprises a driving simulator with a complete vehicle (Audi A4 with steering and pedal unit, fully digital display and externally controllable head-up display, as well as integrated, contactless “Eye & Head Tracking”). Two high-performance beamers (Zeiss) project the driving route onto a 180° screen and let virtual driving scenarios be played. LED arrays are used for the realistic simulation of glare. The main focal points are:

- detecting and characterising interrelations between structure/morphology and sensory functions,
- understanding (visual) requirements in everyday life and issues relating to performance and quality of life,
- developing and improving diagnostic, therapeutic and rehabilitative equipment, procedures and measures for patients with visual pathology lesions or other impairments. The working group feels equally committed to research, teaching and caring for the affected people.

Contact partner
Prof. Dr. med. Ulrich Schiefer
Phone: +49 7361 5764605
Ulrich.Schiefer@hs-aalen.de

Fields of competence

<table>
<thead>
<tr>
<th>Components</th>
<th>System integration/system manufacturer</th>
<th>Testing</th>
<th>Development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior</td>
<td>Automotive</td>
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<td></td>
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<tr>
<td>Equipment</td>
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</tbody>
</table>

Aalen University – Competence Center ‘Vision Research’
Anton-Huber-Str. 23
73430 Aalen
www.vision-research.de
Employees: 6

Interfaculty drive technology research activities at Aalen University

There are many activities in the field of drive technology at Aalen University, which have so far been decentralised in different study programmes at different faculties. In future, the IAA will bundle these research activities with the aim of exploiting as many interdisciplinary, scientific synergies as possible. The Institute is working on the following innovative topics: mechanical, electrical and hydraulic drive concepts, heavy-duty gearboxes, vehicle gearboxes, electrified vehicle drives, microdrives and pumps, as well as integrated control systems.

The IAA is the central contact point for students interested in research-oriented Bachelor’s and Master’s theses in the field of drive technology and for the supervision of scientific papers and doctoral students. Externally, the Institute is a contact partner not just for renowned companies in the automotive industry and their suppliers, but also for innovative small and medium-sized companies with which several professors and scientific staff already work.

Contact partner
Prof. Dr.-Ing. Moritz Gretschel
Phone: +49 7361 5762516
Moritz.Gretschel@hs-aalen.de

Fields of competence

<table>
<thead>
<tr>
<th>Components</th>
<th>System integration/system manufacturer</th>
<th>Testing</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Drivetrain</td>
<td>Automotive</td>
<td></td>
<td></td>
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<tr>
<td>Gearbox, thermal management, motor/generator, inverter (electrical/electrical), electrical storage</td>
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</table>
ads-tec Energy GmbH – technology for professionals – 100 % Made in Germany

ads-tec Energy GmbH is a company of the ADS-TEC Group with a share held by Bosch. Based on decades of experience with lithium-ion technologies, ads-tec Energy GmbH develops and produces battery storage solutions and rapid charging systems including their energy management systems. For private houses, public institutions and commercial enterprises, the range of applications starts at 19 kilowatthour storage capacity. The scalable battery storage systems enable industrial and infrastructure solutions as well as self-sufficient energy supplies up to the multimegawatt range. The newly developed fast-charging technology for electric mobility is ground-breaking and unique in its compactness worldwide. The high quality and functionality of the storage technology are due to an extraordinarily high level of integration. All components, except for the cells, come from our own company.

Through initiatives in numerous projects funded by the federal and state governments, ads-tec remains in close contact with companies and research institutions along the entire value chain.

AKKA stands for passion for technologies: accelerate your innovations with us!

AKKA is the leading European provider in the fields of engineering consulting and R&D services for the mobility industry. As an innovation accelerator, AKKA supports industrial companies from the automotive, aviation, railway and life sciences industry throughout the entire life cycle of their products using state-of-the-art digital technologies (AI, ADAS, Internet of Things, Big Data, Robotics, Embedded Computing, Machine Learning).

AKKA was founded in 1984 and has a strong entrepreneurial corporate culture. With 20,904 employees, who put their passion in the service of tomorrow's industry, the Group achieved a turnover of EUR 1.8 billion in 2019. As an engineering service provider and technology consultant, we offer faster innovation of products and services for the digital world. From initial design and manufacture to post-commissioning services, we have years of expertise at our disposal.

In Baden-Württemberg, our focus is on automotive. We combine our electronics expertise with state-of-the-art information technology to create solutions that improve products and systems.
Highly efficient wheel hub drives for mobile working machines, vehicles and much more

Drive technology from Allweier: powerful and enduring, compact and powerful.

Since 1970, the name Allweier has stood for high-quality system components, turned and milled parts, as well as gear technology from the high-tech region of Lake Constance. Since 2002, Allweier Systeme GmbH (ASG) has combined the core competencies of the Allweier Group in gear construction and drive technology.

The company has quickly made a name for itself as a supplier of innovative and first-class products. The wheel hub gears from our PGR series, which are developed and produced exclusively in Germany, are in use wherever high power density, robustness and endurance are required and appreciated.

On the basis of our powerful gearboxes, together we have developed complete, highly efficient drivetrains with strong partners. This has resulted in modular, compact and customer-specific drives that meet the highest quality requirements.

Contact partner
Manfred Zinner
Phone: +49 7551 9207277
manfred.zinner@allweier.com

Alzner Battery is part of the Alzner Automotive Group. Alzner Automotive is a very successful family business in the field of sheet metal processing and is one of the established suppliers of large industrial companies. For several years, Alzner has also made a name for itself as a supplier in the battery and fuel cell industry, and is certified according to ISO 9001, ISO 14001 and IATF 16949. With Alzner Battery, a further milestone has now been set for an innovative company expansion. Especially with the focus on the development and production of high-performance batteries with large format LTO pouch cells, a new innovative market segment has opened up. Storage at both module and system level is offered especially for stationary and limited mobile applications with a focus on industrial applications and a high “functional safety” standard. These special high-performance batteries are particularly suitable for peak load balancing in use with hydrogen fuel cells or electrolyzers due to their high level of safety and extremely high performance.

Contact partner
Hans-Martin Tekeser
Phone: +49 162 7846655
hans.tekeser@alzner-automotive.de
ARADEX AG develops innovative power electronics and electric motors for construction machinery, commercial vehicles and ships. The focus is on extraordinarily high efficiency, environmental compatibility, as well as optimum matching of the components to the application and its respective load profile. ARADEX offers highly specialised drive components and is known for its particularly high technological maturity. Thanks to constant technological developments, ARADEX drives combine high load capacity, maximum safety, optimised efficiency as well as ecological and economic sustainability. In addition to the first-class hardware, ARADEX offers convenient and useful adaptive software solutions which allow quick and easy operation and commissioning, as well as a precise analysis of all current flows in real time. A broad and above all customer-oriented range of services completes the portfolio. With concentrated professional competence, our team of engineers is at your side with advice and support in all matters concerning electrification.

ARADEX has made it its business to revolutionise mobile drive technology. We drive new energy for a green future!

**Contact partner**

Mark Oliver Utz  
Phone: +49 7172 91810  
mutz@aradex.com

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We are an engineering and consulting company: cars/electric mobility, pharma and medicine

Our focus on development covers the two areas of competence of special machine construction and vehicle development. In order to provide our customers with the best possible support, we focus on quality, efficiency and speed in the design and planning stages. Development focus of the production plants: battery – fuel cell – e-motors.

**Project planning:** Within the scope of our development and design of assembly and testing systems, we offer our customers integrated project planning. This is based on a preliminary analysis and is then individually adapted to the respective conditions of the future plant.

**Design:** The designing of assembly and testing systems is part of our main tasks. These include manual workstations, fixtures, processing machines and assembly cells. In order to develop the designs in the best possible way, we always work with the latest CAD software such as SolidWorks, Inventor and Creo.

**Process planning:** arco-concept GmbH has supported companies with process and production planning for several years. With the well-founded knowledge of our employees, you can be sure of receiving optimal advice.

**Contact partner**

Antonio Coiro  
Phone: +49 7151 1651610  
a.coiro@arco-concept.de

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**Fields of competence**

**Components**  
Motor/generator, inverter (electrical/electrical)

**System integration/system manufacturer**  
Autonomous

**Services**  
Energy

**Contact partner**

Mark Oliver Utz  
Phone: +49 7172 91810  
mutz@aradex.com

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**Fields of competence**

**Components**  
Motor/generator, inverter (electrical/electrical)

**System integration/system manufacturer**  
Autonomous

**Services**  
Energy
As a development partner to the automotive industry, the ASAP Group offers comprehensive services with a focus on the megatrends of electric mobility, autonomous driving and connectivity. ASAP’s strategic development focus is on the future-oriented technology fields of electronics development such as system integration, software development, vehicle simulation, testing and the development of testing systems. ASAP also supports its customers in the areas of vehicle construction, vehicle electrical system development and CAD engineering. The portfolio is supplemented by cross-sectional topics from project, process and quality management as well as global technical services.

ASAP focuses on the questions of tomorrow – not only in terms of automotive technology, but also in terms of securing the company’s long-term future. As an owner-managed company, ASAP is able to adapt quickly and consistently to both customer and market requirements. In doing so, the ASAP Group can look back on almost unique growth in automotive engineering over the past ten years. Today, more than 1,300 employees work at 11 locations for the group of companies.

Contact partner
Martin Ott
Phone: +49 7044 94972 10
weissach@asap.de

Fields of competence

Components | System integration/system manufacturer
---|---
Drivetrain | Software
FC system (chemical/electrical), gearbox, thermal management, motor/generator, inverter (electrical/electrical), electrical storage, chemical storage
Interior | Energy
Equipment, thermal management, electrics/electronics
Exterior | Development
Electrics/electronics, chassis, vehicle cover

Technical competence and ethical values – our basis for the mobility of the future

AtTrack GmbH | Gesellschaft für Mobilität – a development and consulting company with a focus on mobility.

Development: Design, calculation and simulation, competitive comparisons, prototype construction, drive concepts, alternative drives, complete vehicle development.

Realisation and testing: Feasibility studies, prototypes/demonstrator set-up, test design and execution.

Motor sport: Racing car development, racing support and planning, team management.

Consulting: Interim management, business area and product strategy, coaching, strategy consulting in the technology sector. Competence analyses, planning and management, interdisciplinary integration, project documentation. Innovation management, product and process consulting, road mapping/life cycle management. Technology and process consulting, development methodology, production-related IT projects, process optimisation.

Contact partner
Dr. Ulrich W. Schiefer
Phone: +49 711 91242087
info@attrack.de
Audi stands for high-performance vehicles, high-quality workmanship and progressive design – for “Vorsprung durch Technik.” Founded in 1899 by August Horch as “Horch & Cie. Motorwagen-Werke,” the company is now one of the world’s leading suppliers of premium vehicles. The high level of innovation is one of its factors for success.

Audi has always written automotive history: from the quattro permanent four-wheel drive and lightweight construction with the Audi Space Frame aluminium frame, to the automated driving of today. The first purely electric series model Audi e-tron officially rolled off the production line at Audi Brussels in September 2018. It is the world’s first CO₂-neutral large-scale production car in the premium segment. For Audi, sustainable action begins with procurement and extends all the way to vehicle recycling. The company is active in more than 100 markets worldwide and is growing continuously. In 2019, AUDI AG handed over around 1,845,550 cars to customers worldwide. The company currently employs 90,000 people across the globe, more than 60,000 of whom work at the German sites in Ingolstadt and Neckarsulm.

Contact partner
Dipl.-Ing. Joerg Starr
Phone: +49 151 52817541
joerg.starr@audi.de

Audi continuously drives the development of innovative drive technologies

As the world’s largest independent development company, the simulation and testing of drive systems (e.g. hybrid drives, electric drives, batteries and fuel cells) for cars, trucks, mobile machines and stationary systems, AVL has decades of experience in the development and optimisation of these systems for all industries. As a global technology leader, the company provides agile and integrated development environments, state-of-the-art measurement and testing systems, as well as efficient simulation methods that cover the entire vehicle development process.

Furthermore, AVL is a pioneer in the field of innovative solutions, e.g. diverse electrification strategies for drivetrains, and is increasingly taking on tasks such as the research and industrial implementation of new testing methods for vehicle development with a focus on electric mobility, automated driving and alternative fuels. Based on the company’s innovative spirit, AVL is involved in numerous publicly funded research projects such as RobustSENSE, ENABLE-S3 (project coordinator), SmartLoad (project coordinator) and VV methods.

Contact partner
Dipl.-Ing. Kerstin Mayr
Phone: +49 151 15054446
kerstin.mayr@avl.com

Contact partner
Jörn Krohn
Phone: +49 151 55144842
joern.krohn@avl.com

Comprehensive solutions for electrification and automated driving

Audi AG
Auto-Union-Straße 1
85045 Ingolstadt
www.audi.de
Employees: 90,000

Contact partner
Dipl.-Ing. Joerg Starr
Phone: +49 151 52817541
joerg.starr@audi.de

Fields of competence

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AVL Deutschland GmbH
Carl-Zeiss-Straße 26
74321 Bietigheim-Bissingen
wwwavl.com/de
Employees: AVL total: 11,500, AVL-Deutschland GmbH: 1,100 (2019)

Contact partner
Dipl.-Ing. Kerstin Mayr
Phone: +49 151 15054446
kerstin.mayr@avl.com

Contact partner
Jörn Krohn
Phone: +49 151 55144842
joern.krohn@avl.com

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Auto-Union-Straße 1
85045 Ingolstadt
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Employees: 90,000

Contact partner
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joerg.starr@audi.de

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wwwavl.com/de
Employees: AVL total: 11,500, AVL-Deutschland GmbH: 1,100 (2019)

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Dipl.-Ing. Kerstin Mayr
Phone: +49 151 15054446
kerstin.mayr@avl.com

Contact partner
Jörn Krohn
Phone: +49 151 55144842
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Auto-Union-Straße 1
85045 Ingolstadt
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Employees: 90,000

Contact partner
Dipl.-Ing. Joerg Starr
Phone: +49 151 52817541
joerg.starr@audi.de

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As early as 2013, the DHBW Mannheim introduced the study programme on electric mobility and set up laboratories to be able to examine new vehicle components. Its core is the battery and fuel cell laboratory, which enables the extensive testing of energy converters. The power spectrum ranges from a few watts up to approx. 10 kW, whereby 24/7 operation is possible. The laboratories are used in teaching and research, for which purpose the interdisciplinary Electrochemistry Research Cluster (ELCH) was established. Of all the successful research projects, the EU project MEMPHYS (2017–2020, budget EUR 2 million) deserves special mention. Under the consortium leadership of the DHBW, this project deals with the recycling of hydrogen from industrial waste gases. Another example is a ZIM project funded by BMWi (2017–2019, budget EUR 400 thousand) for the additive production of fuel cell parts.

In addition, the Electrochemistry Research Cluster has been offering further training measures on the topic of fuel cells since 2018. The focus here is on the transformation of the automotive industry. Several teams have already been trained in the development and production of fuel cell drives for various OEMs.
Bertrandt – engineering and testing in electric mobility from a single source

Bertrandt is a reliable and professional partner for engineering and safety in the field of electric mobility, from start-ups to (system) suppliers and OEMs. The company, which has decades of expertise in vehicle development, relies on state-of-the-art technologies and the continuous development of processes and know-how. In doing so, the understanding of systems is consistently in the foreground. Bertrandt offers services from the initial concept idea through the development of functions and systems to in-house prototype construction and testing.

In its state-of-the-art testing laboratories, customers can draw on a wide range of safety services in the electric mobility segment. The expertise covers a wide range of testing methods for a large number of components – from the battery (complete system, module, BMS) to the charging station, wiring harnesses, connectors, auxiliary units, comfort components and onboard chargers, right through to power electronics, electric motors and axles.

Bertrandt draws on the extensive experience and the group-wide network of around 13,000 employees at over 50 locations around the world.

Contact partner
Matthias Medger
Phone: +49 160 4792657
e-MobilityTesting@bertrandt.com

Fields of competence

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Perfection in detail: climate chambers for forming, durability and performance tests

World market leader in the field of simulation cabinets.

As a family company, BINDER is completely focused on simulation chambers. We are the world’s largest specialist for simulation chambers for scientific and industrial laboratories. Over 22,000 devices leave our factory in Tuttingen every year. Mature cutting-edge technologies, trendsetting innovations and absolute precision characterise the BINDER brand image. Our focus is on the perfect simulation of biological, chemical and physical environmental conditions for a variety of industries. The three red triangles represent superior products, the best service package and professional advice. For you, this translates into “the best conditions for your success.”

Contact partner
Harald Schädel
Phone: +49 7462 2005426
harald.schaedler@binder-world.com

Fields of competence

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Eye-tracking analysis and recording taken further

With Blickshift Analytics, Blickshift offers one of the world’s most advanced software solutions for analysing gaze data in combination with biometric data and other data from driving experiments.

The analysis of eye-tracking data, for example, plays an important role in human-vehicle interaction and many questions pertaining to the development of algorithms for future assistance systems.

This is complemented by software tools for the recording of driver behaviour data in the simulator and in real world journeys. Based on our products, Blickshift also offers the development of adapted solutions for efficient insight into the behaviour of individuals in driving experiments.

Paving the way for a cleaner, more energy-efficient world

Whether in a highly efficient combustion engine, an intelligent hybrid system or the very latest electric drive, BorgWarner is driving mobility for today and tomorrow. Our vision is a clean, energy-efficient world. That’s why we develop mobility system solutions that reduce energy consumption and emissions, while at the same time improving performance. As the product leader with more than 130 years of experience in the field of power train systems, we are supporting the automotive industry in realising clean propulsion and efficient technology solutions for light-, medium- and heavy-duty vehicles as well as off-road applications.

By offering expertise in a variety of technologies for electric applications, we provide vehicle manufacturers the ability to easily and efficiently electrify the next generation of mobility. Whether power electronics, electric motors, thermal management or battery solutions, we provide the technology needed for the future.

Fields of competence

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The Boysen Group is a specialist for exhaust technology, and with 23 sites worldwide at present it is one of the fastest-growing suppliers to the international automotive and commercial vehicle industry.

The main tasks of our products are exhaust gas purification, noise reduction and the conversion of exhaust heat into usable energy. With this, we make a decisive contribution to the effective reduction of pollutant and noise emissions and to increasing the efficiency of internal combustion engines. We are also involved in product transfers – from exhaust technology to alternative drives – and new developments in the fields of energy and environmental technology: from battery housings and unit frames for electric motors, to stainless steel fuel tanks for hybrid vehicles, to the production of redox flow batteries and fuel cells. Furthermore, the energy-saving production and storage of hydrogen and the production of hydrogen combustion engines are in focus. Our core competencies are, aside from innovative development methods, primarily in metal processing and automated production. The degree of automation in our plants is over 90 %.

Boysen Group
BIN Boysen Innovationszentrum Nagold GmbH & Co. KG
Carl-Friedrich-Gauss-Straße 4
72202 Nagold
www.boysen-online.de
Employees: 4,600 (2019)

Contact partner
Dr. Andreas Dreizler
Phone: +49 7452 8408260
Andreas.Dreizler@bin.boysen-online.de

More than ten years of experience in IT-related consulting are the basis for our expertise in digitalisation and transformation at the highest level. The bridgingIT group is a manufacturer-independent and product-neutral technology and management consultancy.

As an innovative “end-to-end” provider, we create the bridge between requirements on the business side and IT. As an owner-managed company, the bridgingIT Group employs more than 600 consultants at ten locations throughout Germany. The service spectrum of the bridgingIT Group supports the digital growth of our customers from the generation of new approaches, through to their actual realisation and up to the support of the solutions by CraftingIT GmbH. The claim of our consulting is shown at Fastahead GmbH, which stands for innovative business models and strategic consulting approaches. This is where ideas are developed and quickly put into practice using agile methods. BridgingIT GmbH is the strongest link in our end-to-end offer for the realisation of concepts. Complexity in project management, agility in implementation and state-of-the-art methods and leading technologies are the elements that underpin successful projects.

BridgingIT GmbH
N7, 5–6
68161 Mannheim
www.bridging-it.de
Employees: 600

Contact partner
Detlef Schumann
Phone: +49 152 5669 4008
detlef.schumann@bridging-it.de

Fields of competence

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We have made it our business to ensure a meaningful connection between a product and its test requirements in an individual working environment. We develop small and medium-sized mechanical testing solutions for you. We provide you with intelligent adaptations to accommodate newly specified components and prototypes on existing test benches, as well as complete test benches, optimally tailored to your individual testing requirements. BRIGHT is also your contact for the design and development of additive manufactured components with a strong focus on test engineering.

We provide you with an efficient entry into the world of additive manufacturing.

ADAPTATIONS. Design for fatigue testing, adaptations for passive safety, delivery of test frames
SYSTEMS. Drivetrains, trolley/pallet systems, assembly devices, operating equipment and special tools
TEST BENCHES. Mechanical test solutions, test benches with counter effective drives, modernisation of existing test benches
ADDITIVE MANUFACTURING. Development of highly complex structures, function/component integration, bionics and lightweight construction, consulting and potential assessment

Contact partner
Sebastian Dressel
Phone: +49 172 8123652
sebastian.dressel@bright-testing.de

We are your partner for mechanical adaptations and test benches

For over 20 years, the Hanover-based IT and mobility company cantamen has stood for passion and competence in the shared economy. Today, cantamen offers complete IT solutions for all forms of car sharing, transport groups and fleets comprising all types of vehicle, stationary and free floating, with or without e-bike and public transport connections. As a full service provider, we offer over 60 sharing and mobility providers, in addition to powerful and reliable software layers, Web interface and back end access systems, professional consulting, 24/7 emergency support and a 24/7 service centre for customer care.

In addition, cantamen is heavily involved in various research projects to render its contribution to highly innovative developments in shared mobility and make them available to our customers. Among other things, cantamen participates in the following projects:
- econnect Germany
- BiE – Assessment of Integrated Electric Mobility
- ReKoMo – Regional Cooperation and Mobility Platform
- 3connect
- OPTIMOS 2.0

Contact partner
Steffen Nebendahl
Phone: +49 511 9999900
info@cantamen.de

Full-service provider for shared mobility and more

Components
- Interior
- Exterior
- Chassis

System integration/system manufacturer
- Automotive

Services
- Testing
- Development

Fields of competence

Components
- Interior
- Exterior
- Chassis

System integration/system manufacturer
- Automotive

Services
- Testing
- Development

Fields of competence
The Industrial Metrology division is a leading manufacturer of multidimensional measurement solutions. These include coordinate measuring machines, optical and multisensor systems, as well as metrology software for the automotive, aircraft, engineering, plastics and medical technology industries. Innovative technologies such as 3D X-ray measuring technology for quality inspection round off the product portfolio.

ZEISS eMobility Solutions combines a selection of products from the ZEISS portfolio and thus offers unique holistic measurement and testing solutions for all components of electric mobility: from batteries and power electronics to electric motors and gears – from energy to eMotion.

Contact partner
Patrick Stempfle
Phone: +49 7364 205454
patrick.stempfle@zeiss.com

CarMedialab is a telematics company. Today, its services include telediagnosis and smart charging for applications in automotive development and mobility. The product spectrum ranges from embedded systems for use in vehicles or charging infrastructure to the overall system operation of telematics solutions.

The main differentiating factor between CarMedialab and its competitors is that CarMedialab not only supplies embedded systems, but is also used to acting as a telematics service provider in your market. For many years, systems for the automotive and energy industries have not only been developed, but also operated responsibly over the entire life cycle.

CarMedialab works exclusively with qualified and TS16949-certified manufacturing companies in the production of your control units. Depending on the volume, complexity and required flexibility, the appropriate partner is selected from the network of producers. In this way, the company can meet its demands for quality and performance.

Contact partner
Heiko Bauer
Phone: +49 7251 72400
heiko.bauer@carmedialab.com

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Energy with a future

For more than 30 years, ZSW has been researching batteries, fuel cells, electrolysis and the power-to-X process. With the eLaB, we have a research platform for the production of large lithium-ion cells. We serve the entire value chain: from active materials and cell prototypes, to industrial process and production research, supplemented by a battery test centre.

Our expertise in fuel cells includes design, simulation and the construction of stack and system prototypes, as well as the development of production and testing technologies. We also operate a large, independent test field for fuel cell stacks and systems. With the “HyFall Baden-Württemberg” the ZSW is building a research factory for fuel cells. It is intended to strengthen the supplier industry and create an open, flexible range of services to develop and test automated production and quality assurance processes. The competencies for hydrogen production by electrolysis range from the development of electrodes, electrolysis blocks and plants (focus on alkaline electrolysis) to the design, construction and operation of research and demonstration plants on a megawatt scale.

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Centre for Solar Energy and Hydrogen Research (ZSW)
Helmholtzstr. 8
89081 Ulm
www.zsw-bw.de
Employees: 275 (2020)

Contact partner
Dr. Margret Wohlfahrt-Mehrens
Phone: +49 731 9530612
margret.wohlfahrt-mehrens@zsw-bw.de

Contact partner
Dr. Ludwig Jörissen
Phone: +49 731 9530605
ludwig.joerissen@zsw-bw.de

Your partner for testing battery management systems and the charging interface of e-vehicles

Since 2009, with its products for battery cell simulation and charging system analysis for electric mobility, comemso has been offering stationary and mobile test solutions for manufacturers of battery management systems, electric vehicles and charging stations, as well as their operators. With in-house production (laser cutting, laser engraving, automatic placement machines, wiring, testing, etc.), as well as in-house development and testing departments, we meet the dynamic and high demands of the electric mobility industry and guarantee both short delivery times and top quality. Well-known electric mobility customers worldwide trust in comemso products.

Fields of competence

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Contact partner
Anita Athanasas
Phone: +49 711 50090040
sales@comemso.de

comemso GmbH
Karlsbader Str. 13
73760 Ostfildern
www.comemso.com
Employees: 80 (2020)

Contact partner
Anita Athanasas
Phone: +49 711 50090040
sales@comemso.de
The Competence & Design Center for Mobility Innovations, founded in 2009 by the electric mobility pioneer and former Smart Head of Development, Prof. Johann Tomforde, stands for systematic holistic solutions in all areas of electric mobility.

An internal team of experts consisting of strategy developers, designers, engineers and economists work closely with external experts and system partners on sustainable energy-efficient concepts, innovations and system solutions for:

- the automotive and supplier industry
- the transport and logistics industries
- the electricity suppliers and infrastructure companies
- mobility start-ups and new business areas

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### Contact partner

Prof. Johann Tomforde
Phone: +49 7031 3069595
tomforde@mobility-innovations.de

For over 25 years, csi entwicklungstechnik has been an innovative development partner of the automotive industry. Represented at ten locations in Germany, we supply engineering solutions tailored to individual requirements. We specialise in the development, simulation and design of components and component groups, as well as in project management.

Our core competencies lie in the development of lightweight and safe chassis structures in multi-material design, of exterior components tailored to vehicle safety, of high-quality interior modules, as well as in the development of class A surfaces.

In addition, we supplement our core competencies with new fields of technology such as software development, additive manufacturing, simulation, VR/AR, electrics/electronics, battery and innovative mobility solutions of the future.

In the field of electrics and electronics, we focus on battery and charging, as well as telematics and vehicle electrical systems.

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### Contact partner

Florian Dennerlein
Phone: +49 174 2430474
florian.dennerlein@csi-online.de
As a leading international manufacturer of decentralised measurement technology, CSM is an innovative and reliable partner to well-known vehicle manufacturers, suppliers and service providers in the automotive industry. For many years, our customers have relied on our CAN and EtherCAT®-based measurement technology for the development of their vehicles and components. It is used worldwide in test vehicles and on test benches. One of our core competencies is measurement technology for electric mobility. CSM has a complete portfolio of high-voltage-safe measuring modules and associated sensor technology for recording all physical parameters in the field of electric mobility.

Our new, patent-pending digital temperature measurement system HV DTemp for up to 512 measurement points supports battery developers in the investigation and characterisation of vehicle batteries. The Vector CSM eMobility measurement system is designed for fast multichannel measurements in the high-voltage lines and HV components of vehicles. It calculates all relevant parameters online: charging system efficiency, vehicle energy consumption, drivetrain efficiency, axle power, engine power, vehicle electrical system ripple and shield currents.

**Contact partner**
Johann Mathä
Phone: +49 711 779640
info@csm.de

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**Measurement technology for electric mobility**

**Components**

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<th>System integration/system manufacturer</th>
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<td>Development</td>
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**We make batteries more efficient, resource-saving, cost-optimising**

You want to optimise your batteries – we test them. We test your battery performance in terms of battery life, ageing condition, battery charging time, range, safety and capacity. All according to your task. The team at CTC battery technology specialises in testing batteries for applications in the automotive and electric mobility sectors, power tools and electronics, as well as energy storage systems (ESS).

With our self-developed test systems and test benches for batteries, and especially for lithium-ion batteries, we measure, record and analyse the relevant parameters for battery performance.

On this basis, we support you in the development, operation and recycling of your batteries, and in the optimisation of next-generation products. We are committed to making your products better and more efficient so that you save raw materials, time and ultimately costs. Together, we get the best out of your batteries.

**Contact partner**
Alexander Kohs
Phone: +49 7031 2040 58 54
alexander.kohs@ctc-battery.com

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**Fields of competence**

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Your system integrator for electric mobility

CuroCon GmbH specialises in engineering services in the fields of testing and process technology, electrical, automation and drive technology for industrial applications and applications in electric mobility. The company’s speciality is the provision of holistic consulting, support and implementation in the areas of high-tech automation for industrial plants and applications in the stationary and mobile sector.

Areas: Electrification of commercial vehicles, system integrator electric mobility, controller programming for battery-electric commercial vehicles and moving machines, standard-compliant charging with DC and AC and the development of location-oriented charging infrastructure, and test bench technology for electric mobility.

Competencies: Conceptual design, project planning, programming and testing of drive technology, power electronics, control technology, regulation technology, measurement technology, visualisation and operating systems.

Products: CuroControl hardware and software automation system for measurement, control, regulation and virtualisation in stationary and mobile applications.

Contact partner
Dipl.-Ing. Michael Wissbach
Phone: +49 6251 7047082
michael.wissbach@curocon.de

CuroCon GmbH
Gernshamer Str. 3
64673 Zwingenberg
www.CuroCon.de
Employees: 16 (2020)

Innovative technologies for emissions-free driving. We set the course for tomorrow.

Daimler at a glance – electric offensive in full swing.

Daimler AG is one of the most successful automotive companies in the world. With the divisions Mercedes-Benz Cars & Vans, Daimler Trucks & Buses and Daimler Mobility, the vehicle manufacturer is one of the largest suppliers of premium passenger cars and one of the world’s largest manufacturers of commercial vehicles. As a pioneer in automotive engineering, Daimler is motivated and committed to shaping the future of mobility in a safe and sustainable manner.

The company focuses on innovative and green technologies, as well as safe and high-quality vehicles that fascinate and inspire. Daimler is investing consistently in the development of efficient drive systems – from high-tech internal combustion engines and hybrid vehicles, to purely electric drives with batteries or fuel cells – in order to enable locally emissions-free driving in the long-term. The company is also driving forward the intelligent networking of its vehicles, as well as autonomous driving and new mobility concepts. This is because Daimler considers it a commitment and an obligation to live up to its responsibility for society and the environment.

Contact partner
Holger Kunz
Phone: +49 176 30603109
holger.kunz@daimler.com

Contact partner
Dr. Jörg Wind
Phone: +49 160 86267 43
joerg.wind@daimler.com

Daimler AG
Mercedesstraße 120
70372 Stuttgart
www.daimler.com
Employees: 298,700 (2019)

Components

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Fields of competence

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<td>Vehicle cover, chassis</td>
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Fields of competence

© Daimler AG, Press kit

© CuroCon GmbH
DEKRA electric mobility: services spanning the entire automotive value chain

Our experts support you with testing services along the entire automotive value chain: from homologation and type testing to product and material testing and training. The portfolio is supplemented by damage reports and analyses, as well as vehicle evaluations.

We offer these services for all vehicle classes. From heavy commercial vehicles and passenger cars, to pedelecs and e-scooters.

We also take a close look at the infrastructure of electric mobility. Whether charging station, wallbox, charging cable or charging plug: we test, certify and assess these components in our laboratories.

Contact partner
Dipl.-Ing. Andreas Richter
Phone: +49 711 78610
e-mobility@dekra.com

Connecting Ideas. Creating Solutions.

Metal. Electricity. DODUCO! Nearly 100 years of experience in precious metal processing, as well as comprehensive know-how in all aspects of conductive connections, make DODUCO a reliable partner for globally renowned companies in the electrical engineering and automotive industries.

Strategic development partnership. Our value proposition “Connecting Ideas. Creating Solutions” is the mantra we embrace in our daily work. In doing so, we develop our customers’ ideas further and create a cost- and quality-oriented overall solution in close cooperation.

Unique technology network. Our services range from precious metal recycling and stamping technology, to plastic-coated assemblies. True to the motto “One face to the customer”, we reduce supplier interfaces and create high-quality and economically optimal solutions for our customers.

Outstanding materials know-how. Wherever metal and electricity come together, we offer our customers extensive expert knowledge in terms of materials, surfaces and their further applications. This is how we have been creating reliable contact solutions from DODUCO for more than 95 years.

Contact partner
Daniel Schindler
Phone: +49 7231 602256
dschindler@doduco.net

DEKRA SE
Handwerkstraße 15
70665 Stuttgart
www.dekra.de
Employees: 44,000 (2019)

DODUCO Solutions GmbH
Im Altgefäll 12
75181 Pforzheim
www.doduco.net
Employees: 1,100 (2019)

Fields of competence

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64 65
Dr. Ing. h.c. F. Porsche AG, based in Stuttgart-Zuffenhausen, is the world’s leading manufacturer of exclusive sports cars. In 2019, the company delivered more than 280,000 new cars to customers all over the world and generated a turnover of EUR 28.52 billion. With the iconic 911, Porsche founded the sports car segment over 50 years ago.

Porsche also sets milestones in plug-in hybrid drives: Porsche was the first manufacturer to use this technology in high-performance sports cars (918 Spyder), exclusive saloons (Panamera S E-Hybrid) and premium off-road vehicles (Cayenne S E-Hybrid). With the Taycan, Porsche launched its first purely electrically powered sports car on the market in 2019 – the first series-produced vehicle to be equipped with a system voltage of 800 volts, thus enabling fast and convenient battery charging. It is produced on a CO₂-neutral basis at the main plant in Zuffenhausen.

The production locations are Zuffenhausen (911, 718 Boxster, 718 Cayman, Taycan), Leipzig (Panamera, Macan) and Bratislava (Cayenne). Development and Design, as well as Motor Sports, are located in the Weissach Development Centre.

Fully electric and CO₂-neutral for the future of mobility

Fields of competence

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<td>Development</td>
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Contact partner
Michael Dimitrov
Phone: +49 711 91184332
michael.dimitrov@porsche.de

High-quality power electronics and components for the mobility industry

Dr.-Ing. S. Haußmann Industrielektronik develops and manufactures high-quality components for test benches in the automotive and supplier industry. The product portfolio includes linear actuators, automatic gear shifters with innovative actuator technology for development tasks on stationary test benches and for EOL tests in transmission production, as well as complete solutions for endurance and functional testing of gearboxes and drive components.

Hardware and software concepts for residual bus simulation in engine development or production and new, powerful battery simulators for electric vehicle systems are also part of our product range, which also includes universal inverters for characterising dynamic e-drives and special power electronic developments.

Fields of competence

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Contact partner
Dr. Klaus Schorer
Phone: +49 7022 95650
info@sh-el.de
The Dürr Group is one of the world's leading manufacturers of machinery and plant with outstanding competence in the fields of automation and digitalisation. Its products enable highly efficient manufacturing processes in the automotive and mechanical engineering industries, as well as in the chemical, pharmaceutical and woodworking industries.

In the field of battery production, Dürr is particularly involved with robot technologies for the automated application of paints, sealants and adhesives. Bonding technology plays a central role in the combination of battery cells to form a battery system. Only if it is ensured that the individual cells are joined together in a high-quality manner can the diverse requirements placed on a battery system in terms of safety, thermal management, corrosion protection and rigidity be met. Dürr Megtec has been part of the Dürr Clean Technology Systems business unit since 2018. Dürr Megtec offers specialised coating systems for lithium ion electrodes – including solvent recovery and distillation, as well as drying technologies for a wide range of roll-to-roll processes.

Dürr – the right partner for the development of your production base in the field of electric mobility

Dürr Systems AG
Carl-Benz-Str. 34
74321 Bietigheim-Bissingen
www.durr.com
Employees: 16,500 (2020)

Contact partner
Dr.-Ing. Ralf Schurer
Phone: +49 7142 781900
ralf.schurer@durr.com

Dürr Technik GmbH & Co. KG
Pleidelsheimer Straße 30
74321 Bietigheim-Bissingen
www.duerr-technik.com
Employees: 120 (2019)

Dürr Technik stands for oil-free compressors of the highest quality.

For over 40 years, Dürr Technik has focused its efforts on oil-free compressors. An innovative development and project planning department, as well as a certified quality management system, offer optimal conditions for developing customer-specific applications.

High-quality materials and our many years of know-how (made in Germany) in oil-free technology ensure low-maintenance operation, an extremely long service life and satisfied operators.

Since 2017, Dürr Technik has been an innovative network partner of e-mobil BW, and supports the implementation of joint research and development projects on electric mobility.

With our oil-free compressors you can consciously focus on sustainability, energy efficiency and the reduction of CO₂ emissions.

Contact partner
Hamdi Rekik
Phone: +49 7142 902248
rekik.h@duerr-technik.de

Field of competence

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<td>Vehicle cover</td>
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Vehicle thermal management: Eberspächer offers the right solution for every type of drive

The heating and cooling solutions from Eberspächer ensure that the vehicle interior is characterised by optimum temperatures. Eberspächer is the only full-range supplier to supply the right system for all types of drive concepts. The portfolio includes electrically and fuel-powered air and water heaters. Variants of the fuel-powered stationary heaters can be operated with diesel, petrol, HVO and bioethanol. The systems protect the battery and are, therefore, the ideal choice for longer distances.

It is not only with conventional drives that the automotive industry relies on the components from Eberspächer. With regard to the field for alternative drives, the compact high-voltage water heaters with PTC technology play a leading role. The powerful PTC elements protect against overheating due to their self-regulating effect inherent to the system, and enable a safe and powerful heating performance. These heaters are already in use in around 1.5 million electric and hybrid vehicles. Here they not only ensure that the vehicle interior is pleasantly warm, but also keep the lithium-ion battery at an optimum operating temperature.

With full power into electric mobility – new energy system solutions powered by EDAG

Our competencies extend over the entire set-up of electric mobility. EDAG has set up its own programme for the innovative and ongoing development of corresponding components and systems for the entire field of vehicle electrification and the integration of innovative e-drive solutions for complex electric drives.

In the past, our focus has been on the development of new battery technologies and systems. In the future, we also want to develop alternative or complementary systems and refocus our efforts on the fuel cell!

Energy storage and converters, fuel cells, control modules, electric motors including power electronics, the vehicle electrical system and up to the charging infrastructure. In the course of development, we take over system responsibility for controlling the function, component and subsystem integration for our customers. In other words: we support our development partners and customers in the implementation and specification of appropriate components, and, in the course of this, create a new understanding of processes.

Contact partner
Aron Deutschländer
Phone: +49 172 6459489
aron.deutschlaender@edag.com

Fields of competence

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© Eberspächer Group

© EDAG Group
EDI GmbH offers AI-based applications that can be used to optimise, control and monitor processes and machines. The developed EDI hive IoT framework with patented technology is a powerful private cloud with many implemented standard modules and thus guarantees the fast implementation of the respective desired applications and the digitalisation concept, which is usually available in companies. The EDI hive IoT framework can be run on/off-premises. This means that existing data can be semantically networked almost overnight using the EDI hive. On this basis, AI-based applications can then be offered. Furthermore, EDI GmbH supports the development of new digital business models, whereby the simple adaptation of the EDI hive IoT framework to the desired corporate design of the company is a key to success. A fast return on investment (ROI) of the developed digital services is thus guaranteed. Our customers and partners include regional and international companies, as well as DAX-listed companies such as Daimler AG and Siemens AG.

For more about our projects and customers, see www.edi.gmbh.

Contact partner
Dr.-Ing. Dipl.-Wi.-Ing. Thomas Freudenmann
Phone: +49 176 24129720
freudenmann@edi.gmbh

ELABO GmbH specialises in the individual design of workplace, assembly and testing systems and has established itself as a competent partner for digital transformation. In addition to functionally and ergonomically optimised workstation systems and assembly, inspection and test systems, ELABO’s portfolio includes the independently developed Elution® factory software, one of the leading Industry 4.0 solutions for medium-sized production.

In the automotive sector, many well-known customers already rely on ELABO’s individual solutions. The semi- and fully automated assembly, inspection and test systems, in conjunction with the Elution® factory software, offer a complete package for your series production. From assembly and service stations with a worker assistance system, semi-automated safety, function and quality tests, to fully automated inspection cells with robot integration, e.g. for vision, touch and rotary selector testing – ELABO offers solutions tailored precisely to your product. ELABO always meets the highest quality standards and ensures consistent documentation of your processes worldwide using Elution® factory software.

Contact partner
Dr. Mark Dolezal
Phone: +49 7951 307111
mark.dolezal@elabo.de

Fields of competence

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eliso GmbH offers complete solutions for the charging infrastructure of electric vehicles. The range of services includes all activities that need to be taken into account in the planning, construction and operation of charging infrastructure. This includes preparatory activities such as advising customers, analysing the specifications and influencing factors, the subsequent preparation of a detailed concept – including a profitability calculation – and the specific planning of the project processes. During the implementation phase, any application for funding and tenders is organised, the installation is carried out by highly qualified partners and comprehensive project management is ensured throughout. In doing so, eliso GmbH remains manufacturer-independent. After setting up the charging infrastructure, eliso offers the connection to the IT back end and the operation of the charging stations including access, billing and load management. Maintenance of the charging stations and technical support in the event of a malfunction round off the offer.

Contact partner
Johannes Brodführer
Phone: +49 711 50448641
johannes@eliso.io

eliso GmbH
Wagnerstr. 38A
70182 Stuttgart
www.eliso.io
Employees: 23 (2019)

We make filling up with electricity easy – for every manufacturer, cost-optimised and billable!

Many have visions. We have already implemented them.

As an independent supplier with a global presence, the ElringKlinger Group is a strong and reliable partner to the automotive industry. Whether for passenger cars or commercial vehicles, internal combustion engines, hybrid technology or electric motors – we offer innovative product solutions for all types of drive systems and thus contribute to sustainable mobility.

ElringKlinger has been conducting research within the field of alternative drive technologies for around 20 years. At our development centre for electric mobility, we bundle research and development activities relating to battery modules and fuel cell stacks. And we are working on further innovations for tomorrow’s mobility. Even today, small series of modules, stacks and systems are produced there and fully tested with the corresponding testing and validation equipment, such as cell tests, module tests or component validation. Our battery and fuel cell systems are used in both the automotive and non-automotive sectors.

Within the ElringKlinger Group, more than 10,000 employees work at 45 locations worldwide.

Contact partner
Dr. Stefan Hornauer
Phone: +49 7123 7249009
stefan.hornauer@elringklinger.com

ElringKlinger AG
Max-Eyth-Straße 2
72681 Dattingen/Erms
www.elringklinger.de
Employees: >10,000 (2020)

Fields of competence

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© Own representation

© Own representation
Multicore architectures require parallel software. We take care of that.

Automated software parallelisation for embedded multicore processors, FPGAs and GPUs.

We at emmtrix Technologies are your supplier of software development tools for embedded systems. We offer tools for code generation from models for embedded single core systems and for the parallelisation of applications. Our tools support the development for embedded multicore systems starting with MATLAB® and Scilab environments for technical calculations, which are widely used in enterprise workflows. This enables smooth and easy integration into existing processes. The effort, costs and risks of implementing a new programming language are eliminated. In addition to systems with several processors, platforms with accelerators such as GPUs, FPGAs or DSPs are also supported. Furthermore, we can support you with our consulting and training services, from the choice of the hardware platform to the testing of the parallelisation results, to meet your project and technology requirements.

Delivering the energy revolution safely

EnBW is one of the largest energy companies in Germany and Europe and supplies around 5.5 million customers with electricity, gas and water, as well as energy-related products. The transformation towards renewable energies and intelligent infrastructure solutions is a core component of the company’s strategy. This also includes electric mobility. EnBW makes electric mobility simple and suitable for everyday use: as the leading charging infrastructure operator, it has set up the largest rapid charging network in Germany and is consistently expanding it. With the EnBW mobility+ app, e-car drivers have access to the largest charging network in the DACH region. In addition, they can also use the app anywhere in the Netherlands, Italy and France, and thus access a total of more than 100,000 charging points for the same price. Fuel cells and hydrogen have been research priorities at EnBW for several years. Today, the EnBW subsidiary Erdgas Südwest offers fuel cell heating systems. EnBW investigated the production and use of hydrogen with government funding at its own filling stations in Karlsruhe and Stuttgart. Today, its subsidiaries ZEAG and Energiedienst are also researching how hydrogen can be produced CO2-free at competitive costs.
The Energiedienst Group is a German-Swiss public limited company with a regional and ecological focus. It is one of the first energy companies to be climate-neutral starting in 2020. The Group generates green electricity from hydropower and sells electricity and gas. Its own grid companies supply customers with electricity. Through climate-neutral and holistic energy solutions, it is shaping the process of change in the energy world. These include products and services in the fields of photovoltaics, heating and electric mobility – including e-car sharing.

The Energiedienst Group supplies over 270,000 customers with electricity. It has around 1,000 employees, including around 50 apprentices. The Group includes Energiedienst Holding AG, Energiedienst AG, ED Netze GmbH, Messerschmid Energiesysteme GmbH, EnAlpin AG and TRITEC AG, winsun AG and my-e-car GmbH. Energiedienst Holding AG is a holding company of EnBW Energie Baden-Württemberg AG (Karlsruhe).

**Employees:** 1,000 (2019)

Contact partner

**Dipl.-Ing. Peter Trawitzki**

Phone: +41 62 8692509

peter.trawitzki@energiedienst.ch

**ERDRICH Umformtechnik**

is a medium-sized family-owned company. For our customers in the automotive industry, we have been developing and producing innovative components and assemblies in the fields of chassis, brakes, electrics and drivetrains for over 55 years. We are located in Germany, the Czech Republic, the USA and China. One of our outstanding strengths is to contribute our experience and know-how from the development phase and to closely accompany our customers from the first enquiry to the product becoming ready for series production. Based on our core competences of deep drawing, fine blanking and stamping, we develop complex formed parts, substitute cast and turned parts or realise the production of assemblies.

In doing so, we integrate modern assembly methods such as laser beam welding and control procedures such as leak testing into our flexible manufacturing processes. Our proprietary tool construction department covers the complete life cycle of our tools with method planning, series production and maintenance. And our internal prototype construction enables us to produce the first components or small series for our customers within the shortest possible time.

**Employees:** 1,700 (2019)

**Contact partner**

**Dipl.-Ing. Harald Vollmer**

Phone: +49 7843 7051155

harald.vollmer@erdrich.de

**Dipl.-Ing. Michael Welle**

Phone: +49 7843 7051167

michael.welle@erdrich.de

**Fields of competence**

**Components**
- Drivetrain
- Guarbox, thermal management, motor/generator, FC system (chemical/electrical)
- Interior
- Thermal management, electrical/electronics
- Exterior
- Chassis

**System integration/system manufacturer**

**Service**
We offer you know-how expansion within the discipline of power electronics incl. production

ergo: elektronik GmbH & Co. KG was founded in 1996 by the graduate engineers Ralph Leier and Michael Maurer. We are a partner in military, aerospace and aeronautical engineering, as well as to the specialist machine and plant construction industries. With almost 25 years of experience in the field of electronic development and production, we support you with our expert knowledge. Together with you, we develop reliable, robust and innovative solutions to transform your wishes and ideas into economical products.

We contribute our knowledge and experience to create successful products together with you. Our customers appreciate our cooperative working style, flexible project management and adherence to delivery dates.

Our specialist field is power electronics:
- Switching power supplies for special applications, e.g. power supply units for DC fast charging stations 200 kW/400 kW
- Impulse current sources with current rises of over 1,000 A/μs
- Electronic power supply units for UV applications up to 35 kW
- Complex power supplies for TWT test systems up to 50 kV

Fields of competence

<table>
<thead>
<tr>
<th>Components</th>
<th>System integration/system manufacturer</th>
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<tbody>
<tr>
<td>Drivetrain</td>
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<tr>
<td>Vehicle electrical system</td>
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<td>Interior</td>
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<td>Electrics/electronics</td>
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Contact partner

Dipl. Ing. (FH) Ralph Leier
Phone: +49 731 1690880
info@ergo-elektronik.de

Employees: 23

Last mile as one of the most important challenges in freight transport

We are a manufacturer of commercial vehicle bodies for inner-city delivery vehicles: last mile. Lightweight construction in combination with sustainable materials is the focus of our development efforts and small trucks with electric drive is currently a project under implementation. Research and development for hybrid applications of the materials used in commercial vehicles and commercial vehicle superstructures are in the planning stage for what will ultimately guide our company’s commercial efforts in future.

The reorientation of inner-city supply with transport units, which meet the future requirements placed on logistics and material use within the scope of influence for last mile, is the objective of our work in the area of research and development.

Fields of competence

<table>
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<tr>
<td>Drivetrain</td>
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<td>Vehicle cover, electrics/electronics</td>
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</tbody>
</table>

Employees: 40

Contact partner

Jürgen Erhardt
Phone: +49 170 7897799
j.erhardt@erhardt-fahrzeugbau.de
We control movement

The ETO GROUP is a fast-growing, medium-sized group of companies and is one of the leading manufacturers of innovative electromagnetic drive components and sensors for automotive and mechanical engineering. Our products can be found wherever highly dynamic processes take place. They are, so to speak, the heart of the machine and improve safety, efficiency and environmental compatibility. The quality, reliability, stability, precision and safety of ETO products set international standards. ETO regularly invests more than 7% of its annual turnover in fundamental research and predevelopment efforts, and always manages to present new solutions which receive a lot of attention in the market.

With over 2,400 employees, we develop and produce worldwide customised solutions for leading vehicle manufacturers, suppliers and plant constructors. From our locations in Germany, Poland, the USA, China, India and Mexico, we inspire customers around the world with quality and innovation.

Qualified and committed employees are an essential factor in our success.

Contact partner
Dipl.-Ing. (FH) Oliver Thode
Phone: +49 7771 8091470
o.thode@etogruppe.com

Fields of competence

<table>
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<tr>
<th>Components</th>
<th>System integration/system manufacturer</th>
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<tbody>
<tr>
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ETO MAGNETIC GmbH
Hardtring 8
78333 Stockach
www.etogruppe.com
Employees: 2,400 (2019)

High-voltage systems for electric vehicles

The Forschner Group is a successful, expanding group of companies with the following business units: cabling systems, precision-turned parts, electromechanical systems, SCR systems (exhaust after-treatment) and high-voltage systems. For more than 50 years, we have been supplying renowned vehicle manufacturers and their suppliers worldwide. We are certified according to IATF 16949. With 3,000 employees worldwide, the Forschner Group develops and produces, as a system supplier, innovative technical solutions that serve both progress and people.

Our main areas of innovation are environmentally friendly mobility and electromobility. In this area, we distinguish ourselves through:
- self-developed and series-produced high-voltage systems for cars, vans, trucks and buses
- high-level innovative prowess and competence for customer-specific system solutions (mechanics, hardware, software) and their implementation in series production
- extensive experience in thermal and mechanical simulation for system validation and to shorten development times
- a willingness to break new ground and to open up new fields of technology

Contact partner
Dr.-Ing. Wilhelm Eckert
Phone: +49 7424 943243
eckert@forschner.com

Fields of competence

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Max-Planck-Straße 14
78549 Spaichingen
www.forschner.com
Employees: 3,000 (2020)
Fautronix GmbH is an engineering company specialised in electronics and software development, especially FPGA design.

For the automotive industry, we develop customised emulators, measuring instruments and test bench components.

We often operate at the limits of feasibility and are happy to win over prospective stakeholders with far-sighted and balanced concepts.

Contact partner
Dipl.-Ing. (FH) Christoph Fauck
Phone: +49 7121 7555851
christoph.fauck@fautronix.com

The aim of our research: forward-looking solutions for SMEs and industry. Since 1922.

The fem Research Institute Precious Metals + Metal Chemistry deals with all questions of material and surface technology concerning metal. Special areas of expertise are precious metals, their alloys and galvanic surface finishing. Further focal points are additive manufacturing, corrosion, light metals and paint coatings, physical coating processes and material physics. The fem has extensive technical facilities for material and coating characterisation, as well as for material analysis. Approximately 200 processes and test methods are accredited according to DIN EN ISO/IEC 17025.

In the field of energy technology, competencies include material development for lithium-sulphur batteries and fuel cells. In various projects, efficient coating technologies for fuel cells, electrolysis electrodes and battery electrodes have been developed. In this context, the development of efficient lithium metal electrodes by electroplating, the development of long-term stable catalysts for fuel cells and the micro-structuring of current collectors for battery electrodes should be emphasised.

Fields of competence

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Katharinenstraße 17
73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

Contact partner
Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

Contact partner
Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

© fem Forschungsinstitut Edelmetalle + Metallchemie
Katharinenstraße 17
73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

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Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

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Dr. Manfred Baumgärtner
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73925 Schwäbisch Gmünd
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73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

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opitz@fem-online.de

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73925 Schwäbisch Gmünd
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Employees: 87 (2020)

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Phone: +49 7171 1006318
opitz@fem-online.de

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73925 Schwäbisch Gmünd
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73925 Schwäbisch Gmünd
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Phone: +49 7171 1006318
opitz@fem-online.de

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Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
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73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

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Phone: +49 7171 1006318
opitz@fem-online.de

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Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

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73925 Schwäbisch Gmünd
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Employees: 87 (2020)

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Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

Contact partner
Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

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73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

Contact partner
Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

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Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

© fem Forschungsinstitut Edelmetalle + Metallchemie
Katharinenstraße 17
73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

Contact partner
Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

Contact partner
Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

© fem Forschungsinstitut Edelmetalle + Metallchemie
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73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

Contact partner
Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

Contact partner
Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de

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Katharinenstraße 17
73925 Schwäbisch Gmünd
www.fem-online.de

Employees: 87 (2020)

Contact partner
Dr. Martin Opitz
Phone: +49 7171 1006318
opitz@fem-online.de

Contact partner
Dr. Manfred Baumgärtner
Phone: +49 7171 1006301
manfred.baumgaertner@fem-online.de
Innovations for maximum productivity, a global presence and close system partnerships with customers are Festo’s trademarks. In the 1950s, Festo was the first company in Europe to use compressed air as a drive medium in automation. Today, the company offers more than 30,000 products and system solutions for pneumatic and electrical automation technology, from which customer-specific applications for a wide range of industries in factory and process automation can be produced using a wide variety of modular systems.

These include pneumatic and electrical automation technology, servo controllers, motion control, valves, valve terminals, installation-saving connection technology, handling and assembly technology, compressed air preparation, connection technology, vacuum technology, position and quality testing, sensors and control technology. The core range includes components at all levels of the pneumatic and electrical control chain, with which approx. 80 % of all applications can be implemented quickly and easily. Festo also offers a wide range of modular system solutions and standard handling systems.

Contact partner
Martin Mayr
Phone: +49 711 3470
martin.mayr@festo.com

Fields of competence
- Chemical storage, electrical storage, inverter (electrical/electrical)
- Motor/generator, gearbox
- Interior
- Electrics/Electronics
- Exterior
- Chassis, vehicle cover

Service
- Automotive

Virtual fluids. Real insights.

Physics and simulations are our passion. The fascination with mathematics, computers and their interaction with nature are what drive us to new findings and developments every day. This has resulted in our successful particle-based CFD simulation software for liquids and viscous materials, PreonLab. PreonLab enables engineers to solve hydrodynamic problems and provide accurate answers in a short time and at a low cost. This makes engineering more creative, innovative and efficient than ever before. In addition to the simulation of Newtonian fluids such as water or many oils, it is also possible to simulate non-Newtonian fluids and even snow. PreonLab wins over our customers with its unique calculation power and its extraordinary efficiency during application. Today, PreonLab is used successfully by leading well-known companies in the automotive and household industries worldwide. With our software, we want to enable engineers, designers and managers to develop innovative and better products, and to extend the limits of simulation possibilities.

Contact partner
Dr. Markus Ihmsen
Phone: +49 761 45892380
info@fifty2.eu

Fields of competence
- Gearbox, thermal management, motor/generator
- Automotive

Service
- Automotive
fischer automotive stands for the highest product quality and modern production technologies at its headquarters in Germany (Horb) and at its sites in the Czech Republic (Ivanovice), China (Taicang) and the USA (Auburn Hills). The international project teams work hand-in-hand to implement customer orders.

The product range includes air vents, cup holders, storage compartments or multifunctional components that ensure order and comfort in the vehicle. In addition, there are products for electric mobility, such as tailgates for electric vehicles. The design and feel of the components underline the respective vehicle type and its characteristics.

In the development centre in Horb am Neckar, interior components are produced which meet all the demands of future-oriented product solutions.

From development to series production – we are at your side

Development of drive systems with and for our partners.

Our drive is the passion for individual electric motors. Your innovations are our source of impulse to drive technological progress with high-performance drives. We accompany your projects from the idea to the implementation phase.

- Specialised employees for development and feasibility studies
- Experienced teams in project planning, design and production
- Calculation of the motor geometry and motor parameters
- FEM calculation of the magnet system and power utilisation
- 3D plastic simulations
- Design of the performance parameters
- Design of the control and sensor systems
- Large, modern machine park with proprietary prototype and tool construction
- Performance measurement on our own test bench
- Training and support at your plant
- Spacious storage and production halls at five locations

Fischer Elektromotoren GmbH
Schützenstr. 19
74842 Billigheim-Affald
www.fischer-elektromotoren.de

Employees: 120

Contact partner
Jürgen Held
Phone: +49 151 56337756
jh@held-automation.de

Fields of competence

Components | System integrator/system manufacturer | Service
--- | --- | ---
Drivetrain | Automotive | Development
Motor/generator | Stationary systems |
Interior | |
Electrics/electronics | |
Exterior | |
Electrics/electronics | |

Fischer automotive systems
GmbH & Co. KG
Industriestraße 103
72160 Horb am Neckar
www.fischer-automotive-systems.de

Employees: 1,000

Contact partner
Ralf Rogowski
Phone: +49 151 57158667
rafl.rogowski@fischer.de

Fields of competence

Components | System integrator/system manufacturer | Service
--- | --- | ---
Interior | |
Thermal management, electrics/electronics, equipment | |

© Fischer Automotive Systems GmbH & Co. KG
© Fischer Elektromotoren GmbH
The weight, safety and reliability of vehicles play a central role in the success of electric mobility. The Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut, EMI, is working on making electric cars of the future lighter and yet safer and more reliable, even when under extreme loads. The Fraunhofer Crash Centre, the tomography laboratory and the battery test bench for destructive, dynamic tests of electrical energy storage devices are used for this purpose. In addition to its experimental skills, the Fraunhofer EMI possesses outstanding expertise in the numerical simulation of dynamic loading processes for all kinds of materials – from steel to CFRP and textile materials. The combination of these competencies allows the development of innovative vehicle designs, as well as protection concepts for occupants and energy storage systems for electric vehicles.

In addition, the scientists carry out safety and reliability analyses, such as on the functional safety of battery management systems or in the field of autonomous driving, using lean method chains for requirements determination, system design and verification.

**Fields of competence**

**Components**

- Electrical systems
- Automotive
- Chassis, vehicle cover
- Drivetrain

**Systems**

- Software
- Testing
- Energy
- Development

**System integrator/system manufacturer**

- Automotive

**Safe and secure sustainability**

**Fraunhofer Institute for High-Speed Dynamics, Ernst-Mach-Institut (EMI)**

Ernst-Zermelo-Straße 4
79104 Freiburg im Breisgau

www.emi.fraunhofer.de

Employees: 330 (2019)

**Contact partner**

Philipp Dahl
Phone: +49 761 2714-569
philipp.dahl@emi.fraunhofer.de

Fields of competence

- Automotive
- Electrical systems
- Chassis, vehicle cover
- Drivetrain

**Applied research for sustainable mobility and innovation systems of the future**

The Fraunhofer-Gesellschaft is the leading organisation for applied research in Europe. Seventy-four institutes and research facilities throughout Germany work under its roof. Around 28,000 employees generate an annual research volume of EUR 2.8 billion.

As part of its research work, the Fraunhofer IAO develops solutions and methods for generating, designing and evaluating new product, process and service innovations in the course of mobility change. Topical priorities include mobility trends and innovative technologies, electric mobility and local energy systems, the digitalisation of the mobility and energy industry, as well as data-driven mobility concepts.

**Fields of competence**

**Components**

- Automotive
- Commercial vehicles
- Energy

**System integrator/system manufacturer**

- Automotive

**System engineering**

- Software
- Stationary systems
- Development

**Fraunhofer Institute for Industrial Engineering (IAO)**

Nobelstraße 12
70569 Stuttgart

www.muse.iao.fraunhofer.de

Employees: 628 (2019)

**Contact partner**

Dr. Florian Herrmann
Phone: +49 711 9702142
florian.herrmann@iao.fraunhofer.de

Contact partner

Dr. Anna-Lena Klingler
Phone: +49 711 9702398
anna-lena.klingler@iao.fraunhofer.de
We produce the future:
sustainable, personalised and smart

The Fraunhofer Institute for Manufacturing Engineering and Automation was founded in 1959 and employs almost 1,000 people. Our future and key topics are bio-intelligent value creation, digital transformation in the context of Industry 4.0, energy storage, frugal production systems, artificial intelligence in automation, lightweight construction and resource efficiency. Many of these aspects can also be applied to the field of hydrogen. IPA supports intelligent production and automation in the field of hydrogen. In particular, the industrial production of fuel cell stacks and the associated peripherals is shifting further into focus. For this purpose, tools such as digital twins, quality monitoring and traceability are used to make existing or newly planned production lines more efficient or to increase the quantities produced respectively. The same applies to similar processes in electrolyser production. Raw material analyses and circular economic considerations complement the production processes and involve the current and future framework conditions in Europe.

Fields of competence

Components | System integration/system manufacturer | Services
---|---|---
Software | Testing | Development

Contact partner
Friedrich-Wilhelm Speckmann
Phone: +49 711 9703690
friedrich-wilhelm.speckmann@ipa.fraunhofer.de

Research for the mobility evolution

The Fraunhofer Institute for Solar Energy Systems (ISE) creates the technical prerequisites for an efficient and environmentally friendly energy supply in industrialised, newly industrialising and developing countries. With its research focuses on energy generation, energy efficiency, energy distribution and energy storage, it contributes to the broad application of new technologies for the transformation of our energy system towards sustainable and renewable sources. Our sustainable mobility services include research and development on PV vehicle integration and yield forecasting, power electronics and grid integration, battery cells and systems, PEM fuel cells, hydrogen production and infrastructure, synthetic fuels, thermal management, cooling and heating, intelligent vehicle envelopes and life cycle analysis, techno-economic analysis and monitoring.

Fields of competence

Components | System integration/system manufacturer | Services
---|---|---
Software | Testing | Development

Contact partner
Dipl.-Ing. Stefan Reichert
Phone: +49 761 45885476
stefan.reichert@ise.fraunhofer.de

Contact partner
Dipl.-Ing. Ulf Groos
Phone: +49 761 45885202
ulf.groos@ise.fraunhofer.de
Fraunhofer ISI analyses the emergence and impact of innovations

The Fraunhofer ISI is one of the leading innovation research institutes in Europe. It conducts research in seven competence centres for practical application and sees itself as an independent thought leader for society, politics and the economy. Our competence in the field of innovation research is based on the synergy of technical, economic and social science knowledge of our employees. For our customers, we investigate the scientific, economic, ecological, social, organisational, legal and political conditions under which innovations are created, as well as their effects. For this purpose, we use well-founded analysis, evaluation and forecasting methods.

In the field of electric mobility for cars and trucks, the Institute deals with questions concerning market ramp-up, charging infrastructure, the development of business models, early identification and intervention topics, the development of road maps, balancing the interests of the climate and environment, broader public acceptance and the associated economic effects. Furthermore, in this context, other alternative engines and fuels, modal shifts and strategies for the further development of batteries are dealt with.

Fraunhofer Institute for Systems and Innovation Research (ISI)
Breslauer Str. 48
76139 Karlsruhe
www.isi.fraunhofer.de
Employees: 225 (2019)

Contact partner
Prof. Dr. Martin Wietschel
Phone: +49 721 6809254
wietschel@isi.fraunhofer.de

Fields of competence

<table>
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<tr>
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<td>Energy</td>
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Industrialsing hydrogen technology with small and medium-sized enterprises

In July 2018, the Innovation and Research Centre (IFC) at Furtwangen University started operations. The IFC offers scientists, companies and start-ups access to HFU research and development facilities. In addition to medical technology, mechanical engineering and production technology, energy storage systems and hydrogen technology are another focus. In cooperation with the Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW) and the competence network H₂-Region Schwarzwald-Baar-Heuberg e. V. (SBH) the state-funded Baden-Württemberg project entitled “Modulärer Brennstoffzellen-Systemprüfstand für die H₂-Region SBH” was won by Furtwangen University in early 2020. This project will enable companies to test and further develop pre-competitive development patterns in a fully functional system environment under realistic operating conditions. A unique selling point of the project is to use the competencies of the companies for the industrialisation of components such as valves, compressors and control units for the periphery of the fuel cell system and thus to catalyse the transformation towards sustainable propulsion systems.

Contact partner
Prof. Dr. Frank Allmendinger
Phone: +49 761 15026622
frank.allmendinger@hs-furtwangen.de

Fields of competence

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<td>Energy</td>
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As a tool shop with over 50 years of experience in the field of highly complex forming challenges, we have set ourselves the goal of meeting the technical demands in the forming of metallic bipolar plates with filigree channel structures (flow field) and very thin steel foils, mostly made of stainless steel, in an extremely efficient large-scale production process. We are thus addressing two decisive areas which support the fuel cell as a complete system when achieving the desired breakthrough: efficient cost structure and, at the same time, the process-safe realisation of the technical and efficiency-critical requirements in the area of the large-scale production of metallic bipolar plates. Our development enables the process-secure implementation of the required flow field structures with a precision and surface quality not previously available on the market. We currently work in sheet thickness ranges from 0.05 mm to 0.1 mm and develop the optimum flow field design together with our customers. Our manufacturing process is future-oriented in terms of its design and is set out to handle the largest quantities.

Contact partner
Simon Brugger M.A.
Phone: +49 151 65914343
brugger@gebhardt-gmbh.de

Fields of competence

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<td>Vehicle cover</td>
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Highly efficient production of bipolar plates with the highest demands placed on the design of the flow field

Gebhardt Werkzeug- und Maschinenbau GmbH
Löwenstraße 4–8
88255 Baienfurt
www.gebhardt-gmbh.de
Employees: 103 (2020)

For many decades, the Gehring Group has stood for innovation and know-how in production technology for the electric drivetrain as a system supplier to the automotive industry and with its e-motive business unit.

The integrated portfolio includes production technology for the manufacture of traction drives for electrified vehicles based on hairpin technology. The portfolio ranges from independent, tailor-made solutions for stator prototype development, taking into account a high degree of production suitability and small series production, to fully automated, new system solutions for electric motor production lines. From pin production, pin setting, twisting and welding of the pin ends to the impregnation of the stators with trickling impregnation and powder coating, we offer all steps from one source. The automation in use guarantees a continuous flow of the stators through the line. With modern simulation methods and many years of competence in project management, we are an expert partner for the design of new production lines with high productivity.

Contact partner
Dr. Sebastian Schöning
Phone: +49 711 3405358
sebastian.schoening@gehring-group.com

Fields of competence

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<th>Components</th>
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Excellence in motion. Future in mind.
From the high-voltage laboratory to project planning and the installation of controlled charging infrastructure and preventive maintenance and testing, to first-level support in the event of a fault, we offer everything from a single source. We plan and construct automated plants independently of the industry and have an extensive array of competencies and experience in the field of “high voltage” for laboratory equipment and its safety.

Our specially trained experts will work out your optimal solution, so that you can check and test cost-effectively and reliably, while also being able to efficiently design production processes. In addition, we are the Germany-wide service partner for over 4,000 electric mobility charging points at present. Our service spectrum ranges from preventive maintenance and testing right up to first level support in the event of a fault.

Moving forward with us into the mobility of the future

Genthner Industrietechnik GmbH
Gottlieb-Daimler Str. 3
75382 Althengstett
www.genthner-gmbh.com
Employees: 100

Contact partner
Andreas Stutzki
Phone: +49 7051 93390
andreas.stutzki@genthner-gmbh.com

Scientific pioneer for the energy storage industry

DLR is the Federal Republic of Germany’s research centre for aeronautical and space travel. We conduct research and development in aeronautics, space, energy and transport, security and digitalisation.

The DLR Institute for Engineering Thermodynamics in Stuttgart, with further research institutes in Cologne-Porz, Ulm, Oldenburg and Hamburg – with over 180 employees – conduct research in the field of efficient and resource-saving energy storage and next-generation energy conversion technologies. The spectrum of work ranges from theoretical studies and basic research-oriented laboratory work, to the operation of pilot plants. In addition to its core activities in the “Energy” business area of DLR, the Institute of Engineering Thermodynamics also works on selected topics from the “Aviation” and “Transportation” business areas. There is close networking with the University of Stuttgart, in particular with the University Institute for Building Energy, Thermotechnology and Energy Storage, the Helmholtz Institute Ulm (HIU), the University of Ulm and the Centre for Applied Aviation Research (ZAL) in Hamburg.

Contact partner
Andreas K. Friedrich
Phone: +49 711 6862278
andreas.friedrich@dlr.de

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Efficient emissions reduction through sector coupling based on green hydrogen

The DLR Institute of Space Propulsion has been using hydrogen in test beds for space propulsion systems at its Lampoldshausen site for over three decades.

In order to be able to apply this know-how in other areas, the institute is working on hydrogen for the energy, transport and industrial sectors as part of the technology transfer from space travel. The DLR team is working on the development and implementation of research and demonstration projects in the context of decentralised energy systems, power-to-gas and sector coupling with hydrogen. In addition, a test bed infrastructure will be established to enable research and industry partners to investigate components such as fuel cells in (continuous) operation with hydrogen. For this purpose, the know-how of experts in the technical planning, approval, realisation and operation of hydrogen plants and test benches is available.

A further goal is to expand green hydrogen production at the Lampoldshausen site using locally generated, CO₂-neutral electricity.

Contact partner
Michael Füting M. Sc.
Phone: +49 6298 28734
Michael.Fueting@dlr.de

Components
- Drivetrain
  - Motor/generator, FC system (chemical/electrical), thermal management, vehicle electrical system, electrical storage
- Interior
  - Thermal management, electrical/electronics
- Exterior
  - Chassis, electrical/electronics

System integration/system manufacturer Service
Testing
Development

Fields of competence

FK researches, develops and evaluates new vehicle concepts and technologies

At the Institute of Vehicle Concepts (FK), innovative vehicle energy architectures and construction methods are examined and developed to optimise the energy requirements of future vehicle concepts for road and rail. The work includes the systemic interaction of energy storage systems, energy transmission paths and technologies, as well as special components for energy conversion. They range from the conceptual consideration, simulation and design, as well as the prototypical construction of selected technologies, to the construction of research vehicles. A test bench infrastructure with battery, fuel cell and electric motor test benches and an air-conditioned roller test bench, as well as a dynamic crash system for the validation of vehicles and components, round off the range of competencies. This makes it possible to research the entire chain of effects of the energy structures in the vehicle. The focus is on the use of hydrogen as a future energy source and the provision of electrical energy by means of fuel cells at vehicle level.

Contact partner
Prof. Dr. Tjark Siefkes
Phone: +49 30 67055691
tjark.siefkes@dlr.de

Components
- Drivetrain
  - Motor/generator, FC system (chemical/electrical), thermal management, vehicle electrical system, electrical storage
- Interior
  - Thermal management, electrical/electronics
- Exterior
  - Chassis, electrical/electronics

System integration/system manufacturer Service
Testing
Development

Fields of competence
GOTECH vehicle development and design

GOTECH GmbH is a development partner to automotive manufacturers and suppliers from the design phase to the start of production of a product. For more than 25 years, we have been developing a wide variety of automotive components and contribute to short development times with our development expertise and accompanying services. Our highly specialised team also turns ideas into workable concepts for medical technology and consumer goods products, provides support in the design and functional layout of products and analyses the designs using modern methods and software.

In vehicle development, we provide support in the areas of interior and exterior, as well as vehicle electrical systems and high-voltage networks. We implement the results in prototype construction (3D printing) or enable visualisation and testing in virtual reality. In particular, our innovative testing environment allows us to make our developments in vehicle interiors – with a focus on operating and display elements – tangible at an early stage.

Our motto: We give movement a direction!

Contact partner
Dr. Henrik Gommel
Phone: +49 7044 90430
h.gommel@gotech-cad.de

Fields of competence

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Greening develops efficient technologies!

“The Efficient Way Of EngineerIng” – Greening is a development partner for efficient technologies and works in the three-pillar model “EngineerIng – ResearchIng – Consulting”. Greening has ten years of experience in development and the creation of customer-specific solutions for all aspects of electric mobility. The focal points include, in particular:

- Electric drive systems for vehicles: Dimensioning, packaging, design and constructive integration, development of cable harnesses and power distribution units
- Battery systems: Vehicle-specific design and configuration of drive and power supply batteries (HV and NV), battery safety, battery preparation and recycling
- Fuel cell systems: System layout, packaging, vehicle integration
- Thermal management for electric vehicles: Low temperature systems for electric machines, inverters and batteries, component design, integration of the components into the vehicle.

Greening Technologies is a manufacturer of customised energy storage and conversion systems. The focus is on prototypes and small series of batteries and fuel cells.

Contact partner
Dr.-Ing. Uwe Kehn
Phone: +49 7195 904330
uwe.kehn@greening.de

Fields of competence

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GROB assembly lines: innovative and highly automated – from the idea to series production

Since its foundation in Munich in 1926, GROB, as a globally operating family company, has been on a constant growth course in the development and manufacture of machine tools, plants, automation systems and fully automatic assembly lines. Our customers include the world’s most renowned automotive manufacturers, their suppliers and well-established companies from a wide range of industries.

Through the acquisition of DMG Meccanica, the Italian specialist for plants involving winding and drawing-in technology for stator production in 2017 (today GROB Italy S.r.l.), GROB was able to further expand its competencies and is now a competent partner to the automotive industry in the series production of hybrid and electric drives. Our tasks range from design and planning to the implementation of turnkey assembly lines for electric machines and electric motors. In addition, GROB supplies new plant concepts for energy storage systems and provides support in the production and assembly of battery cells, modules and packs. Together with its customers, GROB also develops innovative solutions for fuel cell assembly.

Contact partner
Nicole Guggenmos
Phone: +49 8261 9967297
Nicole.Guggenmos@grob.de

Fields of competence

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Aluminium casting and engineering – for the innovations of the future!

The Grohmann Gießerei Group is one of the leading companies in the industry and offers a unique spectrum of possibilities. Aside from prototype, sand and gravity die casting and their mechanical processing and component assembly, composite casting is also an important technology area. Cast parts for drives and power electronics are equipped with cast-in cooling pipes or meandering structures and can thus be actively cooled on the vehicle. As demanding and wide as the variety of vehicles is, as varied is our range of services in terms of dimensions, the quantity and alloys of aluminium castings. In joint projects with customers, we develop the castings up to series production readiness. The focus is on the harmony of functionality, cost and quality. This is the goal of every development – this is where we start and create innovations in the form of cast aluminium.

Aluminium – light, heat conductive, high-quality and even in a load-bearing capacity it remains reliable, it is irreplaceable as a material in many industries and offers a wide range of application possibilities. Just ask us!

Contact partner
Jürgen Hänsch
Phone: +49 7476 9413 0
haensch@grohmannaluworks.de

Fields of competence

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Hydrogen electrolysers and fuel cells together form the basis of the future hydrogen economy, in which large amounts of energy can be flexibly stored and retrieved from renewable sources. The fuel cell also enables emissions-free mobility without range limitation or long charging times. Redox flow batteries supplement hydrogen technologies as a means of storing large amounts of energy.

To increase the performance and service life of fuel cells, electrolysers and redox flow batteries, our focus is on the development of innovative membrane electrode assemblies. Together with you, we develop concepts for composite membranes and electrodes exactly according to your requirements. In cooperation with the University of Freiburg, we have access to the latest characterisation methods and also develop them further ourselves: from measuring stands to material analysis and nanotomography.

As your partner, we are always interested in joint, publicly funded research and development projects and also offer development and characterisation as a direct order.

Contact partner
Dr. Severin Vierrath
Phone: +49 761 20354060
Severin.Vierrath@Hahn-Schickard.de
The electric mobility experts at HELDELE have been dealing with all aspects of electric mobility for years and have mastered the entire service chain: from electric mobility checks, project planning and installation, maintenance and support to an electric mobility portal and energy supply. With us, you get everything from a single source, and from one contact person. This is because our experience shows that in the field of electric mobility functioning overall solutions are in demand. You can trust our expertise. We find the tailor-made concept for your requirements.

Are you looking for a mobile charging solution or a wall or pillar charging station? AC or DC charging? Together with the products of our partners from MENNEKES, Delta, Chargepoint and Alfen, as well as Juice Technology and Designwerk, we will always find the optimal solution for your needs. Start with us now into the future of electric mobility.

Contact partner
Jochen Hofmann
Phone: +49 7162 4002161
jochen.hofmann@heldele.de

HELDELE is a complete supplier for AC and DC charging stations and electric mobility services

With around 8,200 students, the Heilbronn University of Applied Sciences (HHN) is one of the largest universities for applied sciences in Baden-Württemberg. Its focus is on engineering, economics and computer science. The HHN offers more than 50 future-oriented Bachelor's and Master's programmes at four locations. The HHN also offers plenty of space for research: technical test benches, a logistics hall or virtual reality – the HHN conducts research across subject boundaries on socially relevant topics such as electric mobility.

Study tomorrow's topics and shape the future
Whether full-time, part-time or in conjunction with vocational training: HHN stands for future-oriented training and cultivates close cooperation with worldwide leading companies in the region. Students benefit from this network as early as during their studies.

International campus life – including in digital format
Many exchange students enrich campus life. In return, the HHN offers the opportunity to go abroad with a variety of partner universities. The HHN also promotes the step into self-employment through its internal start-up centre “Startklar”.

Contact partner
Prof. Dr.-Ing. Andreas Daberkow
Phone: +49 7131 504417
andreas.daberkow@hs-heilbronn.de

“Automotive & Mobility”, “Materials Processing & Engineering” and “Digital Living Worlds”
Intelligent solutions for mobility and controlling – this is what the name highQ stands for. With innovative software solutions we support companies and local authorities in the effective planning, implementation and optimisation of their tasks. highQ has been successfully developing software for almost 25 years.

In addition to our headquarters in Freiburg, we have further offices in Hamburg, Berlin, Stuttgart and Frankfurt, in order to maintain close proximity to our customers.

highQ supports the transition to a GreenCity: companies, as well as cities and communities, can renew their mobility, optimise traffic flow and increase the quality of life. We offer advice and support in the implementation phase and, at the same time, deliver the solution with our software products. Our customers become partners: we would like to be agile when developing and improving because technologies, requirements and goals are increasingly on the move these days.

We consistently make sure that our software is application- and user-friendly, and guarantee the responsible use of the system with customer and user data as defined under the GDPR.

**Fields of competence**

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**Contact partner**

Dr. Katharina Peine  
Phone: +49 761 70 60 40  
k.peine@highQ.de

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The HTWG Konstanz is a modern university with an application-oriented profile

The HTWG – University of Applied Sciences is a modern university with an application-oriented profile. It offers a wide range of subjects and benefits from its interdisciplinary approach and the combination of theory and practice. In research and development, technology transfer and continuing education, the university is a partner for innovation-oriented companies and motivated, creative people. It is an essential part of the international scientific and economic region of Lake Constance. The core concern is to provide committed talents from different educational backgrounds with professional and personal development and life opportunities. It is important to provide students with personal advice, individual support and to open up opportunities for them to go abroad. In this way, the HTWG wants to contribute to the sustainable development of society. The Institute of Applied Thermo- and Fluid Dynamics is the centre of competence at the HTWG for all questions concerning thermodynamics and fluid dynamics. Research and development are carried out across all departments, from process and environmental engineering to energy technology. The results of this work, in turn, benefit scientific education in the respective faculties.

**Contact partner**

Prof. Dr. Peter Stein  
Phone: +49 7531 206304  
pstein@htwg-konstanz.de

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**Fields of competence**

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The HTWG Konstanz – University of Applied Sciences  
Alfred-Wachtel-Straße 8  
78462 Konstanz  
www.htwg-konstanz.de  
Employees: approx. 5,000 students and 350 employees

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The HTWG Konstanz is a modern university with an application-oriented profile

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**Contact partner**

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Phone: +49 7531 206304  
pstein@htwg-konstanz.de

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Electronic components, battery management systems, e-drive and hybrid systems

Huber Automotive AG develops and manufactures automotive electronics such as electronics for battery management systems for renowned automotive manufacturers, as well as system solutions in the field of hybrid and e-drive systems with the ultimate goal of improving future mobility. With successful developments, products and forms of cooperation, the growing demand for automotive electronics in the field of new mobility (incl. fuel cell) is thus covered.

Huber Automotive has been working on hybrid and e-drive systems since 2011. The focus here is on light commercial vehicles, electrified trailers and special applications, for example for underground mining. The RUN-E brand covers all the electric drive systems developed by Huber Automotive. The e-drive/hybrid sector in the company places particular emphasis on modularity, load capacity and the increasingly important aspect of the environment. This is how modern, future-oriented and innovative projects are brought to life. Huber Automotive supports its customers and cooperation partners from the development and system integration to intelligent control systems in the complete vehicle.

Contact partner
Mathias Koch
Phone: +49 7335 9206209
mathias.koch@huber-group.com

Artificial intelligence, business analytics, cloud computing, blockchain, IoT and security

In order to support companies of all sizes in the digital transformation of their business models and to make the opportunities of digitalisation available to them, IBM is concentrating on the growth initiatives of artificial intelligence (AI), business analytics, cloud computing, blockchain, IoT (Internet of Things) and security. For IBM, these strategic fields form both the basis of its constantly expanding solution portfolio and the foundation of its ongoing transformation to an AI and cloud platform provider.

Innovation is at the core of IBM’s strategy. With the foundation of IBM Watson Group, IBM underscores its commitment to AI-based solutions for business – a new era of solutions that can learn, argue and interact with people using natural language. IBM Watson was designed to use natural language to analyse, evaluate and interpret enormous amounts of unstructured data in a fraction of a second.

In 2019, IBM applied for over 9,200 US patents. This means that IBM is now, for the 27th time, the most innovative company in the USA.

Contact partner
Dipl.-Ing. Thomas Walz
Phone: +49 171 2228151
thomas.walz@de.ibm.com

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Fields of competence

**COMPONENTS**
- Drivetrain
- Motor/generator, inverter (electrical/electrical)
- Interior
- Electrics/Electronics
- Exterior
- Electrics/Electronics

**SYSTEM INTEGRATION/SYSTEM MANUFACTURING**
- Automotive
- Software
- Testing
- Development

**SERVICES**
- Software
- Testing
- Development
Interplex is a vertically integrated global company and provider of multi-technology solutions with headquarters in Singapore. For more than 60 years, we have made a significant contribution to providing customised solutions of the highest quality. The market segments are: Automotive, Datacom & Telecom, Medical & Life Sciences and Aerospace. Our team of around 13,000 employees is there for our customers at over 30 locations in 14 countries. Our core competencies are stamping technology, electroplating and plastics technology. Our global presence is flanked by two power teams: Interplex Product Development (IPD) and Technology Innovation Centres (TIC). Our IPD teams and TIC facilities focus on new technologies as well as design, development, optimum manufacturability and advanced production. Interplex NAS Electronics GmbH was founded in Heilbronn in 1982 where we have an efficient service and application centre with prototype construction, test facilities and laboratory. Our plants are certified according to ISO 9001, IATF 16949, ISO 14001, ISO 13485 and others. From presales and aftersales to engineering, production, quality, marketing and logistics, we offer our customers perfect support.

Contact partner
Julio Kuntz
Phone: +49 7066 941410
julio.kuntz@de.interplex.com

Components
- Drivetrain
  - Motor/generator, inverter (electrical/electrical), thermal management
- Interior
- Thermal management, electrics/electronics
- Exterior
- Electrics/electronics

Service
- System integration/system manufacturer
- Testing
- Development

The destination ahead with the virtual test drive

As a global technology leader for virtual road testing, IPG Automotive develops innovative simulation solutions for vehicle development. The software and hardware products can be used throughout the development process from the concept phase to validation and release. By working with virtual prototypes, the approach of Automotive Systems Engineering can be continuously pursued and new systems can be developed and tested in the virtual complete vehicle.

IPG Automotive is an expert in the field of virtual development methods for the application fields of autonomous driving, ADAS, power train and vehicle dynamics, and helps to master the increasing complexity in these areas. Together with its international customers and partners, the company increases the efficiency of the development process with its groundbreaking solutions.

Contact partner
Dr. Pascal Piecha
Phone: +49 721 985200
info@ipg-automotive.com

Components
- Automotive
- Software

Fields of competence

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With more than 20 years of experience, IPT Technology GmbH offers a highly developed generation of wireless energy supply solutions for industry and electric mobility, which offer flexibility in production processes and guarantee optimum safety and improved availability. Our products are used in both industrial and electric mobility applications where wireless power transmission is used to provide a highly efficient, reliable and trouble-free charging experience. Onshore and offshore! We design, manufacture, install and maintain wireless charging systems for all types of solutions for cars, buses, ships, robots and industrial trucks. We have installed more than 11,000 metres of continuously charged ground or rail tracks and provide wireless power to thousands of vehicles every day.

Safe, solid, simple and sustainable.
Cables are no longer necessary and the charging stations blend in invisibly with the environment. Landmarks, parks and cultural sites are preserved, minimising visual pollution and enhancing the overall charm of the city.

IPT Technology GmbH
Im Martelacker 14
79588 Efringen-Kirchen
www.ipt-technology.com
Employees: 22 (2020)

Contact partner
Richard van den Dool
Phone: +49 7628 692960
richard.dool@ipt-technology.com

Fields of competence

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At the Institute for Applied Materials – Materials for Electrical and Electronic Engineering (IAM-WET) at the Karlsruhe Institute of Technology (KIT), fuel cells have been developed and investigated since 1996 in cooperation with national and international partners from industry, large-scale research institutions and universities.

The characterisation and modelling of fuel cells (SOFC, PEMFC) and electrolysers (SOEC) is in focus. Impedance spectroscopy and the DRT method (distribution of relaxation times) developed at the Institute make it possible to resolve the individual loss components, describe them using physicochemical equivalent circuit models (ESB) and thus quantify losses and ageing processes in the cathode, electrolyte and anode. For the microstructural analysis of porous electrode structures, tomographic methods (FIB-SEM, μCT) are used, which allow a three-dimensional reconstruction of the material and pore distribution in the electrode volume. The experimental results are incorporated into ESB and FEM models on different scales (electrode to system) for the analysis and model-based optimisation of fuel cells.

KIT, IAM-WET – characterisation and modelling of fuel cells

KIT Institute of Applied Materials – Materials for Electrical and Electronic Engineering
Adenauerring 20b
76131 Karlsruhe
www.iam.kit.edu/wet/
Employees: 32 (2020)

Contact partner
Dr.-Ing. André Weber
Phone: +49 721 60847572
andre.weber@kit.edu

Fields of competence

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Research in electrical drive technology: focus on holistic mechatronic optimisation

The Karlsruhe Institute of Technology (KIT) is one of the largest research and teaching facilities. The KIT aims to become an institution of top-level research and outstanding scientific education. At the KIT’s Institute of Electrical Engineering (ETI), experts in power electronics, electrical machines and drive control conduct research, with these neighbouring research areas cooperating on an interdisciplinary basis. One of the core tasks of the ETI is to meet the increasing requirements in terms of power density and functionality and, last but not least, to improve energy efficiency.

Weight, efficiency and cost, as well as the required operating strategies and control algorithms necessary for top performance, are optimised. In addition, the design of electric drives is the focus of research and development work at the ETI. The optimum design can only be achieved if the mechanical and electromagnetic design and modelling of the drivetrain are carried out in an overarching, interdisciplinary context.

Contact partner
Prof. Dr. Martin Doppelbauer
Phone: +49 721 60846250
martin.doppelbauer@kit.edu

Fields of competence

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Research and teaching for the mobility and vehicle systems of the future

Against the background of climate change and congested urban traffic space, we develop knowledge, methods and solutions on four levels: the vehicle as a digital mechatronic system, the interaction between man and vehicle, the vehicle in traffic and infrastructure, and the vehicle in society and the environment.

Our basis – excellent equipment:
- Test benches for complete vehicles and components
- Hall with lifting platforms and workshops for vehicle preparation
- Test vehicles and various test areas on-site
- Participation in the Test Area for Autonomous Driving Baden-Württemberg
- Extensive skills and equipment for analytical and numerical modelling and simulation, as well as for control, regulation and optimisation methods

We contribute our know-how to numerous organisations and committees:
- KIT Centre for Mobility Systems with about 40 participating professorships
- Service Centre Profile Region Mobility Systems Karlsruhe
- Strategy Dialogue Automotive Industry Baden-Württemberg
- acatech – German Academy of Science and Engineering

Contact partner
Prof. Dr. rer. nat. Frank Gauterin
Phone: +49 721 60842370
frank.gauterin@kit.edu

Fields of competence

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Energy-efficient mobility: safe, intelligent networking and alternative drives

The Research Institute of Energy Efficient Mobility (IEEM) is concerned with various topics for efficient, sustainable and holistic mobility. The holistic concept is reflected by a focus on networked mobility solutions within the R&D fields, which not only deal with the vehicle itself. Such system openings are exposed to an overarching risk of cyber attack, which is why questions about security in embedded and distributed systems are answered at the IEEM.

On the drive side, the IEEM focuses on the use of alternative fuels as renewable energy sources and offers a unique climate and altitude simulation test bench for hand-held power tools. Using an IoT-based remote control – with the functions of a human hand – the test objects in the test bench can be automatically remote controlled. Efficiency also includes the development of assistance systems and intelligent driving functions such as for vehicles and e-bikes. These topics are addressed by another research team of the Institute. The IEEM has its headquarters on the Bruchsal Research Campus and on the campus of the Karlsruhe University of Applied Sciences.

Contact partner
Prof. Dr.-Ing. Reiner Kriesten
Phone: +49 721 9251420
reiner.kriesten@hs-karlsruhe.de

Fields of competence

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Impact of mobility services and offers on passenger transport behaviour

The Karlsruhe Institute of Technology (KIT) combines the tasks of a university of the state of Baden-Württemberg and a research institution of the Helmholtz Association in research, teaching and innovation. It is the research university in the Helmholtz Association. The Institute for Transport Studies (IfV) at KIT is part of the KIT Centre for Mobility Systems and deals with all questions in the mobility sector, ranging from planning concepts based on society as a whole to technical developments in transportation. With an interdisciplinary concept, the IfV pursues the goal of organising traffic efficiently and sustainably, researching the effects of new mobility systems, such as micro- or electric mobility and (fully) automated vehicles, on users and ensuring system integration. The latest methods of agent-based demand modelling with the software mobiTopp (www.mobitopp.de) are applied.

The Institute’s main areas of research are mobility research, transport planning and modelling, as well as transport technology and telematics.

Contact partner
Dr.-Ing. Martin Kagerbauer
Phone: +49 721 60847734
martin.kagerbauer@kit.edu

Fields of competence

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© KIT -IfV
Modern mobility is based on the digital services, marketplaces and platforms behind it. The staff of the chair of Prof. Weinhardt is conducting research to improve the quality of electronic markets and platforms. As part of interdisciplinary research projects, we link methods from the fields of economics, business studies, business informatics and psychology.

For example, we are investigating how stakeholders can be encouraged to collect data relevant to mobility and share it on data marketplaces. We also investigate the preferences of electric vehicle users with regard to smart charging and the extent to which their behaviour is influenced by incentives (such as smart tariffs, use of local electricity and emissions reduction). Furthermore, we investigate whether a change in the behaviour of private and commercial users is necessary and how electric mobility can be adapted to their needs. This understanding enables the efficient coordination of electric mobility in the overall system of sustainable energy supply.

Contact partner
Prof. Christof Weinhardt
Phone: +49 721 60848370
office-ise@iism.kit.edu
Research on process optimisation, automation and the creation of process understanding

The wbk Institute for Production Science at the KIT with its near-100 employees is thematically located in the Faculty of Mechanical Engineering. The three areas of production and materials technology, machines, plants and process automation, as well as production systems, which are taught by Prof. Dr.-Ing. habil. Volker Schulze, Prof. Dr.-Ing. Jürgen Fleischer and Prof. Dr.-Ing. Gisela Lanza, are dedicated to application-oriented research, teaching and innovation in the field of production engineering at KIT.

In addition to research activities in the classical fields of mechanical and plant engineering, the wbk focuses on the development of production technology for enabling technologies such as electric mobility. On the one hand, this involves investigating how classical production technologies and systems can be transferred to new materials and substances, while on the other hand, the upscaling of facilities and the design of future production systems are investigated. In joint projects with industrial partners, the wbk works out solutions for a wide range of topics in production technology and also develops methods and processes for tomorrow’s production.

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Contact partner
Janna Hofmann M. Sc.
Phone: +49 7216 8828286
janna.hofmann@kit.edu

Employees: 105 (2019)

Charging stations are more than just a power socket

In order to avoid having to make compromises in the use of your charging infrastructure later on, it makes sense to plan and install professionally right from the start. Its experience from the installation of many different charging stations makes Kellner Telecom one of the most competent service providers in what is still a young branch of electric mobility. As a specialist, the company is, therefore, the first point of contact when it comes to setting up and operating charging infrastructures.

Kellner Telecom offers all services for a sustainable charging infrastructure: from obtaining permits for public locations and sensible location planning, to manufacturer-independent delivery of charging stations, roll-out management and installation by specially trained employees. The service is rounded off by maintenance contracts, a hotline for fault handling and equipment provision. Kellner Telecom also provides services such as the analysis of charging processes. Depending on the requirements, these can be carried out as individual services or as a general contractor.

Components

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Contact partner
Thomas Schinzel
Phone: +49 7150 9430 343
thomas.schinzel@kellner.de

Employees: 200
KESSLER energy GmbH develops and manufactures direct drives for applications in machine tools, for stationary applications such as winch drives, centrifuges and agitators, presses and plants, as well as for mobile applications in commercial vehicles, classic cars, ship propulsion systems and sport motorboats.

It offers a broad portfolio of asynchronous, synchronous, torque and linear motors, through to special motors and complete drive systems. Individual solutions are developed together with the user. Within the KESSLER Group, KESSLER energy GmbH bundles the production of electric drives. KESSLER energy accompanies the product from the electrical and mechanical design to the numerical calculation process using the finite element method and analytical calculation programs, right through to testing, commissioning and parameter optimisation. The motors meet the highest efficiency requirements. The customer base includes the most important companies in the mechanical engineering industry. With competencies from the core business, the megatrend of electrification is opening up huge opportunities in new business areas.

Contact partner
Karl-Heinz Haller
Phone: +49 7582 8094089
Karl-Heinz.Haller@kessler-group.biz

Your drive is our solution

**KESSLER**

KESSLER energy GmbH
Franz-Kessler-Straße 2
88422 Bad Buchau
www.kessler-energy.de
Employees: 800 (2020)

**Fields of competence**

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Innovation and efficiency in electric mobility: GVI® by König Metall Group

GVI® is a division of the König Metall Group. It is dedicated to increasing efficiency in electric mobility. The goal: more safety, greater range, shorter charging time. With the help of the patented GVI® technology, this goal is just a battery casing away. Innovative thermal management makes electric cars more powerful. In addition, the housing protects the cells from mechanical damage caused by crashes. Thanks to GVI®, the requirements of UNECE R100.2 can be covered by one component. Problems caused by “thermal propagation” are a thing of the past.

Contact partner
Michael Fischer
Phone: +49 7225 6803253
m.fischer@koenigmetall.com

**König Metall Group – GVI®**
Josef-König-Straße 1
76571 Gaggenau
www.gvi-systems.com
Employees: 1,200 (2019)

**Fields of competence**

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Your plasticspartner for electric mobility

Konzelmann GmbH offers a comprehensive service package for electric mobility:
- extremely thin-walled plastic parts, between the cells
- heat-conductive plastics, high temperature plastics
- integration of functions in plastic components, temperature sensors, arresters/ electrodes, valves/seal seats, seals, mounting aids
- production of close-to-production plastic prototype components, initial samples and series deliveries, housing technology including sealing systems
- pressure compensation elements, venting systems with membrane technology
- puch cells: plastic frame, end plates, spacer, crash absorber
- development support for plastic-compatible design, support for component design, filling image simulation, distortion analysis
- 2K or multi-component assemblies
- silicone injection moulding, combination two-component hard plastic LSR

With our production possibilities, we can offer small, medium and large series configurations.

Konzelmann GmbH
Lise-Meitner-Straße 15
74369 Löchgau
www.konzelmann.com
Employees: 275 (2020)

Contact partner
Christian Lay
Phone: +49 7143 40806565
c.lay@konzelmann.com

Krempel – innovative development partner and materials manufacturer in the field of electric mobility

As a premium manufacturer with many years of practical experience with electrical and thermal insulation technology, as well as in the field of innovative materials, we want to support you in your diverse development projects in the field of electric mobility.

High performance for electric motor insulation:
In its comprehensive product portfolio, Krempel offers electrical insulation materials in the automotive segment that have proven themselves many times in the series production of electric drives.

Optimum materials for fuel cells, batteries and e-infrastructure in the vehicle and in the charging station:
Tailor-made insulation systems for batteries and busbars, as well as high-temperature foils and flexible copper laminates. Thermal and electrical insulation.

Composites for automotive applications:
Your materials expert for fibre composites made of glass, carbon and aramid fibres, such as for battery housings and various lightweight components in vehicles. From requirements analysis and material selection to series delivery – in close cooperation with you, we create innovative components for electric mobility. Certified according to IATF TS 16949.

Krempel GmbH
Papierfabrikstraße 4
71665 Vaihingen an der Enz
www.krempel.com
Employees: 1,150 (2020)

Contact partner
Tobias Bässler
Phone: +49 7042 915368
t.baessler@krempel-group.com

Fields of competence

Konzelmann

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© Konzelmann GmbH
© Krempel GmbH
Electric mobility for everyone – simple, flexible, digital – that is our charging promise!

LAPP Mobility offers user-friendly charging cables for infrastructure operators, charging stations and vehicle manufacturers, as well as for private e-car drivers for charging at public AC charging points, Wallboxes and at the household or industrial charging socket.

Lapp Mobility’s mobile charging station offers electric car drivers the flexibility to charge their cars from a standard household or industrial socket. The mobile charging station can be easily mounted on the wall and connected to the mains using the corresponding bracket. The result is a simple Wallbox: the Wallbox Light. If the mobile charging station is needed on the road, it can be removed in one simple step and stored in the boot. This gives you the security of being able to charge anywhere, even when you’re on the move, and you don’t have to worry about finding a charging point.

Our charging cables for charging columns or Wallboxes are available in various shapes, including the LAPP Helix, a quick-charge cable that automatically rolls back up to its original shape after charging.

Fields of competence

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Contact partner
Julia Dembele
Phone: +49 711 78381153
julia.dembele@lappmobility.com

Powerful components for electric and hybrid drive systems

Liebherr is a specialist in the development and production of high-performance components in the fields of mechanical, hydraulic and electrical drive and control technology. The components of outstanding quality are characterised by the latest technologies and particularly robust construction, and are specially designed for a wide range of applications: mobility and vehicle construction, transport and logistics, shipping, wind energy technology, mechanical and plant engineering, etc.

Liebherr’s complete electrical systems integrate all elements of drive systems: engines, generators, fuel and battery cells, energy storage systems as well as power and control modules. Liebherr uses state-of-the-art test benches in the development and provision of the latest technologies for electric and hybrid drives, including power test benches for motors, energy storage systems and frequency converters. Liebherr regularly participates in international partnerships for the research and development of future technologies in the fields of electric and hybrid drive systems, especially in shipbuilding and vehicle construction.

Fields of competence

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Contact partner
Dr. Oliver Fenker
Phone: +49 7351 412861
oliver.fenker@liebherr.com
One of the great challenges of our future is to preserve nature, but also to reduce the increasing number of pollutant emissions. For this reason, alternative systems for generating energy and drive concepts to secure our mobility are increasingly being sought. An essential part of such a system is the fuel cell with so-called bipolar plates.

On this basis and with the knowledge gained from our previous experience we have developed, among other things, a leak test system for bipolar plates, which, by means of trace gas, enables measuring accuracy up to the range of <1E-4 mbar*l/s independent of temperature.

For decades, LIWO Prüfautomation has been involved in the processes, test procedures and quality requirements of the major automotive suppliers, as well as the energy and pharmaceutical industries, and develops efficient plant concepts for them, according to the motto “Lippok & Wolf [FINALLY A SOLUTION].”

MAG IAS GmbH is a member of the FFG Group and supplies individual machines (turning, milling, drilling, honing, grinding and gear cutting), as well as complete production systems. For the machining of housing components, MAG manufactures single- and multi-spindle machining centres (MAG brand), special machines and, for shaft components, CNC machines (BOEHRINGER brand), in addition to cleaning cells, measuring stations and components for plant automation. MAG integrates the necessary third-party equipment into the overall layout of a production line. Digital twins for systems, for the product or for the process are part of the delivery portfolio. With subsidiaries in Europe, the USA, China and India, MAG offers global customer service.

Fields of competence:
- Machining of housings, shafts, gears and other structural components
- Systems for series production with product and volume flexibility
- Integrator, project management and turnkey plant supplier

Contact partner
Dr.-Ing. Manfred Berger
Phone: +49 7161 8054900
manfred.berger@mag-ias.com
Your specialists for electromagnetic actuators, sensors and valve technology

Magnet-Schultz GmbH & Co. KG
Allgäuer Straße 30
87700 Memmingen
www.magnet-schultz.com
Employees: 2,700 (2019)
Contact partner
Florian Neumann
Phone: +49 8331 1040
info@magnet-schultz.com

Magnet-Schultz is an independent family business in its fourth generation, which
stands for experience, knowhow, sustainability and highest quality. With a high
vertical range of manufacturing, and locations in Europe, the USA and China we are
a reliable and global partner for innovations.

As a special factory, we develop and manufacture for our customers in the
following industries with high demands placed on technology and quality.
Our products are created as a “custom design” and are used from the deep sea
to outer space, in rail and road vehicles, in commercial and construction vehicles
as well as in passenger cars, medical equipment, industrial environments and
potentially explosive atmospheres. We see the hydrogen-powered fuel cell as
a sustainable technology for mobility, transport and energy supply. Our range of
services for these application areas includes hydrogen valves for high pressure up
to more than 1,000 bar, safety valves, flow control valves, purge and drain valves,
as well as complex valve and functional units. In addition to modern simulation and
calculation tools, specially equipped laboratories are also available for this purpose.

Contact partner
Florian Neumann
Phone: +49 8331 1040
info@magnet-schultz.com

MAHLE is committed to shaping future mobility
by establishing a sustainable drive mix

MAHLE Group
Pragstr. 26–46
70376 Stuttgart
www.mahle.com
Employees: 77,000 (2019)
Contact partner
Dr.-Ing. Nic Sautter
Phone: +49 711 501 47845
nic.sautter@mahle.com

MAHLE is a leading international development partner and supplier to the
automotive industry, as well as a pioneer for the mobility of tomorrow. The product
portfolio covers all important issues relating to drivetrain and air conditioning
technology – for propulsion solutions involving combustion engines as well as
electric mobility. In 2019, the technology group generated sales of around EUR 12
billion with more than 77,000 employees and is represented by 160 production
sites in more than 30 countries.

Contact partner
Dr.-Ing. Nic Sautter
Phone: +49 711 501 47845
nic.sautter@mahle.com

Fields of competence

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MANN+HUMMEL – innovative filtration solutions for clean mobility

MANN+HUMMEL is a leading global expert in filtration. The group of companies with its headquarters in Ludwigsburg develops filtration solutions for vehicles, industrial applications, clean air indoors and outdoors in industry and public spaces, and the sustainable use of water. In 2019, more than 22,000 employees at over 80 locations worldwide generated sales of around EUR 4.2 billion. The products include air filter systems, suction systems, liquid filter systems, technical plastic parts, filter media, cabin filters, industrial filters, as well as membranes and modules for water filtration, wastewater treatment and process applications.

We successfully apply these competencies for electrified drivetrains: it concerns the protection of battery systems against water ingress and condensation, the separation of pollutants from cooling air and cooling liquids for battery and fuel cell systems, acoustically and pressure loss-optimised systems for the supply and exhaust air for fuel cells with the cleaning of the cathode air or clean air in the interior – we are your competent system partner for electric mobility filtration solutions.

Fields of competence

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<th>Components</th>
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<td>FC system (chemical/electrical), electrical storage</td>
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30 years of experience throughout the entire process chain of a lithium-ion cell and module production line

Founded in 1987, Manz AG is a globally active high-tech mechanical engineering company. In addition to the CIGSfab turnkey production line in the “Solar” segment, the company is also setting the pace in the “Electronics and Energy Storage” segments with cost-effective and competitive systems for the production of lithium-ion batteries – from the cell to the finished pack – and automated assembly lines for cell contacting systems, with a special focus on the automotive industry.

With 30 years of experience in process development and assembly solutions for the production of lithium-ion battery cells and modules, Manz offers its customers measurable advantages with regard to the degree of automation, process accuracy and reliability.

The company group, which has been listed on the German stock exchange since 2006, employs 1,500 employees in eight countries. The Manz Group’s sales revenue totalled EUR 264 million in the 2019 financial year.

Fields of competence

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Contact partner

Dr. Michael Harenbrock  
Phone: +49 7141 982242  
michael.harenbrock@mann-hummel.com

Manz AG  
Steigäckerstraße 6  
72768 Reutlingen  
www.manz.com  
Employees: 1,500 (2019)

Contact partner  
Eduard Ams  
Phone: +49 7121 90000  
eams@manz.com
Manufacture of hydraulic presses for electric mobility and lightweight construction

Maschinenfabrik LAUFFER is a manufacturer of hydraulic presses for the electronics and metalworking industries. Founded in 1872 and based in Horb am Neckar, the company employs over 280 people and, with its products, is one of the leading manufacturers of machines and plants in the fields of laminating technology, plastics and wrapping technology, forming technology and powder technology. LAUFFER is appreciated by its customers above all for its high level of innovation, the reliability and quality of its systems and plants, as well as the flexibility in developing complex solutions. With an export share of 70%, the products from Lauffer are in use by customers worldwide.

Contact partner
Florian Lier
Phone: +49 7 451 902128
florian.lier@lauffer.de

Employees: 280 (2019)

Fields of competence

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High-pressure for hydrogen: Mehrer compressors are core components in H₂ projects

Mehrer Compression GmbH is one of the world’s leading manufacturers of oil-free piston and diaphragm compressors. The Balingen-based company has been setting standards in gas and air compression for more than 130 years. With its fail-safe compressors, Mehrer Compression is an important partner to the process-gas industry, as well as the energy and environmental sectors.

Due to their modular design and drive performance ranging from 3 to 350 kW, the compressors can be integrated into a wide range of plant systems. They can be used both in the low-pressure range and when very high final pressures are required, regardless of whether the gas is in a particularly dry or moist state. This flexibility makes it possible to implement a large number of different applications. Mehrer compressors play a central role, particularly in the utilisation of hydrogen: with up to 1,000 bar, they compress the hydrogen after electrolysis so that it can be stored and then processed further. In the field of H₂ mobility and in research centres, many renowned companies worldwide also rely on Mehrer’s broad expertise in handling process gases.

Contact partner
Luis Tändler
Phone: +49 7 433 26058246
L.Taendler@mehrer.de

Employees: 140 (2020)

Fields of competence

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MicroNova offers solutions for the testing of components and systems in the field of electric mobility.

The software and system house MicroNova offers innovative products and services for various industries. Our experts in the area of testing solutions develop solutions for testing electronic control and regulation components.

MicroNova focuses, in particular, on holistic concepts: from turnkey hardware-in-the-loop (HiL) test benches, proven software solutions for test automation and professional on-site support, to comprehensive consulting services. With its product and service portfolio, MicroNova covers the testing process completely and supports companies in optimising their entire testing landscape. Due to our many years of experience, our current focus is on the automotive and wind power industries. However, our products and solutions are suitable for every industry, in which electronic control units must be reliably protected.

Our goal: to find the optimum solution for our customers to meet the challenges of tomorrow. 300 experts work with technological competence and passion on exciting projects that move people.

### Fields of competence

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Mission Hydrogen helps you to make your projects and products even better known.

The aim of Mission Hydrogen GmbH is to support a hydrogen society, to promote and facilitate it in the long-term. Mission Hydrogen networks the community as an independent partner, and advises companies on the way to a profitable hydrogen future.

In addition: every year on 8 October, Mission Hydrogen organises probably the largest worldwide online hydrogen event (Hydrogen Online Conference) consisting of a conference, virtual exhibition stands and an interactive network area with thematic chats.

We believe that a hydrogen society will only be possible when everyone pulls in the same direction. The production and use of “green” hydrogen is essential to de-fossilise industry and transport and thus to protect the climate. The time has now come to cement the hydrogen society even more firmly in place, and to involve even more companies, entrepreneurs, politicians and the media.

### Fields of competence

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</table>
We, the MOTEC team, turn your visions into reality. With over 20 years of experience in the automotive industry, we work with customers such as Porsche, AUDI and Lamborghini in a goal-oriented manner, drawing on developments in the fields of bodywork, mechanics, engine technology, complete vehicles, plastics, cast metal and fibre composites.

WHY MOTEC?
- 22 years of experience: vehicle development
- Comprehensive and in-depth EXPERTISE: fuel cell
- Broad NETWORK with universities, research centres and industry
- SYNERGIES between fuel cell and combustion engine
- Highest FLEXIBILITY
- CAN-DO mentality

RANGE OF SERVICES
- Development, construction and project management
- Individual parts and complex systems
- Interception of short-term capacity bottlenecks
- Sample parts, prototype construction and rapid prototyping

Contact partner
Dr. Bernhard Schaible
Phone: +49 7175 923770
vertrieb@motec-gmbh.de

We say YES to the fuel cell and will gladly support you with your project

MS2 – your partner for test technology in the field of fuel cells and hydrogen

MS2 offers you individual testing technologies and suitable testing concepts around the topic of fuel cells – we have 20 years of experience in this field.

From the concept to aftersales service: take advantage of our know-how and many years of experience for your success.
We offer you test systems for research and development.
- Fuel cells: from the single cell test bench to the 200 kW stack test bench with freeze-start option (media and environment) at –35 °C
- Fuel cell system test benches for outputs up to 400 kW with air conditioning
- Component test benches for anode and cathode path components
- Component and tank test benches for high-pressure H₂ supply up to 1,000 bar
- Test benches for testing the media resistance of materials
- Leak test systems
- End-of-line acceptance and conditioning test benches for production

Regular on-site calibration of the systems by the MS2 Calibration Service (DAkkS or factory calibration) ensures consistent quality and reproducibility of your results.

Contact partner
Dipl.-Ing. (FH) Martin Schäfer
Phone: +49 7021 4855112
martin.schaefer@ms2-engineering.de

Fields of competence
- Components
- System integration/system manufacturer
- Testing
- Development
Electric mobility in a holistic way: charging infrastructure + photovoltaics + storage

With around 6,100 employees, MVV Energie AG is one of the largest German energy companies. MVV Enamic is part of the MVV Energie Group and is an experienced efficiency partner developing intelligent energy solutions for commercial, industrial and real estate applications. The modular range of solutions includes energy data management, energy supply, sustainable energy generation, energy efficiency services and electric mobility. For our customers, we install and operate charging infrastructure solutions for fleet vehicles, employees and guests throughout Germany. We offer our customers the following modular range of services:
- Consulting and conception
- Manufacturer-neutral hardware selection and procurement
- Electrical planning – including transformer and mains connection
- Installation and commissioning – including earthenworks and civil engineering
- Maintenance and servicing
- Billing of all charging processes
- Load and load management
- Green electricity supply, photovoltaics and storage solutions

Contact partner
Gerhard Kiesbauer
Phone: +49 621 2902356
gerhard.kiesbauer@mvv.de

Applied research on systems for sustainable energy use

The research activities of the Institute of Energy Systems Technology (INES) at Offenburg University of Applied Sciences focus on the investigation and development of systems for sustainable energy use. Eleven professors and their staff work on an interdisciplinary basis in various projects in the wide-ranging field of energy systems technology. Research and development topics include battery technology, hydrogen technology, electric mobility, smart grids, building energy technology, photovoltaic technology and energy management. The equipment comprises test rigs and pilot plants, including laboratories for battery characterisation, hydrogen technology and photovoltaic production technology, a decentralised energy network (smart grid with regenerative power generation, storage and consumers), climatic chambers for investigating energy distribution systems in buildings and an approved electric vehicle.

INES has extensive expertise in modelling, simulation, control and optimisation – from the multiphysical simulation of lithium-ion batteries to the model-predictive control of thermally activated component systems.

Contact partner
Prof. Dr. Wolfgang Bessler
Phone: +49 781 2054653
wolfgang.bessler@hs-offenburg.de
Pininfarina combines elegant styling concepts with concrete engineering solutions

Premium design and engineering. In industry and automotive, from racing to the commercial vehicle, from the concept to the prototype to small series production. Pre-development concepts incl. styling, modelling, VR as well as innovative package solutions on system and component level, up to complex project management in complete vehicle development for system suppliers and OEMs.

From Germany, we manage and coordinate the projects of our German clients for the entire Pininfarina Group. In the automotive sector, our strengths lie in the core competencies of bodywork, exterior, interior, package, chassis and digitalisation. With more than 230 highly qualified employees at our locations in Munich and Leonberg, we focus on customer proximity, fast response times and efficient and innovative project implementation.

Contact partner
Bernd Bauer
Phone: +49 151 55105681
bernd.bauer@pininfarina.de

Pininfarina Deutschland GmbH
Riedwiesenstr. 1
71229 Leonberg
www.pininfarina.de
Employees: 235 (2019)

Metal profiles: from prototype and series production to the profiling line = PROFILMETALL

The PROFILMETALL Group is the specialist for roll-formed metal profiles and its innovative profiling lines enable profiling in a new dimension. The group of companies is the only supplier of roll-formed profiles in Germany to combine the business areas of engineering, tool and profiling plant construction and series production under the umbrella of a group of companies.

The focus is on customer-specific, thin-walled profiles from 0.08 mm in all materials. Our customers appreciate us as experts for efficient profiling processes, interface-free communication with our experienced designers – and the technological know-how from numerous research and development projects with national and international partners and clients.

All formable materials are processed, such as steel in various qualities (galvanised, bright, painted, polished, ground, foil-laminated) up to strengths of 1,500 MPa, but also non-ferrous metals such as aluminium, copper, etc.

Contact partner
Dr. Daniela Eberspächer-Roth
Phone: +49 7478 92930
dr.eberspaecher-roth@profilmetall.de

PROFILMETALL-Gruppe
Wagnerstraße 1
72145 Hirrlingen
www.profilmetall.de
Employees: 100

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© PROFILMETALL
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PTV technology makes mobility and transport strong for an environmentally conscious and intelligent future

PTV Group. Empowering mobility.

PTV Group offers software and consulting to make mobility and transport sustainable. Its market-leading software for intelligent traffic management and transport optimisation helps decision makers in politics, cities, industry and trade to save time and money, make roads safer and protect the environment. PTV Group is already using simulations to show today how tomorrow’s mobility can be realised with all its ecosystems and dimensions. From strategic traffic planning to micromobility for the last mile.

The company was founded in 1979. Today, around 900 employees worldwide work on future-oriented solutions – to make mobility and transport smarter and more environmentally conscious.

The PTV Global Research division is involved in national and international research projects to develop concepts, strategies and models for tomorrow’s mobility in interdisciplinary teams. The headquarters in the heart of the Karlsruhe technology region is a development and innovation centre.

Contact partner
Michael Schygulla
Phone: +49 721 96517284
michael.schygulla@ptvgroup.com

PROMESS technology makes mobility and transport strong for an environmentally conscious and intelligent future

PROMESS has specialised in the development, manufacture and worldwide distribution of servo presses for over 30 years. Our core competence is the development of complete technologies for the solution of individual and complex assembly and testing tasks, as well as the production of high-quality standard components. In addition to the extensive range of servo presses, our product range includes universal torque modules, individual workstations and test stations. PROMESS was founded in 1977 by Dr.-Ing. Gerhard Lechler as an engineering office in the field of production-technical measuring, and initially dealt with the production and distribution of patented, measuring bearings for tool monitoring. In 1989, the company specialised in assembly and automation systems and developed the universal joining module UFM with integrated NC-control and easy-to-handle user interface under Microsoft Windows. Our products are used in the automotive sector, for example in the assembly of gearboxes, chassis or engines. They are also used in other areas such as the electrical industry, while in battery production or medical technology they are used for force-displacement monitored joining, forming, embossing or punching.

Contact partner
Dietmar Fechter
Phone: +49 151 67820092
fechter@promessmontage.de

Fields of competence

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</table>
R. KOHLHAUER GmbH with its headquarters in Gaggenau is one of the leading system suppliers for noise protection on road and rail in Germany and Europe, and is the market leader for transparent noise protection systems. As a medium-sized, owner-managed family business with more than 25 years of experience in the field of noise protection, we offer our customers individual, innovative and high-quality system solutions for noise protection reduction, tailored to their requirements and needs.

The product portfolio is supplemented by mesh insulation systems, aluminium cassette systems and designs in wood. You are welcome to gain an overview of our product variety on our website at www.kohlhauer.com.

Contact partner
Reinhard Kohlhauer
Phone: +49 7225 97570
reinhard.kohlhauer@kohlhauer.com

We are your partner for technologically challenging electric motor insulation

The PVS Group is an innovative injection moulding company specialising in the development and production of technical plastic components for the insulation of electric motors. Besides the over-moulding of stators and stator segments with iron lengths from 5 to 200 mm, in recent years the over-moulding of rotors has also been developed.

About 450 employees work at the headquarters in Niedernhall (Germany) and in plants in the USA, Hungary and China. The company was founded in 1976 and is now managed by Jürgen Frank.

The PVS Group has a production area of 33,000 m² worldwide to fall back on. 120 injection moulding machines with a clamping force from 15 to 1,600 tons are in use.

Contact partner
Dipl.-Ing. (FH) Jürgen Frank
Phone: +49 7940 912670
j.frank@pvs-plastics.net

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j.frank@pvs-plastics.net
RA® – an IT service provider and tool specialist with measurement, calibration and diagnostic know-how

RA® projects and RA® products like the DiagRA® MCD Toolset or the Silver Scan-Tool® support the development process of electronic control units and vehicle networks in the areas of diagnosis, measurement and calibration. We also develop individual software solutions, database projects and telematics applications for our customers, in order to efficiently design the security of development processes for approval-relevant data. The basis for all our developments are the standards of “Automotive Electronics Engineering”, in whose standardisation work we actively participate. As a technology-oriented company, we see research as a great opportunity for our innovative strength and have extensive experience in research and development projects. We have successfully participated in numerous cooperative research projects in the field of electric mobility and autonomous driving, and will continue to be active in research initiatives. More than 400 renowned customers in the automotive industry worldwide testify to the customer proximity achieved with our services and the high degree of maturity of RA® products.

Contact partner
Armin Rupalla
Phone: +49 7251 9819520
info@rac.de

Fields of competence

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<tr>
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<td>Electrics/Electronics</td>
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We set new standards in electrification – for a green driven future

Setting new standards with sustainable solutions – this is not only our philosophy, but also the idea to which we have committed ourselves for the future. We develop solutions for efficient, economically and ecologically conscious work. Wherever the electrification of mobile work machines and commercial vehicles is required. Whether in automated vehicles for container transport, agricultural or construction machinery, municipal vehicles or e-buses – REFUdrive solutions can be used flexibly, efficiently and sustainably.

Together we develop the specific solution that fits your mobile application exactly. We are always competently at your side – from design and project planning to commissioning and service. Benefit from our broad product portfolio – from inverters for drives or auxiliary units in various series and performance classes, to storage and charging components, always optimally matched and connected via intelligent communication solutions. As part of the internationally active Prettl group of companies, we are – together with our sister companies – your partner on the road to electric mobility.

Contact partner
Bernd Horn
Phone: +49 7121 4332100
bernd.horn@refu-drive.com
As the industry leader, remoso realises the best software systems for your mobility

remoso GmbH develops the mobility of the future. With our comprehensive digital applications, the vehicles of international mobility providers and DAX corporations are reserved, used, shared and billed. By implementing complex usage concepts and innovative business models, we generate maximum added value for our customers’ vehicle fleets in more than ten European countries. Our focus is on the development of innovative usage and sharing concepts for vehicle fleets, as well as the implementation of comprehensive mobility platforms for companies and cities. We are convinced that the future of mobility lies in shared vehicle use and process flexibility. This gives us the opportunity to develop integrated fleet systems and comprehensive mobility offers that can be used by companies and end customers alike. Bringing together different mobility entities and combining different usage models is our top priority.

Contact partner
Claus-Michael Keun
Phone: +49 751 2018790
michael.keun@remoso.com

As the industry leader, remoso realises the best software systems for your mobility

Research in motion. Research and development services for 90 years

The Research Institute of Automotive Engineering and Vehicle Engines Stuttgart (FKFS) provides research and development services for the international automotive industry. Approximately 180 highly qualified and committed employees offer comprehensive services in the fields of vehicle propulsion, vehicle technology and electronics/electrics, as well as for demanding interdisciplinary tasks. Highly specialised and unique test benches and test facilities, as well as in-house measuring and testing procedures developed at FKFS, enable the solution of complex problems.

Public and self-financed research activities, as well as direct integration in teaching activities at the University of Stuttgart, complement the tasks pursued by the Institute. The FKFS Foundation, established in 1930, cooperates closely with the Institute of Automotive Engineering Stuttgart at the University of Stuttgart.

Contact partner
Prof. Dr.-Ing. Hans-Christian Reuss
Phone: +49 711 68565888
info@fkfs.de
Electric mobility on rail and road

As the largest mobility service provider in the European Mobility Region Rhine-Neckar, the rnv places special emphasis on electric drives. More than two-thirds of the 170 million passengers per year are already moved electrically and emissions-free by the rnv. This is based on the rnv’s 207-kilometre rail network, on which 190 electric light rail vehicles are in operation. This service will be further expanded in the coming years with the introduction of a new generation of light rail vehicles from 2022 and the planning of new lines.

At the same time, the rnv is stepping up its activities in the electrification of bus transport. This is to be converted to emissions-free drives within a decade, so that rnv will, in future, be 100 % electrically powered. Two lines in Mannheim and Heidelberg have already been converted to electric buses. With the procurement of further vehicles, the proportion of electric buses in the fleet will rise continuously. Furthermore, rnv plans to use fuel cell range extenders, which are particularly suitable for large vehicles with long turnaround times on lines with high demand.

Rheinmetall Automotive AG – technologies for the mobility of the future

Rheinmetall Automotive AG is the mobility division of the Rheinmetall Technology Group and, as a global automotive supplier, is a major player in the automotive industry with its expertise in the areas of air supply, emissions control and pumps, as well as in the development, manufacture and spare parts supply of pistons, engine blocks and plain bearings in the respective markets. In electric vehicles, the product spectrum ranges from electrically driven coolant, oil and vacuum pumps, electric coolant valves and actuators, to a heat pump module and housing components for electric motors and batteries.

With several demonstrator vehicles, Rheinmetall Automotive has also highlighted its development competence for electric vehicles. First, a battery electric vehicle was supplemented by a small combustion engine with generators as range extenders. This was followed by another city car, the EMove, this time with in-house developments in the electric motor and battery pack. In addition to this high-voltage application, there are also promising developments in ETUs (electric traction units) and battery systems with 48 V for light vehicles, P4 hybridisation and pedelecs.
Technology for life

The Bosch Group is a leading international technology and service company with around 400,000 employees worldwide (as of 31.12.2019). In the 2019 financial year, it generated sales of EUR 77.7 billion. Its activities are divided into the four divisions Mobility Solutions, Industrial Technology, Consumer Goods and Energy and Building Technology. As a leading provider in the field of the Internet of Things (IoT), Bosch offers innovative solutions for Smart Home, Industry 4.0 and Connected Mobility.

Bosch pursues the vision of sustainable, secure and inspiring mobility. With its expertise in sensor technology, software and services, as well as its own IoT cloud, the company is able to offer solutions and products for networked life that either have artificial intelligence (AI) or are developed or manufactured with its help. With innovative and inspiring products and services, Bosch improves the quality of life for people worldwide. Bosch offers “Technology for life.”

Bosch GmbH
Robert-Bosch-Platz 1
70839 Gerlingen-Schillerhöhe
www.bosch.com
Employees: 398,200 (2020)

Contact partner
Dr. Andreas Schönknecht
Phone: +49 711 8118828
Andreas.Schoenknecht@de.bosch.com

Your contact for assembly systems for the production of sustainable drive systems

As an internationally active company from Thuringia, ruhlamat GmbH has established itself worldwide in the field of special machine construction.

With customer-specific automation systems, ruhlamat offers within this business area – mainly for the automotive supplier industry – suitable machine solutions. Through the change from conventional drive systems towards sustainable alternatives, the company is now also developing assembly systems for the production of components that are used for electric mobility and fuel cell technology. In the market segment of fuel cell technology, ruhlamat GmbH offers its customers scalable and flexible automation solutions that enable them to make the transition from semi-automatic to fully automatic production. Tailor-made machine systems are planned, designed, manufactured and commissioned in accordance with customer wishes and requirements. Regular service and maintenance assignments, fast spare parts delivery and machine-specific training courses are only a part of the company’s extensive service offering.

ruhlamat GmbH
Sonnenacker 2
99834 Garstungen OT Marksuhl
www.ruhlamat.de
Employees: 1,200 (2020)

Contact partner
Matthias Trostmann
Phone: +49 36925 929430
m.trostmann@ruhlamat.de

Components

Components:
- Drivetrain
  - Vehicle electrical system, inverter, motor/ generator, thermal management, FC system
- Interior
- Electrics/electronics
- Exterior
- Chassis

Components:
- Automotive

Components:
- Stationary systems

Components:
- Development

Fields of competence

Contact person:
Dr. Andreas Schönknecht
Phone: +49 711 8118828
Andreas.Schoenknecht@de.bosch.com

Contact person:
Matthias Trostmann
Phone: +49 36925 929430
m.trostmann@ruhlamat.de
**Design and development for the commercial success of your products**

Scala Design, as a company for technical product development, was founded in 1986 by Werner Goldensteiner, Heiko Tegeder and Peter Theiss. All three are active in the company as managing directors. In the four departments of Design Draft, CAD Construction (using Catia, SolidWorks, Rhinoceros 5, Siemens NX), Prototype and Model Construction as well as Small Series Production, products are developed in close dialogue with our clients – from the first sketch of an idea to functional prototypes and small series.

Our expertise has developed over the years and led to in excess of 1,000 successful projects. We are currently developing and producing as a Tier 1 supplier with 42 employees in our workshops and project areas in Biblingen near Stuttgart.

Contact partner
Martin Gottlob Wohlbold
Phone: +49 157 80528842
M.Wohlbold@scala-design.de

**Schaeffler technologies make a significant contribution to future mobility**

The Schaeffler Group is a leading global automotive and industrial supplier. The portfolio includes precision components and systems in engines, gearboxes and chassis, as well as rolling and plain bearing solutions for a wide range of industrial applications. With innovative and sustainable technologies in the fields of electric mobility, digitalisation and Industry 4.0, Schaeffler is already making a decisive contribution to the mobility of the future. In 2019, the technology company generated sales of approximately EUR 14.4 billion.

With approximately 86,500 employees, Schaeffler is one of the world's largest family-owned companies and has around 170 locations worldwide in over 50 countries comprising a global network of production sites, research and development facilities and distribution companies. With almost 2,400 patent applications in 2019, Schaeffler ranks second among Germany’s highly innovative companies according to the German Patent and Trademark Office.

Contact partner
Philipp Kautzmann
Phone: +49 9132 8288233
philipp.kautzmann@schaeffler.com

Contact partner
Jürgen Remmlinger
Phone: +49 721 60841762
juergen.remmlinger@schaeffler.com
We reduce complexity in EMC – thus allowing customers to focus on the essentials

The Schaffner Group is a leading international provider of solutions, which ensure the efficient and reliable operation of power electronic systems through the targeted conversion of electrical power.

The Schaffner Group’s product range includes EMC filters, power magnetic components and power quality filters with the associated services. For the automotive industry, Schaffner develops and produces antennas for keyless entry systems and filter solutions for hybrid and electric vehicles and their charging infrastructure. Schaffner components are also used in electronic engine control systems, wind and photovoltaic systems, railway technology, machine tools and robots, electrical infrastructure and the power supply of electronic devices.

Contact partner
Holger Urban
Phone: +49 170 8054869
holger.urban@schaffner.com

SCHAFFNER + HEILIG – your forming and assembly specialist for metals and plastics

SCHEUERMANN + HEILIG supplies metal parts for almost every conceivable product in the Mobility, Smart Solutions, HealthCare and Individual Solutions sectors. The product portfolio of stamped and stamped-bent parts, springs and assemblies includes busbars, connectors, cell connectors, shielding plates and shielding sleeves, return rings, rotor and stator packets, bipolar plates and technical springs. With the development of a tensioning system for fuel cell stacks, SCHEUERMANN + HEILIG has succeeded for the first time in developing a technologically mature, economical and resource-saving manufacturing process for large-scale production.

SCHEUERMANN + HEILIG forms the entire process chain from consulting through to development and prototype production, to the validated assembly as a final product and offers the entire workflow from one source, from the customer’s idea to the perfect series product. The modern machinery fleet embraces the latest production technologies for forming, joining and assembly processes (including various laser technologies for cutting, welding, marking, etc.). SCHEUERMANN + HEILIG is certified according to the following QM systems: IATF 16949, DIN EN ISO 9001, 14001, 50001.

Contact partner
Benjamin Kugel
Phone: +49 6281 907132
benjamin.kugel@sh-gmbh.de
Gas generators for the demand-oriented supply of ultra ultra-high-purity

SCHMIDLIN – for decades a reliable partner when it comes to gas generators, laboratory equipment and accessories. With our know-how built up over 25 years, we support our customers from the design and definition of optimum products to commissioning with a continuous service throughout Germany. Our equipment produces purest gases such as hydrogen, oxygen, zero air or nitrogen at the highest level, so that its users can carry out analyses and experiments in test and inspection laboratories, but also in quality control during production. The gas generators offer a reliable 24/7 supply as well as a cost-effective alternative for companies involved in the development and production of fuel cell and hydrogen technologies. Our H₂ gas generators use a mature and patented electrolysis cell technology that produces ultra-high-purity gas with minimal moving parts and, therefore, requires little maintenance. Our gas generators are used in various industries such as automotive, pharmaceutical, chemical and environmental.

Schuler Pressen is the world’s leading supplier of advanced technology in all areas of forming technology. Whether automated mechanical or hydraulic system solutions – Schuler lines enable the flexible and efficient production of a wide range of parts in top quality, also thanks to innovations such as ServoDirekt technology. In the field of fuel cells, Schuler offers production technology for the high-volume manufacture of bipolar plates. This includes servo-mechanical and hydraulic forming presses, forming tools, the necessary automation and, in connection with its group sister Andritz Souotec, also laser welding technology. The systems are designed for up to 60 bipolar plates per minute, so that on one system per year bipolar plates for about 50,000 fuel cell stacks are produced.

Production technology for the mass production of metallic bipolar plates

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<tr>
<th>Components</th>
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<tr>
<td>Drivetrain</td>
<td>FC system (chemical/electrical)</td>
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</table>

Fields of competence

SCHMIDLIN – for decades a reliable partner when it comes to gas generators, laboratory equipment and accessories.

Contact partner
Ralf Winterstein
Phone: +49 7123 889750
ralf.winterstein@schmidlin-labor.de

Employees: 4 (2019)

Contact partner
Dr.-Ing. Hermann Uchtmann
Phone: +49 7161 667949
hermann.uchtmann@schulergroup.com

Employees: 6,276 (2019)

© Own picture

© Schuler Pressen GmbH
The history of SEG Automotive is closely linked to that of the car. For more than 100 years, we have stood for significant developments in drive components: from starters and alternators to start/stop and mild hybridisation. With our passion for innovation, we are driving the change to more efficient combustion engines, 48 V mild hybrids and electrification.

By reducing vehicle emissions, SEG Automotive makes a significant contribution to climate protection. Examples include our 48 V Boost Recuperation Machine for the cost-effective hybridisation of combustion engines and our future EM product family. It offers even higher savings and enables, with scalable performance, fuel-saving 48 V e-drive functionality – from mild hybrids to electric drives for light vehicles. Almost all car manufacturers worldwide trust our products, which combine strong performance, durability, competitiveness and a uniformly high standard of quality worldwide. That is what our intercultural team of over 7,000 employees in 14 countries stands for, as well as our global production network in the world’s major automotive markets.

Contact partner
Dr. Hartmut Becker
Phone: +49 151 10816890
hartmut.becker@seg-automotive.com

Mobility begins with us: global automotive supplier and technology leader

SELB takes care of JIT-JIS processes within the supply chain. Logistics, quality.

The focus is on the supply chain management of our customers (well-known car manufacturers) and on ensuring optimum logistics and quality management for manufacturers and suppliers.

Fields of activity are supplier and quality management, as well as planning and the project management of individual supply processes. In the course of electrification, we see ourselves as a strategic partner and design solutions for charging infrastructure and low voltage drives.

Contact partner
Gunnar Paulick
Phone: +49 152 09431040
gunnar.paulick@yourselb.com

The history of SEG Automotive is closely linked to that of the car. For more than 100 years, we have stood for significant developments in drive components: from starters and alternators to start/stop and mild hybridisation. With our passion for innovation, we are driving the change to more efficient combustion engines, 48 V mild hybrids and electrification.

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Contact partner
Gunnar Paulick
Phone: +49 152 09431040
gunnar.paulick@yourselb.com
The Silberform Group sees itself as a design and development service provider. We offer draft design, 3D modelling, visualisations and renderings for marketing documents, as well as the creation of operating and display concepts (HMI/UX/UI) and touchable applications. In addition, we realise virtual reality and augmented reality applications for our customers. We also develop and manufacture prototypes, show cars, technology demonstrators, design models, wind tunnel models and special vehicles, as well as small and special series.

In addition, Silberform manufactures assembly and handling tools for final series production. In this area, we provide services from process consulting to the finished equipment. Silberform was founded in 2010 as a public limited company and has developed into a group of nine companies. The headquarters of the group is in Renningen. There, on more than 10,000 square metres with workshops, design and presentation areas under one roof, work on complex projects is carried out in the strictest secrecy. There are also locations in Wolfsburg, Cracow (Poland) and Cary (USA).

Technological competence meets creativity

Contact partner
Björn Alber
Phone: +49 7159 16306180
b.alber@silberform.ag

Stainless steel, copper or plastic, whether formed, welded or over-moulded: the versatile company smk systeme metall kunststoff gmbh & co. kg develops innovative solutions for its customers from the most diverse industries. It specialises in technologically sophisticated functional assemblies, which are individually tailored to the needs of the customer. “Driven by dynamic spirit” is the motto that accompanies this team in its work. As a development partner for sophisticated solutions, we develop and implement smk-individual and functional assemblies, such as, heat exchangers, hybrid components and complex welded assemblies for battery systems.

What makes us special? We rethink every project and develop individually perfect solutions, which we implement precisely and with absolute commitment.

Experience the dynamic spirit of smk!

Contact partner
Markus Allmendinger
Phone: +49 711 77866601
markus.allmendinger@smk-systeme.de

Fields of competence

- Components
- System integrator/system manufacturer
- Service
- Development
Over the past four years, Spicetech has developed its own technology stack, which enables the fast, efficient and scalable development of individual Software-as-a-Service, and especially AI-as-a-Service solutions. Spicetech is per se cross-industry, but focuses on the topic of electric mobility. Our software solutions provide continuously automated forecasts and analyses for public utilities, energy suppliers and network operators, such as, on important aspects such as connection capacity, electricity sales, charging infrastructure and technology.

In concrete terms, this can mean that we determine how many charging points need to be optimally placed where, or which connection capacity will be needed in 2040 at which location.

What does scalability mean for us? 100,000 scenarios and variants over many forecast years and the fully automated extraction of analyses and forecasts that are particularly important for you and your commercial advantage. The spectrum of our projects ranges from interactive joint workshops, to detailed studies, to deriving recommendations for action or to the design and implementation of your individual IT solution.

**Contact partner**

Dr. Alexander Thieß
Phone: +49 711 93572672
alexander.thieß@spicetech.de

---

STABIL GROUP International GmbH is an internationally established developer and manufacturer in the field of sensor, electronic and connection technology for passenger cars, commercial and special vehicles. More than 400 employees worldwide – and at the company’s development centre in Kirchheim unter Teck – are there for you with automotive-certified processes.

As an expert for customised innovative product solutions, STABIL has been supplying OEMs and Tier 1 for over 30 years with numerous temperature sensors, level sensors, Hall and Smart-effect sensors, electronic control units (ECU), as well as metallic connection technology including formed parts and hose clamps for the highest technical requirements. The future trends of electric mobility and fuel cell technology become reality at STABIL through a strong network, publicly funded research projects and continuous interaction with customers. This results in sensor solutions for electrified drivetrains, methods for the quality measurement of cooling liquids for batteries and safe connection technology. Our many years of experience guarantee a high degree of know-how for technically high-quality products with development, validation and series delivery from one source.

**Contact partner**

Dr. Florian Dittmann
Phone: +49 7021 738193
dittmann@stabil-group.de

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**Fields of competence**

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<th>Components</th>
<th>System integration/system manufacturer</th>
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<td>Software</td>
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<td>Testing</td>
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<td>Energy</td>
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<td>Development</td>
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**Components**

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<tr>
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<tr>
<td>Drivetrain</td>
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<td>Motor/generator, thermal management, gearbox</td>
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<td>Exterior</td>
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<td>Electric/electronics</td>
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</table>
Better supplied, thinking ahead: we are energy partners to the Karlsruhe region

Our products make life easier and are available at any time, either in the blink of an eye or at the touch of a button. More than 1,100 employees at Stadtwerke Karlsruhe ensure that customers in Karlsruhe and the wider region can enjoy this service undisturbed. But that is by no means all. The energy industry continues to change at a rapid pace. Climate change, the mobility revolution, digitalisation, energy system transformation and demographic change are just a few of the keywords describing this development. As one of the major German municipal utilities, we are actively facing up to these challenges. We are continuing to work intensively on the transformation of energy and heating systems and offer innovative and customised solutions on-site. We are investing in renewable energies and, through training and further education, are strengthening our workforce for the requirements of the future. In doing so, our most important task remains to supply our customers with economical, technically innovative, safe and environmentally friendly energy. The future belongs to well-positioned, effectively working energy service providers – we will be one of them.

Contact partner
Ralf Gumpp
Phone: +49 721 5991032
ralf.gumpp@stadtwerke-karlsruhe.de

Fields of competence

<table>
<thead>
<tr>
<th>Components</th>
<th>System integration/system manufacturer</th>
<th>Services</th>
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<tbody>
<tr>
<td>Stationary systems</td>
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<td>Energy</td>
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Stadtwerke Karlsruhe GmbH
Daxlander Straße 72
76185 Karlsruhe
www.stadtwerke-karlsruhe.de
Employees: 1,100 (2019)

Staiger GmbH & Co. KG – innovative valve technology from Erligheim

Staiger develops and manufactures high-quality micro-magnet valves and fluidic systems for a wide range of applications and customer requirements. For over 45 years, we have been implementing our successful innovation course consistently and offer new products and customised solutions, in particular in the area of proportional valves and general valve technology for fuel cell systems. We produce from single pieces to mass production everything at our location in Erligheim, and also produce all manufacturing and testing equipment in-house. Our know-how enables us to develop cost-effective high-tech solutions that offer our customers a real competitive advantage. Our customers include world market leaders in the medical technology, automotive, industrial, aerospace and drinking water technology sectors.

Contact partner
Marc Staiger
Phone: +49 7143 27070
sales@staiger.de

Fields of competence

<table>
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<th>Components</th>
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<th>Services</th>
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<tbody>
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<td>Drivetrain</td>
<td>Automotive</td>
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<tr>
<td>FC system (chemical/electrical), motor/generator</td>
<td>Stationary systems</td>
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</table>
Shaping the mobility of the future together

Networked competence and a passion for your success: since 1997, STAR COOPERATION has been helping companies of all sizes and from all sectors to plan, design and successfully implement projects efficiently. As our customer, you benefit from interdisciplinary know-how and synergies from the fields of CONSULTING, ELECTRONICS, ENGINEERING, IT, LOGISTICS and MEDIA. Experienced experts accompany you in practice: as a reliable partner, we provide you with innovative ideas and well-thought-out solutions – precisely tailored to your needs. So that you make optimum use of your resources and improve every day.

STAR COOPERATION is certified according to the management systems DIN EN ISO 9001:2015, ISO 50001:2011, ISO 14001:2015 and ISO 45001:2018. Certificate registration number 12 340/100/104 26131 TMS. We accompany industry, science and public authorities into the mobility of the future. We develop integrated mobility solutions, charging infrastructure and energy concepts, as well as tools for vehicle networking – from the initial idea to the final implementation on the market.

STAR COOPERATION GmbH
Otto-Lilienthal-Straße 5
71034 Böblingen
www.star-cooperation.com
Employees: 950 (2019)

Contact partner
Carolin Stickel
Phone: +49 7031 62883554
carolin.stickel@star-cooperation.com

Pioneering connection technology for all industrial sectors

Stäubli is a specialist for technologically advanced connection solutions for industrial applications. The wide range of connectors for power, data, signals and media has been developed to meet the requirements of demanding applications and harsh environmental conditions.

In electric mobility, Stäubli’s solutions offer maximum reliability, absolute safety and resistance to temperature fluctuations or vibrations in on-board and infrastructure applications. Typical applications include the automated charging of driverless transport systems, battery connectors, contacting of assemblies within vehicles, and solutions for power supply and testing applications.

The compact components enable space-saving solutions for permanent electrical contact, easy maintenance and a long service life. Assembled connectors as a completely tested, ready-to-install assembly and customer-specific solutions complete the range.

Stäubli Electrical Connectors GmbH
Hegnenheimer Str. 19
79576 Weil am Rhein
www.staubli.com/electrical
Employees: 5,500 (2020)

Contact partner
Alexander Heilmann
Phone: +49 7621 6670
ec.de@staubli.com

Fields of competence

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<tr>
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<tbody>
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<td>Automotive</td>
<td>Software</td>
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<tr>
<td>Electrical storage, vehicle electrical system</td>
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<td>Testing</td>
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<td>Electro/electronics</td>
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Stäubli offers technologically advanced solutions in the field of mobility. The wide range of coupling technology for the connection and separation of gases, fluids and electrical energy has been developed to meet the needs of demanding applications and harsh environmental conditions. The compact elements are characterised by their light and space-saving design and are easy to use, even in confined spaces.

Stäubli meets your requirements and specifications in terms of reliability, absolute safety and resistance to temperature fluctuations or vibrations. Our extensive industry knowledge is the basis for customer-specific solutions.

Whether for charging or refuelling, for connections between modules such as for cooling on-board electrics, or for connecting a wide variety of lines in test benches or test laboratories: Stäubli offers you the reliability you need.

Support in innovation management, financing and internationalisation

As a subsidiary of the Steinbeis-Europa-Zentrum (SEZ) of Steinbeis Innovation gGmbH, Steinbeis 2i GmbH is committed to the topics of innovation and internationalisation – and has been doing so together with the SEZ for over 30 years.

Steinbeis 2i forms the bridge to Europe for companies, research institutions, universities, administration and politics, and is a partner in the Enterprise Europe Network of the European Commission. We support you in the conceptual design of your innovation project and, in particular, in the identification of suitable funding and successful application – at regional, national and European level. The focus is on sustainable mobility and the networking of industry, research and start-ups, through to the organisation of events. Steinbeis 2i is an experienced partner with expertise in administrative project management and communication, as well as in the dissemination and exploitation of project results from EU research and innovation projects, and is currently involved in the following hydrogen mobility projects: COSMHYC, COSMHYC XL, INN-BALANCE, HiShips, FCHGO!
At stoba e-Systems in Weinstadt near Stuttgart, a very specific mission is taking place. The team is working flat out on an independent electric drive system, which as a modular platform opens up completely new options for electric mobility and is intended to lead into a new energy age as a flexible technology bridge.

The platform comprises the complete electric drivetrain with electric motor, inverter, battery pack, battery management system (BMS) and electronic control unit (ECU) and, with a voltage level of less than 60 V in combination with 25–60 kW nominal power or 40–120 kW peak power respectively, opens up a performance class not yet covered by 48 V systems. As a highly compact, fully validated “all-in-one package” with a low-cost, low-voltage approach and significantly reduced integration effort, the drive system from stoba e-Systems is opening up new possibilities right now, in times of extreme upheaval, as well as new perspectives for the electrification of traction and working drives – far beyond the classic car/truck sector.

Contact partner
Ralph Porschke
Phone: +49 151 22087717
ralph.porschke@stoba-esystems.com

Components
Drivetrain, Gearbox, thermal management, inverter (electrical/electrical), motor/generator

© stoba e-Systems GmbH

Overcoming boundaries, high-power, low-voltage platform

The future needs ideas with vision

Everyone is talking about electric mobility – we are driving it forward. And not just recently, but for many years now. As a pioneer in this field, our company has used its comprehensive expertise to develop efficient, tried-and-tasted charging solutions.

Traditionally, Stöhr is the established manufacturer of components and complete solutions for customers from various industries who trust in our expertise. Due to the broad spectrum, we possess considerable knowledge in new developments, processes and procedures. Our engineers and technicians designed suitable products for electric mobility at an early stage and decisively pushed this important future technology. The market launch of the second generation of our Stöhr charging infrastructure is the next milestone in our company tradition. In this way, we continue to ensure that everything moves in the right direction.

Contact partner
Michael Erbar
Phone: +49 7232 30640
info@stoehr-gmbh.de

Components
Stationary systems, Development

© Stöhr GmbH

Components
Comprehensive systems integrator/system manufacturer, Service

© stoba e-Systems GmbH

Fields of competence

© stoba e-Systems GmbH

Fields of competence

© Stöhr GmbH

Components
Stationary systems, Development
As one of the leading European specialists in the field of vehicle testing, we carry out road tests for our customers worldwide and have been able to gain experience in almost 50 countries through our projects to date. We carry out all types of road tests – from endurance run to function tests – with the highest flexibility and agility. Our service portfolio includes all areas of vehicle support: from the operation of measurement technology and software such as CANape by our test drivers, through to the implementation of vehicle conversions or the updating of software versions, to worldwide vehicle and driver logistics.

Our USPs include our own refrigerated containers at the Aldenhoven test track, an acoustic roller test bench and our own NVH-compatible test track with a length of 825 m and four gradient hills.

We are active for our customers in all the latest topics such as alternative drives, data acquisition for automated drive systems, autonomous driving, brake or tyre testing. Our international network enables us to have permanent locations in England, Spain, Japan and China, as well as direct contact to over 180 test sites on all continents.

We solve your challenge in road tests. Close to the customer. Internationally.

Contact partner
Dominik Eiberger
Phone: +49 7151 94423928
dominik.eiberger@straesser-automotive.com

your solution provider for future-oriented production

Our modular, individual solutions offer exactly the kind of flexible manufacturing that is needed for your production of tomorrow: ideal from small series to mass production.

They also allow full flexibility when integrating new processes into existing production structures. From the seamless integration of a single system to a robot-guided machining process, all variants are possible. We always have the perfect solution in mind. Together with you, our team of future-oriented engineers and designers develops the cutting-edge technology that guarantees long-term success in a constantly evolving manufacturing world. Through early involvement, preferably already during the product development phase, we support you with regard to surface criteria, process technology and prototyping. Talk to us about your very individual machining tasks or let us analyse your production chain together with our experts. In both cases, you will benefit from our innovative manufacturing systems, clever automation options and comprehensive service offers.

Contact partner
Michael Wöhrle
Phone: +49 7834 866241
m.woehrle@supfina.com

components
system integration/system manufacturer
services
automotive
testing
stationary systems
development
SW Engineering
... your desire is clean transportation

Since 2006, we have been working as an engineering office in the Stuttgart region, in Germany and internationally on leading developments in electric mobility and storage technologies. Our focus is on project and business development in the field of electric mobility, electric storage technologies and hydrogen as a carrier of electrical energy and fuel for fuel cell vehicles. In these areas, we develop industrial and public projects, take over project management for development, demonstration and series projects and advise prospective companies on how they can make targeted use of their existing or newly developed potential in the growth markets of electric mobility/electric energy storage. For our customers and for our own projects, we have also been offering the commercial sale of products and services via SWE-Mobility UG (limited liability) since 2012. Parts of the portfolio can also be purchased via our webshop.

www.sw-engineering-services.com
www.swe-mobility-shop.com

Contact partner
Sebastian Wilder
Phone: +49 711 99337080
sebastian.wider@swe-mobility.com

Fields of competence

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<th>Components</th>
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<td>Development</td>
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SW Engineering
Gausstrasse 43 A
70193 Stuttgart
www.sw-engineering-services.com
Employees: 2 (2020)

Technology, quality and customer service

Since its foundation in 1938, Tamagawa Seiki has been manufacturing high-precision sensors, motors and gyroscopes. The flexibility and precision of our products makes it possible for these to be used in many different industries, such as automotive, manufacturing, aerospace, science and robotics. We offer you our high-quality sensor and motor products, which meet very specific requirements by continuously improving and developing our technologies. This helps us to contribute to the development of environmentally friendly electric mobility, to make production lines more efficient and productive and to support scientific research. With offices in Japan, China, Taiwan and Germany, we can support our customers wherever they need us.

Contact partner
Isabella Burk
Phone: +49 731 96338958
i.burk@tamagawa.eu

Fields of competence

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TE Connectivity (TE) is a leading provider with its KISSLING products of high-quality, robust components and systems for switching and distributing high currents. These products are used in all industrial and commercial transport vehicles that have to demonstrate their exceptional performance in harsh environments. Over decades, we have continuously worked to improve our products in the field of switching applications, high current supply and switching under load. As the electric mobility market has evolved in the industrial and commercial transportation (ICT) sector, TE and its partners have responded by developing new switching components for high-power, high-voltage and switching applications. We combine innovative ideas with technical expertise to develop electric mobility solutions that meet the new requirements in applications for electric vehicles and central electric systems for high performance. Our portfolio of high-voltage systems enables a range of applications of between 480 and 900 V. We can also offer individual solutions to meet specific customer requirements.

Contact partner
Andreas Eichhardt
Phone: +49 172 7928160
Andreas.Eichhardt@te.com

We enable the successful electrification of drive systems for trucks, buses, agricultural and construction vehicles

Conceptualising, developing and designing mobility solutions in a disruptive way

Founded in 2013 by the electric mobility pioneer Prof. Johann Tomforde, TEAMOBILITY GmbH stands for systemic vehicle and overall infrastructure solutions in all areas of sustainable auto-mobility.

An internal senior expert team works together with project-specific and efficiently deployed specialists from networked partners on sustainable mobility system solutions for industrial, branch and fleet customers in the business disciplines of:
- urban Transportation Business
- autoMobility Innovation and Design Support
- mobility Services and Business Design
- electric Vehicle Concept and Design
- UCCON Rolling chassis Ecosystem

Contact partner
Prof. Johann Tomforde
Phone: +49 7031 3068595
tomforde@teamobility.de

TEAMOBILITY GmbH
Graf-Zeppelin-Platz 1
71034 Böblingen
www.teamobility.de
Employees: 8 (2020)

electric mobility south-west.
Sophisticated inspection tasks intelligently mastered with TEKON contacting solutions

Made in Germany – TEKON Prüftechnik is the German market leader when high demands are placed on testing services, for example in the automotive industry, in mechanical and plant engineering, in the manufacture of household appliances, in medical technology and in the electronics industry. We are the competence leader for high-quality contacting systems for the process-safe and sensitive testing of electrical plugs and sockets. The experienced specialists at TEKON develop and manufacture sophisticated test equipment with a lot of know-how for customer-specific applications. The contacting solutions stand for innovation, ensure high production quality and permanently minimise our customers’ testing costs. TEKON realises projects with very high contacting cycles for the manual testing process of small lot sizes, as well as for the fully automated testing of complex serial products with high quantities.

Contact partner
Dipl. Ing. Jörg Riehle
Phone: +49 7151 36884-0
j.riehle@tekon-prueftechnik.de

Thermo-engineering – cooling and air-conditioning for the mobility of the future

“Thermo-engineering” describes efficient and sustainable solutions for the cooling and air-conditioning of passenger compartments, drivetrain and transported goods that are suitable for series production. As experts in vehicle thermal management, we develop new cooling systems, coolants and heat exchangers and, in particular, meet the specific thermal requirements of batteries and fuel cells.

The development of new cooling system architectures is carried out with thermodynamic vehicle simulation. A special focus is on the efficient control of all energy flows in the vehicle. At component level, we develop new heat exchangers such as, electronic coolers and battery coolers. Additive manufacturing technologies enable the realisation of novel heat-transferring geometries. Here, we offer fascinating solutions for 3D-printed electronic coolers.

New circuits, components and manufacturing processes require new coolants and surface materials. In the TheSys laboratory, we optimise coolants on our own test equipment.

Contact partner
Dr.-Ing. Peter Ambros
Phone: +49 7121 69627510
p.ambros@thesys-engineering.de

Fields of competence

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Unicorn Engineering GmbH develops innovative energy storage and charging infrastructure elements for the fuel cell and electrical technology market. This particularly concerns light electric mobility and stationary applications. The company’s development spectrum includes mechanical, electrical, software and hardware development. Unicorn Engineering GmbH realises the development work from the concept to the production of functional prototypes.

Previous developments include the products EnergyTube® and EnergyCube® as scalable universal batteries. As a supplement, the following is also under development: H2 Fuel Cell Tube (universal fuel cell system), H2 StorageTube® (refillable hydrogen cartridge) and EnergyLock® (standardised DC connector for light electric mobility).

All developments are based on a smart modular approach and a smart energy grid.

Contact partner
Dr.-Ing. Michael Buchholz
Phone: +49 731 5027003
michael.buchholz@uni-ulm.de

Our visions: intelligent and emissions-free mobility and accident-free driving

The basis of our work is the research and development of modern methods of measurement and control engineering, as well as signal processing and real-time optimisation, which are applied to issues in the fields of electric mobility, automated driving and mechatronic systems. The practical applicability of our research is an important concern and will be demonstrated on our own test benches and test vehicles with test vehicle approval, as well as on our pilot plant with infrastructure sensor technology for networked driving.

In addition to data-driven modelling and, based on this, the control and onboard diagnostics of batteries and fuel cells, higher-level, forward-looking operating strategies for electric vehicles are a research priority in the field of electric mobility. This work is also increasingly being networked with our research on automated driving, in which classical methods, as well as machine learning methods (Deep Learning/KI), are used. Focal points here include object recognition and environment modelling, multi-object tracking and situational understanding in the vehicle and in the infrastructure.

Contact partner
Dr.-Ing. Michael Buchholz
Phone: +49 731 5027003
michael.buchholz@uni-ulm.de

Modular energy storage system with battery, fuel cell and hydrogen cartridge

Unicorn Engineering GmbH develops innovative energy storage and charging infrastructure elements for the fuel cell and electrical technology market. This particularly concerns light electric mobility and stationary applications. The company’s development spectrum includes mechanical, electrical, software and hardware development. Unicorn Engineering GmbH realises the development work from the concept to the production of functional prototypes.

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All developments are based on a smart modular approach and a smart energy grid.
We offer excellent teaching and outstanding application-oriented research

The Faculty of Mechanical Engineering at the Esslingen University of Applied Sciences has a history of more than 100 years. In 1914, the Royal Württemberg School of Mechanical Engineering was relocated from Stuttgart to the neighbouring city of Esslingen. This was mainly due to the rapid industrial development in Esslingen at the beginning of the 20th century. Today, we see a comparable upheaval, which is also taken into account by a changed understanding of mechanical engineering.

Today, mechanical engineering is the central engineering discipline at the interface between mechanics, electronics, information technology and management. Currently, about 600 young people are studying mechanical engineering in Esslingen. The stellar reputation of Esslingen’s mechanical engineering graduates, documented in numerous nationwide rankings, is based on a broad, fundamental education with a high practical relevance. In addition, the faculty successfully cooperates with leading global companies from the region. A wide range of choices allows the students to develop their own personal profile.

Application-oriented research for sustainable energy technology and mobility

With the Institute for Sustainable Energy Technology and Mobility (INEM), a focus on research and teaching at the University of Applied Sciences Esslingen was created in 2012. The INEM is committed to subject-related and interdisciplinary teaching, to disciplinary and interdisciplinary research, and to the transfer in the development of sustainable and efficient technologies in the key areas of energy engineering and transportation. As a result of evermore striving for a sustainable future, climate-friendly mobility concepts and sustainable energy systems are experiencing increasing popularity. We are stepping up to the resulting challenges with our research activities. We conduct basic research and work on real problems in the field of sustainable mobility and energy systems.

**Components**

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**Contact partner**

Prof. Dr. Walter Czarnetzki
Phone: +49 711 3973257
walter.czarnetzki@hs-esslingen.de

**Fields of competence**

- Components
  - Drivetrain
  - FC system (chemical/electrical), thermal management
  - Interior
  - Thermal management
- System integration/system manufacturer
- Software
- Stationary systems
- Energy
- Development
- Testing
- Development

**Contact partner**

Prof. Dr. Ralf Wörner
Phone: +49 711 3974670
ralf.woerner@hs-esslingen.de
From the electron to the component – material understanding on all scales

The focal points of the Institute for Materials Testing, Materials Science and Strength of Materials (IMWF) are on research and development work in the field of microstructure mechanics, multiscale modelling, materials and component testing, as well as materials development and optimisation.

The computer simulations carried out at the IMWF cover all relevant length scales and are dedicated to the damage behaviour of materials, specimens and entire components. In particular, steels and light metals, fibre composites on a metallic and polymer basis, metal-ceramic composites, hard metals and coatings are investigated experimentally and numerically. The focus of the investigations is on microstructure modelling and nano-simulation with regard to microstructure-property correlation and the clarification of the phenomena occurring at lattice level. In fields of work such as damage prevention, modern calculation methods, the stress-specific selection of materials, as well as material-specific manufacturing methods, the IMWF cooperates closely with large but also small and medium-sized enterprises.

Contact partner
Prof. Siegfried Schmauder
Phone: +49 711 68562556
Siegfried.Schmauder@imwf.uni-stuttgart.de

Fields of competence

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Copyright © W. Verestekt, IMWF

Electric driving – wireless charging

The Institute of Electrical Energy Conversion (iew) was founded in June 2011 at the Department of Electrical Engineering and Information Technology at the University of Stuttgart. The research work of the institute focuses on two main areas: electric machines and contactless energy transfer.

Both areas are part of the thematic priorities of electric mobility. The scientists at iew are researching the design of electric motors with very high torque density and position-tolerant inductive charging systems. The aim is to develop highly efficient components for electric vehicles of the future.

Contact partner
Dipl.-Ing. Marco Zimmer
Phone: +49 711 68568030
marco.zimmer@iew.uni-stuttgart.de

Fields of competence

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</table>
The fast lane to Electric vehicles

Valmet Automotive Group is one of the largest contract manufacturers of vehicles in the world, a Tier 1 system supplier for roof systems and an important development partner to the global automotive industry. The strategic goal is to position Valmet Automotive as a Tier 1 system supplier for battery systems and modules. To this end, the range of services has been continuously expanded in recent years. Even today, with its business lines “EV Systems” and “Engineering,” Valmet Automotive covers the complete value chain from concept to battery development, prototyping and testing through to the production of batteries for both the automotive and the non-automotive sector. In autumn 2019, the first high-volume battery production facility was opened in Salo, Finland. A state-of-the-art test centre for battery systems and modules has been in operation in Bad Friedrichshall since spring 2020. Valmet Automotive also established a fuel cell competence centre in 2019. The experts there focus on system integration and the development of components within the fuel cell system, such as the humidifier.

Artificial intelligence for better roads

With artificial intelligence for the long-term maintenance of roads, vialytics offers the intelligent, systematic and cost-efficient recording of the road’s condition on the basis of AI, and thus has a decisive effect on the improvement and maintenance of road infrastructure. The heart of the data collection is a specially developed app for smartphones.

The target group consists of municipalities, in particular their civil engineering offices. In contrast to other road monitoring procedures, which collect data in intervals of five years, vialytics specifically collects the status of the roads several times a year and thus, for the first time, depicts the real status change process. The automatic evaluation of our data provides local authorities for the first time with an objective data basis on which they can react to the current condition of their roads. After all, sustainable and cost-efficient maintenance management can only be introduced through the early detection of damage.

Contact partner
Jonas Hock
Phone: +49 711 25295190
j.hock@vialytics.de

Artificial intelligence for better roads

With artificial intelligence for the long-term maintenance of roads, vialytics offers the intelligent, systematic and cost-efficient recording of the road’s condition on the basis of AI, and thus has a decisive effect on the improvement and maintenance of road infrastructure. The heart of the data collection is a specially developed app for smartphones.

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Contact partner
Jonas Hock
Phone: +49 711 25295190
j.hock@vialytics.de

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© vialytics GmbH
© Valmet Automotive Group

© vialytics GmbH
© Valmet Automotive Group
Wenger Engineering GmbH is a leading development partner in the field of hydrogen

Wenger Engineering GmbH is a leading development partner in the field of hydrogen. Since its foundation in 2007, Wenger Engineering has completed around 500 projects in the field of electric mobility, renewable energies and resource efficiency, of which around 250 were implemented in the hydrogen sector. Customers include corporations such as Daimler, Linde, Bosch, Toyota, Honda and Shell, but also medium-sized global market leaders and start-ups in Silicon Valley. Wenger Engineering is best known as a manufacturer-neutral technology developer and consultant in the field of hydrogen infrastructure, power-to-gas and H₂ ecosystems. Current projects include the planning of hydrogen refuelling stations for commercial vehicles and trains, off-grid power-to-gas projects in Australia, the component development for H₂ tanks and the development of standards for hydrogen refuelling.

Further information can be found at www.wenger-engineering.de. Our sister company Mission Hydrogen GmbH is organising the world’s largest hydrogen conference, the Hydrogen Online Conference, which is held annually on 8 October. www.hydrogen-online-conference.com

Contact partner
Dr. David Wenger
Phone: +49 731 7906050
david.wenger@wenger-engineering.de

Employees: >20

We charge industrial e-vehicles using inductive charging systems – safely and without contact!

Wiferion GmbH
Munzinger Straße 1
79111 Freiburg
www.wiferion.com
Employees: 40 (2020)

Wiferion is the leading solution provider for the mobile, wireless power supply of industrial e-vehicles. The start-up was founded in 2016 by four former employees of the Fraunhofer Institute for Solar Energy Systems and is one of the technology drivers in the field of wireless charging. Wiferion has set itself the goal of advancing the electrification of the global economy and creating the conditions for a resource-saving and sustainable energy supply.

From inductive charging technology and lithium-ion batteries to energy management solutions, Wiferion offers its customers the entire spectrum for efficient energy supply for industrial trucks and driverless transport systems. This also includes retrofit projects to optimise existing fleets. The system supplier of charging and storage technology has renowned reference customers from the logistics, industrial and automotive sectors. These include leading suppliers of automation solutions such as the robotics companies KUKA and Magazino. In 2020, Wiferion received the LogiMAT Award for “Best Product” and was named “Start-up of the Year” at the IFOY Awards.

Fields of competence

- Drivetrain
- FC system (chemical/electrical), thermal management, motor/generator, inverter (electrical/electrical), electrical storage, chemical storage
- Interior
- Stationary systems
- Energy

Contact partner
Julian Seume
Phone: +49 761 542670
julian.seume@wiferion.com

Employees: 40 (2020)
**Wölfle GmbH**

Wölfle is a system supplier (Tier 1) for various large vehicle manufacturers in the field of vehicle and component air conditioning. Especially with our major customers Linde, Still and Jungheinrich we have been active in the field of electric mobility for decades. This expertise is complemented by the unique combination of heating/air conditioning system manufacturer, electronics and control unit producer and our own software programming.

Wölfle electric mobility solutions in figures:
- 40 years of experience with heating and air conditioning systems for vehicles
- 20 years as a system supplier for various electric vehicles
- 15 years since the first electric air conditioning system for commercial vehicles
- 8 years since the first battery cooling for commercial vehicles
- 3 years HVAC development partner of the BMW Group for electric vehicles
- >100,000 electrical heating, air conditioning and cooling systems in the field
- 234 is our quality indicator in ppm for electrical systems
- >68 different concept studies, projects, prototypes and series products
- Only supplier of model-based HVAC controls for commercial vehicles


**Contact partner**

Peter Geigle
Phone: +49 7352 929120
peter.geigle@woelfle-gmbh.de

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**Fields of competence**

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**WITTENSTEIN**

Since 2006, WITTENSTEIN has been setting standards in power density, efficiency and intelligence in the field of drivetrains for electric and hybrid vehicles. Our unique technology developments and series products are used, in particular, when challenging installation space situations have to be overcome and smaller series quantities are planned.

Applications include P1/P2-integrated starter generators for hybrid buses and trucks and electrically assisted turbochargers for super sports vehicles.

WITTENSTEIN electric motors, converters and gears are used when more than the industry standard is required. That is why our products are 100% matched to your application and achieve maximum efficiency in the smallest possible installation space.

WITTENSTEIN is your worldwide partner for application-specific product design for between a few hundred and 10,000 vehicles per year. With our electric mobility technologies, we set new industry standards and thus ensure the success of our customers today and in the future.

**Contact partner**

Marvin Denninger
Phone: +49 7931 49318388
marvin.denninger@wittenstein.de

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**Fields of competence**

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Würth Industrie Service – solutions for the automotive supplier industry

Würth Industrie Service GmbH & Co. KG is part of the Würth Group and specialises in supplying the manufacturing industry in the field of automated C-part management.

Under the brand “CPS® – C-Product-Service” Würth Industrie Service offers individually tailored, logistical procurement and service modules such as scanner-supported shelf systems, electronic ordering systems, fully automated Kanban systems and innovative technologies such as RFID and iBin®. Customers are supplied directly to the production line in the production process.

A specialised range of more than 1,100,000 articles forms the basis for professional industrial C-parts handling: alongside DIN and standard parts, as well as connecting and fastening elements, the product range also includes customer-specific special and customised parts as well as auxiliary and operating materials and much more.

Contact partner
Hans-Hermann Seez
Phone: +49 7931 912344
hans-hermann.seez@wuerth-industrie.com

Würth Industrie Service GmbH & Co. KG
D-Ilberg
97980 Bad Mergentheim
www.wuerth-industrie.com
Employees: 1,664

Components
- Interior
- Exterior

System integration/system manufacturer

Services
- Software

We innovate and develop software and electronics with pioneering spirit, agility and competence

We offer “mind-moving engineering”: development of automotive control systems for the trend topics of connectivity and new mobility.

Our service portfolio covers topics such as infotainment, automated driving and connectivity, but also virtual and augmented reality, comfort electronics, electric mobility and functional safety, as well as methods, tools and test systems.

Contact partner
Dr. Oliver Treichel
Phone: +49 152 09050759
oliver.treichel@xtronic.de

XTRONIC GmbH
Herrnenberger Straße 56
71034 Biblingen
www.xtronic.de
Employees: 170 (2020)

Components
- Software

Software integration/system manufacturer

Services
- Testing
- Development

Components
- Electric/electronics

Exterior
- Interior
- Electric/electronics

Components
- System integration/system manufacturer

Exterior
- Interior
- Electric/electronics

Components
- System integration/system manufacturer

Exterior
- Interior
- Electric/electronics

Components
- System integration/system manufacturer

Exterior
- Interior
- Electric/electronics

Components
- System integration/system manufacturer
When regional wind power becomes green hydrogen

ZEAG Energie AG has stood for pioneering spirit and progressive thinking for more than 130 years. We were the first company in the world to transport three-phase current over long distances. With our knowledge and experience of energy flows and complex infrastructures, we are still breaking new ground today and networking the various sectors in innovative overall systems.

With our H2ORIZON project, we reveal what sector coupling can look like in practice here, renewable energies, hydrogen and storage applications, space travel, heat generation and mobility are coupled. Green electricity from our wind farm is used to generate green, high-purity hydrogen using PEM electrolysis, which is used directly on-site by the German Aerospace Center (DLR). The hydrogen is of fuel cell quality and is, therefore, also available for mobility applications. As a storage medium for large energy volumes and as an admixture in the gas supply network, the ZEAG hydrogen will also make an important contribution to sustainable energy solutions.

Contact partner
Claus Flore
Phone: +49 7131 6101025
claus.flore@zeag-energie.de

ZEAG Energie AG
Weipertstraße 41
74076 Heilbronn
www.zeag-energie.de
www.h2ORIZON.de
Employees: 280 (2020)

System solutions for leak testing and the automation of assembly and laser processes

Complex assembly and manufacturing processes such as laser welding must go hand-in-hand with a complete and consistently documented leak and function test. Connecting both worlds – that of production and testing – in an optimal way requires a broad knowledge of processes and automation. Both for automation and for leak testing, ZELTWANGER is your specialist.

For the field of hairpin stator production, we have our own laser welding process platform (X-CELL), in order to be able to support our partners in development and production in the best possible way with a specially developed clamping device. In doing so, our in-house laser application laboratory allows us to carry out process developments – including weld seam analyses. For the field of fuel cell technology, we offer our expertise in automated assembly (automatic stacking), as well as leak and function testing at component and stack level. In the field of battery system assembly we are the specialists when it comes to automated leak testing or the automation of assembly and laser processes.

Contact partner
Anthony Nobel
Phone: +49 7071 3663106
a.nobel@zeltwanger.de

ZEAG Energie AG
Weipertstraße 41
74076 Heilbronn
www.zeag-energie.de
www.h2ORIZON.de
Employees: 280 (2020)

ZELTWANGER
Jopestraße 3
72072 Tübingen
www.zeltwanger.de
Employees: 420 (2019)
ZIEHL-ABEGG AUTOMOTIVE offers complete axle drive modules for electric commercial vehicles

People all over the world come into contact with products from ZIEHL-ABEGG every day. Lifts are operated with ZIEHL-ABEGG motors, underground railways are ventilated with ZIEHL-ABEGG fans and electric city buses run with axle drive modules from ZIEHL-ABEGG. Innovative ventilation, drive and control technology from ZIEHL-ABEGG can be found in industrial plants, in wind and other power stations, in large buildings such as the Allianz Arena, in hospitals, in trains and many other applications. ZIEHL-ABEGG is certified according to DIN 9001. The family-owned company is the world’s largest supplier of motors and electronics for medium-sized lift manufacturers as well as a technology leader in large industrial fans.

Across our 16 production sites, 28 companies and more than 100 sales locations, today we employ over 4,300 people. At the end of 2011, ZIEHL-ABEGG founded the company ZIEHL-ABEGG AUTOMOTIVE with its headquarters in Kupferzell. ZIEHL-ABEGG thus focuses its core competencies in the field of wheel hub motors, axle drives and generators, in order to offer future-oriented solutions to the commercial vehicle industry.

Fields of competence

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ZIEHL-ABEGG AUTOMOTIVE
Günther Ziehl-Straße 1
74635 Kupferzell
www.ziehl-abegg.com
Employees: 4,300 (2020)

Contact partner
Dipl.-Ing. Harald Ludescher
Phone: +49 7940 1696002
harald.ludescher@ziehl-abegg.de
Additional partners of Cluster Electric Mobility South-West and Cluster Fuel Cell BW
Additional partners of Cluster Electric Mobility
South-West and Cluster Fuel Cell BW

**ARENA INNOVATION**
Managing Director Dipl.-Ing. IT (FH) Hans Marius Schuster (www.arena-innovation.com) is “2020 Mission Innovation Champion” as representative for Germany, with regard to the “Innovation Challenge IC8: Renewable and Clean Hydrogen” (www.michampions.net/meet-the-champions) and founder of the global “Digital Single Hydrogen Society Platform” (www.hydrogen-society.com).

**Automotive BW**
Automotive BW is the nationwide automotive cluster, which networks various industry stakeholders in Baden-Württemberg such as vehicle manufacturers, automotive suppliers, service providers, university institutes, automotive research institutions and associations. The goal of Automotive BW is to develop new models of cooperation, to promote targeted forms of development cooperation and support suppliers in the transformation process.

**Automotive Engineering Network e.V.**
Automotive Engineering Network e.V. (AEN) functions in the Karlsruhe region as mediator, coordinator and initiator in the interaction between companies, universities, administration and politics. AEN brings together member and partner companies with relevant fields of activity – for intelligent mobility and engineering.

**Automotive Solutions Center for Simulation e.V.**
asc(s e.V.) is a non-profit association for know-how entities in the field of automotive simulation. As a research association, interest group and multiplier, it offers its members from science and industry the opportunity to quickly and efficiently advance new simulation methods for virtual vehicle development.

**Baden-Württemberg International**
Baden-Württemberg International (bw-i) is the competence centre of the state of Baden-Württemberg for the internationalisation of business and science. bw-i supports German and foreign companies and clusters, research institutions and universities, as well as regions and municipalities in all matters concerning the topic of internationalisation.

**Deutscher Wasserstoff- und Brennstoffzellenverband**
The Deutscher Wasserstoff- and Brennstoffzellenverband (German Hydrogen and Fuel Cell Association) is the umbrella organisation for H2 and FC technology in Germany. It coordinates interested individuals and companies, informs experts, the public and political decision makers and is the “lobby” for H2 technology in Germany. It works closely with partner organisations in other countries.

**Edgar Lederer Consulting**
As an independent expert for production technology, I support you with the definition and selection of production technologies for fuel cells and in the design of production lines at different levels of automation. The design of components suitable for production rounds off my services. More information is available at www.elederer.com or by email to e.lederer@elederer.com.
IG Metall
IG Metall Baden-Württemberg is a valiant lobbying group. Work – safe and fair: under this motto, we not only negotiate collective agreements for employees that regulate income and working hours, we also take care to ensure good working practices and are committed to a fair transformation of the automotive industry. We develop ideas for the working world of tomorrow.

Merck KGaA
Merck is a leading science and technology company. In addition to traditional R&D, the Merck Innovation Center develops entirely new businesses and technologies beyond the existing spectrum, such as special manufacturing and coating processes for a high-performance CCM. Interested? innovationcenter@merckgroup.com.

microTEC Südwest e.V.
The top cluster microTEC Südwest is the competence and cooperation network for intelligent microsystems technology solutions for Europe and the point of contact for microsystems technology in Baden-Württemberg. As a link between science, industry and politics, microTEC Südwest supports its members with funding projects and the associated partnering.

Peter Sauber Agentur Messen und Kongresse GmbH
Since 1986, we have been designing, organising and staging international and national fairs, conferences and joint stands on the topics of energy and mobility of the future. Our core competence lies in the hydrogen and fuel cell sector. The most important annual events: f-cell, f-cell+HFC and AtEm. www.messe-sauber.de

Wirtschaftsförderung Raum Heilbronn GmbH (WFG)
As a municipal business development agency, WFG advises, supports and competently mediates in all matters concerning the Heilbronn economic region. Other tasks include active sector management in the automotive, metal, plastics and hydrogen sectors, assistance in acquiring funding and technology transfer.

Wirtschaftsförderung Region Stuttgart GmbH
Whether it involves an f-cell congress, Stuttgart hydrogen region or model region Electric mobility: when it comes to sustainable mobility and new technologies Wirtschaftsförderung Region Stuttgart GmbH always comes first. This is not by accident: more than 200,000 people are employed in the mobility cluster in the region.
International partners of the Cluster Electric Mobility South-West

**ACCIÓ**
The Catalan government agency ACCIÓ is responsible for promoting the competitiveness of companies in the region. It reports to the Ministry of Economy and Science. With a worldwide network of 40 branch offices, it supports companies in bolstering their innovative strength and internationalisation.

**Business Region Göteborg**
Business Region Göteborg is the business development department of the city of Gothenburg and represents 12 municipalities. We support the foundation or development of your company with our know-how and the necessary contacts. Our core competencies include mobility, ITK, energy and life sciences. We are the initiators of the visitor programmes “Testbed Gothenburg” and “Green Gothenburg.” For Europe’s best economic policy programme, we were awarded the “European Entrepreneurial Region 2020” prize.

**Automotive Cluster Oulu**
The Automotive Cluster Oulu in Finland brings together more than 40 companies and makes use of decades of experience in the field of telecommunications to develop solutions for the automotive industry. The cluster focuses on wireless connectivity and delay-free data transmission, data security, lighting solutions, machine vision, printed electronics, energy management and many other endeavours, such as the co-development of the 6G network led by the University of Oulu.

**CARA**
CARA, a French cluster initiative in the Auvergne-Rhône-Alpes region, has more than 220 members (manufacturers, universities, research centres). CARA deals intensively with the global challenges facing urban mobility and the vehicles of tomorrow. It represents the regional passenger car and commercial vehicle sector and supports the transformation of transport systems in urban areas.

**BOM Foreign Investments & International Trade**
BOM Foreign Investments & International Trade has its headquarters in Tilburg in the Netherlands and belongs to the Brabant Development Agency (BOM) with 100 highly specialised and motivated employees. During the set-up, expansion or relocation of your business activities, the essential tasks can be completed quickly, but at the same time carefully. BOM Foreign Investments & International Trade will accompany you as your partner through all stages of your project and offers you a wide range of services and support options that will save you time and money.

**CUTRIC**
CUTRIC leads, designs and initiates technology and commercialisation projects to further develop next-generation transport technologies and mobility solutions. The cluster initiative develops simulation tools that enable transportation companies in North America to forecast the operation and maintenance of their electric and hydrogen fuel cell buses and autonomous intelligent vehicles.
International partners of the Cluster Electric Mobility South-West

**Flanders Make**
Flanders Make sees itself as a strategic research organisation in the service of the manufacturing industry. We support companies in research in the fields of mechanical and plant engineering, vehicle construction and manufacturing process. Increasing the efficiency and electrification of the drivetrain is one of the main areas of research at Flanders Make.

**Lombardy Mobility Cluster**
The Lombardy Mobility Cluster promotes and supports the competitiveness of the mobility industry in Lombardy through precompetitive research and innovation (with appropriate specialisation in intelligent technologies), as well as the identification of the most promising global companies (scenarios, trends, business opportunities). It is certified with the silver label of the ESCA and is part of MOVE ESCP.

**Smarter Mobility Hub**
The Smarter Mobility Hub is a private network organisation to promote business development and innovation. The organisation is located in the southern Swedish province of Skåne in the IDEON Science Park operated by Castellum AB in Lund. The approximately 35 members based in Skåne are Tier X companies in the automotive and mobility sector and supply OEM customers throughout Europe. We support our members in business, projects and capital procurement and provide them with contacts with customers in Europe.

**FORTH**
FORTH is a non-profit professional association for the promotion of intelligent solutions for the more efficient and ecological transport of people and goods. FORTH focuses on identifying new mobility offers, accelerating market acceptance, strengthening the industry network and supporting transport policy.

**Mov'eo**
Mov’eo is a competitive cluster initiative focusing on the automotive and mobility sectors. Mov’eo sees itself as a driver of innovation and supports the financing of research and innovation projects, as well as forms of business cooperation involving the 620 members in Normandy and the greater Paris area. Our goal: to create a “Mobility Valley” that sets standards in Europe and worldwide in the field of innovative and responsible mobility.

**Innovation Norway**
Innovation Norway is the Norwegian government’s main national and international trade and economic representation. The organisation assists Norwegian companies and start-ups in entering new markets and promotes the development of a sustainable and future-oriented economy.
## Competence Field Index

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### Components

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- Daimler AG
- Deling AG
- Dieterich AG
- ERDRICH Umformtechnik GmbH

#### Interior
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- ERDRICH Umformtechnik GmbH
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- German Aerospace Center (DLR) – Institute of Vehicle Concepts
- Gerkensmeyer GmbH
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#### Electrics/Electronics
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- CuroCon GmbH
- Daimler AG
- Dumas Interplex
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- Eberspracher GmbH
- Erhardt GmbH Fahrzeug + Teile
- ergo: elektronik GmbH & Co. KG
- FzH Fahrzeug + Teile
- FZI Forschungszentrum Informatik
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- Centre for Solar Energy and Hydrogen Research Baden-Württemberg (ZSW)
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- Deling AG
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- Ganter Werkzeuge und Maschinenbau GmbH
- German Aerospace Center (DLR) – Institute of Vehicle Concepts
- GÖTECH Fahrzeugentwicklungs- und Konstruktionsgesellschaft mbH
- Huber Automotive AG
- Interplex
- Karlsruhe Institute of Technology (KIT) – Institute of Vehicle System Technology, Chair of Vehicle Science (FAST)
- Karlsruhe University of Applied Sciences Eisleben – Faculty of Mechanical Engineering
### Components

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<td>Lapp &amp; Wolf Prolautomation</td>
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