

Driving your change

Accelerate your transition to E-Mobility
with SCHUNK as your partner

Hand in hand for tomorrow



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The change towards e-mobility is in full swing. It is time for the automotive industry to change lanes: from fossil fuels and combustion engines with crankshafts, pistons and injector nozzles to batteries, and e-drives with hairpin stators, shafts and rotors. The challenge here lies in the fast and safe conversion of the manufacturing and assembly processes for the required components.

SCHUNK is your reliable partner for this changeover. We are an automation specialist and competence leader for toolholding and workholding, gripping technology and automation technology and supply you with everything from axis systems to robot accessories from a single source.

Expertise for different applications

- 12,000 customized gripping technology solutions implemented
- 5,000 toolholding and workholding solutions implemented

SCHUNK offers this added value

- + **Concepts & validations of**
 - Gripping applications
 - Handling tasks
 - Clamping tasks
- + **Everything from a single source**
 - Reduction of interfaces
 - Design & project planning (mechanical, pneumatic & electrical, thermal)
- + **In-house manufacturing**
 - High vertical range of manufacture
 - Assembly according to specifications
 - Documentation



Expertise for your application

Through the clever combination of our standard products, we always find an individually suitable solution for you. You will benefit from our many years of engineering know-how in the industry. SCHUNK products are already known by all well-known automotive manufacturers and their suppliers. This accelerates integration into new process chains enormously and keeps you in the fast lane from the very beginning when changing to e-mobility.



E-drive



Battery



Fuel cell



Gripping modules



Toolholding and workholding



Rotary units



Linear modules



Machining tools



Robot accessories



[schunk.com/e-mobility](https://www.schunk.com/e-mobility)

Interested?

SCHUNK offers the complete solution, whether as a single component or an entire system.

Tell us more about the application you want to automate. Our application experts will find the right solution together with you.

Tel.: +49-7133-103-3014
E-Mobility@de.schunk.com

SCHUNK – Your partner for e-drives

We are at the forefront of every step in the production and assembly of e-drives. Regardless of whether it concerns the specific setting of the hairpins, the handling of the sheet packages or the assembly of the components to the finished e-axis – SCHUNK supports you. We take into account special process requirements such as flexibility due to the many different hairpins, precision and dynamics for very short cycle times, and maximum reliability for a long service life of the system.

With our comprehensive portfolio of standard components and special solutions, we are at your side throughout the entire production process.



E-drive

Electric motors place the highest demands on automation. We help you make your processes secure, effective, and robust.



Hairpin

Hairpin applications have high demands when it comes to flexibility, dynamics and precision.



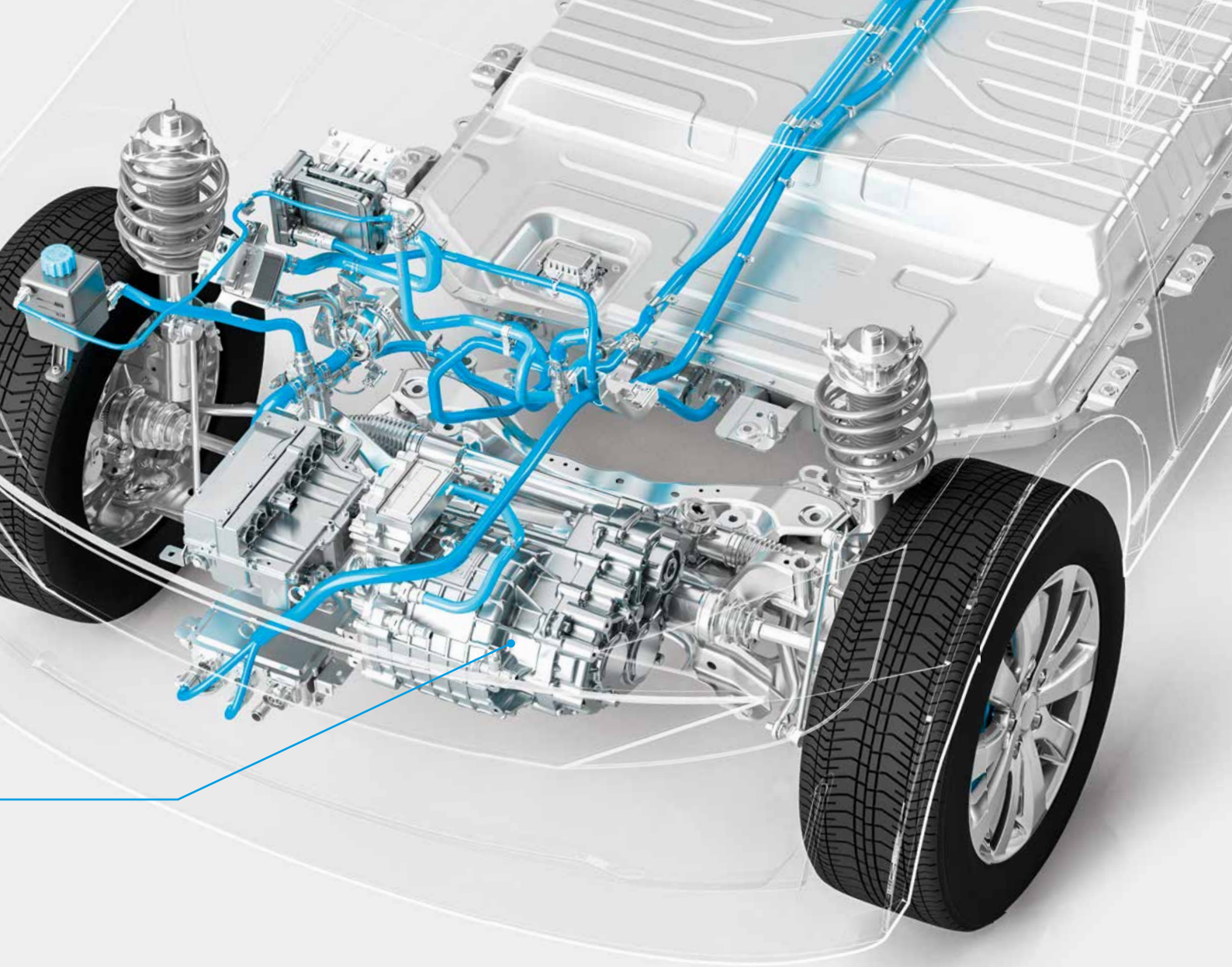
Sheet package

Sheet packages are used in both the stator and the rotor. The processes place high demands when it comes to precision, gripping forces and flexibility.



Stator

The process steps that the stator is involved in require the handling to hold safely, move large masses, and resist high temperatures in certain application steps.



Shafts & rotors

High clamping forces and high precision are required for mounting the shaft in the rotor.



Stator housing

When machining and handling the stator housing, high demands are placed on precise machining and low-deformation clamping.



Housing

In the final assembly, all components are assembled and form the finished e-drive in the housing. This is completed by the control unit.

Step by step to the e-drive: quick and easy with SCHUNK



Hairpins

Patented
hairpin gripper

Handling unit
with two Z-axes
and hairpin grippers.



Stators

Stator clamping using SCHUNK
hydraulic expansion technology



- Optimal filling of all hairpins in any stators
- High repeatability
- High flexibility for a wide range of hairpin geometries



- Set hairpins in less than a second
- Reduction of cycle time due to parallel set-up
- Individually controllable
- Safety-certified encoder system (encoder)



- High-precision and deformation-free clamping
- External machining of stators
- Bonding of the electrical sheets saves an additional process step



Shafts & rotors

Double gripping unit for handling of shafts & rotors



Stator housing & sheet package

Gripping unit for handling of various components



E-drive

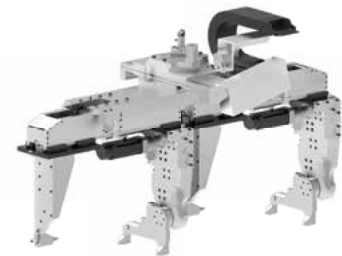
Double gripping unit with large stroke and integrated turning station based on SCHUNK ELG



- Ideal for loading and unloading individual stators across different process steps
- Cycle time optimization through double grippers
- High workpiece weights through use of PGN-plus-P



- Ideal for gripping and turning stator housings, rotors and electrical sheets, for example
- Handling of parts of different diameters using long-stroke grippers
- Turning of the gripped workpieces possible



- Integrated balancing unit
- Flexible swivel angle
- Several grippers accommodated in one housing to save space

Driving your change
Your partner for battery systems

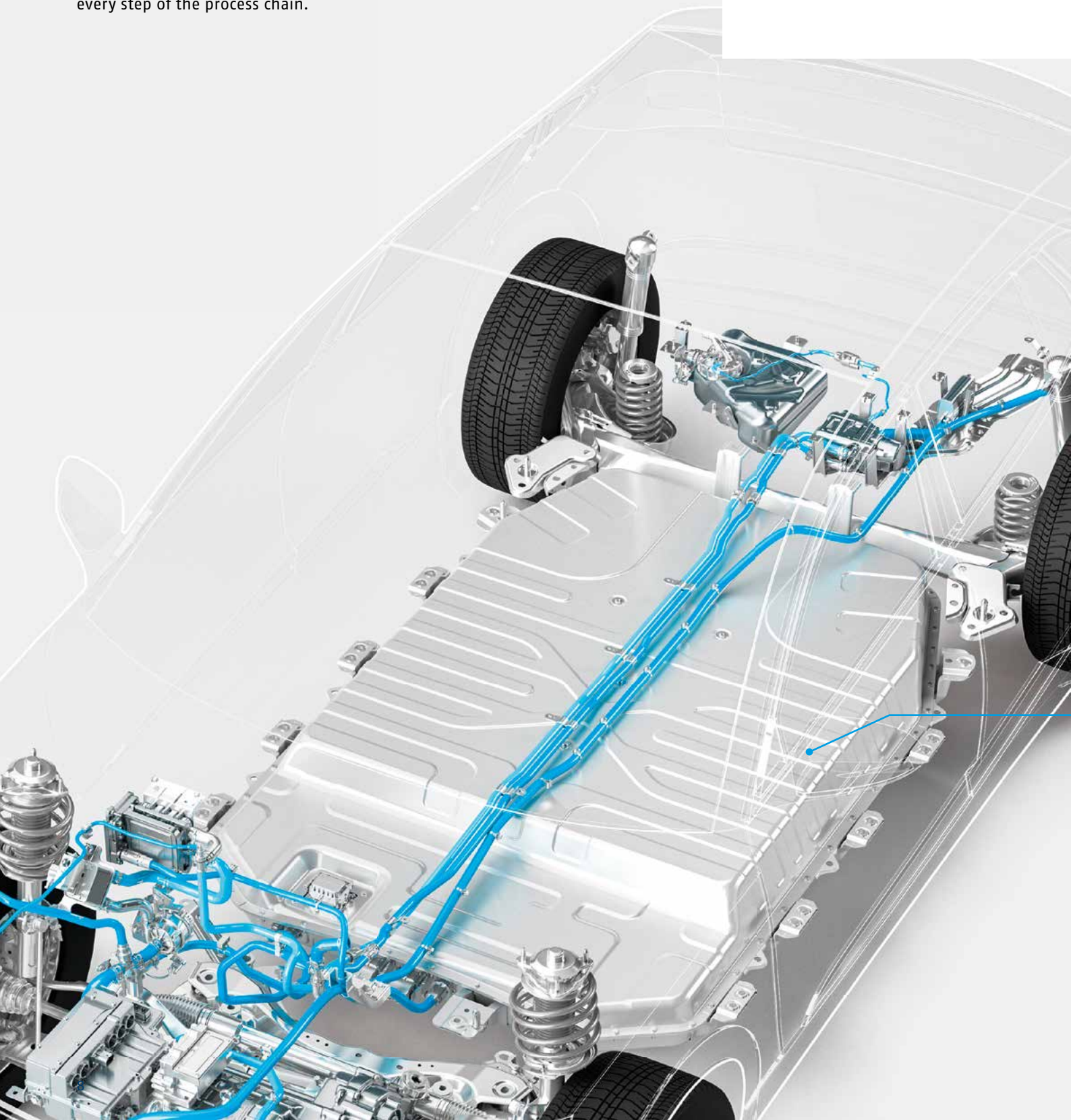
SCHUNK – your pacesetter when it comes to batteries

Using batteries brings completely new challenges to the automotive industry. SCHUNK supports you every step of the way. Starting with cell production with requirements for cleanroom and dry room environments as well as short cycle times, then on to handling sensitive components during assembly into battery modules and packs, and all the way to final assembly in the vehicle: SCHUNK solutions give you the right start along every step of the process chain.



Round cell

Handling many round cells requires multiple grippers and high dynamics for economical production.





Prismatic cell

Flexible and modular handling solutions are needed during transport of the cell as well as during assembly of the module.



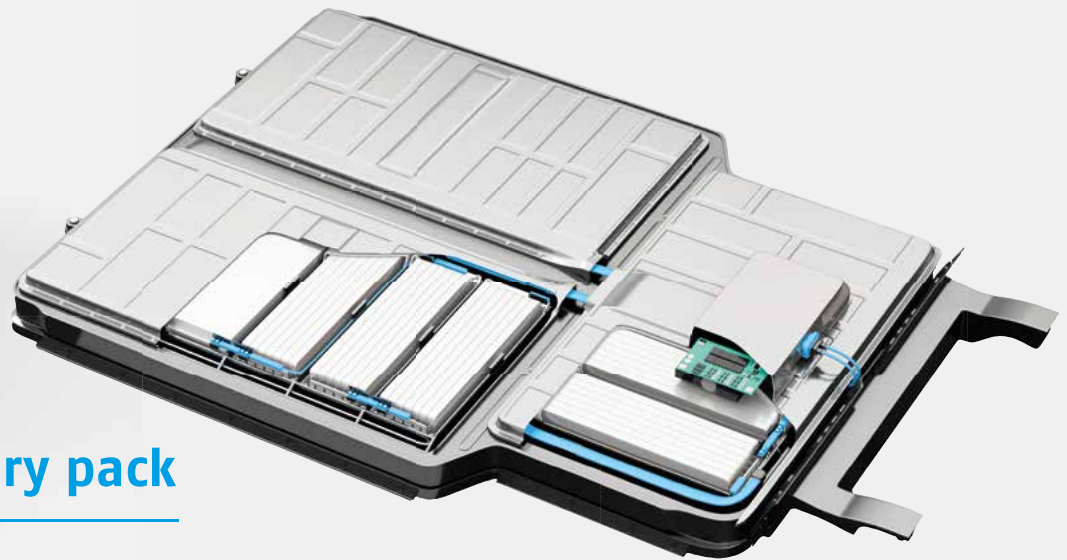
Pouch cell

Separating and stacking pouch cells requires the highest dynamics and accuracy.



Battery module

Several cells connected to each other form what is called a battery module. Combining several modules with a control unit and a cooling system results in a battery pack.



Battery pack

The entire range of automation is used to manufacture the battery systems. This applies to high-speed handling of individual cells to handling the highest masses of battery modules and packs.

Efficient processes for battery systems: with solutions from SCHUNK



Round cells

Flexible handling of round cells:
e.g. for end-of-line testing, loading
and unloading of module and pack
assembly



Prismatic cells

Gripping unit
for prismatic
cells

Media-free
transport
solution for
prismatic cells



Pouch cells

Gripping unit for flexible handling of
pouch cells



- Time saving due to simultaneous handling of several cells
- Handling of magnetic and non-magnetic cells possible
- Adaptable to different diameters



- Safe, repeatable handling
- Adaptable to different cell dimensions



- Application-specific finger design based on the permitted maximum surface pressure

Cell spacing and transport unit for
round cells

Handling of multiple prismatic cells for
loading and unloading tasks

Stacking pouch cells using linear
direct handling



- Adaptable to different diameters and cell spacings
- Possible use of magnetic handling, mechanical handling or vacuum



- Long stroke enables different cell formats
- Adjustment of cell spacing possible during the gripping process



- High repeatability
- Short cycle times
- Control-independent



Module & pack

Assembly of battery modules with round cells



Battery housing

Handling of battery housings



- Use of linear direct drive axes and magnetic grippers
- Loading from both sides reduces cycle times
- Control-independent
- Flexible stroke adjustment



- Use of linear direct drive axes and gripping unit
- Fast cycle times
- Control-independent
- Flexible stroke adjustment



- High loads
- Adaptability to customized component geometries

Handling and clamping of battery modules using SCHUNK ELG

Gripping module for handling battery packs

Screw connection of battery housings



- Adjustability of the gripping force via servomotor
- Long, freely programmable stroke enables handling of different module sizes
- Integrated tensioning function reduces the number of process steps



- Adjustability of the gripping force via servomotor
- Flexible stroke adjustment
- Adaptability of the gripper finger to customized component geometries



- Short cycle times due to linear direct drive axes
- High repeatability
- Flexible use for battery housings of different sizes

Handling of fuel cells and their components – with SCHUNK

In addition to e-drives and battery systems, fuel lines are another core component of e-mobility. They can be used in various mobile and stationary applications.

Mobile applications include, for example, use in cars, trucks, buses and ships, as well as in logistics in department stores. There are also stationary applications, such as backup generators for data centers, homes and buildings, or in industrial production.



Fuel cell

A fuel cell converts hydrogen or other fuels such as methane, propane or ethanol into electrical energy. They are increasingly being used in areas such as mobility, power generation and industrial production.

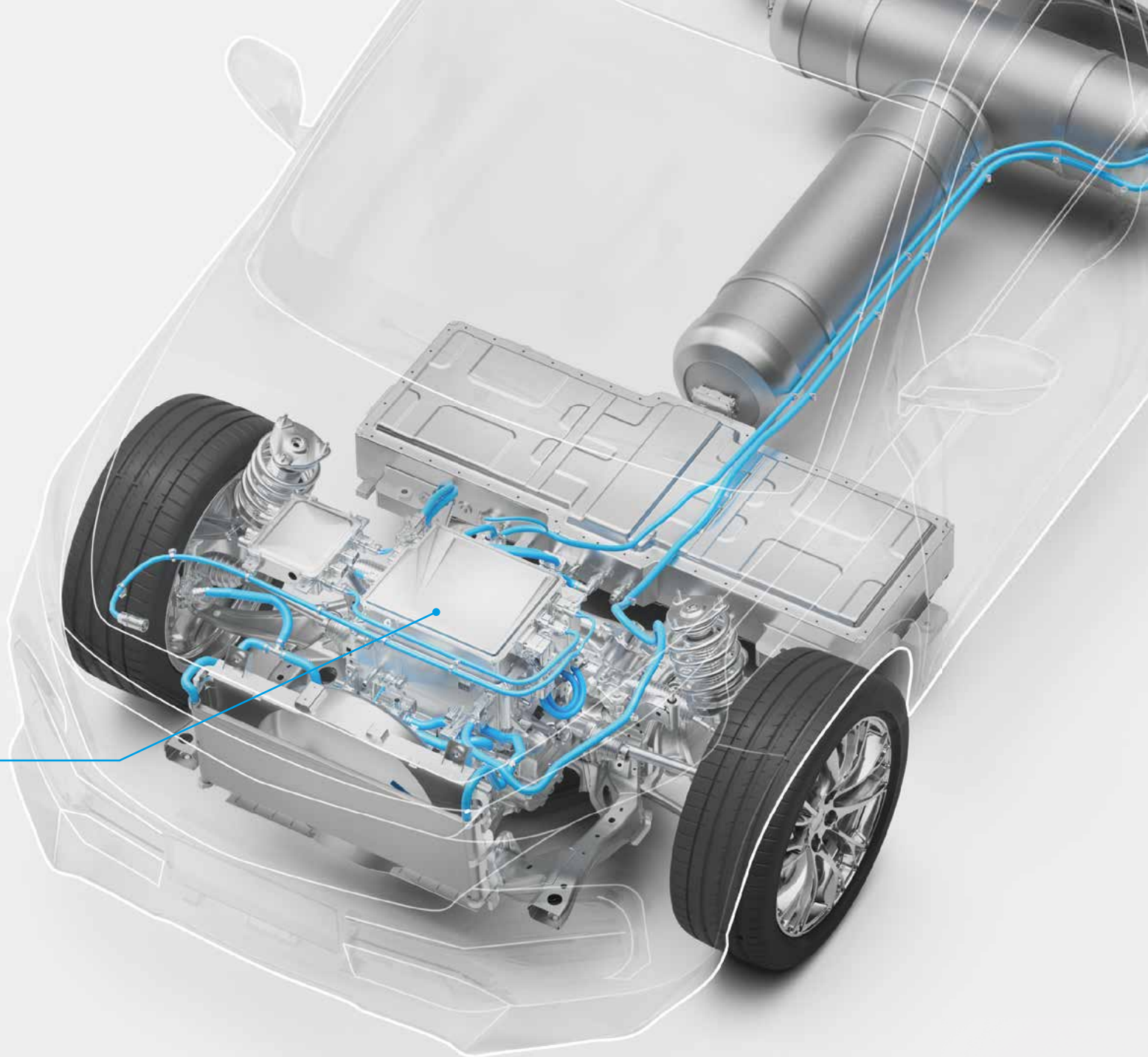
Advantages of fuel cells:

- + High energy density
- + Shorter refueling times
- + Better range
- + Independence from fossil energies through green hydrogen



MEA

The membrane electrode assembly (MEA) is a key component of a fuel cell.



Bipolar plate

A bipolar plate is a component of a fuel cell. It is a flat plate of conductive material that conducts electricity from one fuel cell to the next, providing a continuous power supply.



MEA & bipolar plate

Stacking of MEA and bipolar plate is an important step in manufacturing of fuel cell stacks. In this process, several MEA and bipolar plates are stacked in series.



Stack

By stacking fuel cells, higher performance can be achieved while taking up less space and reducing weight.

Handling of fuel cells – with innovative systems from SCHUNK



MEA

Hydraulic expansion arbor for
roll-to-roll processes



Bipolar plate

Area gripper for the handling
of flexible parts

Flexible handling for loading
and unloading tasks



- Better concentricity
- Higher path speeds



- Energy-efficient gripping
- Large area gripping
- Adaptable to different components/
contours



- Different rotation angles possible:
0°, 90°, 180°
- Optional rotary feed-through for
process-reliable media transfer
- Interchangeable gripping units



MEA & bipolar plate

Stacking of bipolar plates using linear direct handling



Stack

Handling of finished (fuel cell) stacks



Fuel cell

NSE quick-change pallet systems for fixing the stack on the test bench



- High repeatability
- Short cycle times
- Control-independent



- Flexible loading and unloading with linear systems and gripping unit
- Adjustable gripping force with servomotor
- Long, freely programmable stroke enables handling of different module sizes



- Speed and repeatability
- Optional: Quick-change pallet system can be used as robot interface for handling the components



SCHUNK SE & Co. KG
Spanntechnik
Greiftechnik
Automatisierungstechnik

Bahnhofstr. 106 - 134
D-74348 Lauffen/Neckar
Tel. +49-7133-103-2503
schunk.com

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