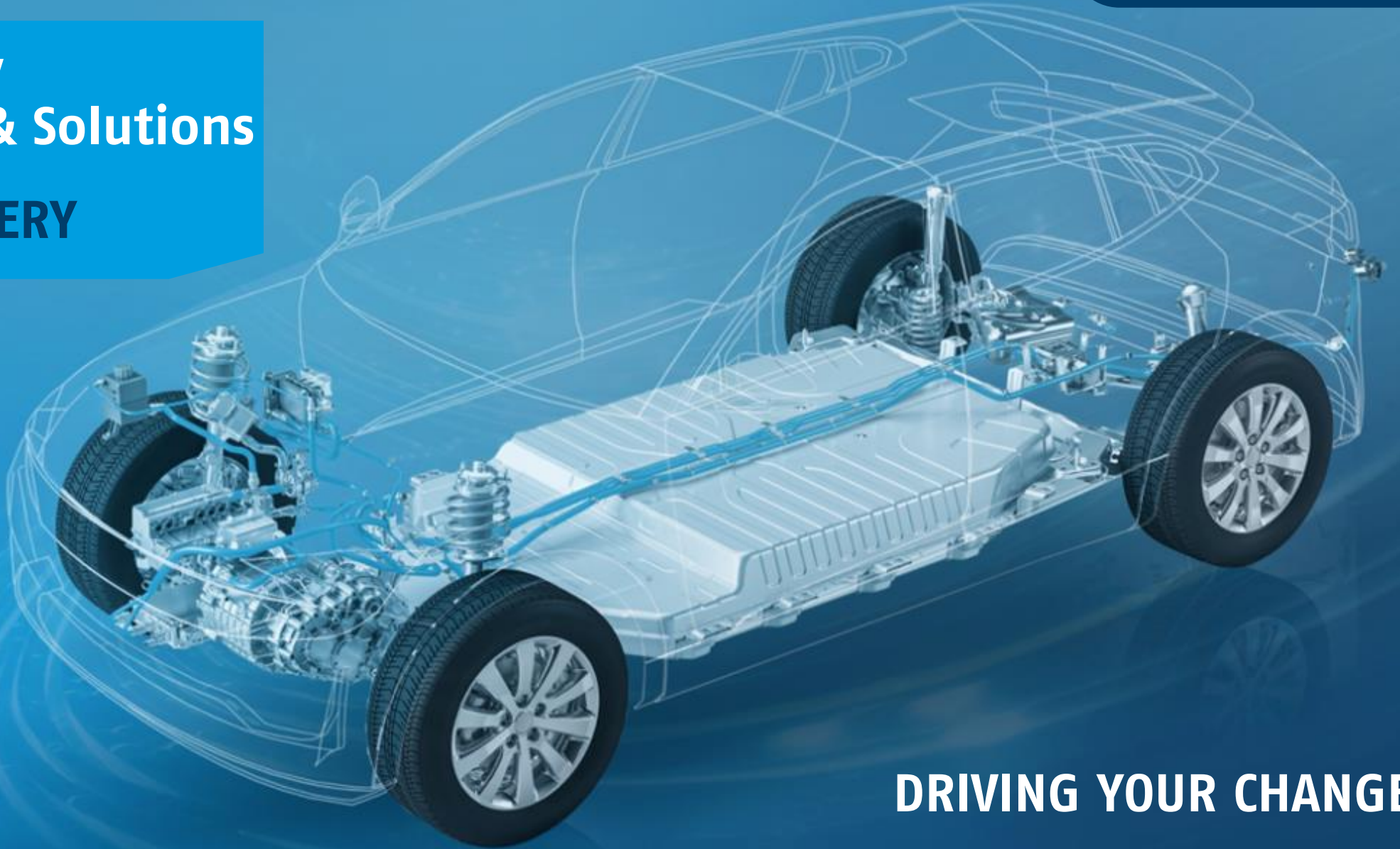


Hand in hand for tomorrow



E-Mobility Portfolio & Solutions

BATTERY

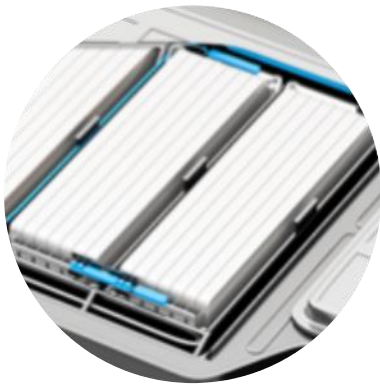


DRIVING YOUR CHANGE

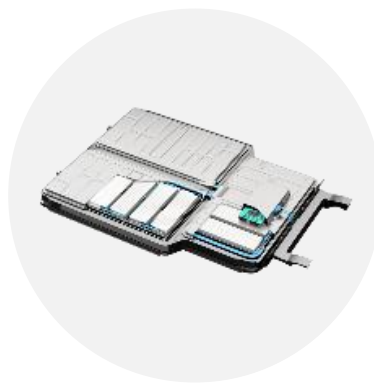
OUR FOCUS



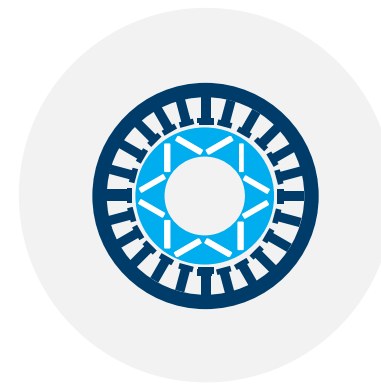
CELL



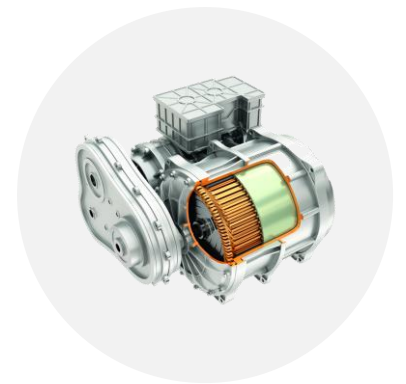
MODULE



PACK



ROTOR | STATOR



E-DRIVE

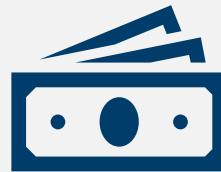
REQUIREMENTS TO SYSTEM INTEGRATORS



SPEED



TURNKEY



COSTS



REFERENCES

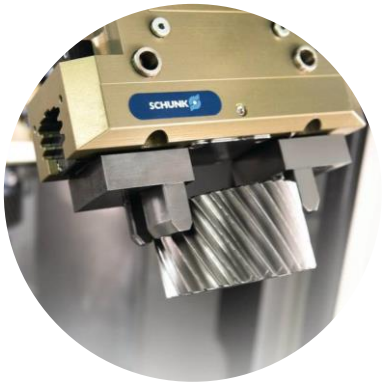


TECHNOLOGY

HAND IN HAND!



COMPONENTS



GRIPPING



SWIVEL



**ROBOT
ACCESSORIES**



HANDLING



CLAMPING

HAND IN HAND!



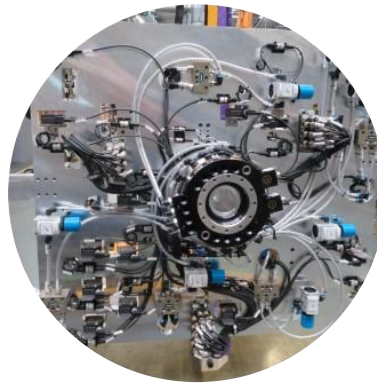
SOLUTIONS



GRIPPING



COMPENSATION



EOAT



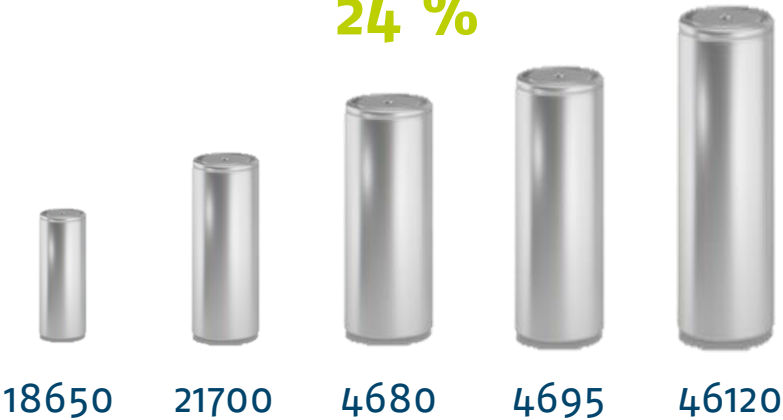
HANDLING



CLAMPING

BATTERY CELL TYPES

CYLINDRICAL
24 %



PRISMATIC
55 %



POUCH
21 %



Cell formats used in BEV & PHEV in 2021



STEEL
MATERIAL



COVERED



UNCOVERED



CARDBOARD BOX



TRAY



LAYOUT



ALUMINIUM



DIMENSION



CARDBOARD BOX



PLASTIC BOX



TRAY



LAYOUT

BATTERY COMPONENT STATE

DELIVERY 



CELL



CELLSTACK
CELLCLUSTER



MODULE



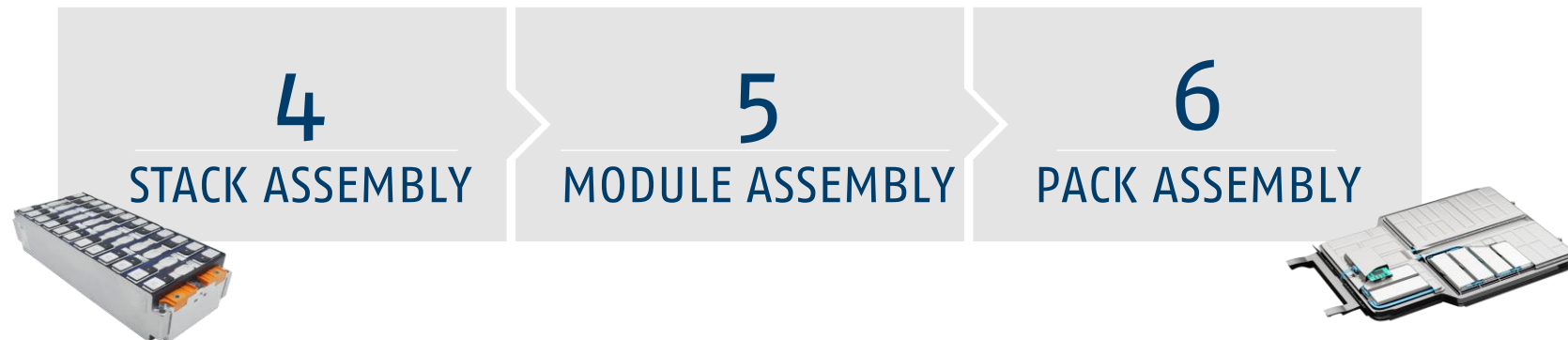
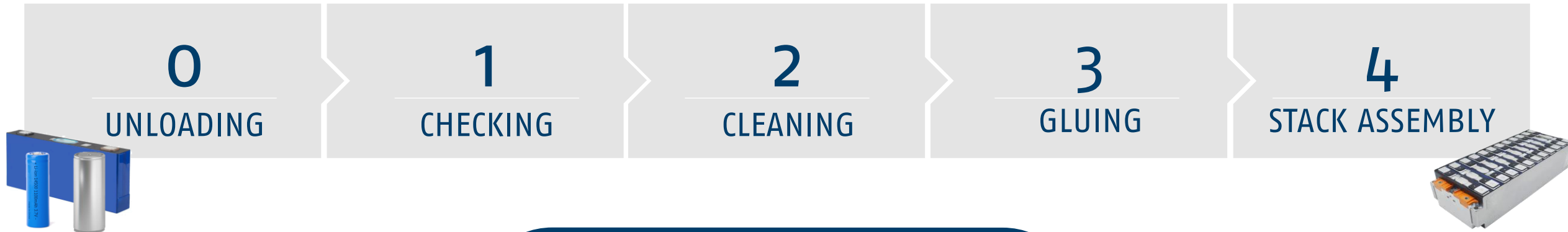
PACK



SHIPPING 

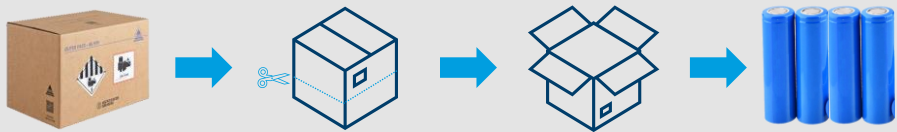


PROCESS STEPS BATTERY

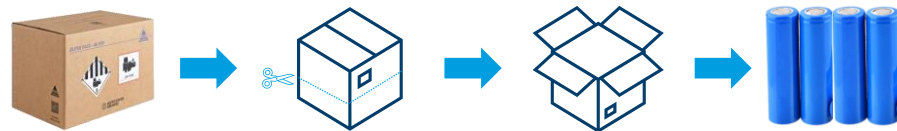


PROCESS STEP BATTERY

0 UNBOXING | UNLOADING



CELL UNPACK STATION



- ✓ **Inline or stand alone system**
concept adaptable to your requirements
- ✓ **All in one**
incl. cutting equipment, conveyor technology, axis gantries and gripping systems
- ✓ **Ready for production**
complete system incl. software and CE marking
- ✓ **High system availability**
Insert of linear direct drives ($a=40\text{ms}^2$ / repeat accuracy $\pm 0.01\text{mm}$)
- ✓ **State of the art**
know how from the range of depaneling machines

CELL GRIPPER

GRIP SEVERAL CELLS AT ONCE



Different gripping technologies

- Pneumatic
- Electric
- Magnetic
- Vacuum

Flexible number of cells

- Number of cells freely configurable

Flexibility

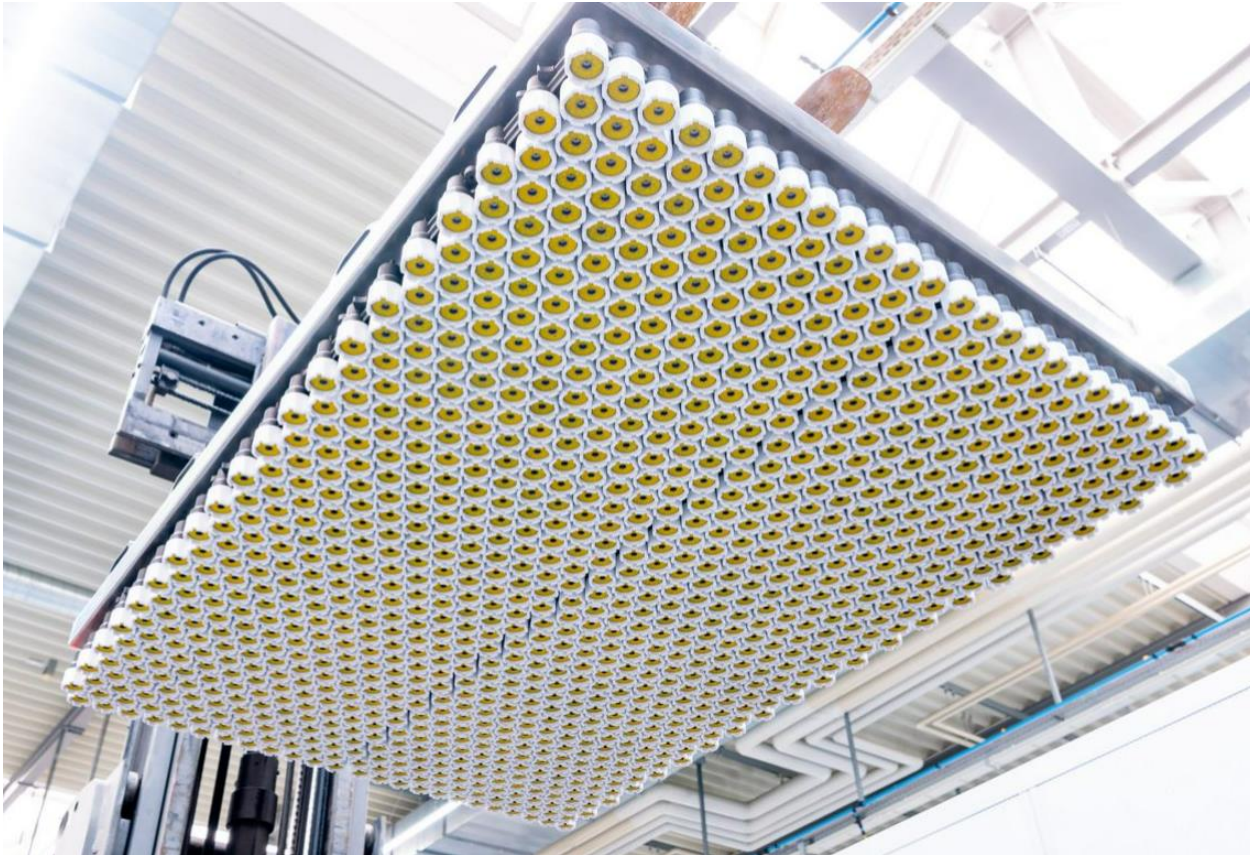
- Grip cells individually or together

From robot to cell

- Delivery of the complete system
- incl. robot connection & sensor technology

MAGNET GRIPPER

GRIPPING OF CELL CLUSTERS



Variety of gripping technologies

- Pneumatic
- Electric
- Magnetic

Scalable solution for your requirements

- Flexible number of cells
- For your cell spacing and cell type
- Optionally with Compensation Units in Z-direction

From robot to cell

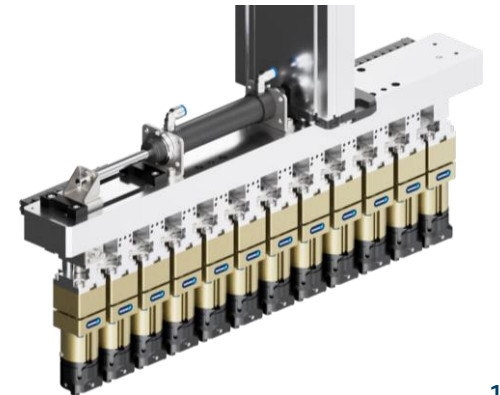
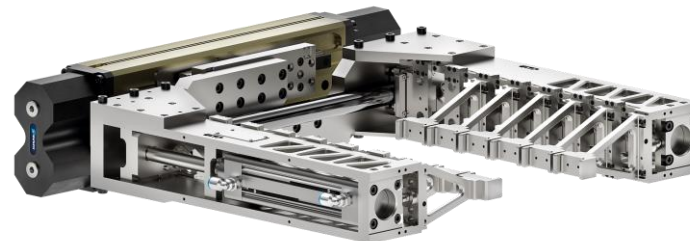
- Delivery of the complete system
- incl. robot connection & sensor technology

PROCESS STEP BATTERY

PITCH ADJUSTMENT



SCHUNK



PITCH GRIPPER

ADJUSTING THE CELL PITCH



Variety of gripping technologies

- Pneumatic
- Electric
- Magnetic
- Vacuum

Flexibility

- Configurable cell spacing and number of cells

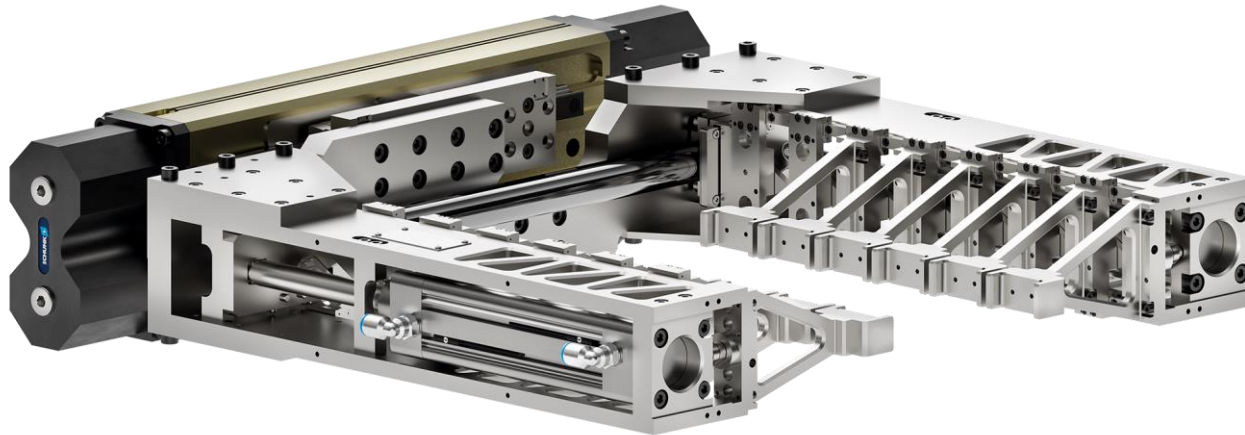
Pitch adjustment

- pneumatic
- electric
- Servo electric



MULTIPLE CELL GRIPPER

HANDLING OF PRISMATIC CELLS



Variety of gripping technologies

- Pneumatic
- Electric

Scalable solution for your requirements

- Flexible number of cells
- For your cell spacing and cell format
- Optional with pitch adjustment unit
- Optional with compensation unit in Z-direction

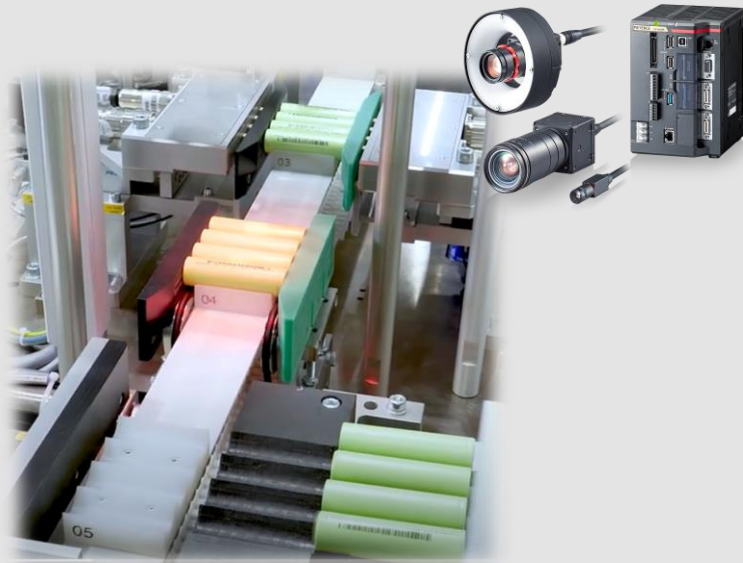
From robot to cell

- Delivery of the complete system
- incl. robot connection & sensor technology

PROCESS STEPS BATTERY

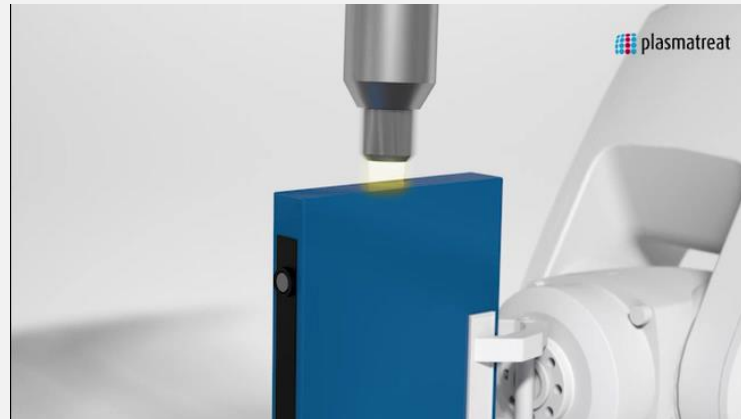
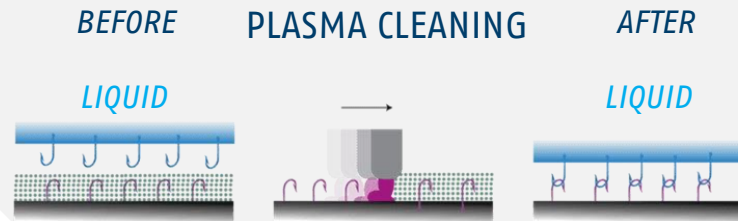
1

CHECKING



2

CLEANING



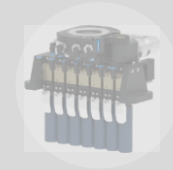
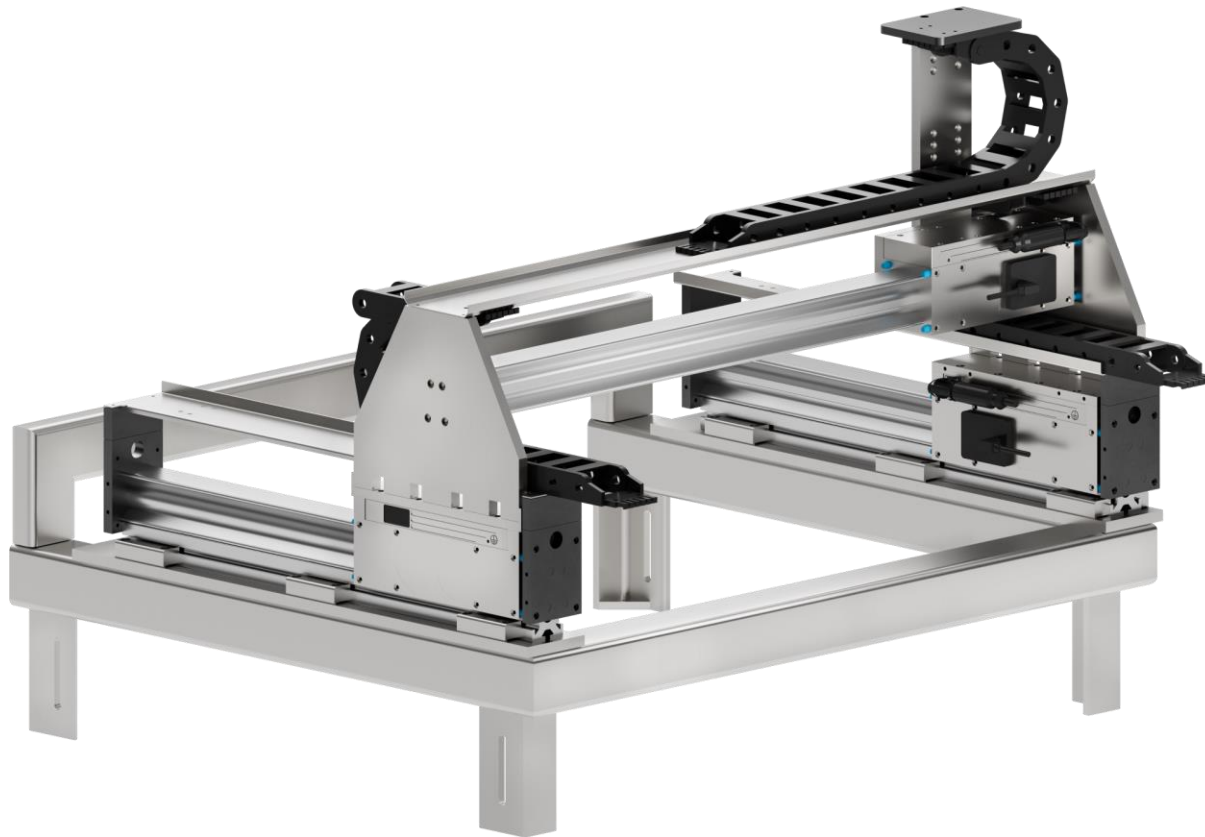
3

GLUING



MULTI-AXIS SYSTEMS

CHECKING / CLEANING / GLUING



high dynamics & accuracy

- Acceleration up to 100m/s^2
- Speed of 5m/s
- Repeat accuracy $\pm 0.01\text{mm}$

More time for your process!

small Footprint

- Use of the complete range of stroke of the axis
- Motor in the slide

Options

- Steel construction
- Cable drag chains
- Complete assembly

Independent of servocontroller

- Fast delivery

Rexroth
Bosch Group

SIEMENS

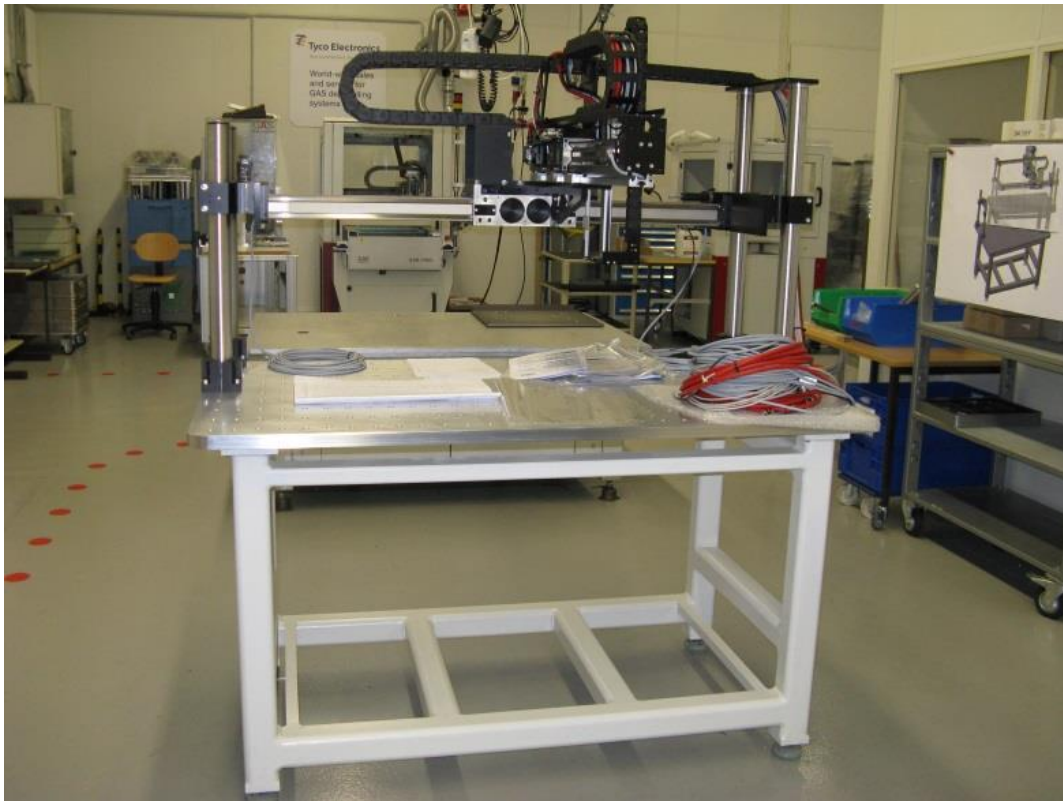
BECKHOFF
New Automation Technology

Schneider
Electric



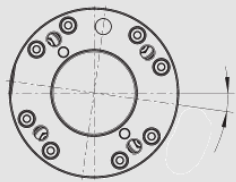
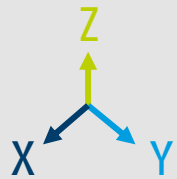
APPLICATION

HANDLING UNIT

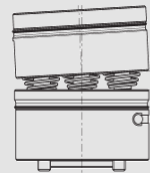


PROCESS STEP BATTERY

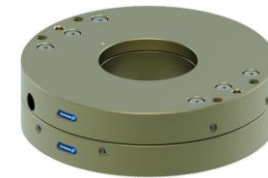
CELL INSERTION



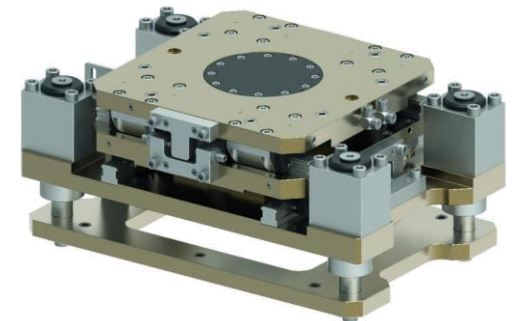
$\pm \alpha^\circ$



$\pm \beta^\circ$

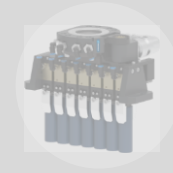
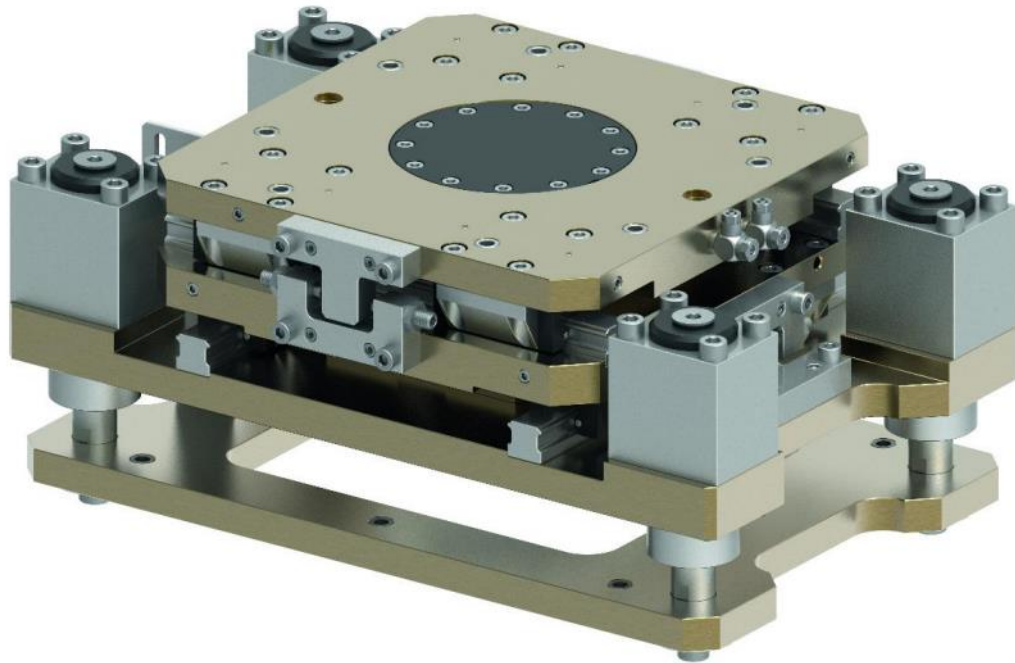


SCHUNK



COMPENSATION UNITS

HANDLING OF STACKS / MODULES / PACKS



Customer specific interfaces

→ For the assembly with your robot or gantry system

Compact und robust

→ For high loads and speeds, even with Emergency stop

Tolerance compensation

→ For joining processes and faster robot programming

Customized compensation distances

→ X-,Y- and Z-Compensation unit freely configurable

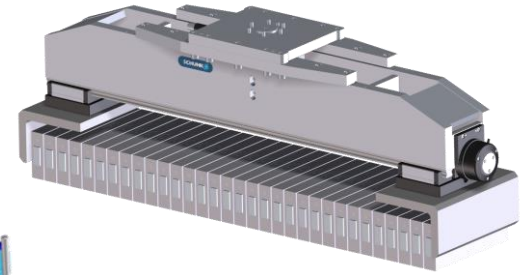
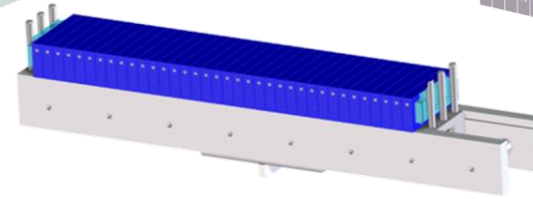
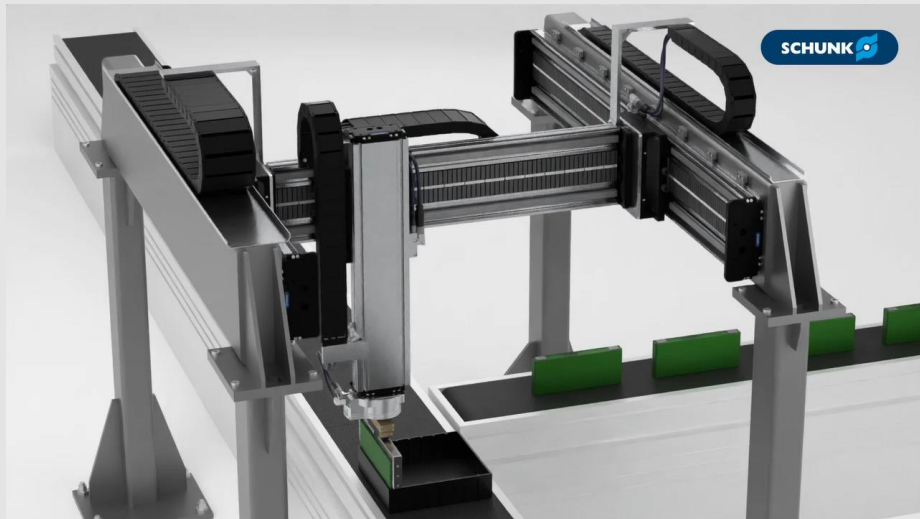
Variety of options

→ Position memory, interlocking, weight compensation, sensor technology, etc.

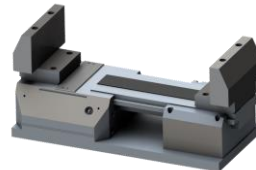
PROCESS STEP BATTERY

4

STACK ASSEMBLY

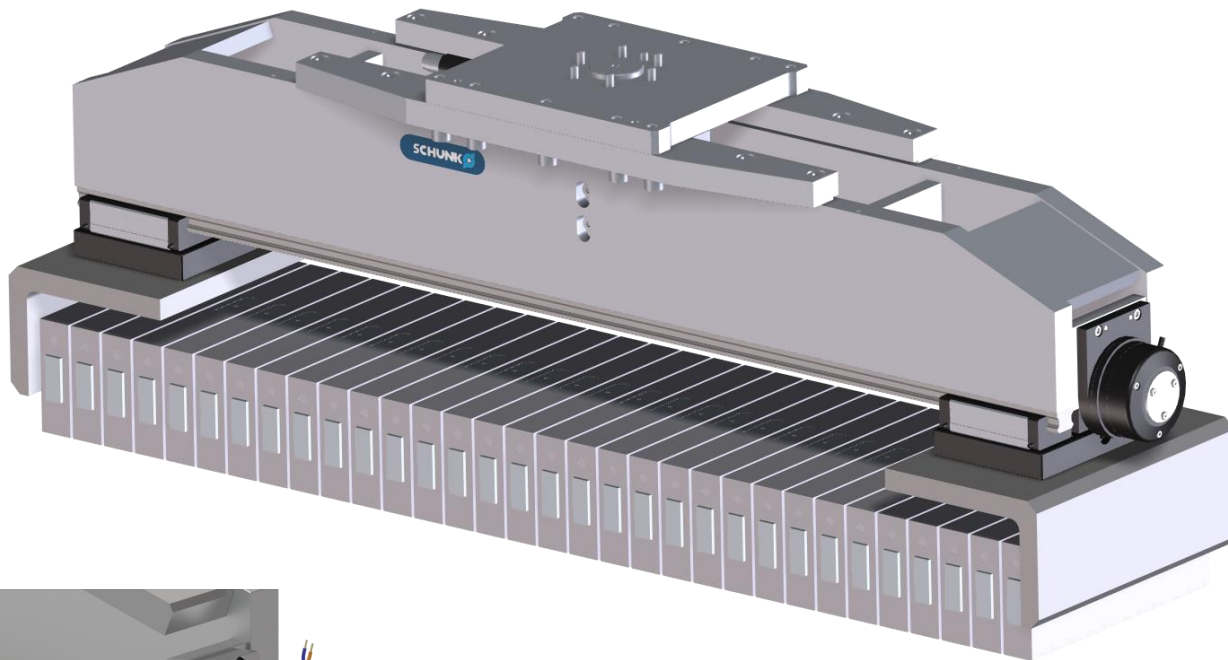


SCHUNK



ELG

HANDLING OF STACKS / MODULES / PACKS



**ELECTRIC
HOLDING
BRAKE**



powerful yet precise

→ Up to 12.000N gripping force with stepless stroke of 100...400mm / jaw

slim design

→ servo drive inside the gripper

large torque capacity

→ gripper fingers up to 800mm length

Position clamping

→ electric holding brake prevents the movement of the spindle

asynchronous jaw movement possible

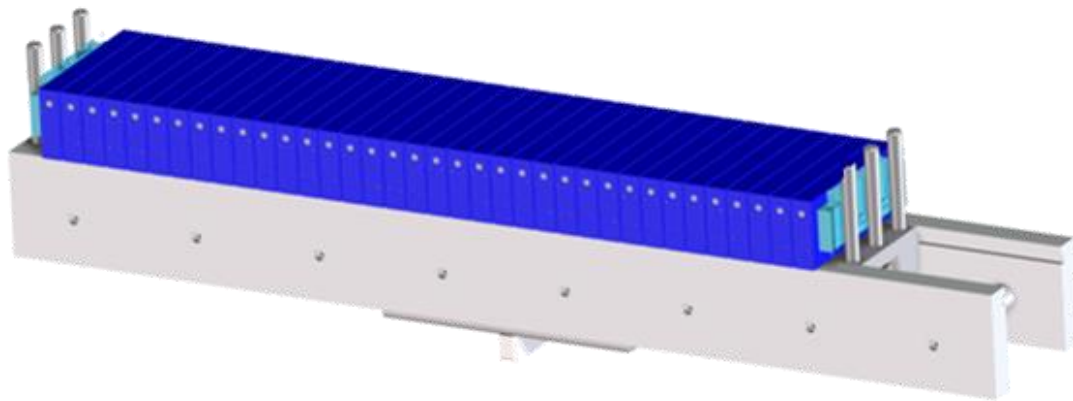
→ positioning of the component in gripped state



Online configurable!

APPLICATION

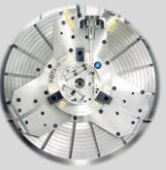
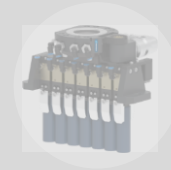
WORKPIECE CARRIER BATTERY STACK



ZERO-CLAMPING
INTERFACE



KSC-F



Technical data

length: **1600 mm**

width: **250 mm**

Height of base body: **160 mm**

Clamping force: **7000 N**

Total stroke: approx. **300 mm**

Spindle completely encapsulated and protected
against dirt with wiper

Grease nipple for service

Steel running plate: **400 x 250 mm**; unhardened
in longitudinal guide and hardened in center

SLD-AXIS SYSTEMS

HANDLING OF BATTERY CELLS | STACKS



High forces & loads

→ Linear direct motors and profiled rail guides

Modular encoder system (absolute encoder)



high dynamics & accuracy

- Acceleration up to 100m/s^2
- Speed of 5m/s
- Repeat accuracy $\pm 0.01\text{mm}$

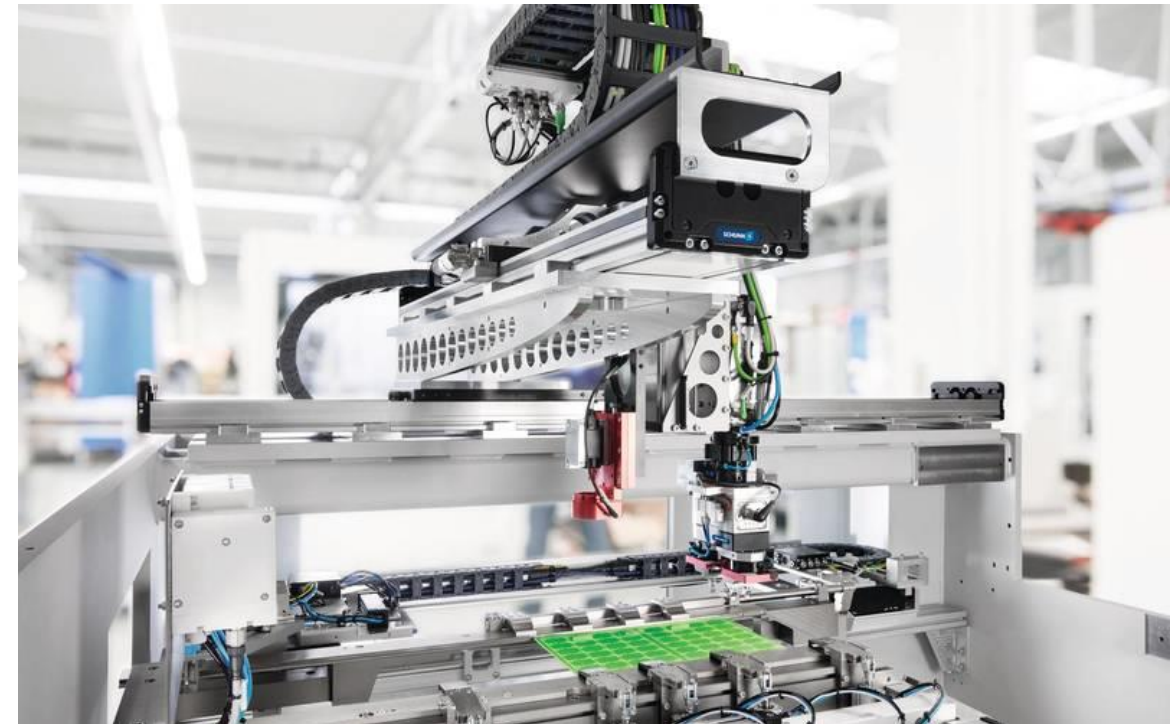
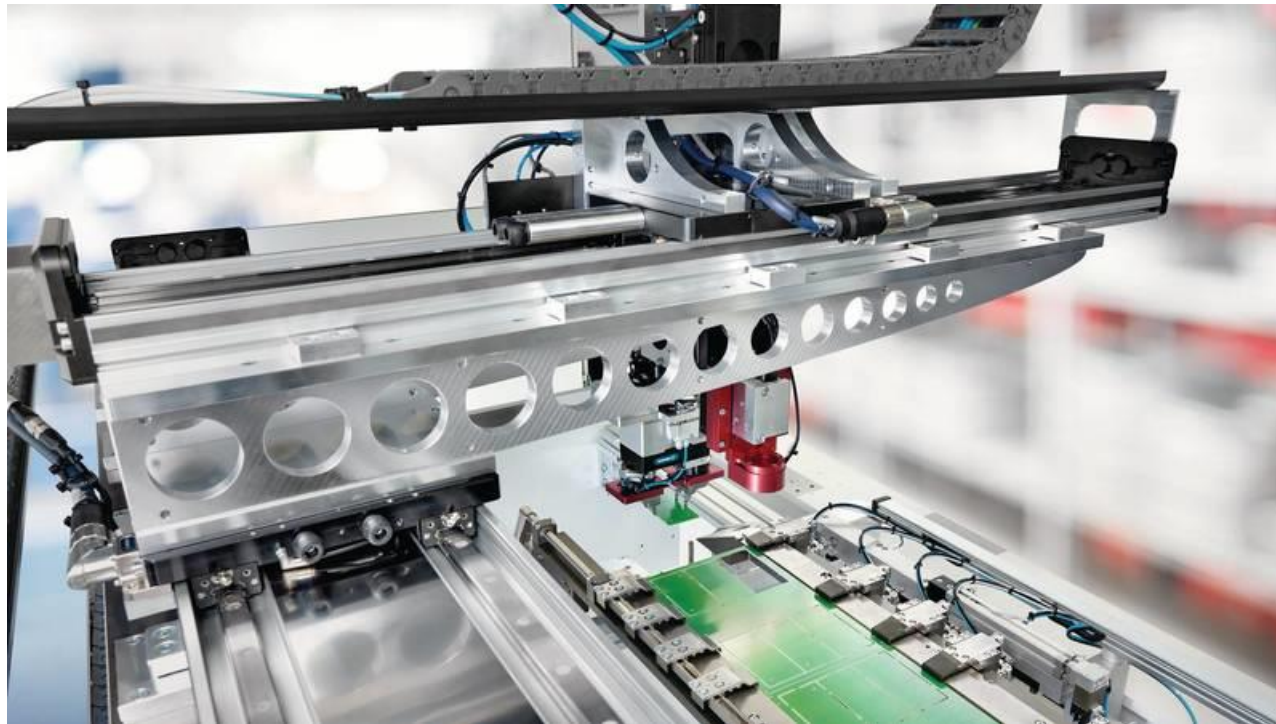
Options

→ Holding brake, cover tape lubrication adapter...

APPLICATION

DEPANELING

- ✓ **Inline or stand alone system**
concept adaptable to your requirements



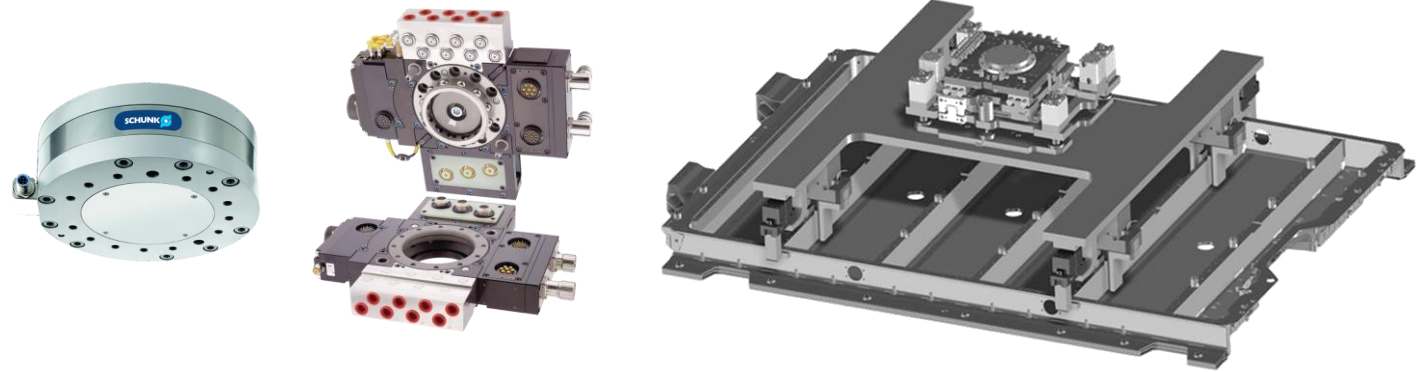
DEPANELING of circuit boards for the battery management system

PROCESS STEP BATTERY

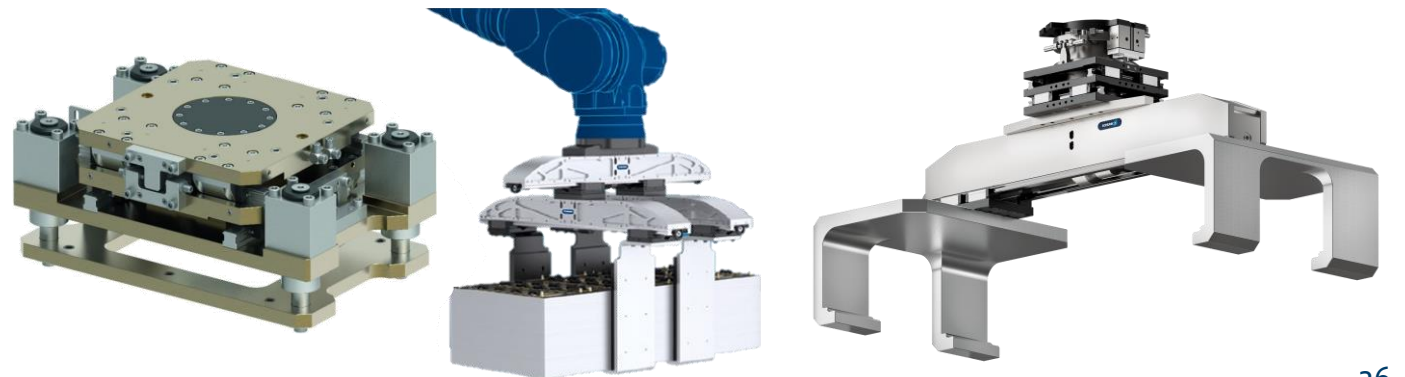
5
MODULE
ASSEMBLY

+

6
PACK
ASSEMBLY

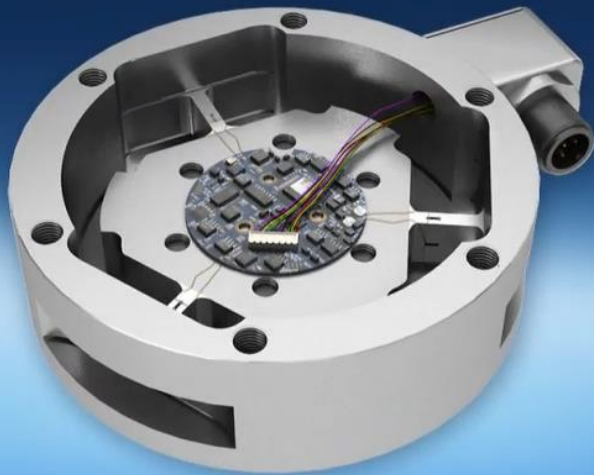


SCHUNK



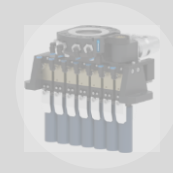
FT-SENSOR

CONTROL / ANALYSIS OF PROCESS DATA



6-AXIS FORCE/TORQUE SENSOR FTNET

SCHUNK 



Process data in 6 directions

→ Force as well as torque

Integrated temperature compensation

→ To deliver precise results

Rotation and translation of the coordination system

→ In all 3 directions

Robust design

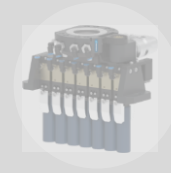
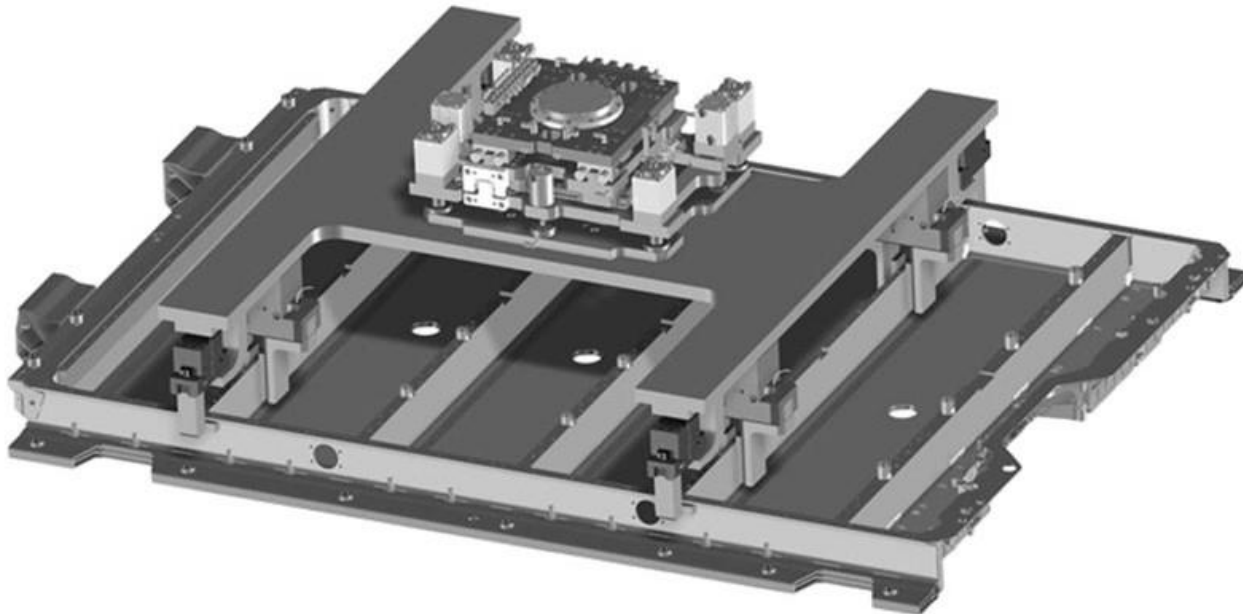
→ Long life cycle due to strong design

IP protection class

→ IP60, 65, 68 optional available

CUSTOMIZED GRIPPING UNIT

HANDLING OF HOUSING / PACK



Short project lead time

→ Design, construction and installation by SCHUNK

Customer specific interfaces

→ For the assembly with your robot or gantry system

Tolerance compensation

→ For joining processes and faster robot programming

Customer specific compensation distances

→ X-, Y- and Z-compensation freely configurable



Hand in hand for tomorrow

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