Automation solutions for battery production





High speed, high throughput, maximum reliability, repetition accuracy and low costs: these are the features that are required in the production of batteries. With the wide range of competitive products offered by Festo, you are sure to find the right components to meet your needs. You produce high-performance batteries. You need an efficient manufacturing setup. We provide the right automation solution.

→ WE ARE THE ENGINEERS OF PRODUCTIVITY.





Festo – your partner for battery production

The focus is always on you and your specific requirements

Wherever you produce your batteries, Festo is there for you, with the appropriate expertise, the right products and the best service. We have proven ourselves many times over in a multitude of projects for leading battery manufacturers. As a single source supplier for all tasks, we offer an extensive range of copper-free, zinc-free and dry-room-compatible components for battery production.

The benefits at a glance

- + Extensive core product range: attractively priced and delivered quickly
- + Pneumatic, electric or a combination of both
- + Functional modules and ready-to-install solutions
- + Seamless connectivity: mechanical systems, motors and controllers
- + Extensive range of products that are free of copper and zinc
- + Wide range of cleanroom products
- + Time-saving engineering tools for project planning and design
- + Global presence guarantees service and support around the world



Festo is well equipped for every level of automation

The production of goods nowadays mostly calls for high quantities at low production costs. In addition to this, variability and flexibility in manufacturing are also becoming increasingly important. This begs the question what level of automation is required in principle and which one is ultimately the right one for you?

In many cases it seems that a mix of different levels of automation is the best and most cost-effective option, with a spectrum ranging from manual elements to digitalisation.

The Festo portfolio offers seamless automation solutions, from a simple mechanical system to a fully automated and digitalised production line. Your requirements are our mission!



- Tubing
- Tubing/fitting combinations

technology

Vacuum technologyMechanical gripping

4

Industry 4.0

Automated systems



In automated systems, Festo components and systems are the perfect way to expand movements and sequences:

- Servo and stepper motors
- Electromechanical systems
- Sensors
- Controllers and software
- Function-specific systems

Fully automated production lines



Fully automated production lines consist of several automated systems that are linked together. A large amount of data and information is generated and processed. This is where Festo increases efficiency with seamless connectivity from the mechanical system to the cloud, condition monitoring and Industry 4.0 solutions:

- Handling and gantry systems
- Industrial robots
- Dashboards
- Artificial intelligence
- Cloud connectivity

Requirements for cell production

Producing battery cells is a highly sensitive process where different parts of the system have different requirements. But all three areas, whether for work, transport or control, must meet the cleanliness requirements. Contaminants such as copper, zinc or electrically conductive or non-conductive particles reduce the quality of the batteries or render them unusable.

Copper- and zinc-free products are therefore frequently required and cleanroom products are recommended. Even our standard products often conform to the recommended cleanroom class, which is more cost-effective for you!

The areas

1 Transport area

The automation technology is not installed directly above the battery cells and does not come into contact with them. To reduce the risk during battery production, unwanted particles with a diameter >5 microns should be avoided.

You can use all cylinders, pneumatic valves, pneumatic grippers and final control elements, all industrial robots, vacuum and compressed air systems, sensors, compressed air filters, compressed air regulators and pneumatic process valves from more than 80 products areas from Festo in cleanroom class ISO 7. Most of them are also suitable for use in classes 6 and 5, and many can even be used in class 4 environments. You can also find suitable customised solutions at Festo.

All our cleanroom products are classified into cleanroom classes in accordance with ISO 14664. It is best to discuss the exact requirements with our specialists, since particle emissions depend on the application in question. That is the quickest way for you to find a practical solution.

Festo recommends using components from cleanroom class ISO 6 or better.

You will find further information in our cleanroom catalogue. Moreover, products with a permissible pressure dew point of -80 °C should also be used.





2 Working area

Here the automation technology is installed immediately above the battery cells and in close contact with them. This is where copper, zinc and particles >5 microns in particular pose a threat to the quality of the batteries.

Festo recommends using copper- and zinc-free products from cleanroom class ISO 7. Contact our experts to discuss your requirements.

3 Control area

The automation technology is installed under the process and is therefore not in contact with the battery cells.

Festo recommends using products from the cleanroom class ISO 7. Almost all standard products from Festo conform to cleanroom class ISO 7.

You will find further information in our Festo product catalogue.

Product features for components in secondary battery manufacturing

The production environment plays a key role in the manufacturing of lithium-ion cells. In particular, the humidity and possible contamination by interfering particles during the production process have a major influence on the quality and safety of the manufactured battery cell.

Festo therefore evaluates its product design in line with common market criteria and based on detailed requirements from customers. In order to meet these high process requirements, large parts of the production process are currently carried out in clean and dry rooms.

		Cleanroom class	Dry room (dew point)	Temperature	Annotations
	Material distribution	ISO 8	/	20 °C 24 °C	The electrode is produced under cleanroom conditions, since interfering particles in the coating can no longer
	Coating	ISO 7	5 °C −5 °C		subsequent process.
	Drying				
	Calendering	ISO 7 – ISO 8			
	Slitting				
	Vacuum-drying		0 °C –30 °C		
	Separation	ISO 7 or better	−25 °C −35 °C	20 °C 24 °C	The cell must be assembled under dry conditions, as water in the cell leads to severe quality losses (service life)
	Stacking/winding		−40 °C −50 °C		and poses a risk (formation of hydrofluoric acid).
0,0,0	Packaging				
	Filling		−50 °C −80 °C		
	Formation	/	1	19 °C 25 °C	The cell is finished in a normal environment. Since the cell is already closed and the degassing takes place
	Degassing				in a vacuum chamber, there are few demands on the environment in terms of particles and humidity.
	High temp aging			30 °C 50 °C	
	Low temp aging			20 °C 24 °C	
	EOL testing				

[Source: VDMA Battery Production Roadmap 2020]

+ Dry room

+ Cleanroom

A dry-room environment with a pressure condensation point of –50°C down to sometimes –80°C is typical for lithium-ion cell production. An appropriate dry-room environment inhibits the hydrophilic tendency of many electrolytes and prevents aggressive hydrofluoric acid from forming through the reaction with atmospheric moisture. All catalogue products from Festo can be used in the dry room without restriction. This is thanks to the consistent use of water-free lubricants, which do not deteriorate prematurely in dry-room environments and retain their normal lubricating properties. In addition, Festo uses only GRP/CFRP-reinforced polymers in components subject to abrasion and mechanical stress, since their wear and strength are not affected by dry-room environments.

Products used in cell production must comply with certain cleanliness requirements and in some cases even cleanroom classes in order to minimise the ingress of interfering particles into the production process. Festo classifies and tests the cleanroom suitability of its products in a standardised procedure in accordance with ISO 14644-14. Cylinders, valves, grippers and drives, all handling, vacuum and compressed air systems, sensors, filters, regulators and fittings from many product series from Festo can be used in ISO class 7 cleanroom environments. Most of them are also suitable for classes 6 and 5, some even for class 4. You will find further information in our Festo cleanroom catalogue or on our website → www.festo.com/cleanroom



+ Products free from copper, nickel and zinc

Depending on the application, products in battery cell production must not emit any copper, zinc or nickel particles. Otherwise there is a risk that the quality of the batteries is reduced or even that they are unusable. Festo offers an extensive product range for battery cell production that takes these requirements into account.

Festo has defined an internal guideline for the development of these products, which is binding for the entire company. Its implementation falls under Festo's ISO 9001 certification. Compliance is confirmed by periodic ISO 9001 re-certifications. Battery compliance is specified for all relevant products in the technical data of the catalogue.

Exceptions from material restrictions regarding copper, zinc and nickel:

- Nickel in ferrous metals
- Electroless nickel plating without copper base layer
- Inert chemical compounds, such as oxides and sulfides
- PCBs, electric connectors, cables, wires and coils

Would you like to find out more about our range of solutions for battery production? Then visit our website → www.festo.com/battery

Battery production process

For each of the numerous steps involved in producing batteries, Festo offers the right automation solutions, whether pneumatic, electric or a combination of several technologies.





Proven real-life applications

In battery production, high throughput and repetition accuracy are just as important as cost-effective solutions; this applies to many different process steps, from conveying, feeding and controlling aggressive media to precise parts handling and force-controlled pressing applications.



Festo meets these requirements with a wide range of standard pneumatics, electric automation and process automation. On the following pages you will find selected examples for individual process steps. Our experienced specialists will be happy to work out the right solution for your application together with you.



Slitting and secure fixing using web catchers

The purpose of slitting is to cut a wide strip of electrode foil into several narrower strips. This cutting process can be done thermally using laser cutting or carried out mechanically using a rolling cutter. To extend the cutter's service life, a cooling liquid can be sprayed directly onto the blade during this process. If the machine stops during the slitting process, the electrode strips are secured using web catchers.



Vacuum generation

The dust particles produced during slitting are collected by a special vacuum-based dust extraction system. The vacuum is regulated by ball or butterfly valve assemblies.





Ball valve unit

KVZB



Butterfly valve unit KVZA

Pulse valve VZWE

Compressed air preparation

To prepare, regulate and distribute compressed air for pneumatic components, Festo has solutions that optionally include energy saving functions to control and optimise the energy consumption of machines.





Loading/unloading

Loading and unloading of heavy electrode rolls before and after slitting.



Service unit

combinations MSB6/9

Balancer kit YHBP

Positioning (motion)

Web edge guide control for accurate rewinding carried out with position controlled linear drives with fast response times, typically controlled by a motion control system such as CPX-E.





Spindle axis EGC-BS

Control system CPX-E

Clamping

The electrode web can be clamped by pneumatic cylinders so that, if the machine stops during the slitting process, the electrode strips are secured using web catchers. Fast-switching valves MHE4 and cylinders DSBC with low friction properties are used to ensure a fast response time and speed.

Dosing

To extend the cutter's service life, a cooling liquid is sprayed directly onto the blade during this process. The liquid must be dispensed in a controlled way and in very small quantities. The dispense head VTOE from Festo is perfect for this task.



Fast-switching solenoid valve MHE4



Standards-based cylinder DSBC

Servo motor

EMMT-AS



Dispense head VTOE

High-speed stacking

In the production of pouch cells a stacking process is used. In the stacking process, the electrode sheets are stacked in a repeating cycle of anode, separator, cathode, separator, etc. Festo offers complete electric handling systems for this particular process step, consisting of axis kinematics, motors and servo drives. All the components are perfectly matched.



Vacuum generation

To remove particles generated during operation, a low vacuum level is applied in the machine.







pressure



Pinch valve VZQA

Ball valve VZBM and quarter turn actuator DFPD

Proportional , regulator VEAB

Pressure sensor SPAN-B

Compressed air preparation

To prepare, regulate and distribute compressed air for pneumatic components, Festo has solutions that optionally include energy saving functions to control and optimise the energy consumption of machines.



Service unit combinations MSB6/9

Energy efficiency module MSE6-E2M



A linear positioning drive lifts the electrode stacks towards the vacuum gripper.



spindle drive EPCC

Electric cylinder with

Servo drive CMMT-ST





Servo drive

CMMT-AS



Vacuum suction

gripper ESG



generator OVEL

Pick & place, gripping

Single anode and cathode sheets are picked up with vacuum grippers and a cartesian robot. Once the cell has been assembled, the complete battery needs to be picked up by a mechanical gripper and placed by another handling system on a tray for further processing.



Toothed belt axis

ELGC-TB

Servo motor

EMMB-AS







Vacuum

Clamping

Separator foils need to be clamped in different positions during Z-folding and the material is fed in using simple pneumatic grippers.

Parallel gripper

DHPC



VTUG

Valve terminal





Automation system CPX-AP-I

Force control

Dancer rollers take care of the tension control of the separator foils in the unwinding process.







Proportional pressure regulator VPPE

Proportional Pressure sensor pressure SPAN-B regulator VEAB



Fluidic muscle DMSP

Safe and precise filling with electrolyte

Once the assembled battery has been inserted into a housing, the battery cell can be filled with electrolyte. The extreme ambient conditions during the filling process call for materials that are resistant to chemicals. Since electrolyte reacts with water and forms hydrofluoric acid, the ambient air must be very dry when filling the battery cells. To ensure this is the case, the air is continuously evacuated and removed from the machine cell.



Vacuum generation

To keep the environment clean during operation, a low vacuum level is applied in the machine. Air is evacuated from the battery cell while the electrolyte is being filled.







Individual valve

VUVG



Pinch valve VZQA

Ball valve VZBM and guarter turn actuator DFPD

Pressure sensor SPAN-B

Compressed air preparation

To prepare, regulate and distribute compressed air for pneumatic components, Festo has solutions that optionally include energy saving functions to control and optimise the energy consumption of machines.





Service unit combinations MSB6/9

Energy efficiency module MSE6-E2M

Positioning

Simple handling system to move the filling heads to the filling position above the battery cells.





Ball valve VZBM

and quarter turn

actuator DFPD







Toothed belt axis EGC-TB

Guided drive DFM

Automation system CPX-AP-I

Valve terminal VTUG

Filling

To fill the battery cell with electrolyte, a ball valve unit is used to isolate the main electrolyte feed line, while the smaller valve VZQA is used to open and close each filling nozzle.



Pinch valve VZQA





Pressure sensor SPAN-B

Loading/unloading

Secure loading and unloading of the tray in and out of the filling machine.



Linear gantry YXCL with electric axis EGC

Clamping

Clamping and securing the tray in the filling position.



Guided drive DFM

VUVG





Individual valve

Stainless steel fitting NPQR



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Sealing and precisely controlled degassing

During the formation process, gas builds up in the battery cell. This must be siphoned off from the already sealed battery cells – without losing electrolyte. This is done by piercing the battery cell using a hollow lance and evacuating the gas until electrolyte is being drawn off too. The system then switches over and blows the drawn off electrolyte back into the battery cell, while the remaining amount of gas is permanently removed.



Vacuum generation

Evacuating the degassing chamber.









Pinch valve VZQA

Ball valve VZBM and quarter turn actuator DFPD

Individual valve VUVG

Pressure sensor SPAN-B

Compressed air preparation

To prepare, regulate and distribute compressed air for pneumatic components, Festo has solutions that optionally include energy saving functions to control and optimise the energy consumption of machines.





Service unit combinations MSB6/9

Energy efficiency module MSE6-E2M

Stopping

Stopping and releasing workpiece carriers on conveyors.







Stopper cylinder DFSP

Stopper cylinder DFST-G2

Loading/unloading

Loading batteries from the workpiece carriers on the conveyors to the trays and vice versa. The battery cells are picked up using mechanical grippers and sensitive gripper fingers.



Toothed belt axis

EGC-TB









Adaptive gripper fingers DHAS

Feeder

Feeding trays with batteries into the degassing chamber.





ELGC-TB

Linear drive DGC

Individual valve VUVG



Securing trays in the loading/unloading positions and in the degassing chamber.











Compact cylinder ADN

Guided drive DFM

Automation system CPX-AP-I

Valve terminal VTUG

Force control

Pressing the heat seal on the battery with a defined force.



EPCC



Electric cylinder with spindle drive





Toothed belt axis

Mini slide EGSC

Parallel gripper HGPL-B

Automation concept for process automation

PROFI PROFT CANopen-DeviceNet EtherNet/IP^{__} BUS INTE Bus connection S 5 Controller CECC **Festo Cloud** SCADA with programmable logic controller CDPX CPX-IOT gateway Dashboards Modbus TCP Valve terminal CPX-MPA Remote I/O Compressed air supply with energy efficiency module 2/2-way solenoid MSE6-E2M media valves VZWM, -F, -P, -D Limit switch box SRBC Quarter turn actuator DFPD Solenoid valve VSNC Ball valve VZBD Linear actuator DLP/DFPC, Positioner CMSX on/off and controlled knife Quarter turn actuator DFPD gate valve VZKA Butterfly valve VZAV/VZAF

Host system DCS, PLC

Pulse valve VZWE



Automation concept for electric automation





Flexible solutions for connecting valve terminals and industrial networks

Depending on the host PLC and the application requirements, Festo devices offer the most economical solution for field communication.

- Complex valve terminals and motor controllers from Festo are available with direct integration of the most common fieldbus systems. Integration of Industrial Ethernet even provides these devices with real-time capability.
- IO-Link[®] is available for intelligent sensors and valve terminals when cost-effective and standardised digital communication with the host PLC is required.





Highlights: perfectly fitting and cost-efficient solutions for you

For our customers involved in battery production, the focus is on high speed and throughput. This must be combined with maximum reliability and repetition accuracy as well as low costs. This is where you can benefit from the wide range of competitive products that Festo offers.



Compact cylinder ADN

The compact cylinder series ADN is characterised by a compact design and a wide range of variants. As part of the Festo core product range, it is available in numerous standard variants available from stock within 24 hours at a very attractive price. For specific requirements, you can select from a variety of features to individually configure the ADN to meet your needs.

Highlights

- Compact, affordable, long service life
- ø 12 ... ø 125 mm
- Fast delivery
- Conforms to ISO 21287
- Up to 50% less installation space than comparable standards-based cylinders to ISO 15552
- Self-adjusting cushioning PPS as option
- Option -F1A available with restrictions regarding Cu, Zn, Ni



Compact cylinder ADN-S

Even more compact: ideal for very small movements in the tightest of spaces. The ADN-S executes small and micro movements reliably in even the smallest of spaces. The ADN-S is copper-free in accordance with the Directive CD 0033, making it perfect for use in battery production.

Highlights

- Short, compact and lightweight
- ø 6 ... ø 63 mm
- Standard strokes of up to 50 mm
- Copper-free
- Fast and reliable delivery, even in large quantities



Slide drive DGST

The DGST is the most compact twin piston slide drive on the market. The slide and yoke plate are made from a single piece, making it particularly torsion-resistant without any misalignment. Together with the extremely precise recirculating ball bearing guide, this ensures maximum precision and thus high quality and process reliability.

- Shortest slide drive on the market
- Powerful, space-saving, highly precise
- All interfaces have a symmetrical design
- Maintenance-free twin-piston drive
- End position accuracy up to ± 0.01 mm
- Seven sizes (from DGST-6 to DGST-25) can be directly combined



Toothed belt and spindle axes EGC

Dynamic drive for high speeds together with heavy loads and long strokes. The axes EGC are extremely rigid and can therefore carry extremely heavy loads. Their high performance means that it is often possible to use a smaller size. The entire EGC range is available as a toothed belt or spindle axis.

Highlights

- Numerous sizes and slide variants
- Force 300 ... 3000 N
- Wide range of applications
- Recirculating ball bearing guide for high loads and torques
- 22 types in stock with short delivery times and modular products for custom variants
- Also as heavy-duty variant EGC-HD



Spindle axis ELGT

The compact, economical spindle axis ELGT is most suitable for use in combination with 2D and 3D cantilever systems. The design of the electric axis and the adapter were optimised to provide an optimal ratio between installation and operating space.

Highlights

- Integrated dual guides, high load capacity, high rigidity
- Force output 805 ... 1575 N
- Designed specifically for the electronics and automotive industry
- Can optionally be equipped with the inductive proximity sensor SIES-8M and magneto-resistive proximity sensor SMT-8 as a simple and economical way to implement position detection
- Third-party sensor mounting kits (Omron)
- Adapter parts for servo motors from Festo and third-party motors in Asia and Europe



Decentralised remote I/O system CPX-AP-I

The new I/O system in IP65/IP67 enables powerful I/O modules and existing valve terminal interfaces to be integrated in the most important host systems. Based on the innovative AP system communication from Festo, CPX-AP-I ensures continuous communication from the workpiece to the cloud – tailored to your needs!

- Ultra-light and compact
- IO-Link[®] master and IO-Link[®] device tool
- Short bus cycle times up to 250 µs
- 2 kByte I/O process data
- Parallel data processing of real-time and non-real-time data
- Theoretically up to 500 modules in line, star and tree topology
- Cable lengths up to 50 m between modules
- Best price/performance ratio with a combination of valve terminals and decentralised I/O

Highlights: perfectly fitting and cost-efficient solutions for you



Valve series VG

The all-rounder for universal use: small, compact and with high flow rates – available as individual valve VUVG or fieldbus-capable valve terminal VTUG with numerous pneumatic and electrical functions. Ideal for all price-sensitive applications. Now with the new VUVG-...-S with core features at an extremely attractive price.

Highlights

- 3 sizes: 10, 14, 18 mm
- Up to 100% higher flow rate than competitor solutions of the same size

Valve terminal VTUG

- All standard fieldbuses
- IO-Link®
- Many multi-pin variants
- Up to 24 valve positions in a fixed grid
- Vacuum and pressure as well as multiple different pressure zones on one valve terminal



Festo Motion Terminal VTEM

The Motion Terminal VTEM is opening up radical new dimensions in the world of automation, as it is the world's first valve to be controlled by apps. The first product to truly earn the label "digitised pneumatics". For a multitude of functions that currently require more than 50 components.

Highlights

- Many functions in a single component thanks to apps
- Combines the advantages of electric and pneumatic technologies
- Highest possible level of standardisation
- Reduced complexity and time-to-market
- Greater profitability and knowledge protection
- Less installation work
- Increased energy efficiency



Proportional pressure regulators VPPE

A proportional valve adapted for the functions you really need for your application. With or without the convenient display, the VPPE offers the exact features required for basic applications.

- Attractive entry price
- Good control behaviour for simple tasks
- Degree of protection IP65
- Suitable for flanged connection
- High EMC resistance (Class A)



Quarter turn actuator DFPD

The quarter turn actuator DFPD is available either as an individual actuator or as part of a fully automated process valve. With its torque of 10 ... 2300 Nm, rotation angle of up to 180° and its corrosion-resistant design, the DFPD is ideally suited for actuating ball valves, butterfly valves or air flaps or controlling media flows in battery production.

Highlights

- Single-acting or double-acting
- Very compact
- Highly modular
- End position adjustable on both sides
- Optimised spring setting design
- For extreme temperatures: –50 ... +150 $^{\rm o}{\rm C}$
- Mounting plate for pilot valve in EU (G) and US versions (NPT)



Pinch valve VZQA

Whether it's connection standards, materials or pinch valve sleeves, the individual parts of the VZQA are modular and configurable. The sealing cartridge can also be replaced without special tools. A replacement may be necessary under certain operating conditions, but only after more than one million switching cycles. The VZQA ensures optimum flow control of electrolytes and is ideal for evacuating aggressive gases using vacuum.

Highlights

- Individual, modular, configurable components
- Compact NC version
- Quick to install, easy to maintain and clean
- Sturdy materials
- Position sensing possible



Servo drive CMMT-AS

The price- and size-optimised, compact servo drive CMMT-AS is an integral part of the automation platform from Festo. The compact servo drive for point-to-point and interpolating motion is suitable for different Ethernet-based bus systems and can be seamlessly and directly integrated in the system environments of various manufacturers.

- Precise force, speed and position control
- Direct fieldbus connection to main controller manufacturers
- Comprehensively integrated protective and safety functions
- Optimally with servo motor EMMT-AS
- Also suitable for the motor series EMME-AS and EMMS-AS as well as third-party motors

Highlights: perfectly fitting and cost-efficient solutions for you



Servo motor EMMB-AS (available only in Asia) This compact and particularly economical synchronous servo motor in four power classes is perfect for simple positioning tasks, particularly in the electronics industry and small parts assembly as well as in test stations. Perfectly tailored to the modular system of the axes ELGC and mini slide EGSC.

Highlights

- Single-turn encoder, optional: multi-turn with battery adapter
- Optional holding brake
- Motor, brake and encoder cables with optimised connection technology
 - 2.5 ... 10 m
 - Optional: versions suitable for energy chains
- Degree of protection:
 - IP65 for motor housing and cable connections
 - IP50 on the motor shaft without and IP54 with shaft seal ring
- Compatible with shafts and flanges on the EMMT-AS



Servo motor EMMT-AS

The AC synchronous servo motor for demanding and dynamic applications is characterised by an extremely low cogging torque. This ensures good adjustability and tracking accuracy for positioning tasks. The "electronic rating plate" contains all the important motor data. This can be read by the servo drive CMMT-AS and then used to automatically set the parameters for the servo motor. This makes commissioning effortless and totally reliable.

Highlights

- 3 sizes 60/80/100 with up to 2.6 kW/9.8 Nm
- Single-turn or multi-turn absolute encoder
- With or without holding brake
- Degree of protection IP67 (housing and connection technology), IP40 (on the shaft, optionally IP65 with sealing ring suitable for unlubricated operation)
- Temperature measurement integrated in motor, interference-proof and digital transmission via the encoder protocol



Multi-Carrier-System MCS®

The Multi-Carrier-System is an innovative and flexible transport system based on linear motors. It is designed for standard applications, has a modular structure and can be freely configured and adapted to your specific requirements – with or without an end-to-end transport system.

- Highly flexible: infeed and outfeed of the carriers without additional transfer couplings
- Freely customisable acceleration, speed and grouping
- Easily integrated into existing intralogistics
- Synchronous movement of multiple carriers
- Cam disc mode and movement synchronised with the process
- 1 controller, even with additional machine modules
- Dynamic and fast, even with large loads



Servo press kit YJKP

The modular servo press kit YJKP gives you just the software functions you need for your application. You get an extremely precise press-fitting system with a high level of repetition accuracy and an excellent price/performance ratio. Simple, cost-effective and quick to install. The complete package includes servo motor EMMS-AS, electric cylinder ESBF, force sensor SKDA, servo drive CMMP-AS, controller CECC-X and software package. It can be used with equipment in process steps like lifting, stamping and bending, e.g. cold/hot stamping machines, crimping, folding wire cores etc.

Highlights

- Suitably designed
- Less expensive than conventional press-fitting systems
- Software and hardware from a single source
- Pre-installed modular software
- Pre-assembled kit
- Press forces up to 17 kN
- Easy to integrate into your own system concept
- Compatible with Industry 4.0



Energy efficiency modules MSE6-E2M, -C2M, -D2M

Where previously condition monitoring and control in compressed air systems was limited to gathering and analysing measurement data, consumption can now be automatically reduced by actively intervening in the supply. Energy efficiency modules MSE6 can be installed in existing or new systems, wherever the supply of compressed air is to be monitored and controlled.

Highlights

- A unique solution, the first of its kind on the market
- Monitoring the compressed air consumption and supply
- Automatic detection of leakages
- No negative impact on plant and system availability
- Can be expanded in the CPX system
- Quick return on investment



Service unit combination MSB, MS series

With the MS series, Festo provides an applicationbased integrated air supply solution. Its latest implementation of remote diagnostics and monitoring opens up a whole new range of application possibilities and ensures your pneumatic system operates smoothly.

- 3 sizes: MSB4 – grid dimension 40 mm, MSB6 – grid dimension 62 mm,
 - MSB9 grid dimension 90 mm
- Threaded connections in the product housing or with connecting plates
- Type of mounting and flow direction can optionally be selected
- Can be configured in accordance with the ATEX explosion protection directive

The right automation for your battery production

Components from Festo can be used in all the process steps in battery production. The solution that is right for you depends entirely on your exact requirements. We have put together an overview to give you a rough idea of which components our experts consider to be particularly well suited for each individual production step.

		Raw material preparation	Mixing	Coating	Slitting	Winding	Stacking	Inserting into housing	Packing	Filling	Formation	Module assembly
Valves and valve te	erminals											
	VUVG	•			•			•	•	•		
27.000	VTUG	•							•	-		
	VPPE				-		•		•	-		
	VPPM			-	-	-	-	-		•	-	-
	VEAA/B			-		-			•	-	-	-
Pneumatic drives												
No. Contraction of the second se	DGST							•		•		
· · · · ·	ADN	-			•	•	•		•	•		•
	DFM	-			•	•	•		•	•		•
ad II	DSNU	•	•	-	•	-	•		•	•	•	•
A.	DSBC	-	-	-	•	-	•		•	•	•	
	DLGF								•			
C III	DRRD								•			
	DRVS											

		Raw material preparation	Mixing	Coating	Slitting	Winding	Stacking	Inserting into housing	Packing	Filling	Formation	Module assembly
Pneumatic drives											1	
	DGC					•	•	•	•	•		•
Ť	DFST-G2								•		•	
Process automation	ı									1		
R at	DFPD	•	•						•	-	•	
O.B.	VZQA								•	-	-	
Electromechanical	drives									1	1	1
0	ELGC					•			•	•	•	•
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ELGA					•			•	•	•	•
	EGC					•	•		•	•	•	-
2	ESBF								•	-	-	-
Se I	EGSC					•			•	-	•	-
	EFSD								•	-	-	-
Motors and controllers												
	СММТ								•			
	EMMT								•			

The right automation for your battery production

		Raw material preparation	Mixing	Coating	Slitting	Winding	Stacking	Inserting into housing	Packing	Filling	Formation	Module assembly
Sensors												
and the second s	SMT		•		•	-			•	-		
	SPAN	-	-		-	-	-	-	•	-	-	-
	SFAH	-			-	-	-	-		-	-	-
Compressed air p	reparation											
	MS series	•	•		•	•	-	-	•	•	-	-
	LRP				-		-	-	-	-	-	-
Pneumatic connect	tion	1 1		1		1	1	, ,		1	1	, ,
	PUN-H	-	÷	-	•	-	-	-	÷	-	-	-
OF M	NPQR		•		•	•			•	•	•	
Grippers										1	1	
Star Line	EHPS					•			•	•	•	•
Vacuum technology												
	OVEL							•	•			•
	OVEM								•			
the set	VN								•			

Festo Didactic – the training provider with "industrial DNA"

Workforce development is a key success factor for a company in order to safeguard its innovation power, sustainability and growth. The fast speed of digitalisation leads to a constant change in our business activities, creating new tools and applications, even creating new, previously unthought of professions. This requires people to have a good understanding of data and IT, as well as sound technical knowledge, problem-solving skills and other skills to be ready for the future. Festo Didactic can help you to master this shift in expertise and offers a wide training portfolio to develop the right competencies.

Who are we?

As an integral part of the Festo Group, Festo Didactic has its roots in automation and boasts "industrial DNA". Working closely with Festo Automation, as well as operating in the same segments as our customers, provides us with a deep insight into the challenges they face. Festo Didactic is therefore able to offer tailored and practical training courses for industry. These courses focus mainly on the core competencies in automation technology.

Our offer:

The goal is maximum value creation. This can be achieved with training in various topics and formats.



+ Technology

Developing technical skills: core technologies in factory and process automation.



Organisation Boosting continuous improvements: strategic planning and process optimisation along the value chain.



+ People

Developing behaviour and attitude: teamwork, communication skills, and leadership qualities.



+ Innovations

Developing competencies for tomorrow: preparing to learn, lead, and be ready for future production in the context of Industry 4.0.



+ Our approach to developing competencies

We focus on industry-specific job profiles, such as for example the smart maintenance specialist. The smart maintenance specialist needs in-depth skills and competencies, especially in the areas of digitalisation, workflows and -processes, preventive and predictive maintenance and customer care as well as troubleshooting. The main target is to maximise overall equipment effectiveness and mean time between failures.

Together with our industrial customers, we assess the current situation in their company and compare that with the target profile in order to establish a skills gap analysis. Based on that analysis, an individual learning journey will be defined, offering different learning methods such as digital learning, hands-on learning, simulations and learning on the job.



+ Festo Learning Experience

With the new Festo Learning Experience portal called Festo LX we enable trainers and trainees to create individual learning experiences based on their individual needs.

This unique online environment is based on an open community approach and features carefully prepared learning resources for many technical topics, as well as all the necessary tools, including Festo Didactic hardware, to create engaging learning journeys. Interested in the Festo Learning Experience? Click here for more information: → https://lx.festo.com

> What are you waiting for? Contact us: Festo Didactic SE Rechbergstraße 3 73770 Denkendorf did@festo.com → www.festo-didactic.com

Productivity

Maximum productivity is a question of ambition

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We are the engineers of productivity.

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