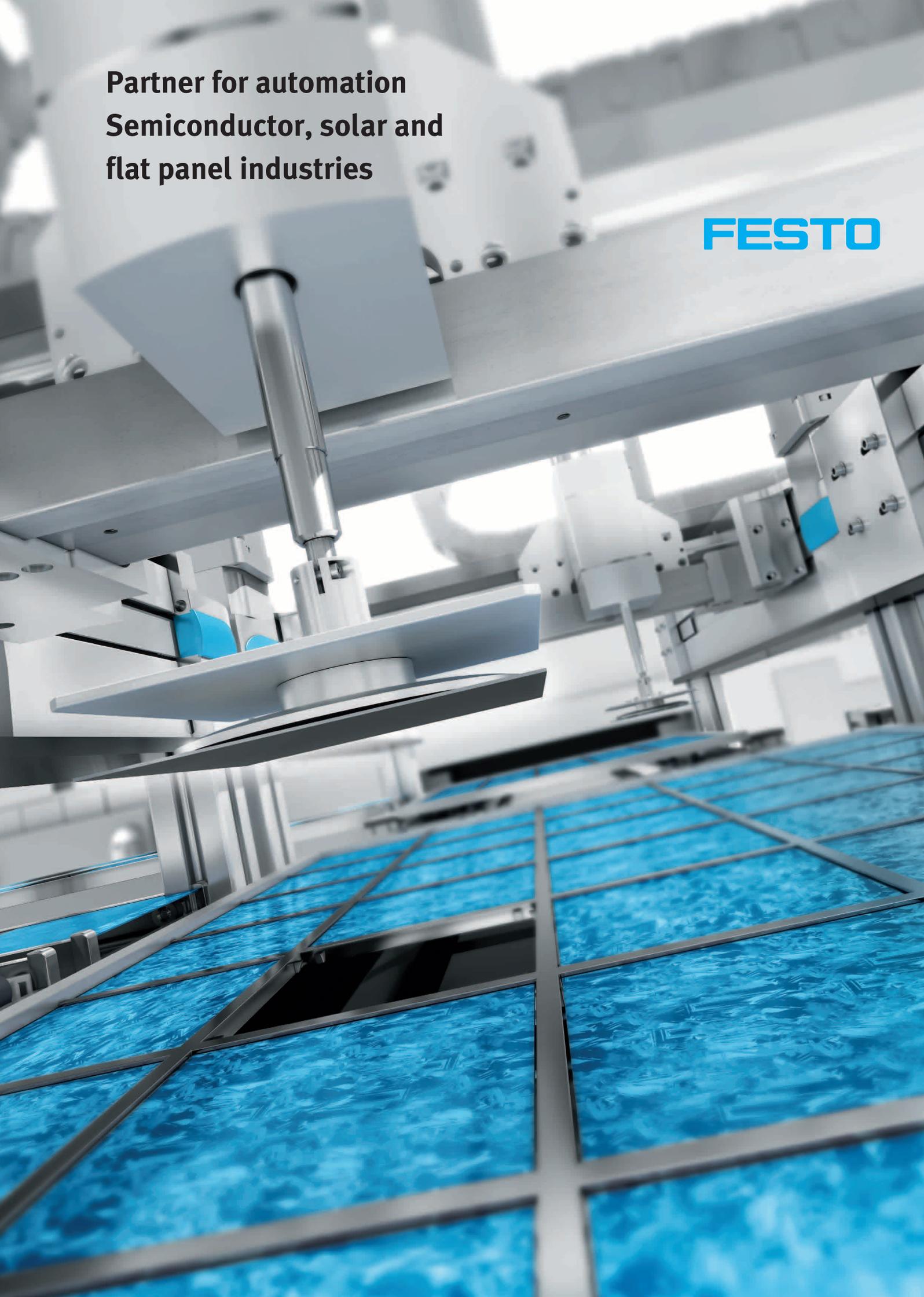


**Partner for automation  
Semiconductor, solar and  
flat panel industries**

**FESTO**





## Your objective: reliable and economical production with innovative systems

High output, reliable production and a quick return on investment are of your main concerns. Whether it's about

- Wafer-based production of solar modules
- Thin-film-based production of solar modules
- Flat panel display production or
- Wafer production and front-end

from a true partner to the semiconductor, solar and flat panel industries you also expect cost reducing, reliable process solutions for the production of wafers, thin-film cells and flat screens, for manufacturing cells and modules, and for inline and batch manufacturing processes – throughout the entire value chain.

## Our contribution: a head start with complete automation systems

**Individualised and perfectly integrated into your manufacturing process: automation solutions from Festo.**

Systems for, amongst other applications:

- Lifting wafers or heavy flat panel substrates
- Piloting gas-box applications
- Fluid control for cooling systems

We support your overall system solutions through their entire life cycle, from consulting, engineering and commissioning, right up to comprehensive after-sales service. For a fast return on investment, maximised productivity and increased process reliability.

**Tailored to your specific requirements: ready-to-install solutions.**

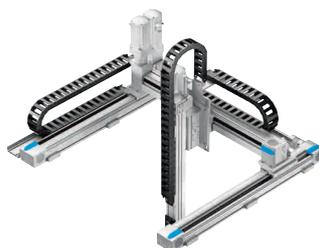
Shipped completely assembled with all tubing and wiring fitted, fully tested and documented:

- From handling systems to optimised high-speed solutions
- Control cabinets
- Mounting plates
- Product modules

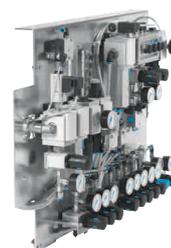
Interface problems are a thing of the past and your time-to-market is reduced. Last but not least, we integrate the entire solution – including a suitable control architecture – into your communications concept and control system.



Telescopic handling unit sliding fork for feeding and discharging substrates



Three-dimensional gantry with toothed-belt axis EGC: ideal for transfer and palletising tasks

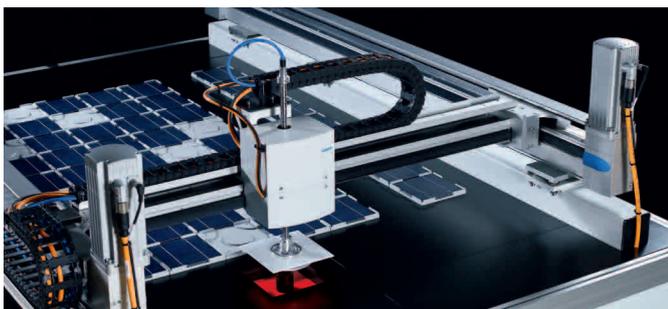


Individualised for your application: ready-to-install mounting plates with pre-assembled components on a support plate



## Many different process steps – a single solution: Festo

The semiconductor, solar and flat panel display industries are characterised by a great variety of different work steps and processes. Develop the ideal solution for your application together with our specialists for the solar and flat panel display industries. Productive, economical and energy-efficient.



### Highly dynamic with minimal breakage

For quick and reliable transfer of solar cells and wafers: the high-speed H gantry. Honoured with the Intersolar Award! Including Bernoulli gripper OGGB for breakage-free, residue-free transfer onto an air cushion.



### Cost-effective feeding and discharging of substrates

Ideal for conveying substrates in high vacuum as well as under atmospheric conditions: the infinitely adjustable, Sliding Fork telescope handling unit. Installation space = workpiece size. And less expensive than any robot solution.



### Fast, gentle, uniform motion

Move fragile and heavy thin-film modules vertically – very quickly but with uniform, gentle motion: no problem for Festo lifter systems, because they combine the advantages of pneumatic and electrical technology.



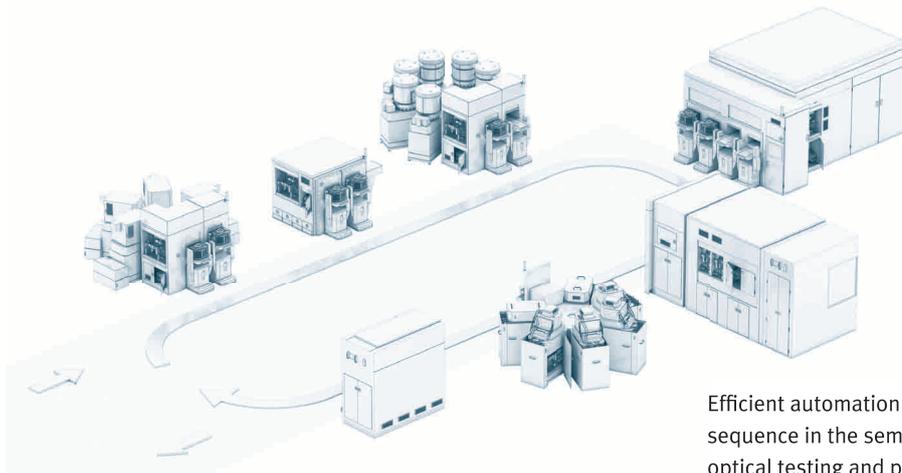
### Contactless substrate support on air cushions

Safe conveyance of substrates with air cushion plates ATBT: The substrates are gently moved over an air cushion – with minimal air consumption. Including high precision travel, e.g. for laser-structuring.

**Your objective: ideally automatized production solutions**

**Our contribution: combined application and technology know-how**

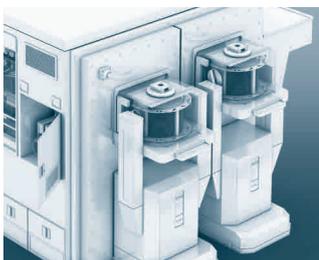
**Wafer production and front-end**



Efficient automation solutions throughout the entire process sequence in the semiconductor industry, from crystal pulling to optical testing and packaging

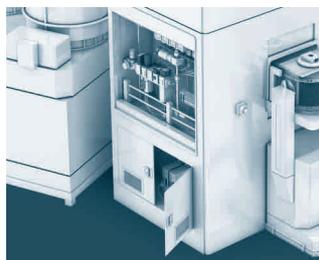
Find out more at

[www.festo.com/semiconductor](http://www.festo.com/semiconductor)



**Accurate positioning**

Automated lifting systems provide for accurate, jerk-free positioning of the FOUP.



**Gas-box application**

Valve terminals control the media valves for various gases in order to avoid incorrect switching.



**Coolant water distribution**

Ready-to-install coolant water systems designed in accordance with customer requirements ensure that the manufacturing process functions perfectly.



**Extremely durable: angle seat valve VZXF**

The robust universal valve for use in process automation. Ideal for all applications involving the control of media flow – whether contaminated or highly viscous.

**Functional diversity with a minimal footprint: valve terminal VTOC**

Ideal as a pilot valve for gas boxes and compact systems in the semiconductor and process industries. Up to 48 3/2-way valves. With integrated fibre-optic system for top process reliability.



**Perfect compressed air preparation: MS series service units**

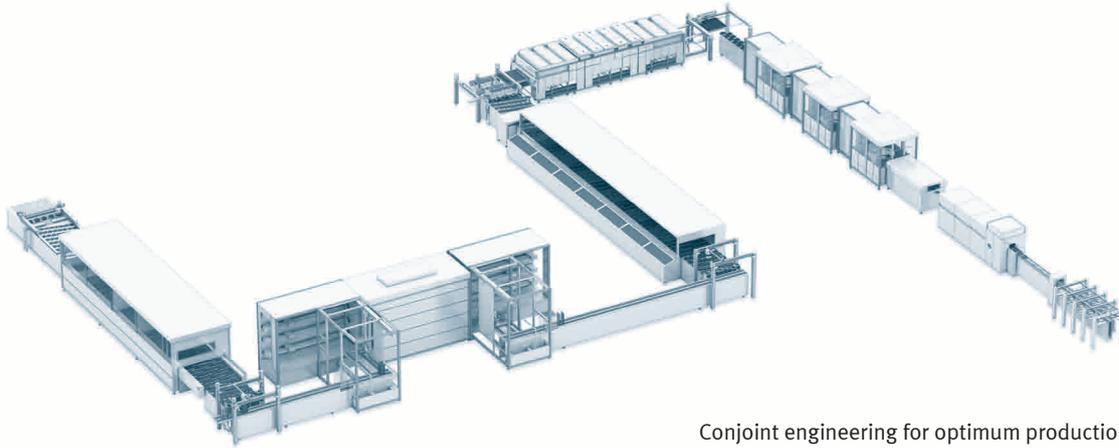
Whether in terms of the breadth of the product range, functionality or diversity of services, the MS series offers a fully integrated concept for application-specific solutions to your compressed-air preparation requirements.

**Valve terminal MPA with electric terminal CPX**

Improved system availability and process reliability thanks to integrated diagnostics and condition monitoring. Intelligent preprocessing, web monitor via Ethernet.



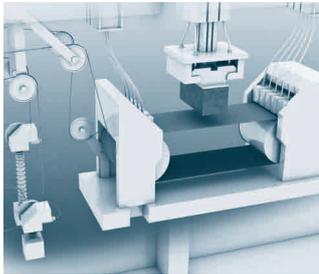
## Wafer-based production of solar modules



Conjoint engineering for optimum production results – from the wafer production up to the module production

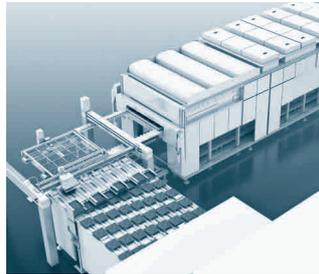
Find out more at

[www.festo.com/solar/wafer-based](http://www.festo.com/solar/wafer-based)



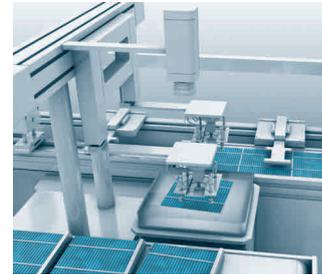
### Wafer sawing

Precise sawing of the ingot by correctly tensioning the saw wire



### Anti-reflection coating

Fast and gentle loading and unloading of the carriers



### Tabbing and stringing

Holistically designed handling solutions for reliable and accurate transfer



### Fast, reliable wafer transfer: the high-speed H-gantry

Extremely flat profile, highly dynamic at 50 m/s<sup>2</sup> and with low vibration. A clever handling concept that uses all the installation space as working space.

### 100% quality inspection: intelligent vision system SBOC-Q

Inspection for correct orientation, surface check, precise measurement, edge inspection and precision positioning. Electronic evaluation unit and interfaces (Ethernet/CAN) integrated into the PLC!



### Fast and gentle conveying of wafers and solar cells: Bernoulli gripper OGGB

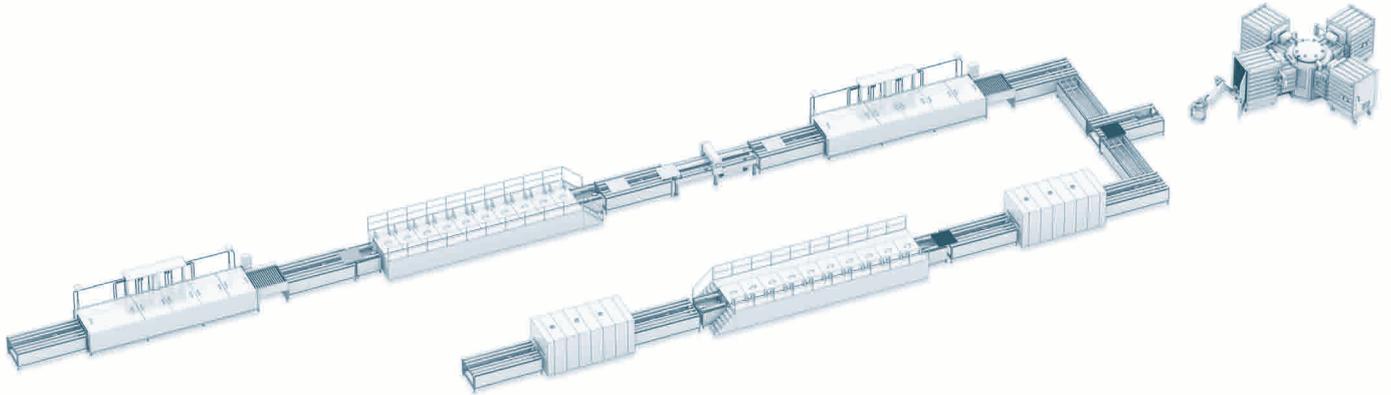
Extremely gentle transfer or conveyance to the surface inspection area thanks to the air cushion. High suction force without vacuum by means of the Bernoulli effect.

### Separating and repositioning: electric cylinder DNCE

Gentle acceleration, stick-slip-free, flexible motor mounting, zero maintenance – the DNCE is ideal for the defined application of contact pressure to the feed separator and for repositioning wafer stacks.



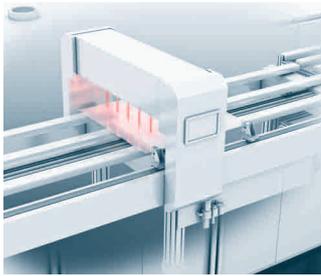
## Thin-film-based production of solar modules



Clever automation solutions, from the front-end to the back-end

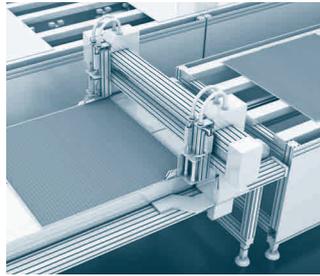
Find out more at

[www.festo.com/solar/thinfilm](http://www.festo.com/solar/thinfilm)



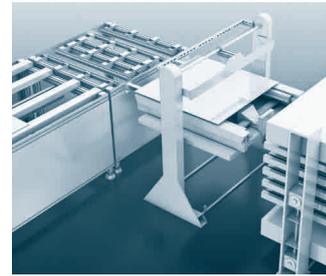
### Structuring

Contactless conveyance of glass plates thanks to air bearings



### Dispensing

Easily programmable axis systems ensure quick and accurate application of conductive adhesives



### Lamination

The Sliding Fork telescope handling unit feeds glass plates to the laminating process



### Elegant transport solution for substrates: the sliding fork

This less expensive and more compact alternative to robots feeds substrates into process chambers under high vacuum at 200° C. Strokes of up to 2 metres, electric drive.

### Contactless conveyance and retaining of thin-film substrates: air cushion plate ATBT

All thanks to an extremely thin cushion of air – with minimal air consumption. Ideal for precision laser edge isolation on wafers, or for structuring thin-film solar cells.



### Clever cushioning saves adjustment time: standard cylinder DSBC

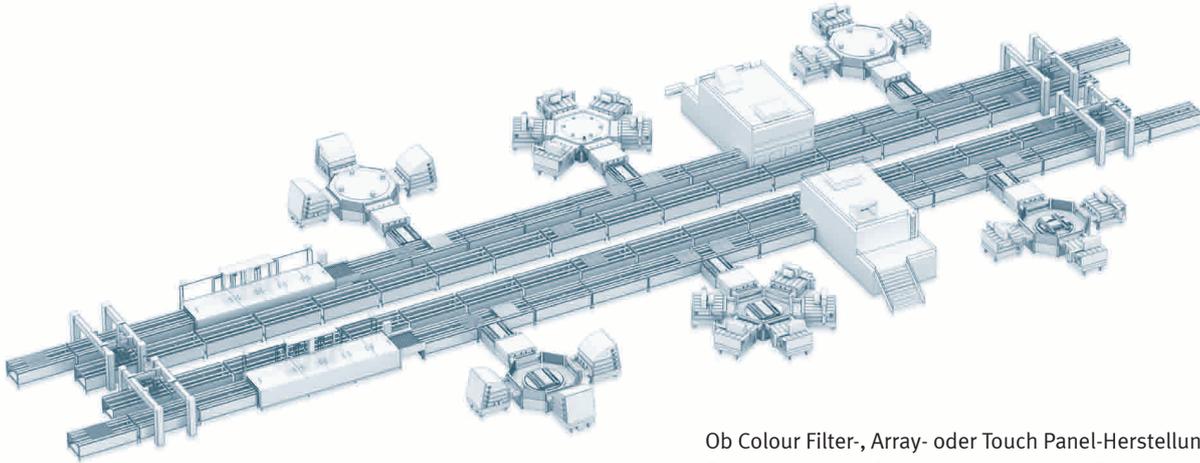
The standard cylinder DSBC to ISO 15552 with self-adjusting pneumatic end-position cushioning PPS adapts perfectly to changes in load and speed.

### Faster and more dynamic flow sensor for liquids: SFAW

Totally accurate detection of flow rates, consumption values and media temperatures of up to 100° C. Intuitively adjustable. Small, rotatable display with changing colours for better process control.



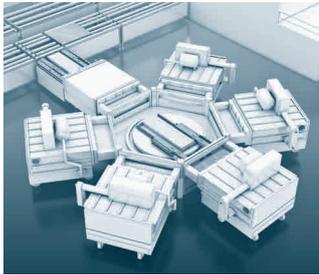
## Flat panel display production



Ob Colour Filter-, Array- oder Touch Panel-Herstellung – Festo unterstützt Sie über die komplette Prozesskette hinweg

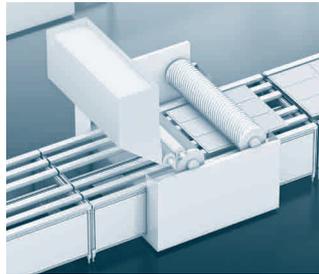
Find out more at

[www.festo.com/flatpanel](http://www.festo.com/flatpanel)



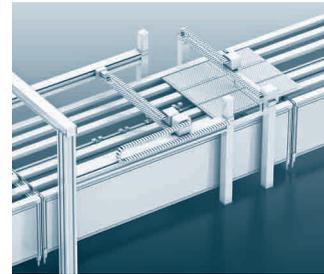
### CVD

Reliable regulation of media valves for applying the semiconductor layer under vacuum



### Plastic rubbing

Accurate control of the rollers by means of proportional technology for uniform marking and structuring



### Cutting and grinding

Intelligent gantry systems for quick and accurate separation of the modules



### Contactless transport of flat panels: air bearing rails ATBT

The innovative transport option for heavy and fragile substrates: contactless conveyance on an extremely thin air cushion. Minimum air consumption!



### More economic through downsizing: electric axis EGC

Dynamic and fast, whether for handling flat screen substrates or other conveying tasks. Outstanding rigidity thanks to aluminium profiles with external guide usually allows for a smaller design. With toothed belt or spindle drive.

### Electric cylinder EPCO and motor controller CMMO-ST

The optimised motion series system: electric cylinder EPCO with attached motor and motor controller CMMO-ST in servo mode is fully assembled and controls 7 freely definable positions.



### Precision dosing: proportional pressure regulator VPPM

Perfectly controlled pneumatics, from defined tensioning of the ingot saw band right up to controlled contact pressure for activating the presses in plastic rubbing.

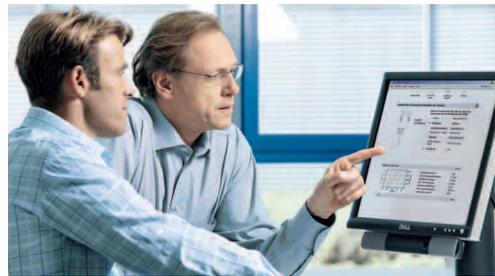


## Provided consistently: worldwide support

Festo's service and support philosophy is backed by continuous analysis of the value creation chains of greatly differing customers from the flat panel and solar industries, and from other sectors as well. Festo has utilised this knowledge to develop a sophisticated portfolio that supports you along your entire value creation chain.

### **Engineering: clever concepts with innovative systems**

- Consultation
- Research and engineering tools
- Dimensioning tools
- Electronic catalogue
- 3D data



### **Procurement and logistics: everything from a single source!**

- Festo online shop
- 24-hour delivery service
- Logistics optimisation service
- PrePack



### **Installation and commissioning: simple, flexible and fast!**

- Ready-to-install solutions
- Commissioning of axis systems
- Compressed air consumption analysis
- Free ePlan and CoDeSys macros



### **Operation and maintenance: high levels of system availability, money saved!**

- Energy saving service
- Modular service contracts
- Compressed air quality analysis
- Spare parts catalogue/ repair service
- Support portal for documentation etc.

