

# Automation solutions for flotation cells

FESTO



Precise and reliable!

## High control precision

### Highlights

- Sturdy and reliable
- Excellent control precision
- Three fail-safe options
- Minimised downtimes
- Higher yield
- Predictive maintenance possible
- Condition monitoring of all system parts
- Reduced investment and maintenance costs

The excellent control precision of the dart valves is the key to achieving optimum results in the flotation process. This ensures a constant froth level – and thus a higher yield. Festo offers three options for the automation of flotation cells in order to optimally separate fine ore and high-quality sulphide ores such as copper, copper-molybdenum and platinum group metals from the gangue.

### Higher yield

Maximise your yield: without external linkages between the actuator and the positioner you have optimal control precision for a constant froth level and higher yield. The flotation cell has fewer downtimes, and damage, caused for example by the corrosive environment and vibration, is minimised. This significantly reduces the need for calibration and maintenance – even in extreme environments.

### No external linkages – no readjustment

The solution is ready to use

immediately thanks to the integrated displacement encoder. Damage during installation and operation is prevented and no readjustment is required.

### All relevant safety functions included

With the fail-safe function you can move the actuator unit manually or automatically to a freely selectable safety position in the event of a power or pressure drop. Fail Freeze: the linear actuator remains stationary in its current position; Fail Safe: the linear actuator closes or opens the valve in the event of a power failure.

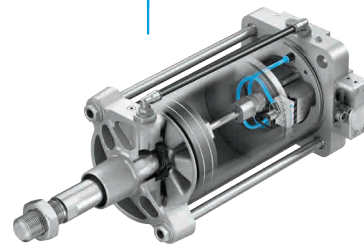
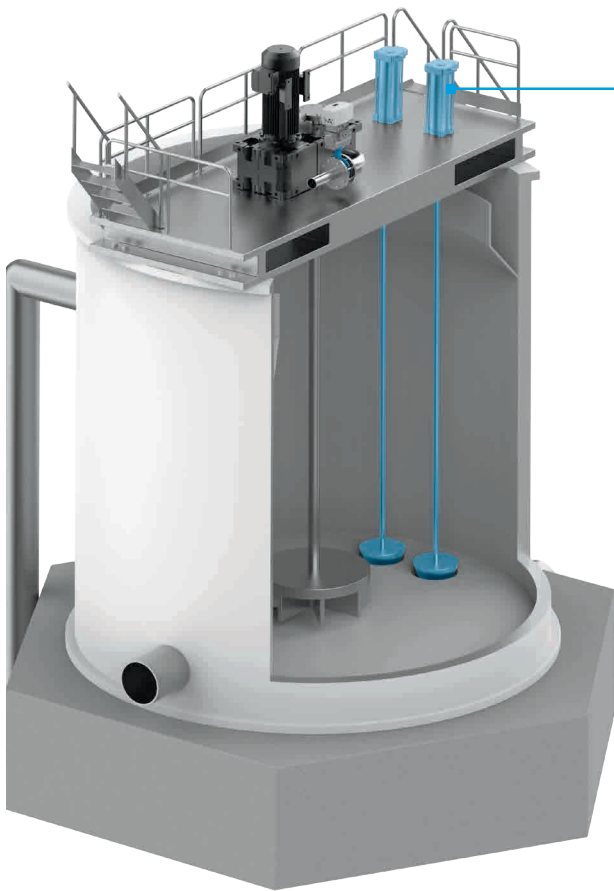
# Choose the solution that best suits your needs.

To provide you with the best possible solution, we offer three options for the flotation cell.

## All three options provide the following benefits:

- Precise control of the froth level
- Sturdy design
- No moving parts outside the actuator – no readjustment or maintenance required
- Ready-to-install unit saves assembly time and money
- Reduced maintenance costs
- Increased productivity
- Integrated safety function, e.g. for moving the actuator unit manually or automatically to a freely selectable safety position (i.e. “extended”, “retracted” or “freeze” position) in the event of a power or pressure drop

### Option 1: Automation of the dart valves with DFPI with integrated positioner

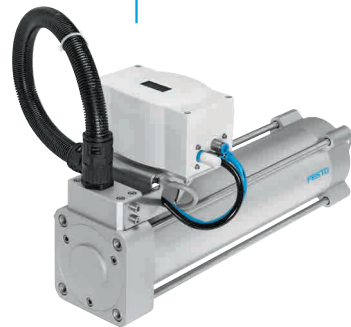
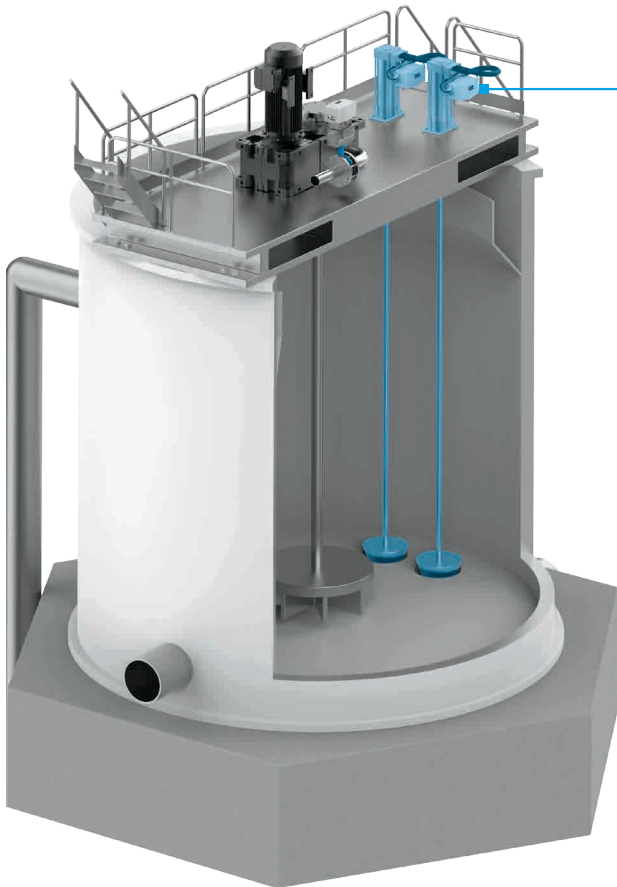


With the linear actuator DFPI-...-C1V-..., the displacement encoder and the digital, electro-pneumatic positioner are fully integrated. A factory-set safety position brings the actuator into a safe position if the operating voltage, analogue setpoint or compressed air fails.

#### Technical data for DFPI-...-C1V-...

- Piston diameter 100 ... 320 mm
- Stroke 40 ... 990 mm
- Operating pressure 3 ... 8 bar
- Temperature range -5 ... +50 °C
- Degree of protection IP65, IP67, IP69K
- Setpoint signal 4 ... 20 mA
- Position feedback 4 ... 20 mA
- 24 V external power supply required

## Option 2: Automation of the dart valves using linear actuator DFPI and directly mounted external positioner



This solution provides you with excellent flexibility. Because it allows you to implement different automation scenarios, you can choose the solution that best fits your system concept for your entire production process. This option also provides the basis for optimised diagnostics.

### **Additional benefit**

Integrated absolute displacement encoder.  
No reference measurement necessary after power failure.  
Power supply directly via positioner, no additional power supply is required.

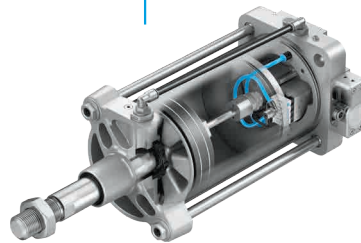
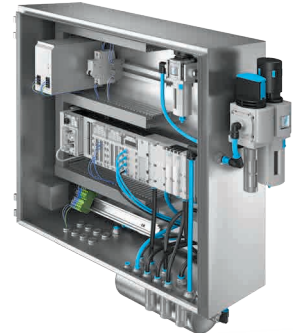
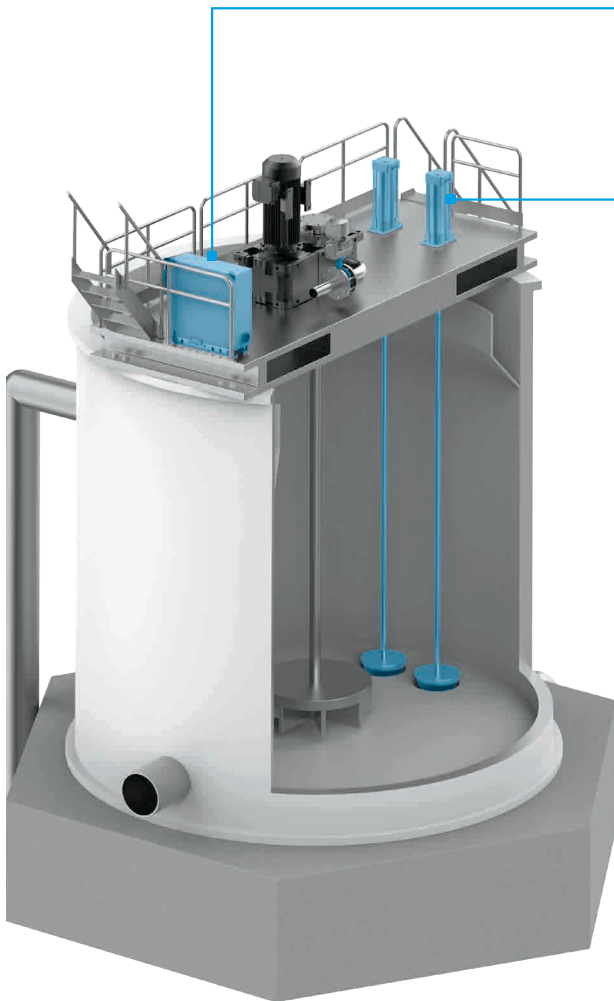
### **Technical data for DFPI-...-E-...**

- Piston diameter 100 ... 480 mm
- Stroke 40 ... 990 mm
- Operating pressure 3 ... 8 bar
- Temperature range -20 ... +80 °C\*
- Degree of protection IP65, IP67, IP69K\*
- Integrated displacement encoder
- Additional communication options, e.g. PROFIBUS PA, Foundation Fieldbus, HART depending on the positioner model

\* The technical data of the positioner used must also be observed.

# Choose the solution that best suits your needs.

## Option 3: Modular automation concept with valve terminal CPX-MPA and linear actuator DFPI



Use the full functionality and modularity of the electrical terminal CPX as a decentralised automation platform. You also get more modularity for your system design – and in most cases with reduced investment costs, as the positioners may not be required.

### Technical data for DFPI-...-E-...

- Piston diameter 100 ... 480 mm
- Stroke 40 ... 990 mm
- Operating pressure 3 ... 8 bar
- Temperature range -20 ... +80 °C
- Degree of protection IP65, IP67, IP69K
- Integrated displacement encoder with 4 ... 20 mA output signal for reliable position feedback over longer distances

### Benefits

- Sturdy solution in terms of compressed air quality and flow rate
- Modular system with respect to the valve terminal (communication protocols, diagnostics, etc.)
- Easy to increase the capacity of the system design
- Reduced number of components in the field

### Technical data for CPX-MPA in an application-specific control cabinet

- Position control via the controller and remote I/O valve terminal solution
- Modular automation concept with PLC directly at the flotation cell
- Bus communication via PROFIBUS DP, PROFINET, CANopen, Ethernet/IP and others possible
- A large variety of functions and connections for the electric modules, including analogue and digital inputs/outputs

### Benefits of digitalisation in actuator technology – on edge

The positioner function in a decentralised control unit reduces investment costs, permits a lower quality of compressed air, allows faster actuator cycles and – optimised accordingly – switching of the actuator even in the event of a power failure.

Decentralised automation of modular systems is thus also possible. Visualisation of the module in higher-level control systems and the corresponding communication significantly reduce engineering effort. This process is more or less automated on the basis of information in the Module Type Package (MTP). The control

system is freely selectable thanks to the standardised interface to the higher-level control system.

With digitalisation, machine learning algorithms – on edge – can also be implemented decentrally. The actuator parameters are comprehensively analysed and at the same

time anomalies in the actual process are detected without additional effort – providing the basis for predictive maintenance concepts and optimisation of the production process. When compared with the standard data, these deviations are detected in good time and plant downtimes caused by malfunctions are avoided.



### Greater transparency with networked components and cloud services

The cloud solution from Festo is there to support you throughout your entire production lifecycle. You can see the following at a glance: asset data, data for preventive maintenance, diagnostic functions, error displays in plain text, simplified process data analysis and fault finding.

The CPX-MPA dashboard shows an exact digital image of your individual configuration. You can

detect operating statuses immediately, receive error messages in plain text and track valve switching cycles as well as the status of the inputs/ outputs live – without any programming. Retrospective process data analysis for up to one year is possible.

### Easy transfer to the cloud

To monitor the data of the valve terminal CPX-MPA in the cloud, you only need:

- Valve terminal CPX-MPA – supplies the data
- Festo controller, such as CPX-CEC – compresses the data before it is forwarded to the CPX-IOT
- CPX-IOT gateway – sends the data to the cloud via an Internet connection

Find out more:

→ [www.festo.com/dashboards](http://www.festo.com/dashboards)



# Automation solutions for the flotation cell

## Everything from a single source: selected components for your solution

Have you found the ideal automation solution for your flotation cell? Here we present some additional peripheral components and modules for media control that also optimally support your solution. And because everything comes from a single source, it all fits together perfectly.

### For the peripherals

#### Air preparation units

- MS series: universal, complete product family, individual configurations, safety functions, high flow rates, Ex certificates
- PCRP: corrosion-resistant stainless steel version
- LFR-EX4: sturdy design in full metal



MS series



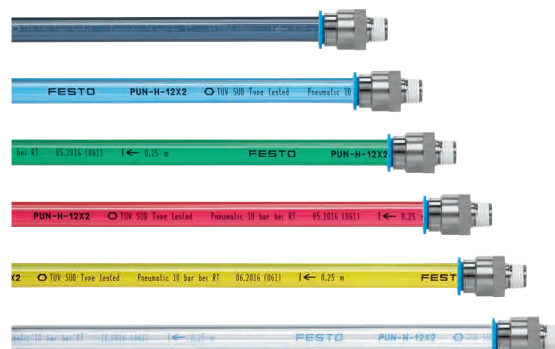
Filter regulator PCRP

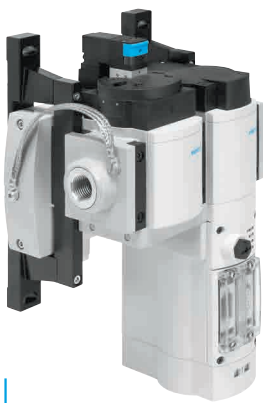


Filter regulator LFR-EX4

#### Tubing and connection technology

- Various tubing with excellent weather and corrosion resistance
- Stainless steel fittings and connectors





**Energy efficiency module  
MSE6-E2M**

- Checks the system for leaks
- Ensures maintenance in the event of leaks
- Monitors relevant process data

**Keep track of everything**

Using the relevant dashboard you can view and track energy consumption – from anywhere in the world. For every system that is supplied with compressed air via the MSE6-E2M, you can view the pressure, flow rate, consumption and changes in pressure at any time. You can identify possible leaks, carry out preventive maintenance and reduce downtimes.

**Easy transfer to the cloud**

To monitor the data of the energy efficiency module in the cloud, you only need:

- Energy efficiency module MSE6-E2M – supplies the data
- Festo controller CECC – compresses the data before it is forwarded to the CPX-IOT
- CPX-IOT gateway – sends the data to the cloud via an Internet connection

Find out more:

→ [www.festo.com/dashboards](http://www.festo.com/dashboards)



## Controlling media

### Pre-assembled process valve units KVZA

- Butterfly valves with hand lever, manually actuated
- Automatically actuated butterfly valves with optional end-position detection and pilot valve
- Controlled butterfly valves with positioner

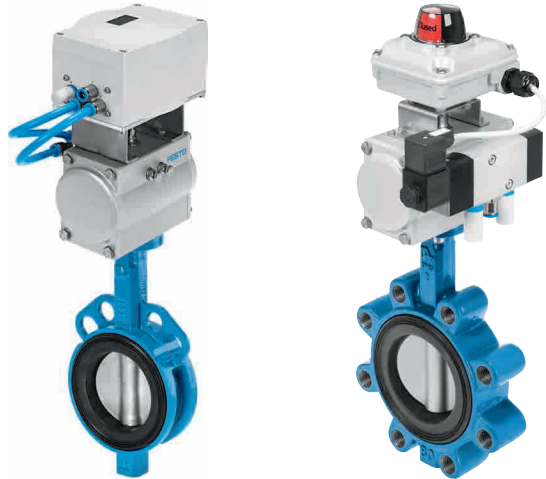
Depending on the requirements, our butterfly valve units consist of:

- Positioner CMSX
- Sensor box SRBC, SRBG
- Quarter turn actuator DFPD
- Pilot valve VSNC
- Butterfly valve VZAV, VZAF

The components precisely match one another – and you can now configure them quickly and easily yourself using our online process valve configurator.

Try it for yourself:

→ [www.festo.com/kvza](http://www.festo.com/kvza)



### Pinch valve and linear actuator DFPI for heavy-duty applications

- High performance
- Extremely low wear
- Long service life in open/close operation and in controlled proportional applications
- Reliable, high control precision

