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## Plug and work for simple electric movements



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# Plug and work for simple electric movements

## When simplicity of pneumatics meets advantages of electric actuators

For simple applications and motion tasks, pneumatic actuators are the preferred choice, they combine simplicity in installation and control, and highly attractive investment cost in one. Festo as a leading supplier for both pneumatic and electric automation components, now brought the simplicity of pneumatics to the world of electric automation, with the new electric Simplified Motion Series.

**E**ven if pneumatics is the preferred solution for applications requiring simple movements, the technology is more and more facing a digitalised world. Here, up to date information about actuator status is required to reduce commissioning times, enabling cost-efficient production and deal with shorter product life-cycles.

Moreover, even if pneumatic actuators – regarding investment cost – are the most attractive technology, total cost of ownership must also be considered.

Diagnostics and big data require a seamless flow of information from the workpiece to the controller and cloud. Traditional pneumatic systems struggle with this challenge, as the compressed air cannot transmit data. With these factors being considered, it is not surprising that machine builders see electric motion more and more as valid compliment or even alternative to pneumatics.

### Simple movements

So, why has the move from pneumatic to electric not happened? Looking at the needs and trends it would be expected that the transformation would be far faster than it is.

This might be explained by the evolution in new pneumatic technology, solving new demands with mature technology. However, the more obvious explanation is that most of the complex motion in machines is already solved with electric actuators and simple movements are easily solved with pneumatics.

And in this field, existing electric actuators have some shortcomings: they are still too costly and too complex to commission. A pneumatic system can be put into operation with moderate expertise and a screwdriver, it needs higher training, electric expertise and software know-how to make electric cylinders run between two positions. Festo took this market

demand for simple electric actuators and solved it in the new Simplified Motion Series.

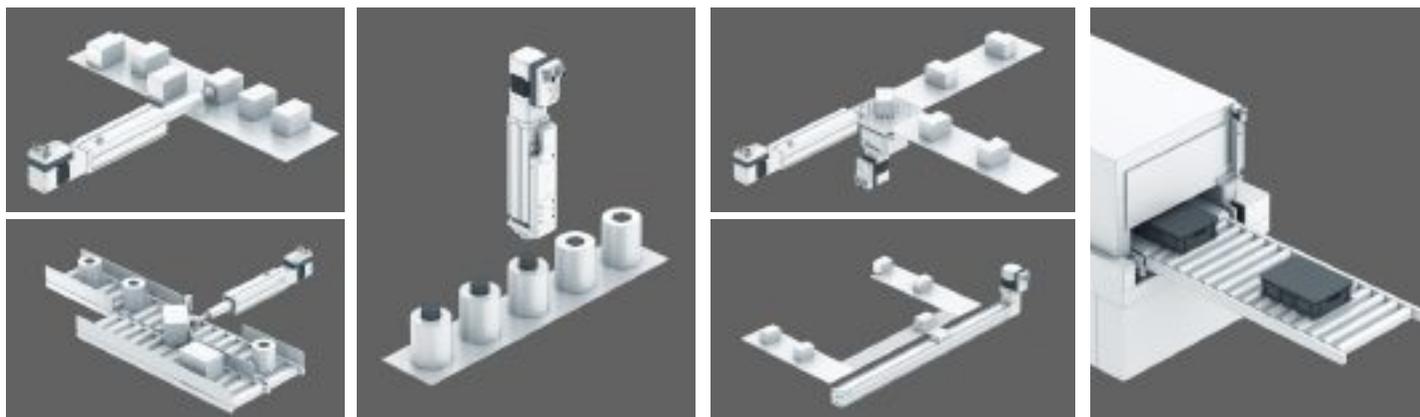
### Simplified installation

Simplified Motion Series from Festo therefore is not only a new line of electric actuators, it is designed from the bottom up to offer simplicity in installation.

The core component of the Simplified Motion Series, launched in September 2019, is a new integrated motor with a permanently attached drive unit, available pre-mounted to a range of mechanical actuators. This enables rotary and linear movements with a variety of formats for the actuator. This concept not only reduces installation space but also minimizes installation time and cost in production processes.

### Simplified motion profiles

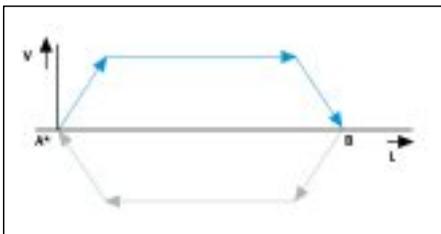
A mechanical installation concept itself does not help close the gap to pneumatics, the deciding feature is



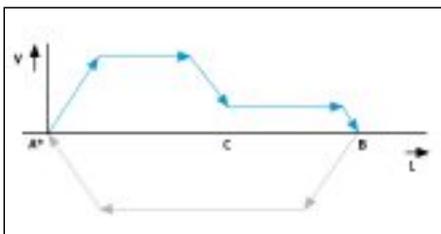
functionality. Therefore, it is important to concentrate on reducing the motion complexity of the Simplified Motion Series actuator to build a real alternative.

A simple movement between two mechanically defined end positions with a pneumatic actuator is done with a hard stop or cushioning and is not always 100% reproducible in cycle time, Simplified Motion Series implements a fixed acceleration and deceleration ramp with a constant speed to realize a gently cushioned and reproducible movement.

Pneumatics has the wonderful functionality to switch from a dynamic movement to a pressing mode without additional cost. With electrics this can only be done with programming effort in traditional electric actuators but is solved in a smart way in the new series. Here the speed-controlled distance can be shortened, transferring it smoothly in a force controlled pressing and movement with zero programming effort.



Basic profile for movement between two end positions: with speed control



Expanded movement profile for simplified press-fitting and clamping functions: with speed and force control

- ➔ "Out" movement
- ➠ "In" movement
- A\*** Reference end position
- B** Operating position
- C** Start position "press"

## Simplified operation and control

The concept of the simplicity of pneumatics with the advantages of electric actuators is extended to the control element, combining software free commissioning with state-of-the-art control options for simple actuators: Digital I/O and IO-Link.

The motor is equipped with just two standard connectors and is based on the „plug and work“ principle: no software and no need to parameterise.

Providing the same ease of use, all adjustments can be set directly on the motor using 3 buttons and an easy to understand LED menu, the speed level and force level for the two directions can be set. In addition, the buttons are used to set the reference end position and the transfer point from speed to force control. Finally, all movements can be tested by Demo-Mode directly on the device. This enables all axis on a machine to be fully commissioned before the software engineer has even opened their laptop.

At its simplest, the actuators are controlled using two digital inputs, similar to a 5/3-way pneumatic valve, allowing a low-cost installation. Using two digital outputs, it is also possible to detect if the end positions have been reached, like a cylinder switch – but without the additional cost.

The most interesting feature though is IO-Link functionality integrated as standard, bringing the simple electric actuators into the world of Industry 4.0 and digitalisation. With IO-Link, all parameters can be adjusted remotely, copied on multiple drives or used as backup in case of actuator breakdown.

Moreover, many process parameters like travelled distance and cycles can be read out easily for predictive maintenance use or sending to the cloud.

Finally, with IO-Link control it is possible to stop a movement at a defined position in the middle of the stroke, avoiding mechanical end stops like with pneumatics. This makes Simplified Motion Series even more flexible.

As all actuators of the series are always containing Digital I/O and IO-Link in one, it's also possible to use the advantages of both options, like commissioning with IO-Link and control with Digital I/O.



Simple electrical connection via M12 plug design for logic and power supply

## Product overview

With all these features of software, free commissioning and simple control by Digital I/O and IO-Link bundled in a compact integrated actuator unit, thanks to Simplified Motion Series the simplicity of pneumatics is now combined for the first time with the advantages of electric automation, enabling machine builders to use electric actuators also for very simple tasks, bringing their machines to a new level.

