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SIPOS AKTORIK
A member of the AUMA Group

PRODUCT BROCHURE

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ELECTRIC ACTUATORS

WELCOME TO VISUAL REALITY

www.sipos.de

02

SIPOS SEVEN
Contents

Welcome to
SIPOS Aktorik GmbH

SIPOS – SUCCESS THROUGH INNOVATION

SIPOS is the market leader for variable speed electric actuators. Since the formation of the company in 1999, a culture of innovation has been one of the critical success factors for the business. This ethos is enhanced by developing actuators which anticipate the customers' needs of tomorrow.

EMPLOYEES – THE MOST VALUABLE ASSET

Sustainable company success can only be achieved by a strong team - this is our greatest conviction. For this reason we focus on training our staff to enhance their expertise. Personal development has become a vital ingredient of the SIPOS success story. In this way we retain our pioneering approach, offer innovative high quality products and provide a personal service.

DYNAMIC COMPANY – GREAT PEDIGREE

Success requires both a detailed understanding of the market place and expertise in product development. SIPOS Aktorik was formed from the electric actuator division of SIEMENS AG. With this heritage, we draw on over 100 years of experience in this sector.

SIPOS SEVEN – THE NEW GENERATION OF ACTUATORS

The SIPOS SEVEN sets a new benchmark in flexibility, cost effectiveness, and reliability of electric actuators. It enables designers, valve manufacturers and plant operators to work more efficiently than ever before.

STAY AHEAD. STAY SIPOS

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04 SIPOS SEVEN
The fact sheet

SIPOS SEVEN:
The new generation of variable speed electric actuators
The new benchmark

SIPOS SEVEN:

- A product range with three models to suit all applications

ECOTRON	PROFITRON	HiMod

- All types of valves can be automated
- Advanced design based on proven SIPOS actuator technology

Intelligent valve protection:

- Soft start and stop in the end positions
- Cut-off without excessive torque
- Avoidance of water hammer and cavitation
- Selection of optimum positioning speeds

Unique frequency controller:

- Complete speed control
- Speed variation at any time
- Continuous torque irrespective of voltage fluctuation
- Accurate position control
- Minimized spare parts inventory due to modular design
- No surge start-up current

Unique user interface concept:

- Large color display: easy legibility even from a distance
- Screen orientation can be rotated in 90° steps
- Intuitive menu navigation, user selectable language
- "Drive Controller": single, hermetically sealed control button for all functions
- No external software required for parameterization

USB port:

- Simple upload/download of parameter values
- Diagnostics and process control set-up possible without mains power supply
- Easy cloning of spare devices

Reliable operation:

- Double sealing protects electronics from ingress of dust and water
- Temperature measurement and monitoring of electronics and motor
- Proven reliability for long product life
- Multi-level password protection
- Time stamped event logging

Control options:

- Analog
- Binary
- Fieldbus
- HART

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Flexibility in action

Adaptable actuation

Wide range of applications for all control systems in the power, water and industrial market segments.

Demanding duty

Designed in compliance with EN 15714-2 for duty classifications A,B,C, and D: actuators for OPEN-CLOSE, inching/positioning, modulating and continuous duty.

Control capability

Compatible with all control systems: binary, analog, fieldbus and HART.

Flexibility

For all types of valves: connection and adaptation to all globe, gate, butterfly and ball valves.

Rugged reliability

Reliable in any mounting position, withstanding the harshest environmental conditions: IP68 enclosure protection, corrosivity category C5 in compliance with EN 15714-2/EN ISO 12944-2 (C5 for extremely long protection duration optional).

Mounting versatility

If ambient conditions make it necessary, the electronics unit can be mounted separately from the gear unit quickly and easily.

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08 Product portfolio

Actuators to match your application

SIPOS actuators are available to suit all process engineering challenges and all torque requirements, irrespective of the size:

For efficient planning: complete information for every actuator is available – ordering data, dimensional drawings, wiring diagrams, spare parts lists, technical data, instruction manuals, certificates and the complete catalog.

9 – 60 Nm

Shown in ECOTRON version

37 – 250 Nm

Shown in PROFITRON version

150 – 4,000 Nm

Shown in HiMod version

Product selection program

Menu-driven product configuration either on-line or via USB flash drive

Detailed product selection is supported by our product selection program. This is also available on USB flash drive or can be accessed via our website www.sipos.de. After product configuration the relevant wiring diagram, dimensional drawings and technical data sheets are available for all products.

Product portfolio
Add-on gearboxes

By combining the SIPOS SEVEN rotary actuators with add-on gearboxes they become ...

... **linear actuators** for automating gate and globe valves.

COMBINATIONS WITH LE LINEAR THRUST UNITS
– Thrusts: 3.8 – 217 kN
– Strokes up to 500 mm
– Positioning speeds 20 – 360 mm/min

... **part-turn actuators with base and lever** for automating butterfly valves with lever arrangement.

COMBINATIONS WITH GS LEVER GEARBOXES
– Torques: 150 – 45,000 Nm

... **part-turn actuators** for automating butterfly, plug and ball valves.

COMBINATIONS WITH GS PART-TURN GEARBOXES
– Torques: 150 – 675,000 Nm

... **rotary actuators with increased output torque**. Customized solutions to suit special applications and system requirements are possible.

COMBINATIONS WITH GST, GK AND GHT MULTI-TURN GEARBOXES
– Torques: up to 120,000 Nm

Rotary actuators can be customized to suit linear, part-turn, lever, or multi-turn gearboxes. The parameters of the most common gearboxes are included in the SIPOS SEVEN operating software: the appropriate gearbox type can be chosen by means of the »add-on gearbox« menu selection.

The matching actuator is automatically adapted to match the gearbox type parameters. If the gearbox fitted is not included in the options displayed, gearbox parameters can be input directly into the SIPOS SEVEN.

Other SIPOS Aktorik products

	Small part-turn actuators
2SQ7... –	for direct or lever mounting 70 – 150 Nm Duty classes A, B, and C
	High precision part-turn and lever gearboxes
2SP7... –	125 – 1,350 Nm
	Double motor actuators
M76348 –	for modulating duty 750 – 3,000 Nm
	Rotary actuators for nuclear applications
M763.1 –	for ON-OFF duty
M763.2 –	for modulating duty

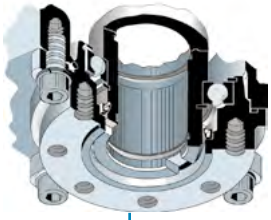
10 Product portfolio
Valve attachments

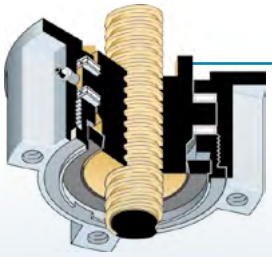
SIPOS SEVEN – with variable mechanical interfaces for all valves

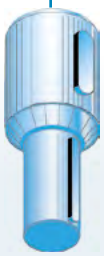
Rotary actuators are available with flange connections and couplings according to EN ISO 5210, DIN 3338, or DIN 3210.

The output shaft for rotary actuators is designed as a B1/B hollow shaft. The torque is transmitted to the valve via a featherkey. Other output shaft types are achieved by means of inserts or extension modules.

Various types of mechanical interfaces are available to create the perfect match for connecting actuators and valves:







A output shaft*
Stem nut for rising, non-rotating valve stems. The rotary movement of the actuator is converted into linear movement of the stem by means of a stem nut (spindle nut). This type of shaft is available with trapezoidal thread according to DIN 103. The output mounting flange with stem nut and axial bearings is capable of withstanding thrust.

B2, B3, B4, and E output shafts
An insert with bore and featherkey is slotted into the B1/B hollow shaft. As with the B1/B hollow shaft, the torque is transmitted to the valve by means of a featherkey.

C output shaft
Hollow shaft with claw coupling inserted into the B1/B hollow shaft. The torque is transmitted to the valve by means of the claws.

D output shaft
A free shaft end with featherkey inserted into the B1/B hollow shaft. The torque is transmitted to the valve by means of the featherkey.

*Also available in spring-loaded version (AF output shaft).

The output shaft types A, B1, and C or A, B, C (if in accordance with DIN 3210) are suitable as hollow shafts for rising spindles. Spindle protection tubes can be supplied in different lengths.

Product portfolio
ECOTRON, PROFITRON and HiMod features

ON-OFF or modulating duty – designed for every process

SIPOS SEVEN actuators are available as ON-OFF and modulating actuators.

According to EN 15714-2, the actuators are designed for:

- Class A: ON-OFF duty
- Class B: Inching-/positioning duty
- Class C: Modulating duty
- Class D: Continuous modulating duty

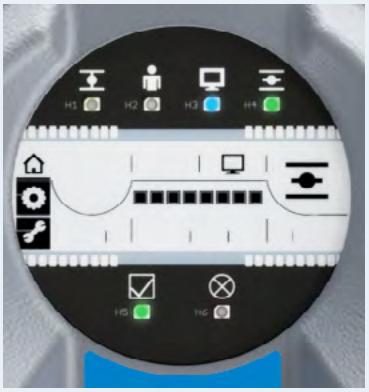
Three models to choose from

SIPOS SEVEN actuators are available in three options: ECOTRON, PROFITRON, and HiMod.

Common features

- Integrated frequency converter
- Electronically adjustable speed
- Electronic limitation of torque
- Numerous internal monitoring functions, including full motor protection
- Double seal protection of electronics against ingress of dust and water
- Simple commissioning with internal user guide
- Integrated power and control electronics
- Local control via Drive Controller

ECOTRON



The ECOTRON is particularly suited for ON-OFF applications as well as simple inching/positioning and modulating tasks.

PROFITRON

The PROFITRON is an excellent option for demanding modulating applications with special function requirements.

- Easy commissioning and menu-driven operation via graphic display
- Comprehensive software functionality
- External USB interface
- Bluetooth interface

HiMod

Equipped with all PROFITRON functions.
Specially designed for continuous duty applications or those requiring extremely accurate positioning.

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Product portfolio
HiMod for highest precision

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Precision in continuous duty: the SIPOS SEVEN-HiMod was developed to operate in conditions where the highest quality of control is an absolute prerequisite

The core design component is the »absolute position encoder« which the HiMod actuator uses to record the drive shaft position even during power failure. As a result, position changes occurring during power failure can be reliably detected and are signaled to the control system after power restoration. Battery supply is therefore not required.

High quality components, together with proven manufacturing processes, ensure reliable continuous actuator operation.

Reaffirming the quality of the actuator and its performance in the most rigorous environments, SIPOS Aktorik provides a five year guarantee on motor and gear parts - components that are most subjected to continuous wear-and-tear.

Especially suited for

- control valves
- boiler start-up valves
- dampers
- turbine regulation
- injector valves / desuperheaters
- feedwater pump control
- and other applications with demanding requirements

Main features

- **Precision:** max. 0.1 – 0.2 % tolerance of total travel
- **Continuous duty:** meets class D requirements of EN 15714-2
- **Reliability and robustness:** five-year warranty for both gear unit and motor
- **Double sealing:** protection in harsh environmental conditions
- **Commissioning:** non-intrusive and without tools or the need to open the actuator
- **Comprehensive software functions:** for smart process solutions

For HiMod actuators, SIPOS supplies suitably designed and precise part-turn and lever gearboxes 2SP7… with the highest levels of positioning accuracy.

14 Product portfolio
Features overview

		ECOTRON	PROFITRON	HiMod
INPUTS AND OUTPUTS				
Binary inputs 24 / 48 V	OPEN, CLOSE, STOP (galvanically isolated)	●	●	●
	EMERGENCY and Mode (galvanically isolated)		●	●
Binary control via permanent contact		●	●	●
Binary control via pulse contact			●	●
Proportional move (binary signal duration proportional to pos. time OPEN to CLOSE)			○	●
Binary outputs 24 / 48 V (galvanically isolated) with freely selectable assignment		5 ●	8 ●	8 ●
Relay outputs max. 300 V DC / 250 V AC (galvanically isolated)		5 ○	8 ○	8 ○
Analog control via setpoint input (positioner) 0/4 – 20 mA			○	●
Analog control via process controller 0/4 – 20 mA (2nd analog input)			○	○
Analog output (position feedback) 0/4 – 20 mA		●	●	●
Passive 24 V supply of the analog position feedback			○	○
Galvanic isolation of every analog input and output			●	●
Control mode selectable from remote			●	●
External 24 V supply of the electronics possible		●	●	●
Cable break monitoring		●	●	●
FIELDBUS INTERFACE				
PROFIBUS DP / Modbus RTU (1-channel optional with FO)		○	○	○
Modbus TCP/IP		○	○	○
HART			○	○
COMMUNICATION WITH PROGRAMMING TOOLS				
PROFIBUS: DTM for FDT, EDD for PDM and AMS		●	●	●
HART: EDD for AMS			●	●
COM-SIPOS PC program via	USB (non-intrusive for PROFITRON, HiMod)	●	●	●
	Bluetooth		●	●
SETTING AND PARAMETERIZATION				
Different tripping torques for OPEN and CLOSE (up to eight steps)		●	●	●
Adjustable output speeds	seven step	●		
	stepless		●	●
Different output speeds for OPEN, CLOSE, EMERGENCY OPEN, EMERGENCY CLOSE			●	●
Tripping (limit-/torque dependent)		●	●	●
Direction of rotation (clockwise-/counter-clockwise closing)		●	●	●
Non-intrusive (actuator commissioning without opening the actuator)		○	○	●
Retry torque block			●	●
Intermediate contacts in OPEN and CLOSE direction			●	●
Motor heating		○	●	●
Maintenance (maintenance intervals of the valve)			●	●
FURTHER SOFTWARE FUNCTIONS				
Split-range-function 0/4 – 20 mA (splitted signal controls different actuators)			○	○
Stroke dependent speed settings (for up to 10 stroke segments)			○	○
Analog speed setting 0/4 – 20 mA during operation			○	○
Stroke dependent positioning time setting (for up to 10 stroke segments)			○	○
Customer specific software			○	○
CONTROL AND MONITORING				
Local controls with only one control elements (optionally lockable)		●	●	●
Segment display (parameterization and commissioning via symbols)		●		
Menu-driven, graphical color display in many languages with status indication			●	●
LEDs for REMOTE, LOCAL, OPEN and CLOSE		●	●	●
Time stamped event logging and operational data			●	●
SAFETY				
Valve protection: soft start and soft stop in the end position ranges		●	●	●
Recording of torque curves of the valves (3 reference curves)			●	●
Measurement and monitoring of the motor temperature		●	●	●

○ = Option ● = Standard

Benefits

Frequency converter for optimal control

Variable speed performance by means of a frequency converter

Using a frequency converter allows complete control of the actuator motor including rotary direction, speed and torque. When combining the electrical actuators with the specially designed actuator controls, this feature offers a variety of benefits:

Planning flexibility

Local conditions often differ from those predicted during planning. Therefore, post install flexibility is an important feature of the SIPOS SEVEN. In addition, the continuously settable output speed for PROFITRON and HiMod (7 steps for ECOTRON) offers further flexibility for process optimization at a later stage.

Accurate position control

The positioner integrated in both the PROFITRON and HiMod makes use of the different speeds provided by the frequency controller: this enables rapid adjustment to large control deviations, due to setpoint peaks, and slower adjustment for small deviations.

Valve protection: careful end position approach

The SIPOS SEVEN operates with a fixed low speed in the end position ranges. Due to the low kinetic energy of valve, motor and gears, over-torque is avoided for torque dependent cut-off, which protects the valve seats.

High torque for unseating or deblocking

The SIPOS SEVEN is capable of deblocking or unseating valves by running at low speed and high torque for a short time. Even sluggish valves can be released again.

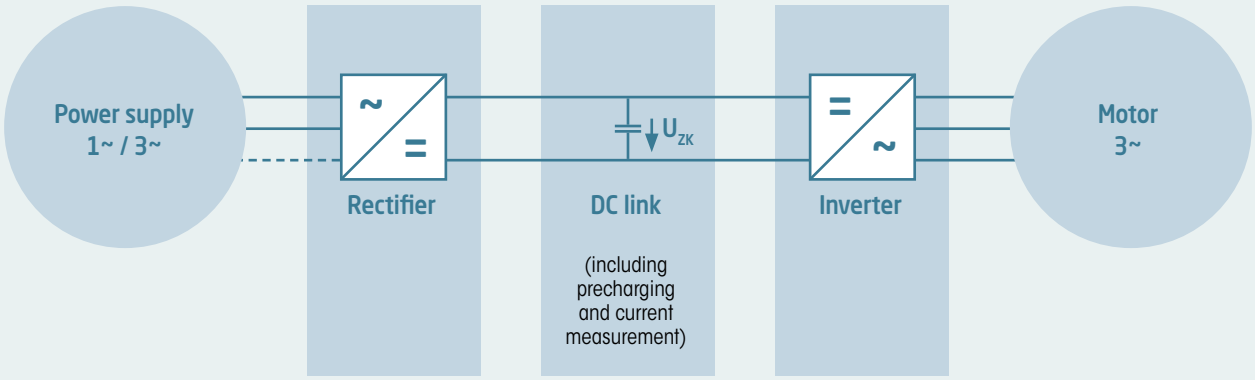
Voltage variation compensation

Voltage fluctuations of 30 % undervoltage to 15 % overvoltage can be accommodated without affecting the performance of the actuator. The specified torque is always produced ensuring that oversizing to allow for undervoltage events is not required.

No surge start-up current

No voltage drop over long cables. The SIPOS SEVEN does not suffer from current surge on start-up, therefore, cables and power supply components can be sized for the rated current. This can result in savings during the planning and installation phases.

Schematic of a frequency converter

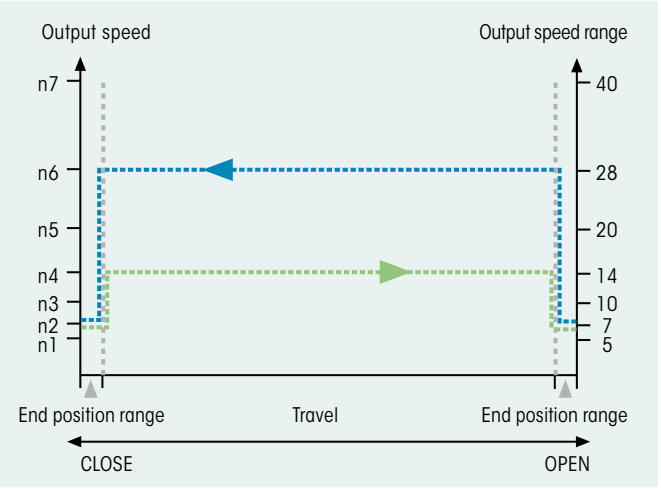


16 Benefits
Speed functionality

Speed reduction in the end positions

Powerful but gentle: valves are driven gently out of, or into, their end position with the application of pre-set levels of torque and prevent over-torque, even in the event of a blockage.

For every SIPOS SEVEN the output speed can be adjusted within the selectable speed ranges. While the ECOTRON version offers 7 steps, PROFITRON and HiMod feature continuously settable output speeds.

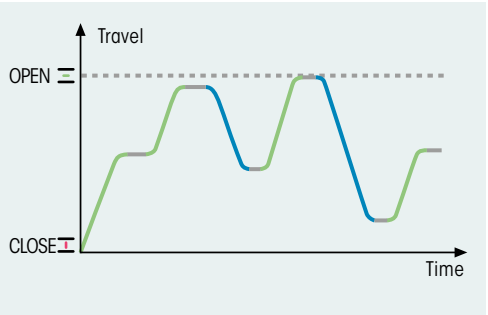


Reduced speed in the valve end positions: example with a speed range of 5 – 40 rpm, OPEN speed set to 14 rpm and CLOSE speed set to 28 rpm.

Change speed at any time

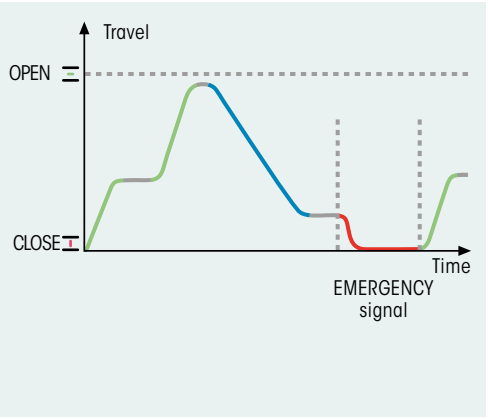
The speed can be changed at any time, even during operation.

This allows post install optimization of the valve positioning times without having to change the actuator motor.



ECOTRON

The graph shows the same operational speed in the OPEN and CLOSE directions.

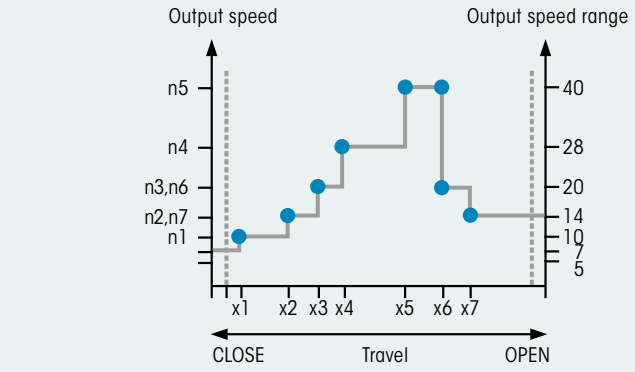


PROFITRON and HiMod

The graph shows that, in addition to different speeds for operation in the OPEN and CLOSE directions, it is possible to configure different speeds for EMERGENCY operation in both OPEN and CLOSE directions. When activating the EMERGENCY input, the actuator moves the valve to the selected EMERGENCY position at the previously configured speed.

Benefits
Extended speed functionality

OUTPUT SPEED SETPOINT CURVE

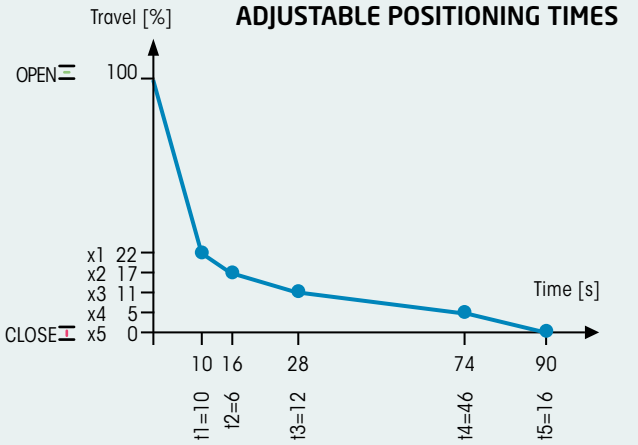


Stroke - Speed curve

Where processes are complex, it is desirable to achieve proportionality between valve travel and the flow-rate of the medium. The SIPOS SEVEN PROFITRON and HiMod facilitate this by changing the speed during transition from OPEN to CLOSE and vice versa.

Depending on travel requirements, different speeds can be specified at up to a maximum of 10 interpolation points to define a speed/travel characteristic curve.

ADJUSTABLE POSITIONING TIMES

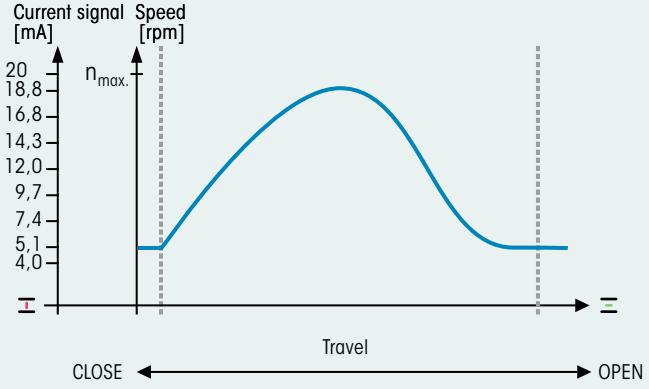


Stroke - Time curve

By specifying up to 10 value pairs, comprising travel position [%] and positioning time [s], the desired positioning time for the given section of travel can be set.

This function is primarily used to prevent or minimize water hammer / pressure transients.

EXAMPLE OF OUTPUT SPEED CONTROL



Analog speed control

This function allows the SIPOS SEVEN to be operated at different speeds without requiring reconfiguration during operation.
The output speed is stipulated by a 0/4 – 20 mA signal at the actuator analog input.

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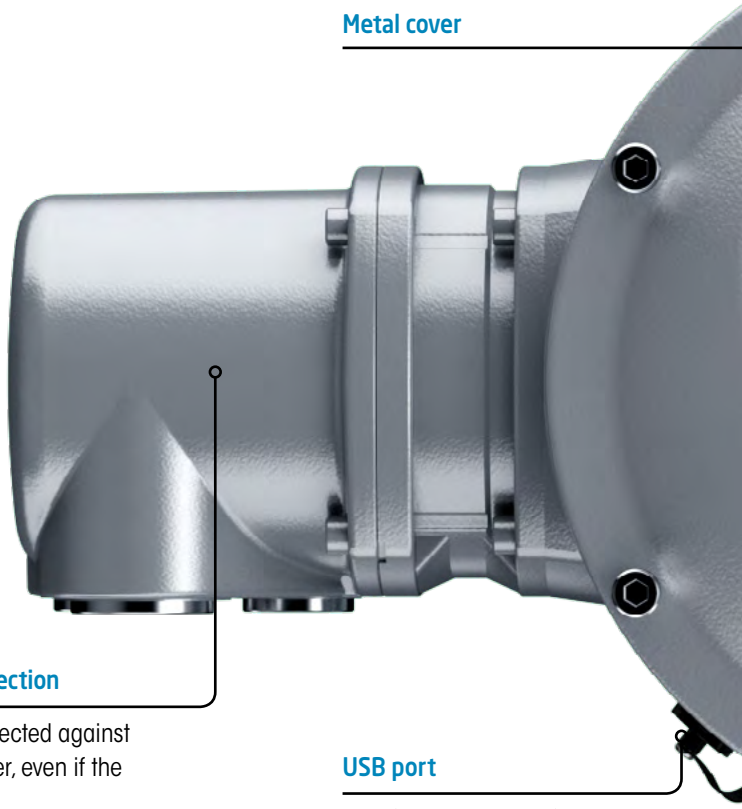
Details

SIPOS SEVEN actuators are extremely robust

They work reliably wherever they are installed, even under harsh ambient environmental conditions.
All the actuators offer an IP68 protection in accordance with EN 60529 and corrosivity class C5 in accordance to EN 15714-2.

For harsher environmental conditions, the actuator is available with a heavy-duty anti-corrosion coating (C5 for 'long protection time').



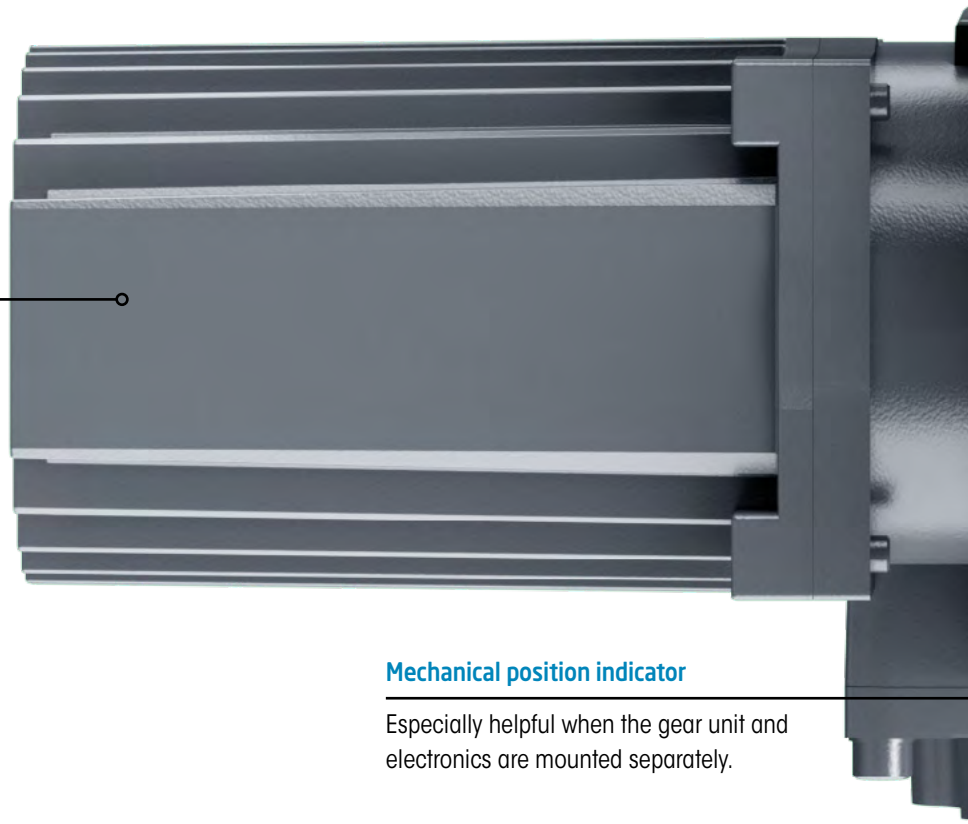
Metal cover

Plug-in electrical connection

Electronic parts are protected against ingress of dust and water, even if the connector is removed.

USB port

Multifunction access for commissioning, diagnostics, and service.



Housing material

This consists of a special, extremely corrosion resistant aluminum alloy. Characterized by its high strength, comparable with ductile cast iron, the material is also extremely light.
Under normal atmospheric conditions, the SIPOS SEVEN can even be used outdoors without paint protection.

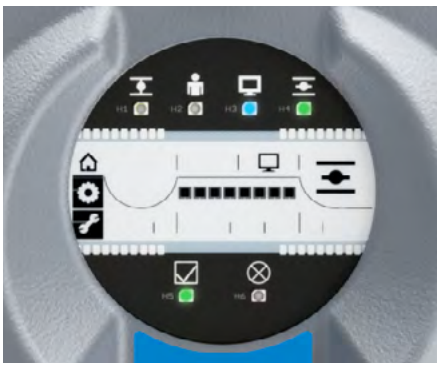
Mechanical position indicator

Especially helpful when the gear unit and electronics are mounted separately.

Indicator glass

Extremely robust. Ensures clear visibility of the display.

Multicolor graphic display with status indication



ECOTRON segment display

Clearly segmented display including six status LEDs.

Drive Controller

A single, hermetically sealed, control button for all functions.

Locking device

The locking device can be used to protect the actuator against unauthorized operation.
In addition, user access to different functions can be defined via pin codes.

Hand crank/hand wheel

Can be locked to prevent unauthorized use.

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Details

Round plug

Motor and control cables are connected by a 56-pin connector element which uses screw-type terminals to ensure reliable electrical contact. If the connection has to be removed for maintenance work, the wiring is always retained.

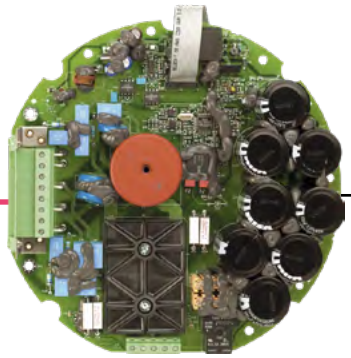
Fieldbus connection

Simple connection of the fieldbus cables to the separately accessible fieldbus termination PCB.
Mains and control cables are connected in the same way within the round plug.

Relay board

ECOTRON control PCB

PROFITRON control PCB



Power control PCB

USB port

A state of the art communication interface in the actuator.

Asynchronous motor

Driving force in the SIPOS SEVEN is provided by an asynchronous motor.

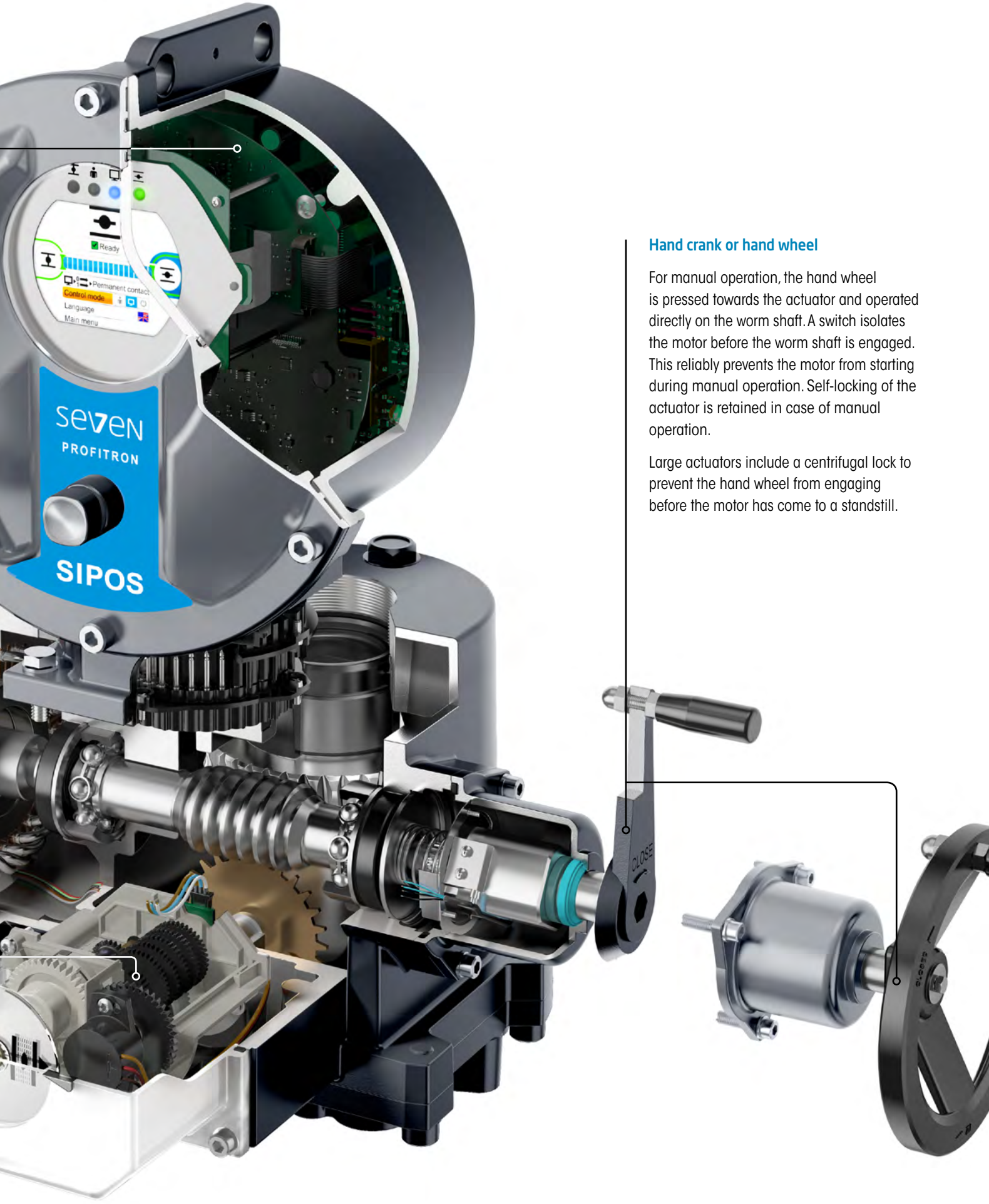
These are the premier option for electric motors combining robustness, reliability, and operational safety with their straightforward design.

Force is transmitted directly to the worm shaft without intermediate gears.

Signaling gear or »non-intrusive« position encoder

For the ECOTRON and PROFITRON versions a precision potentiometer is operated by means of the signaling gear to detect the current position of the valve. The signaling gear reduces the rotary movements of the output shaft to less than 300° for a full stroke from OPEN to CLOSE. The signaling gear can be set to a value between 0.8 and 4,020 revolutions per stroke without any tools.

As an option, the ECOTRON/PROFITRON actuator can also be equipped with a »non-intrusive« position encoder (standard for HiMod).



Hand crank or hand wheel

For manual operation, the hand wheel is pressed towards the actuator and operated directly on the worm shaft. A switch isolates the motor before the worm shaft is engaged. This reliably prevents the motor from starting during manual operation. Self-locking of the actuator is retained in case of manual operation.

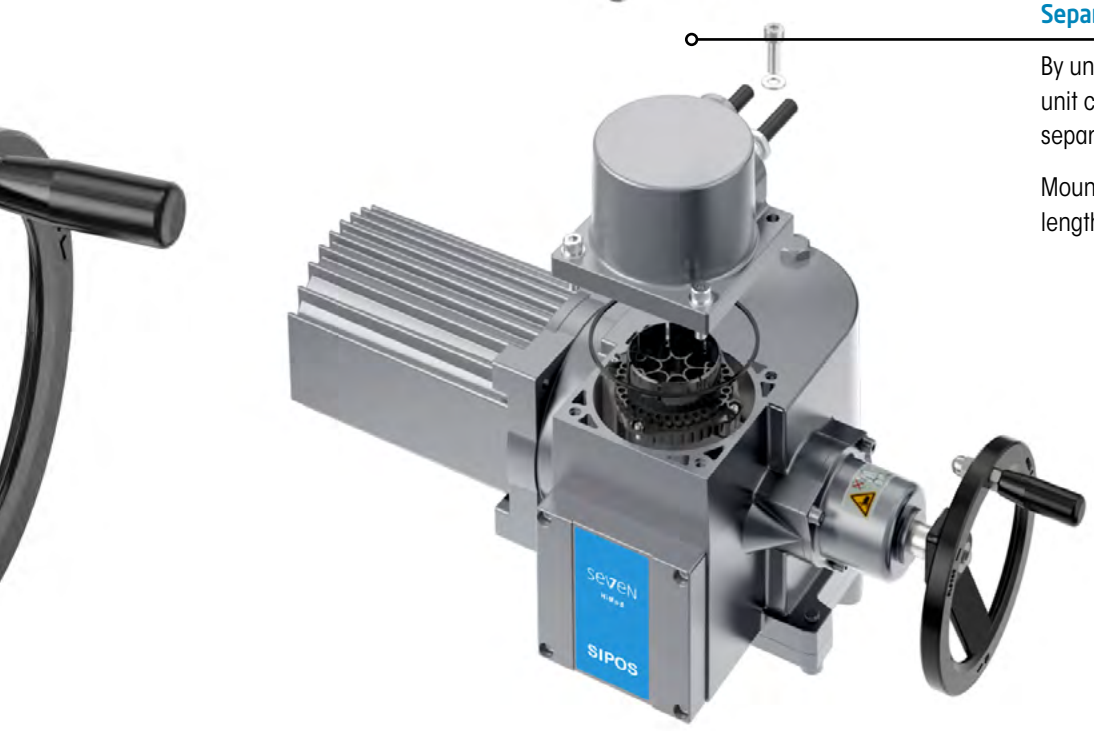
Large actuators include a centrifugal lock to prevent the hand wheel from engaging before the motor has come to a standstill.

SIPOS SEVEN
Details

Separate mounting

By undoing only four screws the electronics unit can be detached and installed separately from the gear unit.

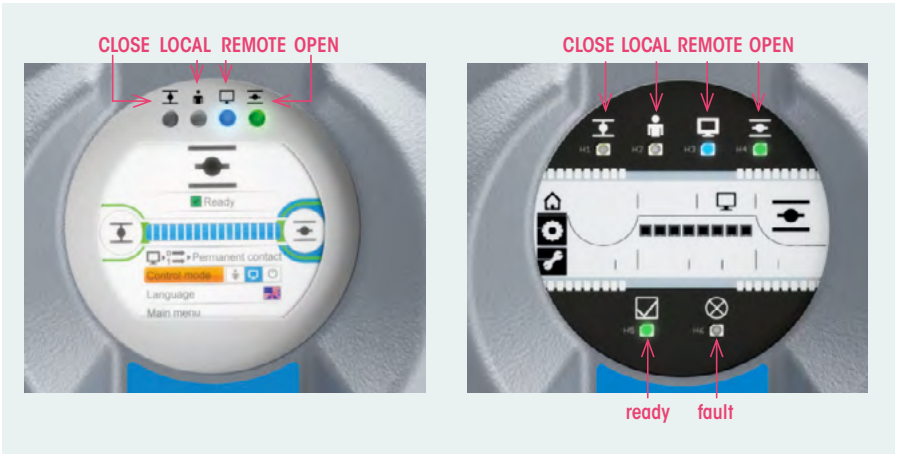
Mounting kits can be supplied with cable lengths up to 150 m.

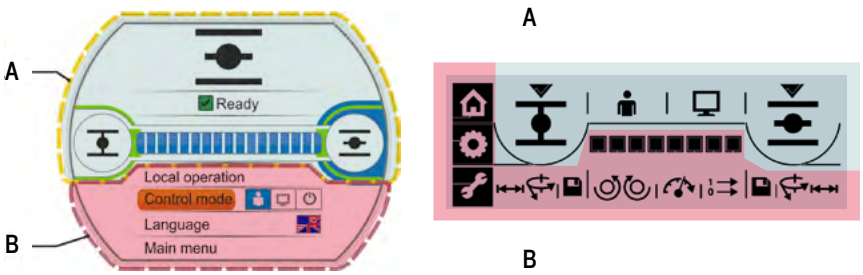


24 Operating concept
Display & Drive Controller

The Display and Drive Controller form a perfect team

All the functions of the actuator can be controlled using the Drive Controller. No additional software is required for configuration. The display provides intuitive menu navigation.





A = The upper section provides actuator status information.
B = The lower section shows the start menu, which allows access to the different operating and parameterization menus.

The display is illuminated automatically: the backlight brightens as soon as the Drive Controller is operated. If no operation is performed it returns to its stand-by state after a short time.

PROFITRON and HiMod display features

- Large color display: easy to read even from a distance
- Screen orientation can be changed in 90° steps: display remains easy to read in any position
- Detailed instructions with animations: simple commissioning and operation

ECOTRON display features

- Easy to read segment display with six status LEDs

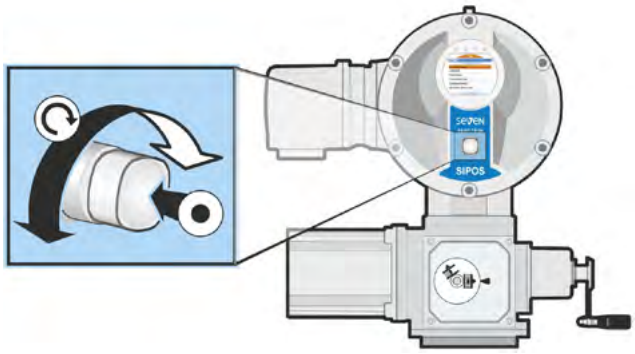
Drive Controller features

- Single control button for all functions
- Easy and intuitive operation
- Non intrusive comissioning
- Hermetically sealed housing

Operating concept
Drive Controller

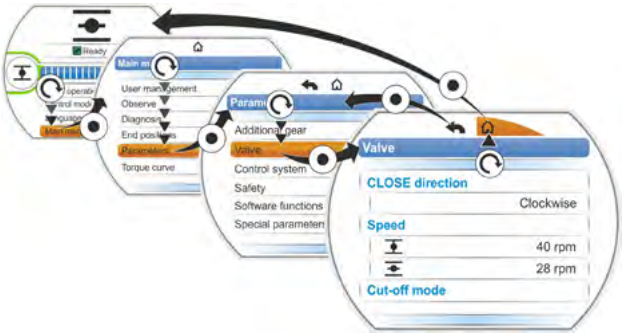
Drive Controller

Single control button for all functions



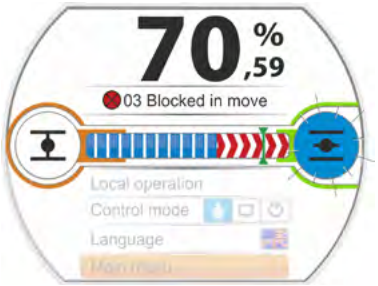
Navigation

Simply turn (◎) and push (◉)



The status display

Everything at a glance



Either/or setting

Selection between two parameter values/properties

Step-by-step setting

Changes in specified steps

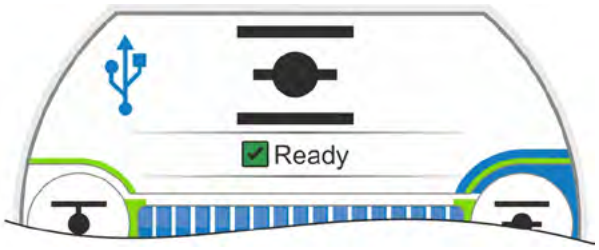
Value setting

Entry of parameter values as numbers

26 Communication
USB port and Bluetooth

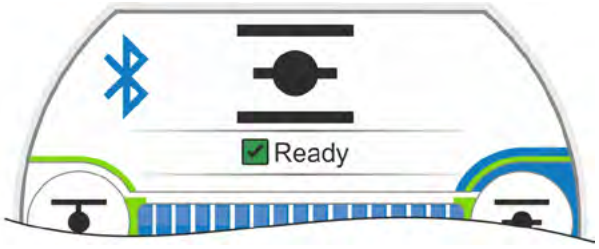
PROFITRON
HiMod

Communication without opening the device using USB or Bluetooth



USB connection features:

- Connection via USB stick or via USB cable to laptop
- Fast and easy upload/download of parameter values
- Process control set-up possible without mains power supply
- Easy cloning of spare devices
- Firmware update
- Interface in protection degree IP68
- Communication is indicated on the display with the flashing USB symbol



Bluetooth interface features:

- Non-contact addressing of actuators over longer distances
- Clear identification of actuators
- Easy upload/download of parameter values
- Firmware update
- Communication is indicated on the display with the flashing Bluetooth symbol
- Can be deactivated

Communication

COM-SIPOS communication software

System visibility

COM-SIPOS, in addition to providing download capability for all parameter values and diagnostic data, gives the opportunity to view the SIPOS SEVEN functions and numerous setting options in clear, topic related menus.

Commissioning

All setting data is visible at a glance, easy to edit and straightforward to upload to the actuator by a simple mouse click.

Control and Monitoring

In addition to the dynamic control signal status, the »Control and Monitoring« menu allows tracking of the actuator's behavior. Furthermore, it is possible to directly operate the actuator via COM-SIPOS.

Operational data logging

All important actuator operational data is continuously monitored and saved. It can be easily read using COM-SIPOS.

Actuator diagnostics

The actuator status is visible at a glance. In addition to any fault signals, the actuator saves the time-stamped fault history and event logging. This allows rapid identification and remedy of any faults.

System/actuator documentation

After successful commissioning, any downloaded data relating to the actuator can be saved for documentation purposes in a file or printed as a summary sheet.

Optimization of actuator and system

To make best use of all available features, COM-SIPOS offers optimization of actuator parameters such as positioning time, braking effects or acceleration ramps while observing actuator behavior.

The »Simulation Mode« allows monitoring of the communication to the respective control system while simulating actuator feedback signals.

28 Control

Control modes overview

The SIPOS actuator is more than the »interface« between the control system and the valve

The control commands, transmitted as binary, analog signals or via fieldbus, are processed intelligently by the actuator and used to operate the valve. In turn, the control system (DCS) expects a feedback signal from the actuator.

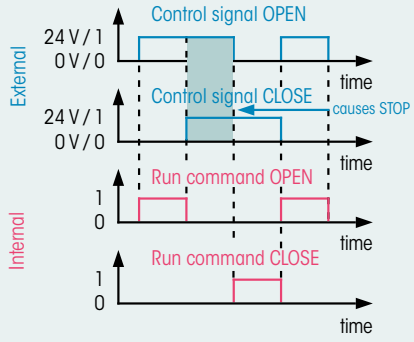
The feedback signal can be a pure status message via binary output signals (e.g. torque OPEN/CLOSE, end position OPEN/CLOSED, fault, etc.) or a feedback signal containing dynamic data (e.g. valve position) via the analog output.

All static and dynamic data is always available via fieldbus.

Control

Control modes overview

Binary permanent contact



Conventional

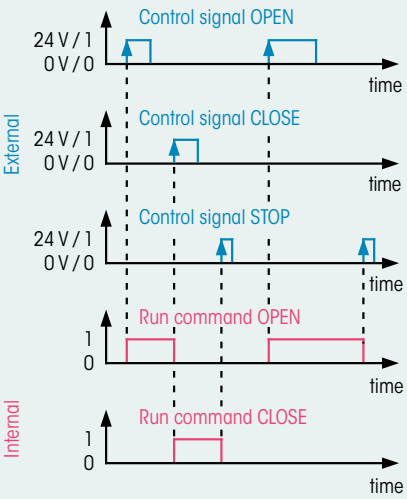
As long as an OPEN or CLOSE command is active, the actuator will move the valve in the requested direction.

If no control command is active, or OPEN and CLOSE signals are emitted simultaneously, the actuator will stop.

Proportional move

Control mode for the most demanding applications. Positioning and accuracy similar to a stepper motor control. The actuator also operates for extremely short control commands proportional to the length of the control command. Ideal for step controller applications for the smallest positioning steps.

Binary pulse contact

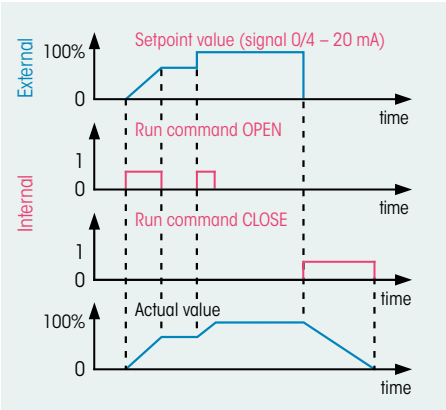


The actuator is controlled via the binary OPEN or CLOSE pulse (minimum 10 ms).

The actuator moves in one direction until a new signal is issued for the opposite direction, the control system sends a STOP command or if the valve end position is reached.

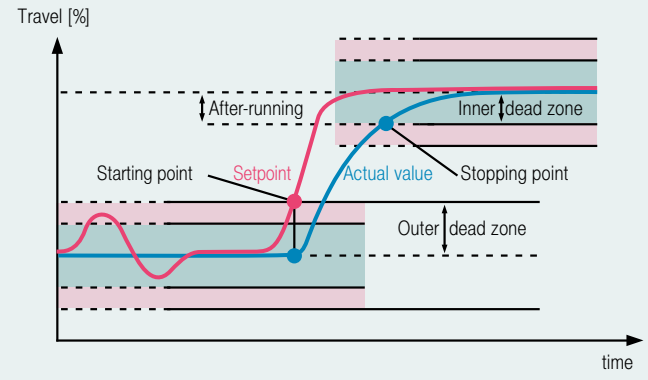
Analog value setpoint

Using an integrated positioner, the actuator can change the valve position proportionally to the setpoint indicated by the analog input signal (0/4 – 20 mA).



30 Control
Control functions

POSITIONER



leaving outer dead zone
determines time of starting

reaching inner dead zone
determines time of stopping

Positioner

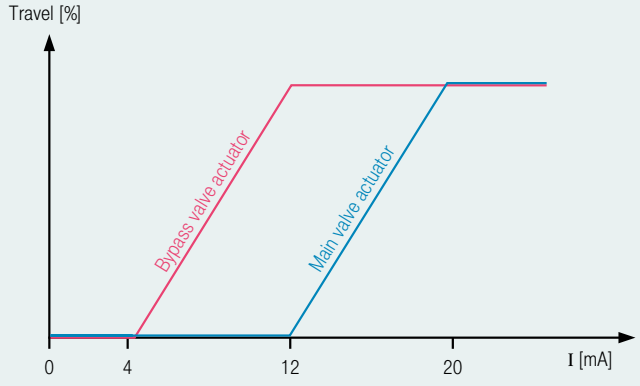
Adaptive three-step controller: optimizes the process and relieves the valve

The integrated positioner of the SIPOS SEVEN PROFITRON and HiMod is an adaptive three-step controller, i.e. the dead zone is always modified based on the quality of the setpoint and actual value signals. A fixed setting is also possible.
This ensures the greatest possible control accuracy with minimum switching frequency, thus optimizing the process and reducing switching cycles to protect both valves and pipelines from wear.

Additional features of the positioner:

- Soft start and electronic braking
- Speed reduction before reaching the setpoint
- Possible overrun is evaluated and avoided

POSITIONER WITH SPLIT RANGE FUNCTION



Example:
Controlled within analog control signal range 4 – 12 mA
Controlled within analog control signal range 12 – 20 mA

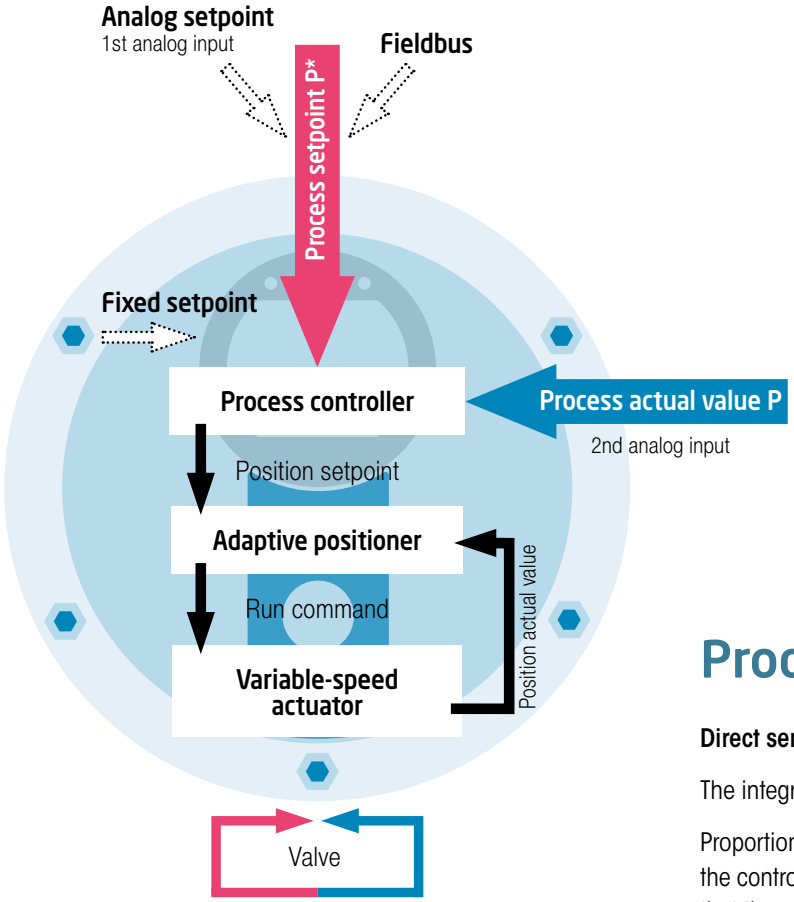
Split range function

Split analog signal: controls actuators operating together

For applications with a wide flow range, e.g. with flow regulation through large pipes, the limits of controlling single control elements can rapidly be reached, since the desired accuracy over the entire flow range cannot be provided. In these cases a split-range arrangement proves beneficial as the controller output signal is divided among two (or more) actuators.

This function can also be used to normalize the effective control range of a valve (e.g. 20 – 80 %) to the input signal (e.g. 4 – 20 mA).

Control
Control functions



Process controller

Direct sensor feedback: automatic actuator control

The integrated process controller is a classical PI controller.

Proportional gain Kp and the reset time Tn can be adjusted. When the controller output limit is reached, the I-portion will be adjusted so that the controller can release itself from the limit at any time.

The following control types are available:

- Conventional process controller:
  The setpoint is generated from an analog input (0/4 – 20 mA).
- Fieldbus process controller:
  The setpoint is generated via fieldbus.
- Process controller with fixed setpoint:
  The setpoint is configured internally as fixed setpoint (0 – 100 %).

32 Control
Fieldbus interfaces

PROFIBUS DP

PROFIBUS DP is readily available worldwide. It provides exceptional device availability through proven security mechanisms and efficient high-speed data exchange, ensuring rapid communication.

SIPOS SEVEN supports the following PROFIBUS DP functions:

- Basic functions **DP-V0**
- Functional level **DP-V1**
- Functions of level **DP-V2**

Functions of level DP-V2 support time stamp and slave redundancy according to the RedCom profile.

HART

HART (Highway Addressable Remote Transducer) is an open protocol for bidirectional data exchange between control system and field device, enabling both analog and digital communication at the same time.
HART always requires an analog current signal 4 – 20 mA for data exchange. Higher frequency, digital HART signals are superimposed by means of an FSK (frequency shift keying) modem.

Modbus RTU

Modbus RTU is a relatively straightforward fieldbus protocol for simple communication between the master control station and slaves (actuators, sensors).
SIPOS actuators support the RTU version.
All process data access and assigning of all actuator parameters is supported by the Modbus RTU slave connection in the SIPOS SEVEN. Additionally, actuator information can be read.
In common with PROFIBUS, the physical connection is made via RS-485 or fiber-optic cables.

Modbus TCP/IP

Same as functionality as **Modbus RTU**.

The physical connection is performed via an external M12 connector in Ethernet physics.

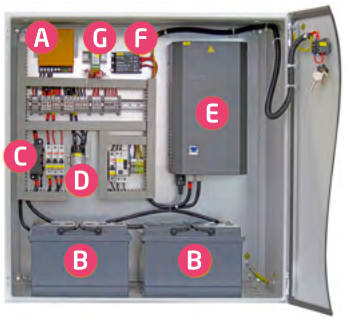
Control system integration

Although control availability is the fundamental requirement, easy control system integration must also be ensured. Specific parameters and data formats must be made available and fully integrated within controls and process control equipment.

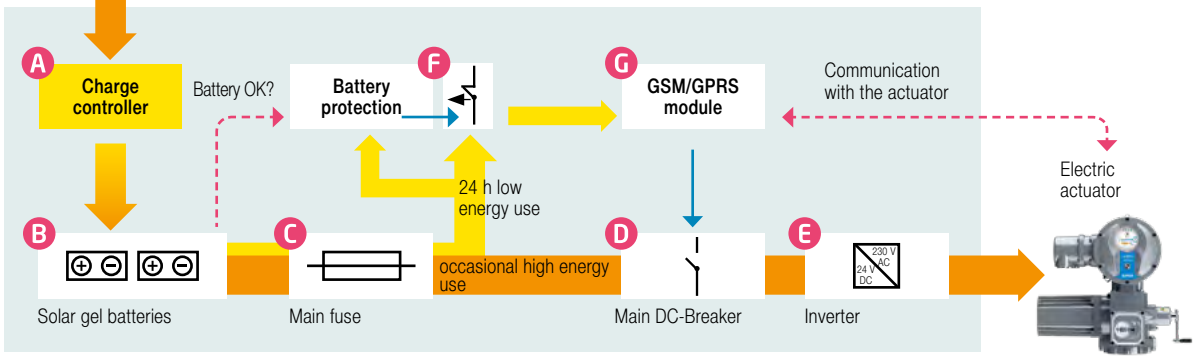
The SIPOS SEVEN provides this compatibility:

- Device master data file (GSD)
- Electronic device description (EDD)
- Device type manager (DTM) for FDT interface (field device tool)

Specialized applications
Stand-alone solutions



Functional principle
Solar switching cabinet



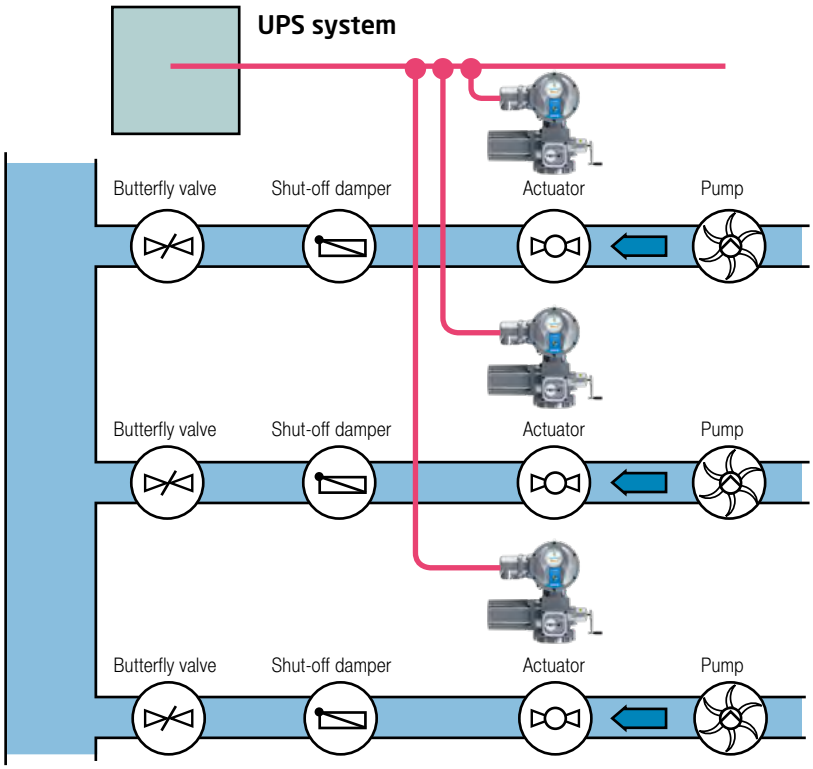
Solar systems

Applications requiring mains-independent solutions are closely linked to power and economic efficiency. Combining the SIPOS SEVEN with a solar system produces the perfect low power solution. This can be used in numerous applications including agricultural irrigation, drinking water supply/distribution, surface water collection reservoirs and for controlling throughput in pipelines.

Simple independence:

- Full SIPOS SEVEN functionality offered for solar operation
- Standard 230 V actuators are used: costly 12 V/24 V motor technology is not required
- Solar system location is independent from the place of installation of the actuator
- A centralised solar system can supply several actuators

34 Specialized applications
»fail safe« applications



UPS

The SIPOS SEVEN is ideally suited for use with battery back-up uninterruptible power supply (UPS) systems. They are used wherever the risk of power supply failure has to be considered. Such safety requirements can be found in many applications including flood protection, mining, drinking water supply, wastewater treatment and district heating.

Economic viability

Starting current is always less than, or equivalent to, the rated current: With SIPOS actuators significantly smaller UPS systems are therefore required compared to conventional actuator power supplies.

Lower actuator power consumption in stand-by mode: subject to equipment specification less than 150 mA.

Most frequent uses:

Single phase AC SIPOS actuators with proven and cost-efficient single phase UPS systems.

Control possibilities:

- Controlled shut-down of the system
- Driving to a safety position
- By-passing a short-term power failure

Services
At your service

A GOOD STARTING POINT

We are your partners for mounting and installation of our actuators.

SAFE START

We ensure smooth commissioning of our actuators.

SAFE OPERATION

We are available for preventive maintenance and regular inspections.

RAPID SUPPORT

In the unlikely event that repair, maintenance work or elimination of malfunctions is required, we are your ideal service partners on site.

PROCUREMENT ADVICE

When needed, spare parts delivery has to be fast. We advise on the optimum inventory of basic spare parts. Due to the modular design of our actuators, spare parts inventory is kept to an absolute minimum.

SAFE MAINTENANCE

Our revision service will support you to efficiently comply with safety standards and legal regulations.

TAILORED OPTIMIZATION

Changing demands may require optimized processes necessitating automation, modification or retrofitting of our actuators. We assist you in implementing customized solutions.

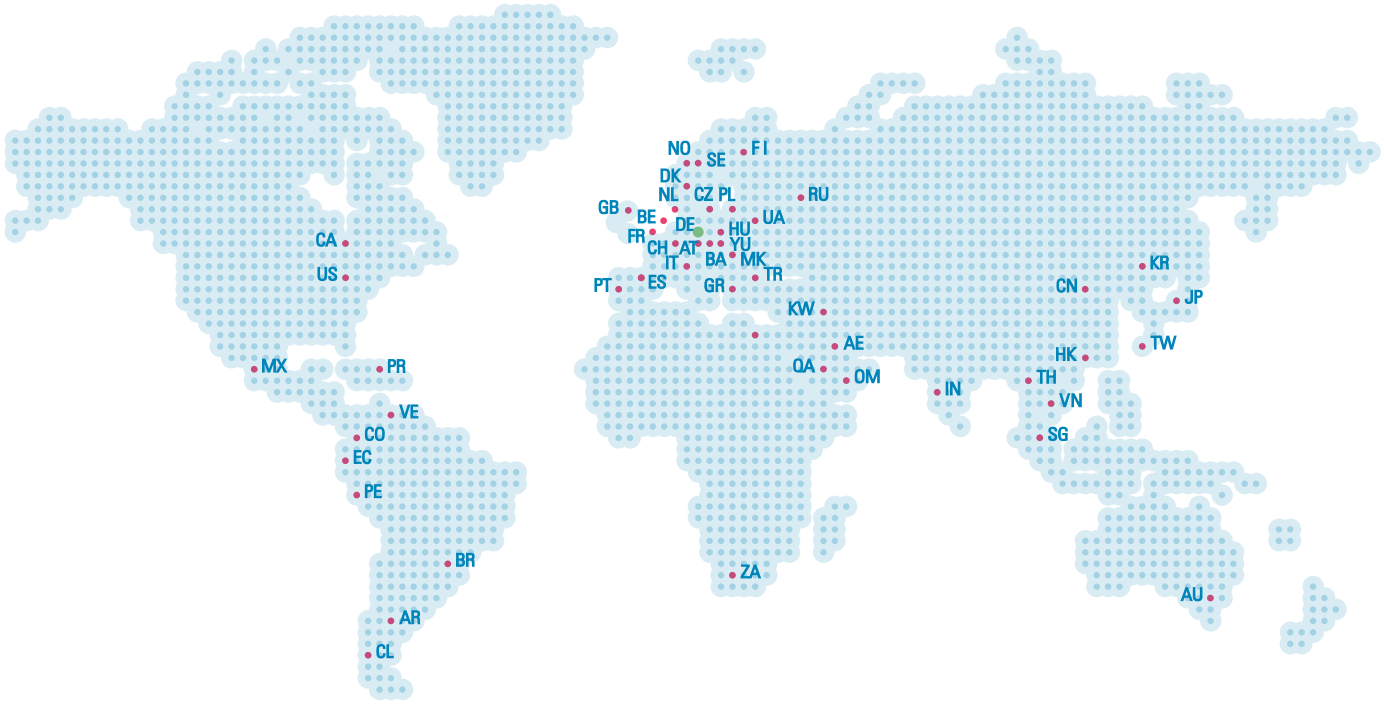
COMPETENCE AND EXPERTISE

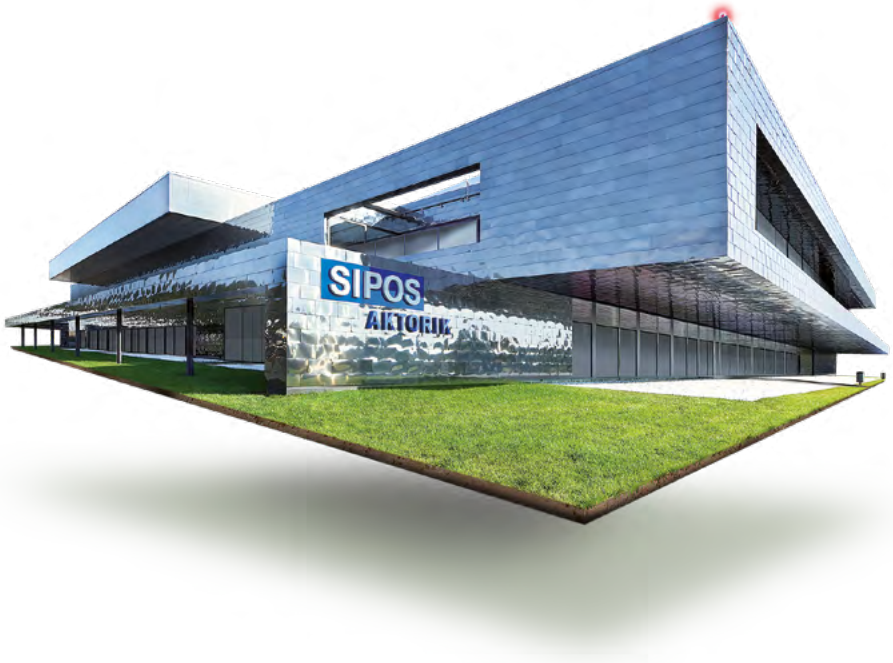
We share our expertise and extensive industry knowledge with you. To this end we regularly organize product and service training as well as on site support.

auma®
Solutions for a world in motion

SIPOS AKTORIK
A member of the AUMA Group

The leader in variable speed electric actuators





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