



Shut-off dampers

AK



TROX[®] TECHNIK

The art of handling air

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CD10037, 1, GB/en

12/2023

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1 Safety

1.1 Correct use

Type AK shut-off dampers are used to shut off the volume flow rate in ventilation systems within closed rooms.

Type AK shut-off dampers can also be used in ventilation systems with chemical contamination (e.g. point extraction or extract air from laboratory fume cupboards). The material design of the unit must meet the requirements of the air pollution. Depending on the composition and concentration of the polluted air, the shut-off damper can be chosen from galvanised steel (standard construction), powder coating (P1) or stainless steel (A2).

In kitchen exhaust air systems, the shut-off damper may only be used if it is ensured that the extract air is cleaned as well as possible by highly effective aerosol separators, see VDI 2052.

Incorrect use

WARNING!

Danger of injury or risk of damage to property due to incorrect use!

Misuse of the unit can lead to dangerous situations.

Never use the unit:

- in areas with potentially explosive atmospheres (EX)
- in aircraft
- outdoors without sufficient protection against the effects of weather
- In wet areas
- for areas of application that are not described in this manual

Modifying the unit or using replacement parts that have not been approved by TROX is not permitted.

1.2 Dangers when handling the unit

The unit is a state-of-the-art product and meets current safety requirements. Residual risks cannot be excluded, however, and you should proceed with caution. This section describes the residual risks that have been identified in a risk assessment.

Always follow the safety notes in this manual to reduce health hazards and prevent any hazardous situations.

1.2.1 Electric shock hazards

Electric current

DANGER!

Danger of death due to electric current!

Contact with live parts poses an immediate danger to life due to electric shock. Damaged insulation or damaged parts are a life threatening hazard.

- Work on the electrical system must only be carried out by skilled qualified electricians.
- If the insulation is damaged, disconnect the power supply immediately and have the insulation repaired.
- Before you start working on electric systems and equipment, switch off the supply voltage and secure it against being switched on accidentally. Comply with the following safety rules:
 - Switch off the supply voltage.
 - Secure it against being switched on accidentally.
 - Ensure that no voltage is present.
 - Connect to the earth; short circuit connection.
- Do not bypass or disable any circuit breakers. Be sure to maintain the correct current rating when you replace a circuit breaker.
- Ensure that live parts do not come into contact with moisture. Moisture can cause a short circuit.

1.2.2 Dangers due to stored energy

DANGER!

Risk of injury due to stored energy.

Pneumatic actuators are pressurised and can cause the damper to move abruptly:

- Only qualified personnel may work on the pneumatic actuator.
- Switch off the compressed-air supply before working on any pneumatic equipment.
- After switching off the compressed-air supply, trigger the actuator to discharge the stored energy.

1.3 Qualified staff



WARNING!

Danger of injury due to insufficiently qualified individuals!

Incorrect use may cause considerable injury or damage to property.

- Only specialist personnel must carry out work.

The following degrees of qualification are required for the work described in the operating manual:

Skilled qualified electrician

Skilled qualified electricians are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to work on electrical systems, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.

1.4 Personal protective equipment

Personal protective equipment is equipment that protects the user against health or safety risks at work.

Personal protective equipment must be worn for various types of work; the protective equipment required is listed in this manual together with the description of each type of work.

Description of personal protective equipment

Safety shoes



Safety shoes protect the feet against crushing, falling parts, and slipping on slippery ground.

1.5 Repair and replacement parts

The devices must be repaired by qualified personnel using genuine replacement parts only. This particularly applies to work on the electrical equipment. For safety reasons, defective devices should therefore be repaired by the TROX Technical Service, [linktarget \[Kundendienst Betrieb\]](#)

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1.6 General safety measures

Large temperature differences

Be careful when there is a large temperature difference. If the unit has been kept in an unheated area, wait two hours before switching on the supply voltage. Condensation may damage the electronic components beyond repair. Only after about 2 hours will the system have reached room temperature.

Foreign matter and liquids

Be careful when objects or liquids have got into the casing, or if the unit emits a smell or smoke. Decommission the unit and have it checked by the manufacturer.

2.1 Product overview

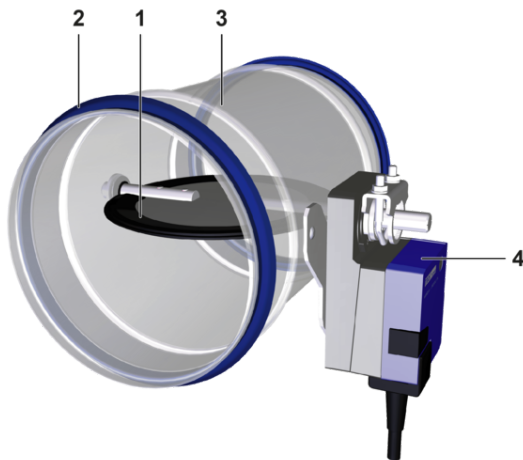


Fig. 1: AK product overview

- 1 Damper blade with sealing profile
- 2 Double lip seal
- 3 Casing
- 4 Actuator (optional)

2.2 Functional description

Type AK shut-off dampers are intended to be used for the low-leakage shut-off of volume flows in ventilation systems with circular ducts. The damper is used to isolate parts of the ventilation system.

A duct section is closed off by means of a damper blade via manual actuation (standard construction) or optional actuators with electric or pneumatic signalling. Actuators are available in various constructions with regard to power supply, safe position (in a de-energised or depressurised condition) and auxiliary switches for the electrical monitoring of the damper blade position.

The actuator of a damper blade must be controlled by a customer-side circuit and then moves the damper blade to the OPEN or CLOSED position.

2.3 Display of the damper blade position

The damper blade position corresponds to the mark on the shaft and is thus recognisable from the outside.

Clamping device (frictional connection)

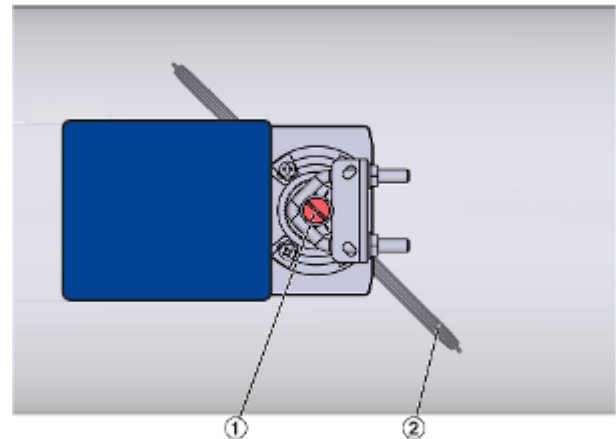


Fig. 2: Display with clamping device

- 1 Shaft with marking for position indication
- 2 Damper blade

2.4 Labelling on unit

2.4.1 Rating plate

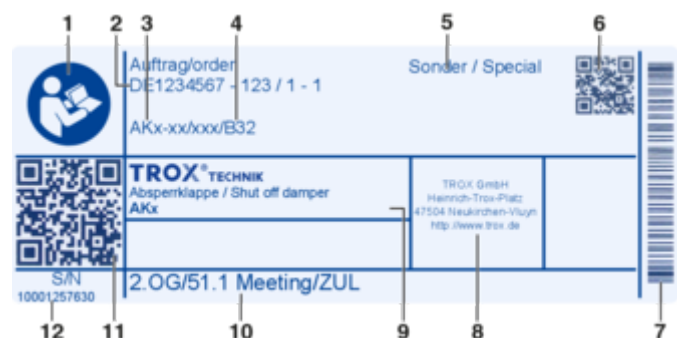


Fig. 3: Type plate (example)

- 1 Note on observing the operating manual
- 2 Order data commission number – item number; if necessary, serial number if there are several pieces in the item
- 3 Order code
- 4 Order code detail of actuator (optional)
- 5 Information on units that deviate from the standard
- 6 QR code containing the customer text (10) below in machine-readable form
- 7 Barcode with the serial number (for manufacturing processes at TROX)
- 8 Manufacturer's address
- 9 Product and type
- 10 Customer text for installation/use (tagging text from the order)
- 11 QR code with link in myTrox to individual product documentation matching the serial number
- 12 Serial number of the complete product including the installed attachment

2.4.2 CE marking / declaration of incorporation

The AK unit complies with the Machinery Directive 2006/42/EC as partly completed machinery, as it does not fulfil an independent function on its own. A CE mark and a Declaration of Conformity are therefore not permitted in accordance with the Machinery Directive.

In accordance with the Machinery Directive, partly completed machinery obtains a Declaration of Incorporation. This Declaration of Incorporation confirms that the basic safety aspects of the Machinery Directive and any other directives are observed.

The Declaration of Incorporation can be accessed via the QR code on the rating plate. You can download the document on the Internet at www.troxtechnik.com.

3.1 General installation information

- Select the installation location such that the unit, inspection accesses and the actuator remain accessible for the following work:
 - Wiring
 - Adjustment work (service socket if necessary)
 - Inspection and maintenance, e.g. for replacing the actuator.

For information on space requirements, see product data sheets.

- Installation in extract air systems in commercial kitchens is only permitted if the extract air has already been cleaned with aerosol separators, see VDI 2052.

3.1.1 Installation of sound attenuators

Circular silencers are usually installed between the shut-off damper and the room. The circular silencer, e.g. CA / CAH / CF (same nominal size) can be installed adjacent to or behind a shut-off damper.

3.2 Fixing/suspension

General installation information

- When designing and constructing ventilation and air conditioning systems, take into account the requirements of VDI 6022, in particular:
 - Hygienic, clean installation of all components and their air distribution surfaces.
 - Planning inspection/cleaning openings in the ducting system.
 - Avoidance of leaks.
- Affix the unit proficiently and only to load-bearing components.
- Load suspension systems only with the weight of the unit. Adjacent components and connecting ducts must be supported separately.
- Only use approved and sufficiently dimensioned suspensions for fixing. Secure screw connections against self-loosening, e.g., by locking them. Fixing material is not included in the supply package.
- Only use the shortest possible drilling screws for fixing into place; these screws must not be screwed into the movement and sealing area of the damper blade.

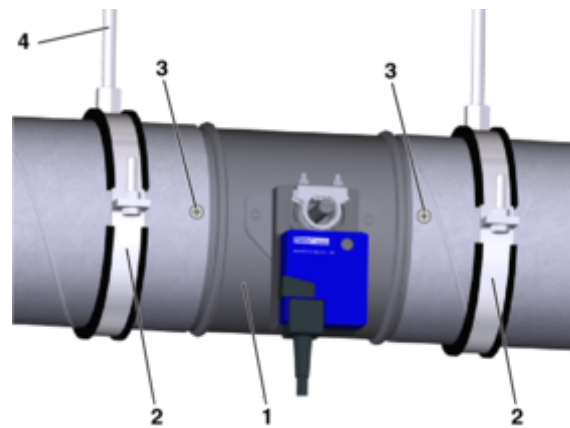


Fig. 4: Installation example of AK-* shut-off damper

- 1 Shut-off damper, e.g. AK
- 2 Drilling screw for fixing to the ducting
- 3 Pipe clamp
- 4 Suspension, e.g., with threaded rod

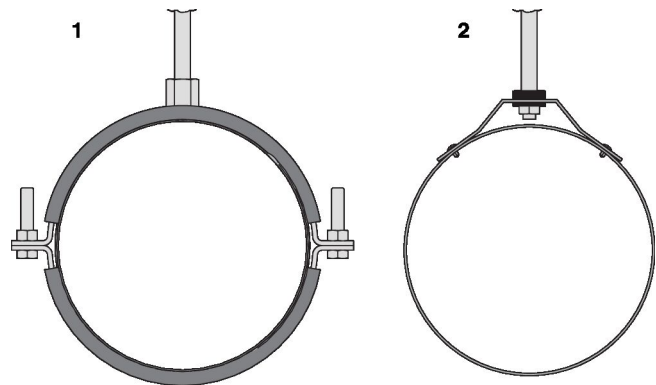


Fig. 5: Examples of fixings for circular units

- 1 Fixing to pipe clamps
- 2 Fixing to suspension element

3.3 Connecting the air duct

When connecting the ducting, the customer must ensure that the connection points are installed as airtight as possible in order to avoid negative influences from leakages such as air volume deviations, power consumption, etc. Unless otherwise stated, the connecting material is not included in the supply package.

In the case of one-sided connection of the ductwork, intervention in the damper blade is to be prevented by suitable measures (for example, grilles).

Before connecting the ducting:

- Check the inside of the unit for damage and loose parts.
- Remove any contamination from the ducting.

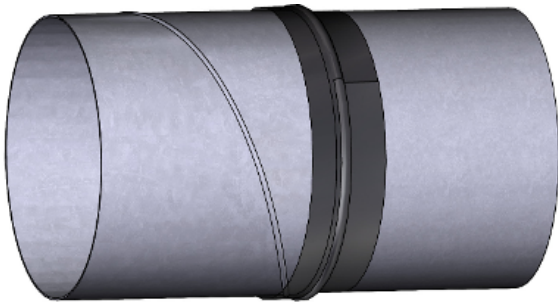


Fig. 6: Spigot without lip seal

- Plug-in mounting on ducting in accordance with EN 1506 or EN 13180.
- Fixing and sealing with ventilation strip, e.g., KLP180.

When using heat-shrinkable tape, carefully heat up the plastic parts near the spigot.

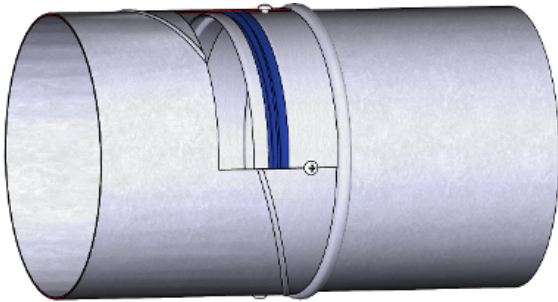


Fig. 7: Spigot with optional lip seal

- Plug-in mounting on ducting in accordance with EN 1506 or EN 13180.
- Connect the spigot with the ducting, e.g., using drilling screws.
- No further sealing required.

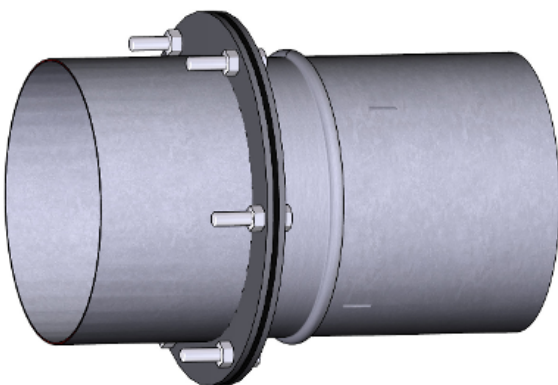


Fig. 8: Spigot with optional flanges

- Matching flanges available as accessories
- Seal and screw connection M8 (to be provided by others)
- Dimensions and number of holes in accordance with EN 12220.
- Position the ducting exactly. Do not pull the distances together via the flange connection.

4 Electrical connection

4.1 Safety notes

 **DANGER!**

Danger of electric shock! Do not touch any live components. Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the supply voltage before working on any electrical equipment.

 **DANGER!**

Risk of injury due to stored energy.

Pneumatic actuators are pressurised and can cause the damper to move abruptly:

- Only qualified personnel may work on the pneumatic actuator.
- Switch off the compressed-air supply before working on any pneumatic equipment.
- After switching off the compressed-air supply, trigger the actuator to discharge the stored energy.

- The responsibility for design, dimensioning and sizing of the electrical and network installations as well as their execution by others lies with the specialist consultant, HVAC contractor and commissioning engineer appointed by the system owner. This includes, in particular, the dimensioning of the power supplies as well as cable types and cross sections.
- Observe wiring guidelines and project-specific circuit diagrams.
- The electrical connection may only be made after complete installation of the unit.
- For units with a 24 V supply voltage, observe the following:
 - Electrical connection only with safety transformer
 - Make sure that all connected units have the same GND reference point for the supply voltage.
- Suitable wire clamping brackets must be provided for all connecting cables.
- Electronic components contain no parts that can be replaced or repaired by the user and may only be opened by the manufacturer!

4.2 Installation instructions

The shut-off damper was manufactured and configured on a project-specific basis. If an electric actuator has been ordered, it is assembled at the factory. For units with an electric actuator, the supply voltage and the signal line must be connected. For devices with a pneumatic actuator, the compressed-air supply and the compressed-air control line must be connected.

The connection is made in accordance with the information on the actuator or connection diagrams in the product data sheet or commissioning instructions for the respective actuator, www.troxtechnik.com. The voltage ranges and the terminal connections specified on the actuator must be observed!

Personnel:

- Skilled qualified electrician

Observe the following during installation:

- Legal and official regulations, in particular VDE guidelines.
- Observe the technical connection rules (TCR) of the local grid operator.
- Wiring work for supply voltage and signal lines on site.
- The rating and manufacturing of customer-side connections and wiring must be carried out in accordance with the recognised rules of electrical engineering.

5 Commissioning and operation

5.1 Requirement for commissioning

Contamination, e.g. dust, can adversely affect the functionality of the shut-off damper.

Therefore, the ventilation and air conditioning system and its components may not be put into operation for the first time until the rooms connected to the ventilation system have been cleaned of any contamination resulting from construction work. Contamination of the ventilation system by construction dust and sucked-in dirt particles must be eliminated. In the case of systems that are heavily contaminated due to construction activities, the system may need to be cleaned before commissioning.

5.2 Commissioning



Code of good practice for commissioning

Commissioning is governed by the standard "DIN EN 12599 Testing and measuring procedures for the transfer of installed ventilation and air conditioning systems", and, if applicable, contractually agreed services between HVAC contractors, system owners and installation engineers. The standard describes the essential commissioning steps of the completeness check, function check, function measurement as well as report generation and handover.

5.2.1 Installation and connection

Once the electrical connections have been correctly installed and made, the shut-off damper is ready for operation.

5.2.2 Settings by others

Setting of the auxiliary switch

For actuators with auxiliary switches, set the switching points.

Special version

Bus-compatible actuators may require integration into the building's network infrastructure to be performed by others (network commissioning, e.g. setting the subscriber address and communication parameters). Manufacturer-specific tools such as adjustment devices or software packages and associated interface adapters may be required for this.

5.2.3 Functional test

Prerequisites for the functional test

- Electrical or pneumatic connections have been correctly installed and tested.
 - Ventilation and air conditioning system is in operation (fans running).
 - Supply voltage or the compressed air supply is switched on.
1. ▶ Check damper blade positions:
 - Door open
 - Door closed
 - Intermediate position (only for variable actuators)
 2. ▶ Check the auxiliary switch positions.

5.3 Operation

Once commissioning has been completed, the shut-off damper will operate in a self-powered manner and require no intervention from the system owner.

In case of a malfunction, decommission the shut-off damper and have it repaired before commissioning it again.

6 Maintenance

6.1 System owner's responsibility

WARNING!

Only authorised specialist personnel are allowed to perform the described maintenance measures.

The system owner is responsible for maintenance. The system owner is responsible for creating a maintenance plan, for defining the maintenance goals, and for the functional reliability of the equipment.

The legal regulations must be observed during maintenance, e.g. the system owner is responsible for hygienic operation in accordance with VDI 6022.

6.2 Maintenance

The shut-off damper and the actuator are maintenance-free with regard to wear, but the damper must still be included in the regular cleaning of the ventilation system. Regular care and maintenance ensure operational readiness, functional reliability, and long service life of the shut-off damper.

6.3 Inspection measures

DANGER!

Danger of electric shock! Do not touch any live components. Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the supply voltage before working on any electrical equipment.

CAUTION!

Crushing hazard.

The shut-off damper may suddenly open or close.

Switch off the voltage supply before you start working on the unit.

DANGER!

Risk of injury due to stored energy.

Pneumatic actuators are pressurised and can cause the damper to move abruptly:

- Only qualified personnel may work on the pneumatic actuator.
- Switch off the compressed-air supply before working on any pneumatic equipment.
- After switching off the compressed-air supply, trigger the actuator to discharge the stored energy.

Personnel:

- Skilled qualified electrician

Protective equipment:

- Safety shoes

1. ▶ Remove contamination on the shut-off damper that affects its function.
2. ▶ Check all screws for firm seating and retighten them, if necessary.
3. ▶ ■ Depending on the construction:
 - Check electrical feeder cables for damage and firm seating in the terminals.
 - Check pneumatic lines for damage and a tight fit.
4. ▶ Functional check of the damper blade position OPEN/CLOSED
5. ▶ Document maintenance measures and measurement results.

6.4 Repair

Repair work is only allowed to be carried out by specialist personnel or by the manufacturer. Only genuine replacement parts must be used.

6.5 Maintenance service

Regular maintenance by the TROX Technical Service is recommended in order to ensure operational readiness, functional reliability, and long service life of the unit.

7 Faults

7.1 Troubleshooting

To troubleshoot the problem, check and log the following points. Take appropriate action if necessary. In case of inquiries to TROX Service, please send the fault log.

System/area:	
TROX shut-off damper type (see rating plate):	
Actuator (see rating plate):	
Complete order code (see rating plate):	

Description	Yes	No	Not applicable
Installation situation			
<ul style="list-style-type: none"> ■ Are the shut-off damper and actuator easily accessible? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
System readiness			
<ul style="list-style-type: none"> ■ Fan switched on? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Actuator			
<ul style="list-style-type: none"> ■ Error-free wiring and supply voltage within tolerance zone? 	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

8 Decommissioning

If the unit is no longer used, it has to be removed and disposed of in an environmentally friendly manner.

8.1 Safety

Personnel

- Disassembly must only be carried out by specialist personnel.
- Only skilled qualified electricians must work on the electrical system.

Electrical system

DANGER!

Danger of death due to electric current!

Danger of electric shock! Do not touch any live components! Live electrical components may suddenly move uncontrollably and seriously injure people.

Therefore:

- Switch off the power supply and disconnect the product permanently before you begin to disassemble it.

DANGER!

Risk of injury due to stored energy.

Pneumatic actuators are pressurised and can cause the damper to move abruptly:

- Only qualified personnel may work on the pneumatic actuator.
- Switch off the compressed-air supply before working on any pneumatic equipment.
- After switching off the compressed-air supply, trigger the actuator to discharge the stored energy.

WARNING!

Risk of injury due to incorrect disassembly

Stored residual energy, pointed parts and parts with sharp edges or corners on the unit or on tools can cause injuries. Therefore:

Therefore:

- Before you start, make sure that there is sufficient clearance for the work you have to complete.
- Be careful when you touch parts that have sharp edges or corners.
- Disassemble components professionally. Be aware that some components are very heavy. Use lifting gear if necessary.
- Secure components to prevent them from falling or toppling.
- When in doubt, contact the manufacturer.

8.2 Disassembly

Before you start disassembly:

- Switch off the unit and secure it against being switched on accidentally.
- Physically disconnect the unit from the power supply and discharge any residual energy.
- Remove and dispose of any operating fluids, auxiliary materials and leftover processing materials in an environmentally sound manner.

Then professionally clean subassemblies and components and disassemble them in compliance with local occupational safety and environmental protection regulations.

8.3 Disposal

If no take back (disposal) agreement is in place, the various parts should be recycled:

- Scrap the metals.
- Take plastic parts to be recycled.
- Dispose of other components in a suitable manner, i.e. depending on their material properties.

ENVIRONMENT!

Risk of harm to the environment due to improper disposal!

Electronic waste, electronic components, lubricating and other auxiliary materials are hazardous waste and must be disposed of by a specialist company.

If you are not sure how to dispose of anything in an environmentally friendly manner, contact your local authorities or a specialist disposal company.

9 Technical data

9.1 General data

Nominal sizes	100 – 400 mm
Permissible static differential pressure	1500 Pa
Operating temperature	10 – 50 °C

9.2 Actuators / attachments

The following actuators are available for the AK shut-off damper:

Electric actuators

Attachment	Actuator	Supply voltage	Auxiliary switch
Open/Close actuators			
B30	Actuator with mechanical stops TROX/Belimo	24 V AC/DC	–
B32			2
B40		100 – 240 V AC	–
B42			2
BP0	Spring return actuator with mechanical stops TROX/Belimo	24 V AC/DC	–
BP2			2
BR0		24 – 240 V AC, 24 to 125 V DC	–
BR2			2
Modulating actuators			
B20	Continuous actuator 0 - 10 V with mechanical stops TROX/Belimo	24 V AC/DC	–
B22			2

Pneumatic actuators

Attachment	Actuator	Control pressure	Auxiliary switch
Pneumatic actuators			
TN0	Pneumatic actuator with safe position Manufacturer: TROX	0.2 – 1.0 bar	–

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