



Flow adjustment damper

VFR



TROX® TECHNIK
The art of handling air

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1 Safety

1.1 Correct use

Type VFR flow adjustment dampers are used to balance the volume flow rate in ventilation systems within closed rooms.

In kitchen exhaust air systems, the flow adjustment 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.

1.3 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 \[Kundendienst Betrieb\]](#) doesn't exist but @y.link.required='true'.

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

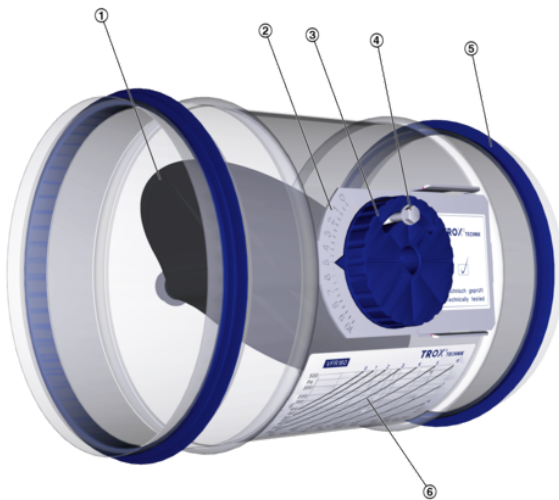


Fig. 1: VFR product overview

- 1 Damper blade
- 2 Volume flow rate scale
- 3 Hand wheel
- 4 Rotary knob locking screw
- 5 Lip seal
- 6 Diagram with setting values

2.2 Functional description

Type VFR flow adjustment dampers are suitable for balancing the volume flow rates in ventilation systems with circular ducts.

For balancing the volume flow rates of duct sections and air terminal devices the differential pressure must be set on the flow adjustment dampers. The value to be set for a certain required volume flow rate at a given differential pressure can be taken from the setting value diagram that each flow adjustment damper carries. This value can then be set using the rotary knob with the position indicator (infinite adjustment between 0 and 10).

NOTE:

It is important to note that the set volume flow rate only applies to the current differential pressure in the duct system or channel system. If the pressure conditions change, the volume flow rate resulting from the originally set flow adjustment damper blade position also changes. This means that the flow adjustment damper cannot balance the volume flow rate independently of the duct pressure. If this is desired, an air terminal unit would have to be used as an alternative.

2.3 Labelling on unit

2.3.1 CE marking / declaration of incorporation

The VFR 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.

You can download the Declaration of Incorporation 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 flow adjustment damper and the room. The circular silencer, e.g. CA / CAH / CF (same nominal size) can be installed adjacent to or behind a flow adjustment 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 area of movement of the flow adjustment damper.

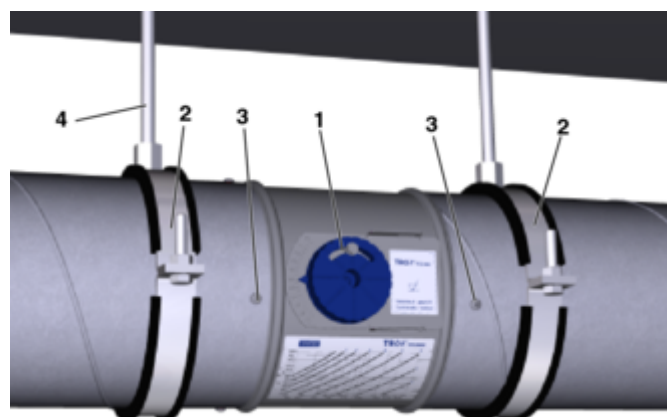


Fig. 2: Installation example for VFR flow adjustment damper

- 1 VFR flow adjustment damper
- 2 Drilling screw for fixing to the ducting
- 3 Pipe clamp
- 4 Suspension, e.g., with threaded rod

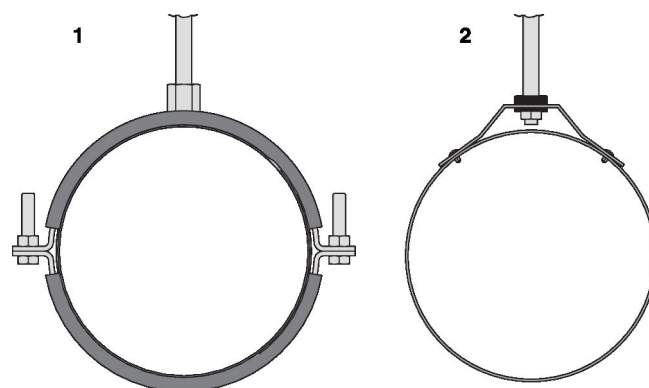


Fig. 3: Examples of fixings for circular units

- 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.

Before connecting the ducting:

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

Connecting the air duct

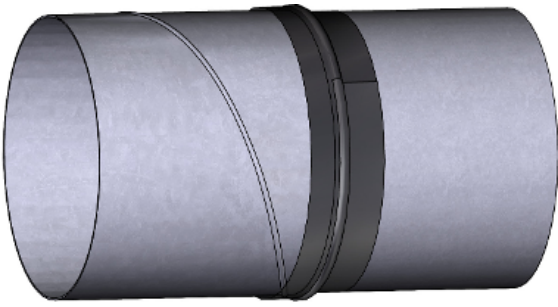


Fig. 4: Spigot without lip seal

- 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.

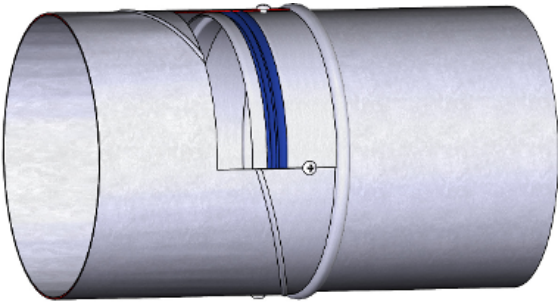


Fig. 5: Spigot with optional lip seal

- 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.

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.

- 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 flow adjustment 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. 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.
- 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:

5 Commissioning and operation

5.1 Requirement for commissioning

Contamination, e.g. dust, can adversely affect the functionality of the flow adjustment 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

The damper blade position must be adjusted by the customer on a project-specific basis. The set volume flow rates only apply for constant pressure conditions in the air duct system.

If a flow adjustment damper is adapted, this also affects other flow adjustment dampers in the system, which must then also be readjusted.

5.2.2 Functional test

Prerequisites for the functional test

- Ventilation and air conditioning system is in operation (fans running).
- Air circulation is guaranteed (shut-off dampers and fire dampers are open).
- Only with actuator:
 - Electrical connections have been correctly installed and tested.
 - The supply voltage is switched on.
- ▶ Check the volume flow rate and readjust if necessary.

5.3 Operation

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

NOTE:

It is important to note that the set volume flow rate only applies to the current differential pressure in the duct system or channel system. If the pressure conditions change, the volume flow rate resulting from the originally set flow adjustment damper blade position also changes. This means that the flow adjustment damper cannot balance the volume flow rate independently of the duct pressure. If this is desired, an air terminal unit would have to be used as an alternative.

In case of a malfunction, decommission the flow adjustment 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 flow adjustment damper and the actuator are maintenance-free with regard to wear, but the flow adjustment damper must still be included in the regular cleaning of the ventilation system. Regular care and maintenance ensure operational readiness, operational reliability, and long service life of the flow adjustment 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 flow adjustment damper may suddenly open or close.

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

Personnel:

- Skilled qualified electrician

Protective equipment:

- Safety shoes

1. ▶ Remove contamination that affects the function of the flow adjustment damper.
2. ▶ Check all screws for firm seating and retighten them, if necessary.

3. ▶ Check electrical feeder cables for damage and firm seating in the terminals.
4. ▶ We recommend that you check the resulting volume flow rate. If necessary, the duct pressure should also be checked to make sure that it corresponds to the original pressure settings.
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 flow adjustment 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 flow adjustment 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.

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	80 – 250 mm
Volume flow rate range	20 – 485 l/s or 72 – 1746 m³/h
Minimum differential pressure	20 Pa
Maximum differential pressure	1000 Pa
Operating temperature	10 – 50 °C

9.2 Actuators / attachments

The following actuators are available for the VFR flow adjustment damper:

Actuators

Attachment	Actuator	Supply voltage	Auxiliary switch
Min/Max actuators			
E01	Actuator with potentiometers, TROX/Gruner	24 V AC/DC	–
E02	Actuator with potentiometers, TROX/Gruner	230 V AC	–
M01	Actuator with mechanical stops, make: TROX/Belimo	24 V AC/DC	–
M02	Actuator with mechanical stops, make: TROX/Belimo	230 V AC	–
Modulating actuators			
E03	Actuator with potentiometers, TROX/Gruner	24 V AC/DC	–

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