Operating and Installation Manual

Fire damper
Type FKR-EU

tested to EN 1366-2
with EC Certificate of Conformity

BC1 - 606 - 4645 - 15650.03 - 4651

CE

TROX® TECHNIK

The art of handling air

Contents

TROX® TECHNIK

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Part no. M375EE3

1 General information

This operating and installation manual describes the following fire damper versions:

- FKR-EU with fusible link
- FKR-EU with spring return actuator

To ensure complete functioning of the fire damper it is essential to read this operating and installation manual before starting any work, and to comply with it. The manual must be given to the facilities manager when handing over the system. The facilities manager must include the manual with the system documentation.

The manufacturer does not accept any liability for any malfunction or damage resulting from non-compliance with these instructions or non-compliance with relevant statutory regulations.

This operating and installation manual is intended for specialist consultants, developers, and operators of systems in which the fire dampers are to be installed. This manual is also intended for people conducting the following work:

- Transport and storage
- Installation
- Electrical connection
- Commissioning
- Operation
- Maintenance
- Decommissioning, removal and disposal

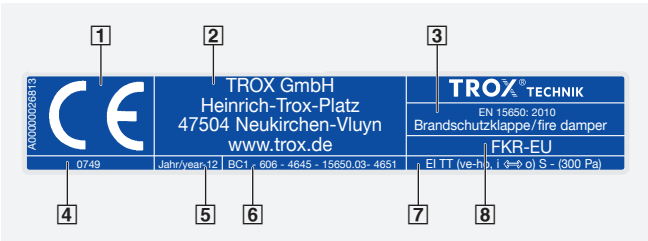
Other applicable documentation

In addition to this manual, the EC-Certificate of Conformity BC1 - 606 - 4645 - 15650.04 - 4651 must be observed:

Symbols used in this manual

	**Danger!** Designates danger to life and limb due to electrical voltage.
	**Warning!** Designates danger to life and limb.
	**Important!** Designates danger that can cause minor personal injury or damage to property.
	**Note!** Designates important notes or information.

Rating plate with CE marking



1 CE mark
2 Manufacturer address
3 Number of the European standard and year of its publication
4 Identification number of the body approved for product certification
5 The last two numbers of the year in which the mark was applied
6 Number of the EC certificate of conformity
7 Specifications regarding all regulated characteristics
The fire resistance class can differ according to use → P. 9
8 Type designation

2 Safety and correct use

General information regarding safety

Only skilled, qualified personnel are allowed to perform the described work on the fire damper. Only skilled qualified electricians are allowed to work on the electrical system.

The installation location must be easily accessible and have sufficient clearance for electrical connection and maintenance of the fire damper.

Compliance with the following regulations and guidelines, among others, is required for all work performed on the fire damper:

- German Equipment and Product Safety Act
- Local industrial health and safety regulations
- Local building regulations
- Accident Prevention Regulations (BGV A1, BGV A3)

Standards and guidelines

- EN 15650:2010 Ventilation for buildings – fire dampers
- Classification according to EN 13501-3 → P. 9
- Tested to EN 1366-2
- Closed blade air leakage to EN 1751, class 4.
- Casing air leakage to EN 1751, class C

Compliance with all additional related fire protection standards and regulations is required.

Repair and replacement parts

The FKR-EU fire damper is a safety related product that has been especially developed for fire protection. To maintain the fire protection, use only original TROX replacement parts for repair.

Environmental protection

- Dispose of packaging in an environmentally sound manner.
- Have used fire damper components or the used fire damper only disposed of by an authorised company.

Correct use

The fire damper is used as an automatic shut-off device to prevent fire and smoke from spreading through ducting.

The fire damper is suitable for supply air and extract air systems. Use of the fire damper is only allowed in compliance with local installation regulations and the technical data in this manual.

The general guidelines of DIN 31051 and EN 13306 are also applicable.

Incorrect use

The fire dampers must not be used under the following conditions:

- Use as a smoke extract damper.
- Use in explosion protection zones.
- Use outdoors without sufficient protection against the effects of weather.
- Use in extract air systems in commercial kitchens.
- Use in ventilation systems in which high levels of contamination, extreme humidity, or chemical contamination may impair the damper function.
- Installation in a way that prevents an inspection of the internal components of the fire damper.

Changes to the fire damper and the use of replacement parts that have not been approved by TROX are not permitted.

Residual risks

TROX fire dampers are subject to strict quality controls during manufacturing. In addition, a functional test is performed before delivery.

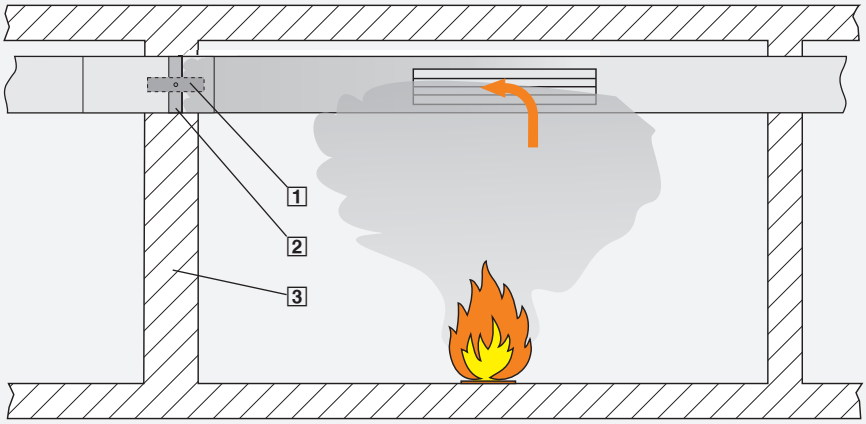
Damage can, however, occur during transport or installation and impair the function of the fire damper.

In any case, the proper function of the fire damper must be checked during commissioning and ensured through regular maintenance while in use.

3 Product description

Functional description

Functional diagram



1 Damper blade OPEN
2 Damper blade CLOSED in case of fire
3 Fire-resistant wall

Functional description

Type FKR-EU fire dampers are used as safety related components in ventilation systems. The fire damper is used to to prevent fire and smoke from spreading through ducting.

During operation at normal temperature, the fire damper is open to enable air passage through the ventilation system. If the temperature increases in case of fire, the damper blade closes. The damper is triggered either by a fusible link at 72°C (95°C in the case of hot air systems) or thermoelectrically with a spring return actuator.

If the damper blade closes due to a temperature increase (i.e. in case of a fire), it must not be reopened.

The proper functioning of the fire damper can be tested depending on the release mechanism. → P. 23

FKR-EU with fusible link

If the temperature inside the fire damper rises to 72 °C or 95 °C, respectively, the fusible link triggers a coil spring mechanism which causes the damper blade to close. A coil spring mechanism then causes the fire damper to close immediately.

As an option, the FKR-EU with a fusible link can be either supplied or subsequently fitted with one or two limit switches. The limit switches can signal the damper blade position to the central BMS or fire alarm system. One limit switch each is required for damper blade positions "OPEN" and "CLOSED".

FKR-EU with spring return actuator

The spring return actuator enables the motorised opening and closing of the damper blade; it can be activated by the central BMS. As long as power is supplied to the actuator, the damper blade remains open.

In case of a fire, the fire damper is closed by the internal thermoelectric release mechanism when the temperature in the duct rises above 72°C or 95°C, respectively, or when the temperature on the actuator of the fire damper rises above 72°C or when the supply voltage fails (power off to close).

As standard, the spring return actuator is equipped with limit switches that can be used to indicate the damper blade position.

TROX smoke detector

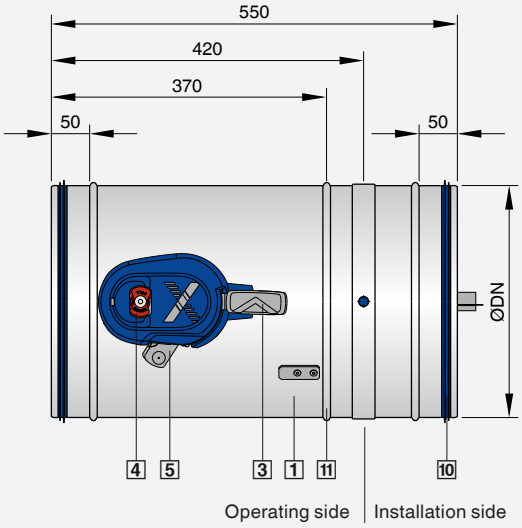
The TROX smoke detector type RM-O-3-D or RM-O-VS-D can be used to trigger closing of the FKR-EU damper blade. This is only possible when the fire damper is equipped with a spring return actuator.

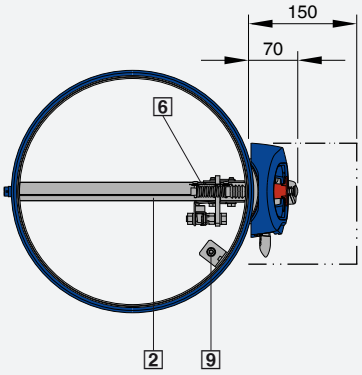
3 Product description

Product overview, dimensions, and weights

Spigot construction

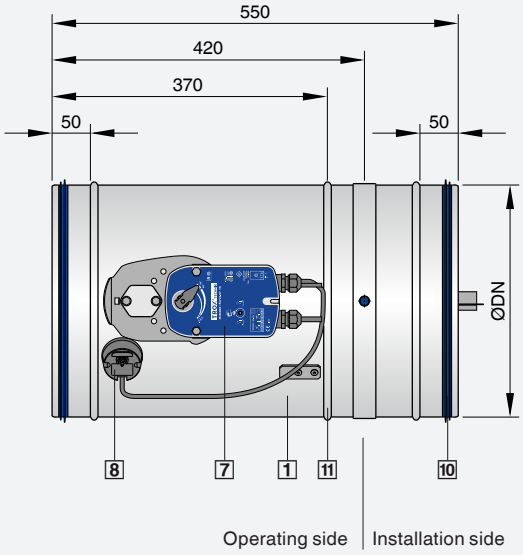
FKR-EU with fusible link

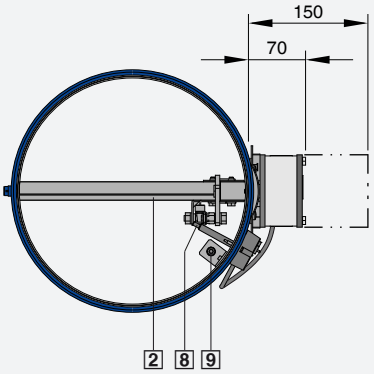




– – – – – **Keep clear to provide access to the release mechanism**

FKR-EU with spring return actuator





– – – – – **Keep clear to provide access to the spring return actuator**

FKR-EU and FKR-EU-FL
Dimensions in mm

Nominal size	315	355	400	450	500	560	630	710	800
ØDN	314	354	399	449	498	558	629	709	799
A	31	31	31	36	36	36	36	36	36
ØD1	352	392	438	488	538	600	670	750	840
α	45°	45°	45°	45°	45°	30°	30°	30°	22.5°
Number of holes	8	8	8	8	8	12	12	12	16

FKR-EU and FKR-EU-FL
Weight in kg

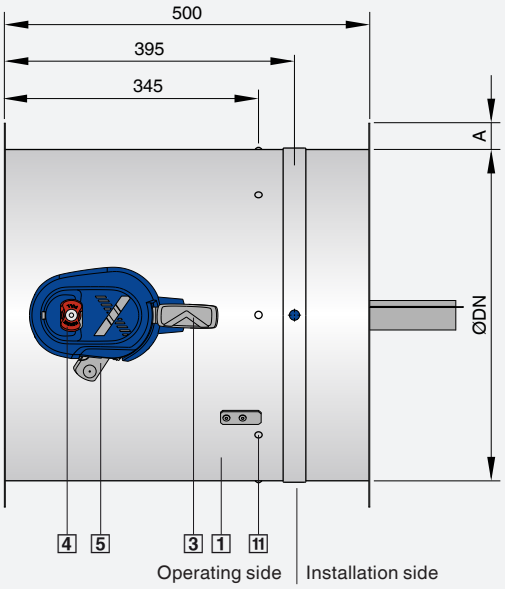
Nominal size	315	355	400	450	500	560	630	710	800
with fusible link	6.8	7.3	8.5	14.1	16.4	18.0	21.3	25.7	28.6
with spring return actuator	8.2	8.7	9.9	16.7	19.0	20.6	23.9	28.3	31.2

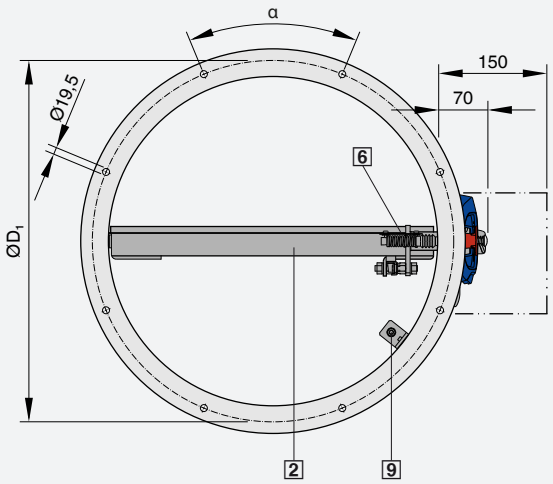
3 Product description

Product overview, dimensions, and weights

Flange construction

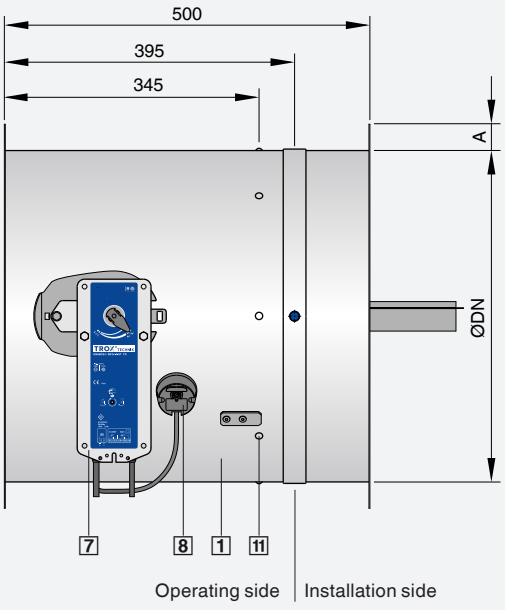
FKR-EU-FL with fusible link

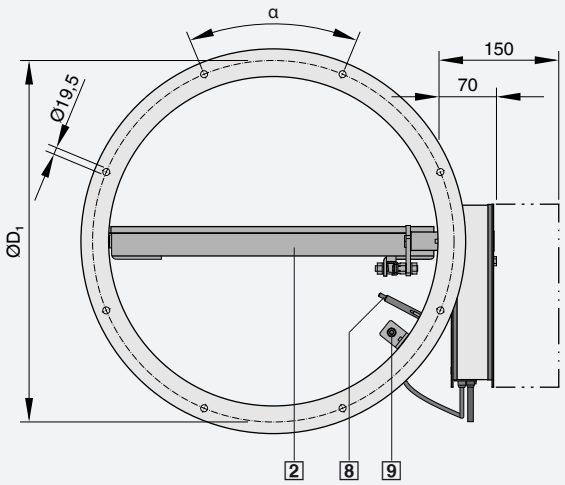




– – – – – **Keep clear to provide access to the release mechanism**

FKR-EU-FL with spring return actuator





– – – – – **Keep clear to provide access to the spring return actuator**

1 Casing
2 Damper blade with perimeter seal
3 Handle
4 Release mechanism with cover
5 Interlock
6 Fusible link
7 Spring return actuator
8 Thermoelectric release mechanism
9 Travel stop
10 Lip seal
11 Installation marking ØDN ≤ 400: crimping; ØDN ≥ 450: embossing

4 Technical data

Limit switch	
Connecting cable length / cross section	1 m / 3 × 0.34 mm²
Protection level	IP 66
Type of contact	1 changeover contact, galv. gold-plated
Max. switching current	0.5 A
Max. switching voltage	30 V DC, 250 V AC
Contact resistance	approx. 30 mΩ

Spring return actuator BLF		230-T TR	24-T-ST TR
Supply voltage		230 V AC ±14 % 50/60 Hz	24 V AC ±20 % 50/60 Hz or 24 V DC -10 % / +20 %
Power rating	Spring compression	6 W	5 W
	Hold position	3 W	2.5 W
	Rating	7 VA	
Running time	Motor / spring return	40 to 75 s / 20 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 3 A	
	Contact resistance	< 100 mΩ	
IEC protection class		II	III
Protection level		IP54	
Storage temperature		–40 ... +50°C	
Ambient temperature		–30 ... +50 °C [1]	
Ambient humidity		≤ 95 % RH, non-condensing	
Connecting cable	Actuator	1 m / 2 × 0.75 mm²	
	Limit switch	1 m / 6 × 0.75 mm²	

Spring return actuator type BF		230-T-2 TR	24-T-ST-2 TR
Supply voltage		230 V AC ±14 % 50/60 Hz	24 V AC ±20 % 50/60 Hz or 24 V DC -10 % / +20 %
Power rating	Spring compression	8 W	7 W
	Hold position	3 W	2 W
	Rating	12.5 VA	10 VA
Running time	Motor / spring return	approx. 140 s / approx. 16 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 6 A	
	Contact resistance	< 100 mΩ	
IEC protection class		II	III
Protection level		IP54	
Storage temperature		–40 ... +50°C	
Ambient temperature		–30 ... +50 °C [1]	
Ambient humidity		≤ 95 % RH, non-condensing	
Connecting cable	Actuator	1 m / 2 × 0.75 mm²	
	Limit switch	1 m / 6 × 0.75 mm²	

[1] The reaching of the safety position is guaranteed up to a maximum of 75°C.

5 Transport, storage, and packaging

Important!
Danger of injury from edges and sheet metal parts. Always wear protective gloves when transporting and installing the fire damper.

Delivery check

Check delivered items immediately after arrival for transport damage and completeness. In case of any damage or an incomplete shipment, contact the shipping company and your supplier immediately.

A complete shipment includes:

- Fire damper
- Attachments / accessories, if any
- Operating manual (1 per shipment)

Transport on site

If possible, take the fire damper in the transport packaging up to the installation location.

Storage

If the fire damper has to be stored temporarily:

- Remove any plastic wrapping.
- Store the fire damper in a clean place, away from dust and contamination.
- Store the fire damper in a dry place and away from direct sunlight.
- Do not expose the fire damper (not even with its packaging) to the effects of weather.
- Do not store the fire damper below -40°C or above 50°C.

Packaging

Properly dispose of packaging material.

6 Installation

General installation information

Important!
Danger of injury from edges and sheet metal parts. Always wear protective gloves when transporting and installing the fire damper.

The fire damper can be installed in any orientation. Minimum wall and ceiling slab thicknesses. → See table below.

Please note:

- Operating components, electric actuator, and inspection access must remain accessible for inspection and maintenance work.
- If the wall or ceiling slab is thicker than 115 mm, an extension piece (accessory or provided by others) is required to connect the fire damper to the duct.
- Perform a functional test before installation. → P. 23
- Do not remove the transport and installation safety device until the mortar/concrete has hardened.

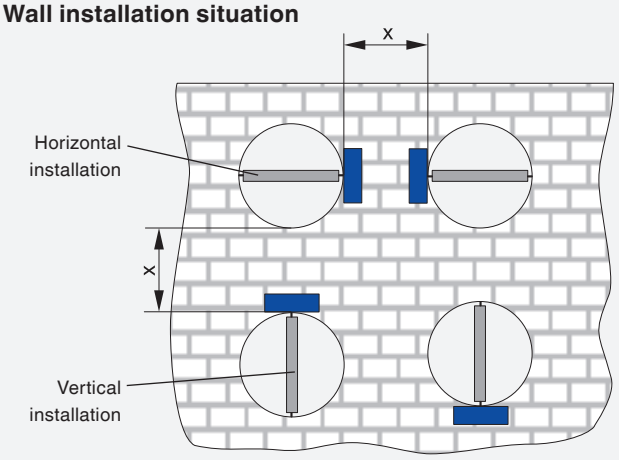
Acceptable mortars for mortar based installation

In case of mortar based installation, the open spaces between the fire damper and the wall or ceiling slab must be filled up with mortar. Entrapped air is to be avoided.

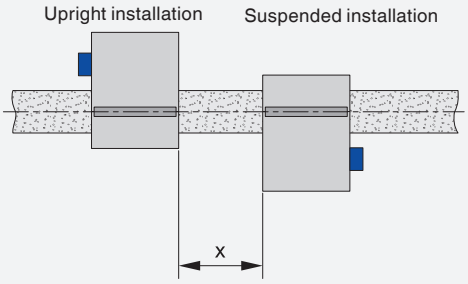
Depending on the wall or ceiling slab, either mortar of Group II, IIa, III, IIIa or lightweight mortar in compliance with EN 998-1/EN 998-2, or concrete or gypsum mortar may be used.

The mortar bed depth must be at least 100 mm.

Wall installation situation



Ceiling installation situation



x = see corresponding installation details

Overview of installation situations and fire resistance class according to 13501-3

Installation location	Construction and building material	Minimum thickness in mm	Fire resistance class EI TT (ve–ho, i ↔ o) S at minimum thickness	Installation details on page
Solid walls	Solid walls in concrete, aerated concrete or brickwork	100	EI 120 S	10
Solid ceiling slabs	Solid ceiling slabs of concrete or aerated concrete	150	EI 120 S	11
Lightweight partition walls with metal support structure and cladding on both sides	Lightweight partition walls according to DIN 4102-4, Table 48 or with general appraisal certificate	100	EI 90 S	12
Lightweight partition walls with metal support structure and cladding on one side	Shaft walls	90	EI 90 S	13
Lightweight partition walls without metal support structure and cladding on one side	Shaft walls	50	EI 90 S	16
Fire walls with metal support structure and cladding on both sides	Fire walls with general appraisal certificate	115	EI 90 S	18

6 Installation

Solid walls

Mortar based installation
Fire dampers are bricked in or installed using a perimeter mortar-mix after the completion of the wall for mortar based installation into solid walls.

Requirements
- Solid walls or fire walls (if referred to as such) of concrete, aerated concrete, or brickwork W ≥ 100 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

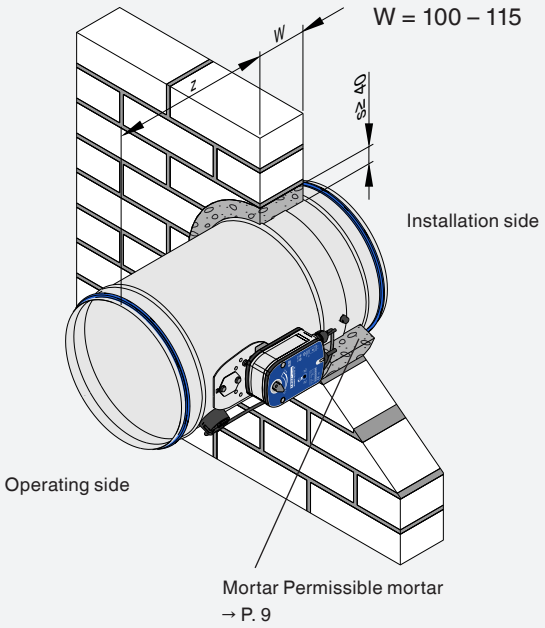
Warning!
Contamination or damage will impair the function of the fire damper.
- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

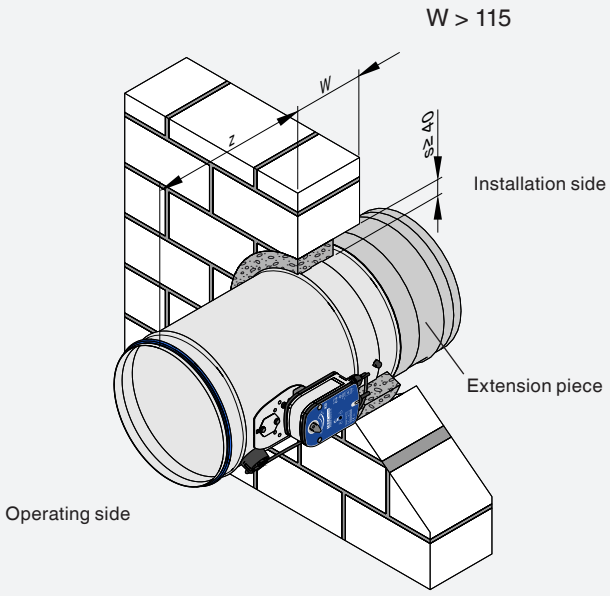
Installation while erecting the wall
If the fire damper is installed as the wall is being erected, the perimeter gap "s" is not required.

To install the fire damper, proceed as follows:
- Place the fire damper on a bed of mortar in the planned installation position in the wall and secure it. In the process, observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- Brick the fire damper into the wall with a circumferential bed of mortar. bed of mortar.

Installation after completing the wall
To install the fire damper into a completed wall, proceed as follows:
- Create an appropriate opening or cut hole: Ø opening = nominal size of the fire damper + at least 80 mm
- Push the fire damper into the installation opening and secure it. In the process, observe distance dimension z. → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22





Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

6 Installation

Solid ceiling slabs

Mortar based installation

Fire dampers are cemented in during the construction of the ceiling or installed using a perimeter mortar-mix after the completion of the wall for mortar based installation into solid ceiling slabs.

Requirements

- Solid ceiling slabs of concrete or aerated concrete D ≥ 150 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

Installation while completing the ceiling slab

If the fire damper is installed as the ceiling slab is being completed, the perimeter gap "s" is not required.

- Place the fire damper in the installation location and secure it. In the process, observe distance dimension z. → Table.
- Protect the spigot and the operating components/actuator, e.g. with plastic foil.
- Extend the fire damper with an extension piece or a spiral duct on the installation side.
- Cast the ceiling slab around the fire damper.

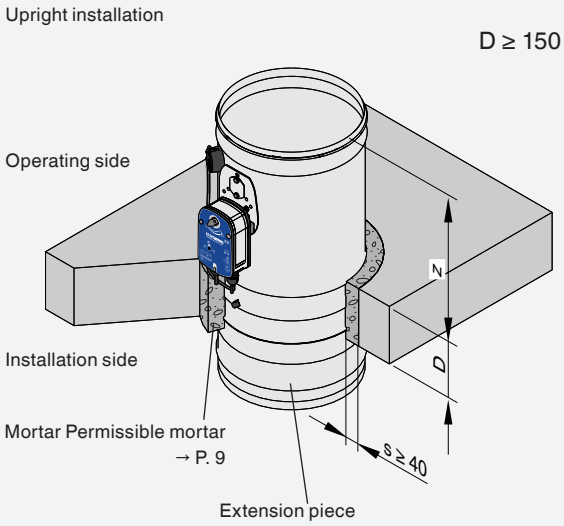
Installation after completing the ceiling slab

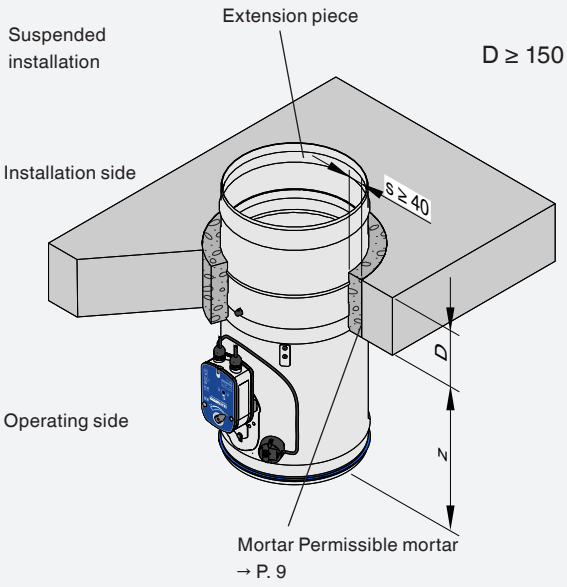
To install the fire damper into a completed ceiling slab, proceed as follows:

- Create an appropriate opening or cut hole: Ø opening = nominal size of the fire damper + at least 80 mm
- Push the fire damper into the installation opening and secure it. In the process, observe distance dimension z. → Table.
- Extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22





Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

6 Installation

Lightweight partition walls with metal support structure and cladding on both sides

Nominal size ØDN 315 through 400

Mortar based installation

Fire dampers with a perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with metal support structure, minimum thickness 100 mm, according to DIN 4102-4, Table 48, or general appraisal certificate, with or without mineral wool
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

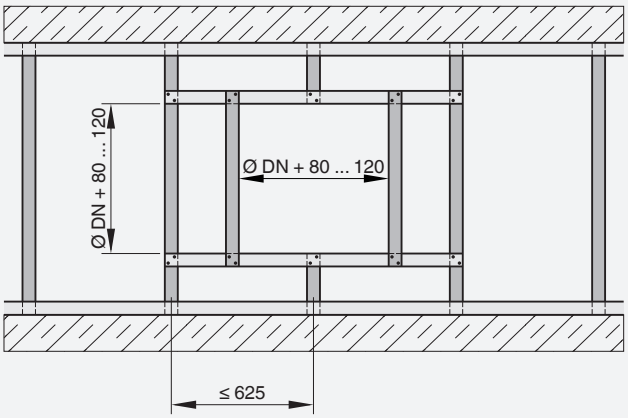
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. Provide the installation opening in the metal support structure with support profiles.
- Push the fire damper into the wall opening.
  In the process, pay attention to the distance dimension z.
  → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

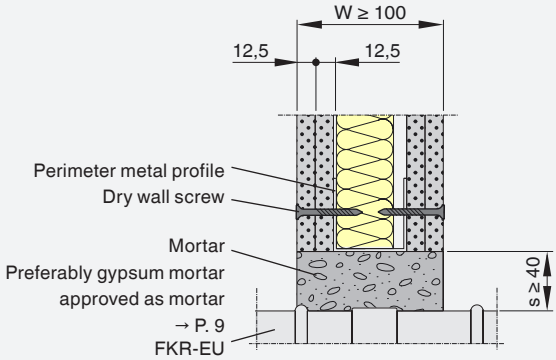
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

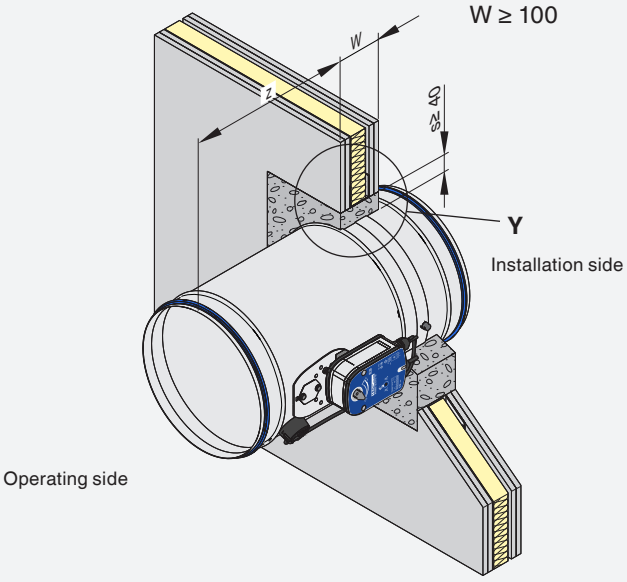
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Metal support structure, nominal size ØDN 315 through 400



Detail Y





6 Installation

Lightweight partition walls with metal support structure and cladding on both sides

Nominal size ØDN 450 through 800

Mortar based installation

Fire dampers with a perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with metal support structure, minimum thickness 100 mm, according to DIN 4102-4, Table 48, or general appraisal certificate, with or without mineral wool
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

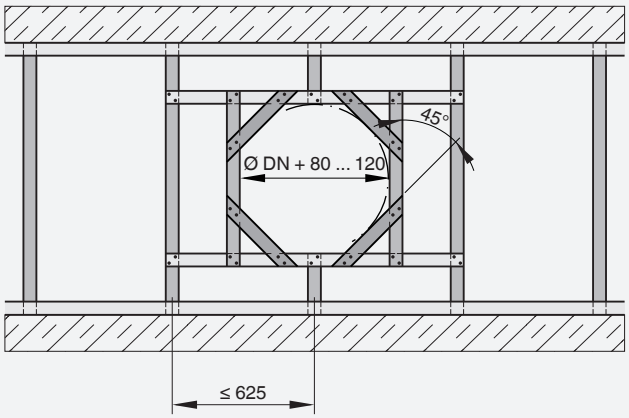
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. To do so, provide the installation opening in the metal support structure with support profiles. From nominal size 450, reinforce the support structure with four additional profiles installed under 45°.
- Push the fire damper into the wall opening.
  In the process, pay attention to the distance dimension z.
  → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

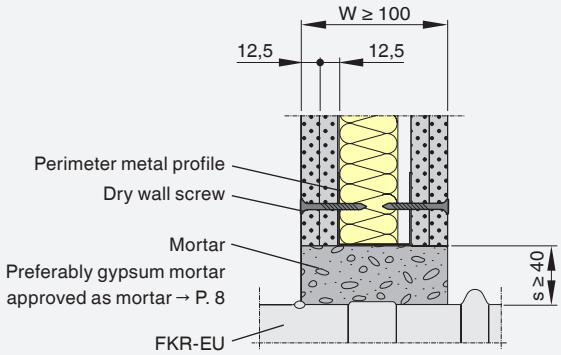
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

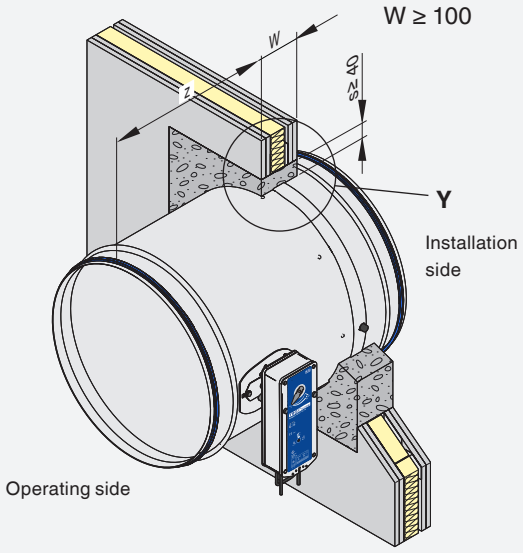
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Metal support structure, nominal size ØDN 450 through 800



Detail Y





6 Installation

Lightweight partition walls with metal support structure and cladding on one side

Nominal size ØDN 315 through 400

Mortar based installation

Fire dampers with a perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with metal support structure with W ≥ 90 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.
- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

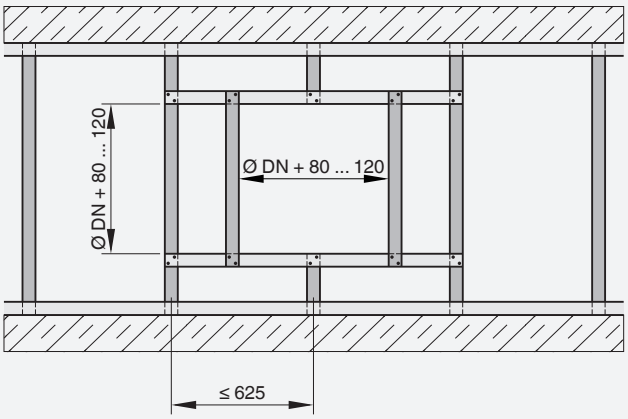
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. Provide the installation opening in the metal support structure with support profiles.
- Create reinforcing board.
- Push the fire damper into the wall opening.
  In the process, pay attention to the distance dimension z.
  → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 110 mm.

After installation

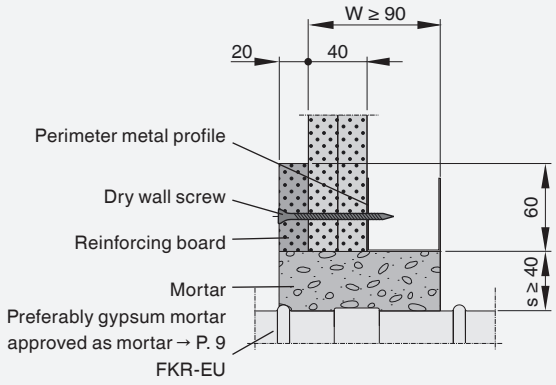
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

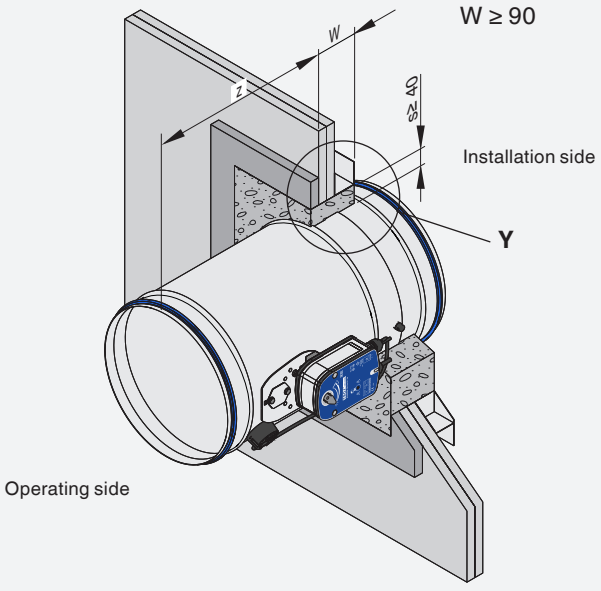
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Metal support structure up to nominal size 400



Detail Y





6 Installation

Lightweight partition walls with metal support structure and cladding on one side

Nominal size ØDN 450 through 800

Mortar based installation

Fire dampers with a perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements

- Lightweight partition walls with metal support structure with W ≥ 90 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

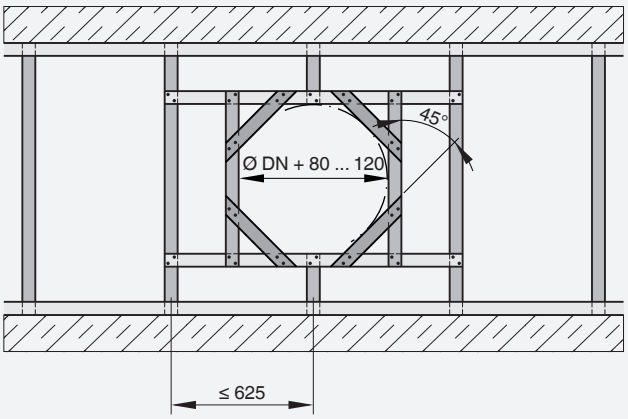
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. To do so, provide the installation opening in the metal support structure with support profiles. From nominal size 450, reinforce the support structure with four additional profiles installed under 45°.
- Create reinforcing board.
- Push the fire damper into the wall opening.
  In the process, pay attention to the distance dimension z.
  → Table.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 110 mm.

After installation

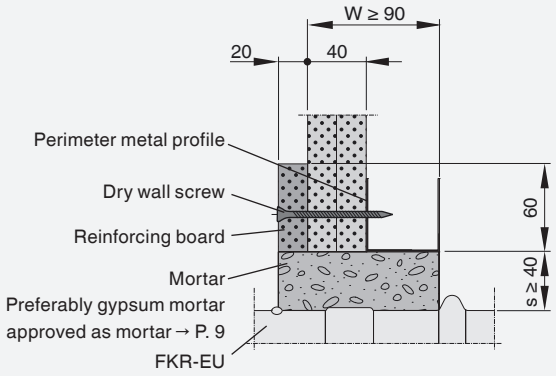
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

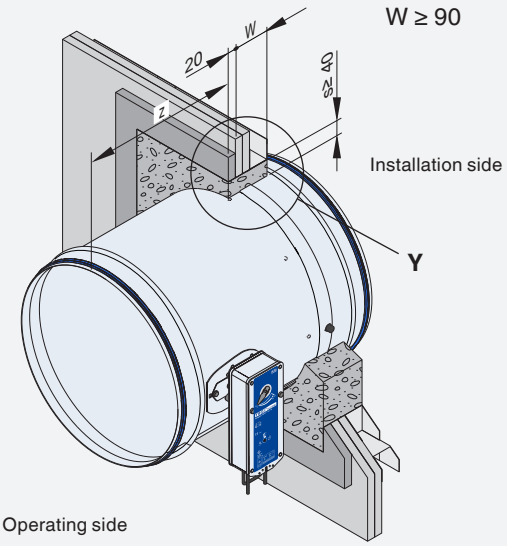
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Metal support structure from nominal size 450



Detail Y





6 Installation

Lightweight partition walls without metal support structure and cladding on one side (shaft walls)

Nominal size ØDN 315 through 400

Mortar based installation
Fire dampers with perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements

- Lightweight partition walls without metal support structure and cladding on one side with W ≥ 50 mm
- Maximum wall width 2,000 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

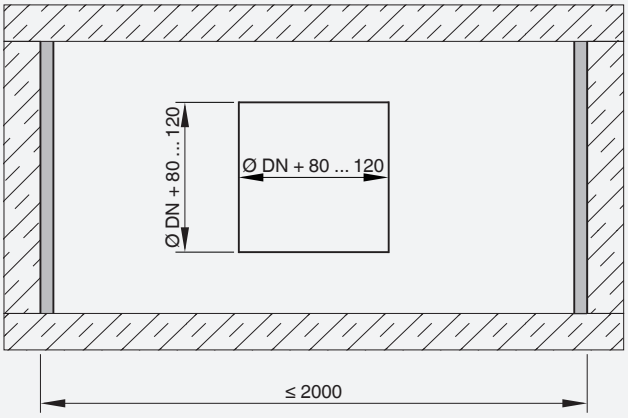
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Make a square installation opening as shown in the opposite drawing.
- Mount the wall cladding and reinforcing board.
- Push the fire damper into the installation opening and secure it. In the process, observe distance dimension z. → Table.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

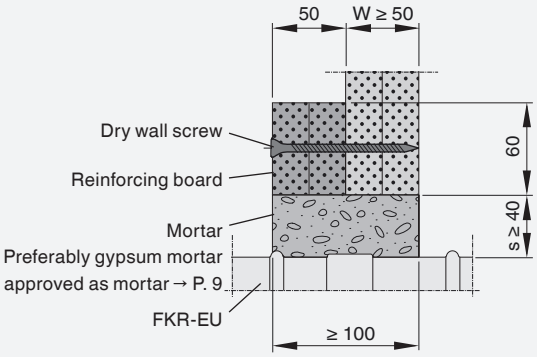
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar/concrete has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

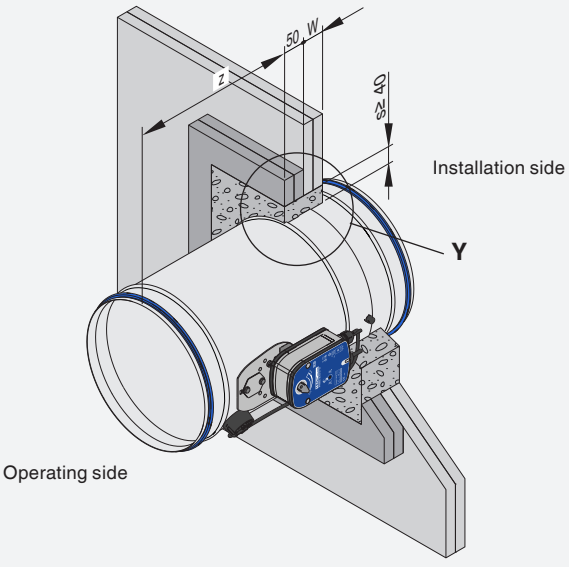
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Installation details of nominal size ØDN 315 through 400



Detail Y





6 Installation

Lightweight partition walls without metal support structure and cladding on one side (shaft walls)

Nominal size ØDN 450 through 800

Mortar based installation
Fire dampers with perimeter mortar-mix are used for mortar based installation into lightweight partition walls.

Requirements
- Lightweight partition walls without metal support structure and cladding on one side with W ≥ 50 mm
- Maximum wall width 2,000 mm
- Maximum wall height 5,000 mm
- 40 mm minimum distance of fire damper to load bearing structural elements.
- 200 mm minimum distance between two fire dampers

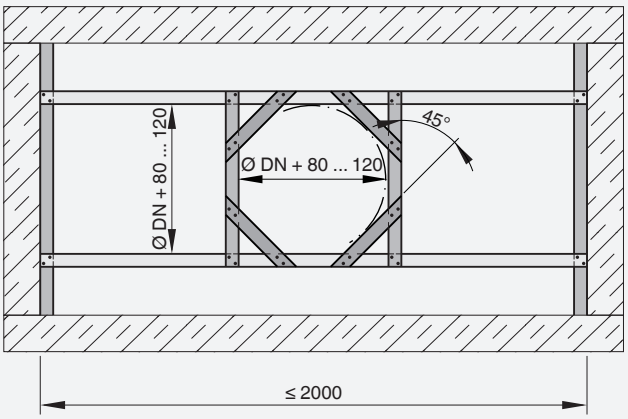
Warning!
Contamination or damage will impair the function of the fire damper.
- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:
- Erect the lightweight partition wall according to the manufacturer's instructions.
- Create an installation opening. Provide the installation opening in the metal support structure with support profiles. Reinforce the support structure with four additional profiles installed under 45°.
- Mount the wall cladding and reinforcing board.
- Push the fire damper into the installation opening and secure it. In the process, observe distance dimension z. → Table.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 120 mm.

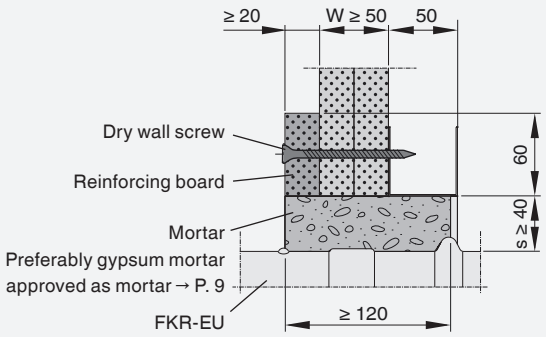
After installation
- Clean the fire damper and wash off any residual mortar with water.
- The fire damper is provided with a transport and installation safety device. This safety device must not be removed until after the mortar/concrete has hardened. → P. 21
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

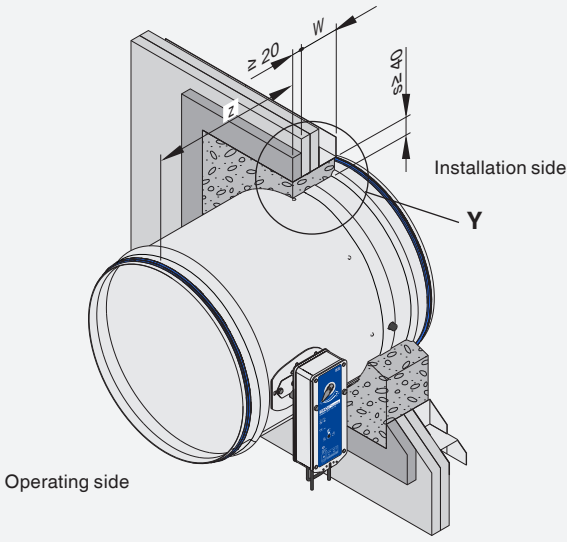
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

Installation details of nominal size ØDN 450 through 800



Detail Y





6 Installation

Fire walls with metal support structure and cladding on both sides

Nominal size ØDN 315 through 400

Mortar based installation
Fire dampers with a perimeter mortar-mix are used for mortar based installation into fire walls.

Requirements

- Fire walls with metal support structures with W ≥ 115 mm according to:
  - – General appraisal certificate P-3391/170/08 (Knauf)
  - – General appraisal certificate P-3391/0890 (Lafarge)
  - – General appraisal certificate P-3020/0109 (Rigips)
  - – General appraisal certificate P-3796/7968 (Promat)
- Maximum wall height 5,000 mm
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

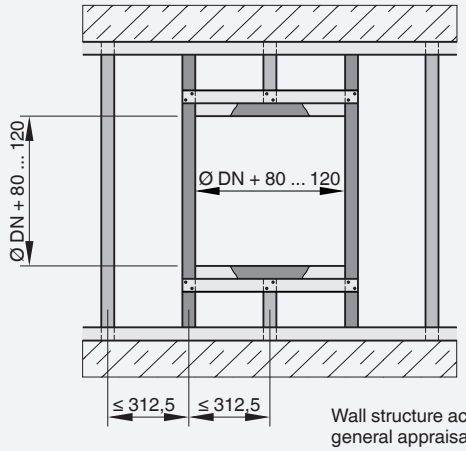
- Erect the metal support structure according to the manufacturer's instructions. Provide the installation opening with support profiles as shown in the opposing figure.
- Mount the wall cladding and, optionally, the trim panel.
- Push the fire damper into the wall opening. In the process, pay attention to the distance dimension z. → Table.
- Secure the fire damper in place.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

- Clean the fire damper and wash off any residual mortar with water.
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

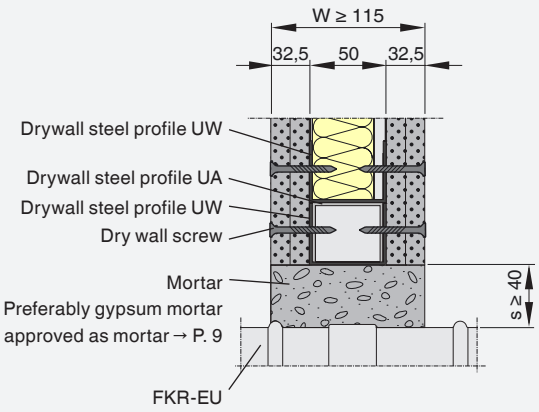
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

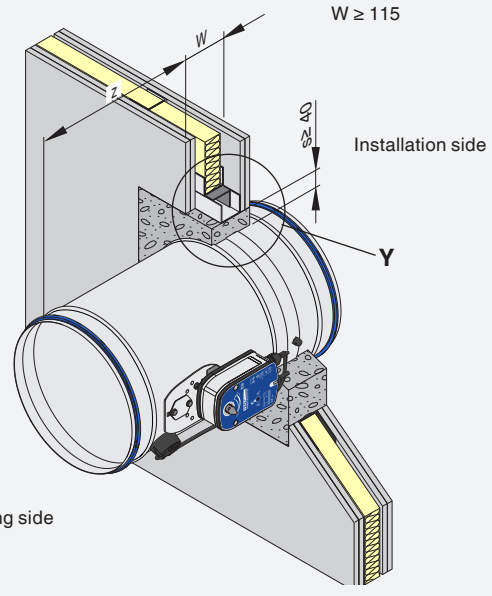
Metal support structure up to nominal size 400, Details → P. 19



Wall structure according to general appraisal certificate

Detail Y





6 Installation

Fire walls with metal support structure and cladding on both sides

Nominal size ØDN 450 through 800

Mortar based installation
Fire dampers with a perimeter mortar-mix are used for mortar based installation into fire walls.

Requirements

- Fire walls with metal support structures with W ≥ 115 mm according to:
  - – General appraisal certificate P-3391/170/08 (Knauf)
  - – General appraisal certificate P-3391/0890 (Lafarge)
  - – General appraisal certificate P-3020/0109 (Rigips)
  - – General appraisal certificate P-3796/7968 (Promat)
- Maximum wall height 5,000 mm
- 40 mm minimum distance between two fire dampers, about 80 mm with flange construction

Warning!
Contamination or damage will impair the function of the fire damper.

- Protect the fire damper from dirt and damage.
- Cover the flange openings and release mechanism (e.g. with plastic foil) to protect them from mortar and dripping water.

To install the fire damper, proceed as follows:

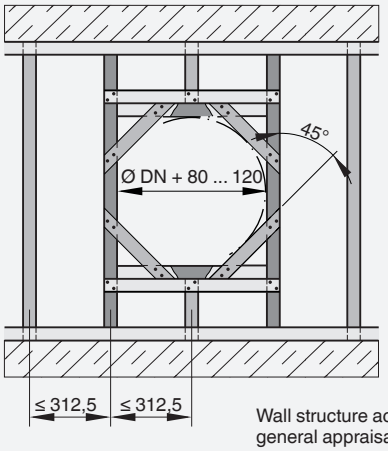
- Erect the metal support structure according to the manufacturer's instructions. Provide the installation opening with support profiles as shown in the opposing figure. Reinforce the support structure with four additional profiles installed under 45°.
- Mount the wall cladding and, optionally, the trim panel.
- Push the fire damper into the wall opening.
  In the process, pay attention to the distance dimension z.
  → Table.
- Secure the fire damper in place.
- If the wall thickness is > 115 mm, extend the fire damper with an extension piece or a spiral duct on the installation side.
- The perimeter gap »s« must be completely filled up with mortar. The mortar bed depth must be at least 100 mm.

After installation

- Clean the fire damper and wash off any residual mortar with water.
- After the hardening of the mortar, perform a functional test of the fire damper. → P. 23
- Connect the ducting. → P. 21
- Establish the electrical connection. → P. 22

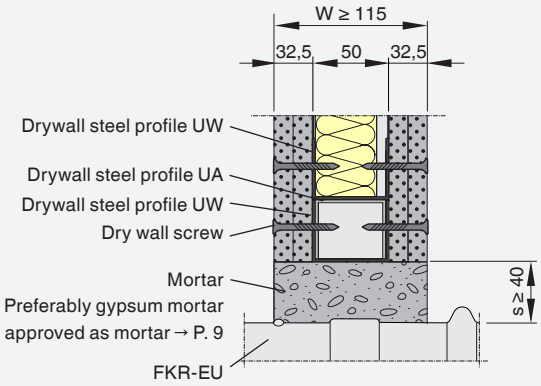
Distance z in mm	
FKR-EU spigot construction	370
FKR-EU flange construction	345

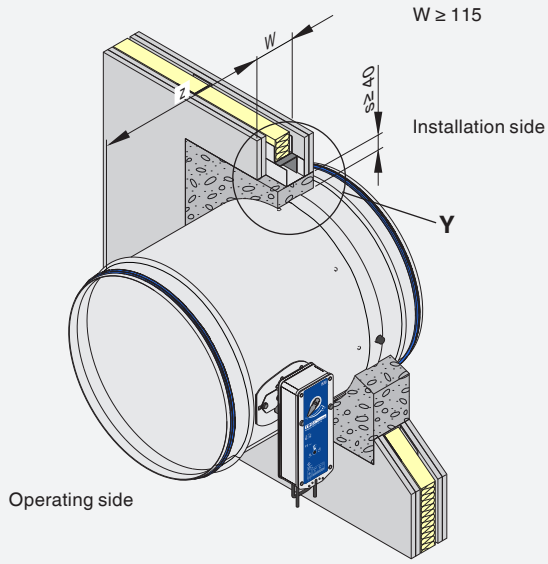
Metal support structure from nominal size 450, Details → P. 19



Wall structure according to general appraisal certificate

Detail Y

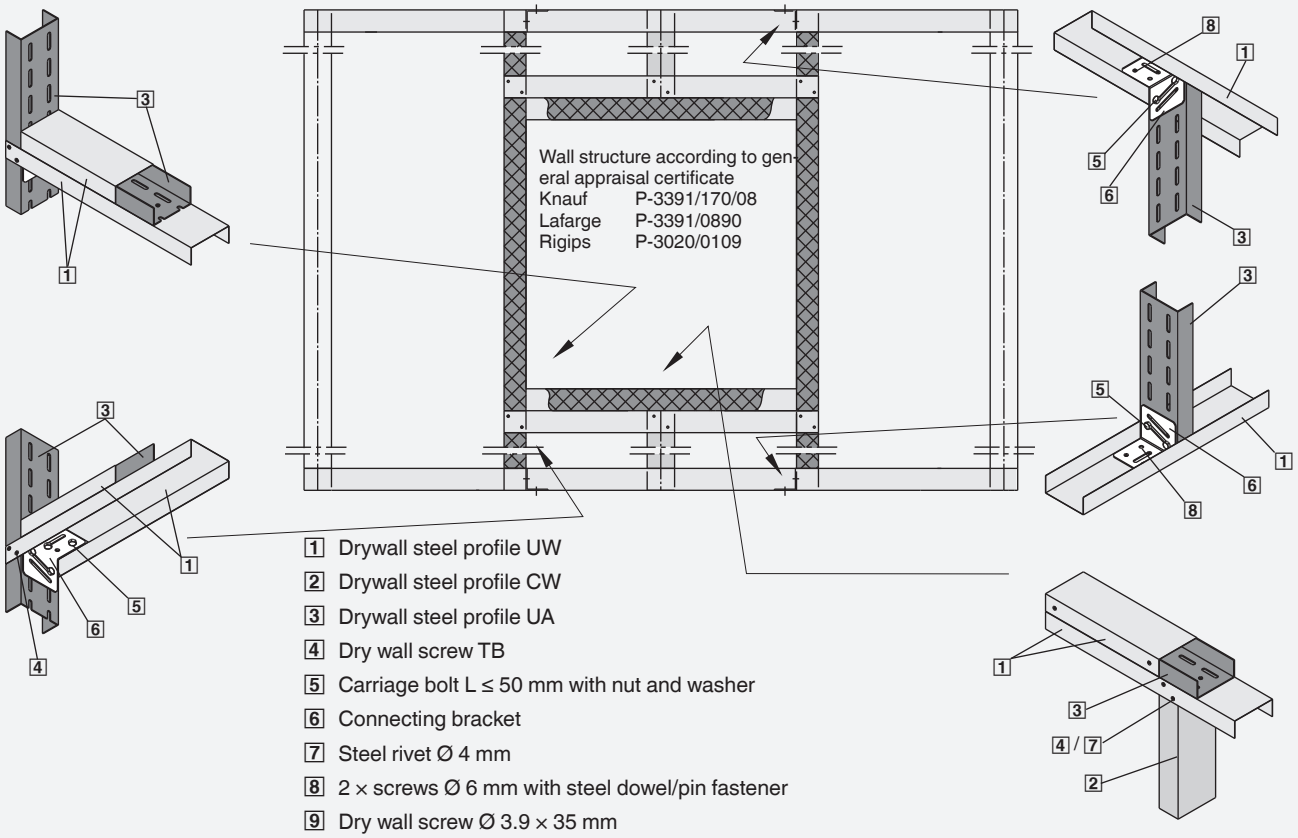




6 Installation

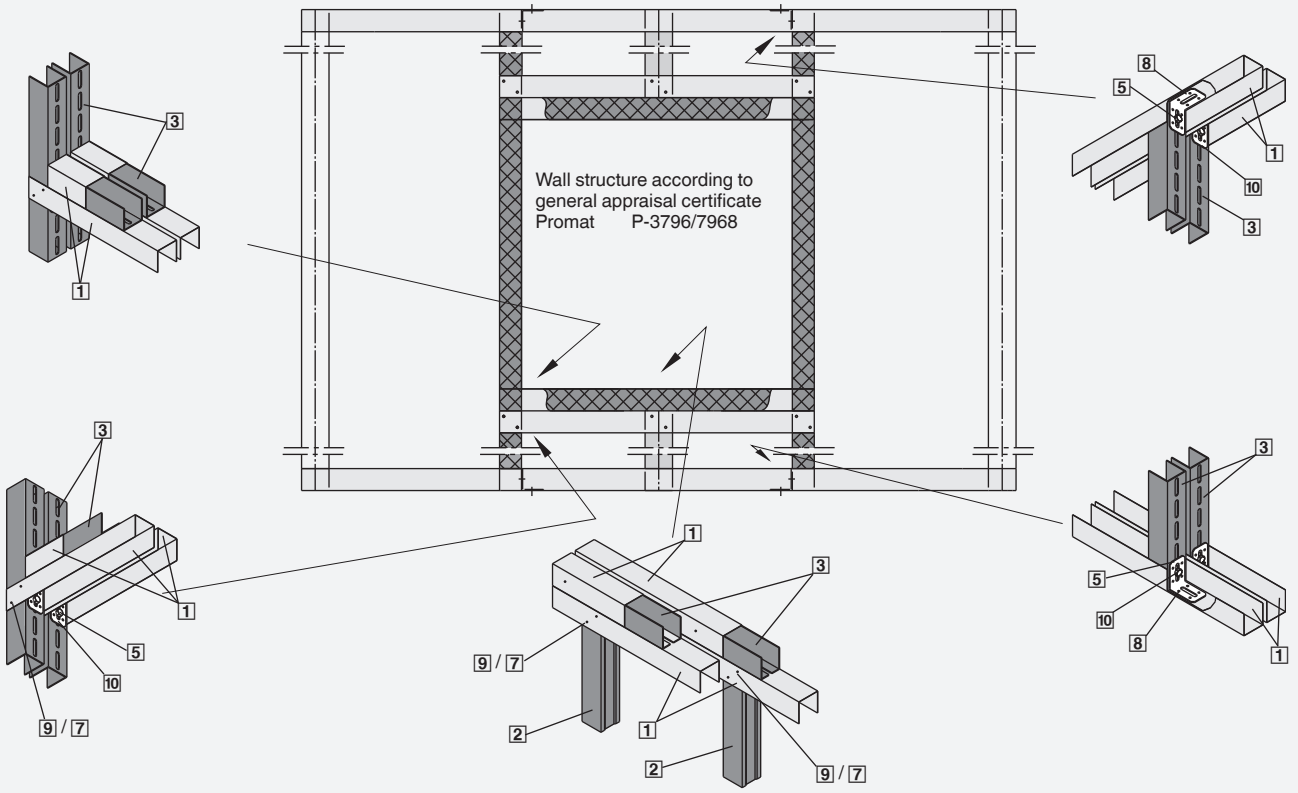
Fire walls with metal support structure and cladding on both sides

Details on metal support structures for fire walls



1 Drywall steel profile UW
2 Drywall steel profile CW
3 Drywall steel profile UA
4 Dry wall screw TB
5 Carriage bolt L ≤ 50 mm with nut and washer
6 Connecting bracket
7 Steel rivet Ø 4 mm
8 2 × screws Ø 6 mm with steel dowel/pin fastener
9 Dry wall screw Ø 3.9 × 35 mm
10 UA connecting bracket

Construction elements according to manufacturer's instructions

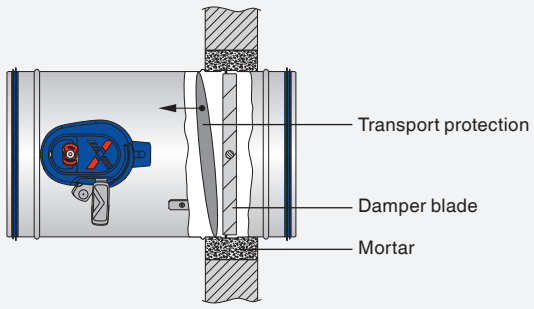


7 Connecting the duct

Removing the transport/installation protection

The fire dampers are provided with a transport and installation safety device. In case of mortar based installation this protection must not be removed until the mortar has hardened.

To remove the transport/installation protection, pull it out of the fire damper on the operating side.



Flexible connectors

Fire dampers must only be connected to ducting that does not impose any loads on the fire damper, wall, or ceiling slash, particularly in case of heating in during a fire.

Flexible connectors on both sides of the fire damper are required in each of the following installation situations:

- Installation into lightweight partition walls, shaft walls, and fire walls in lightweight construction

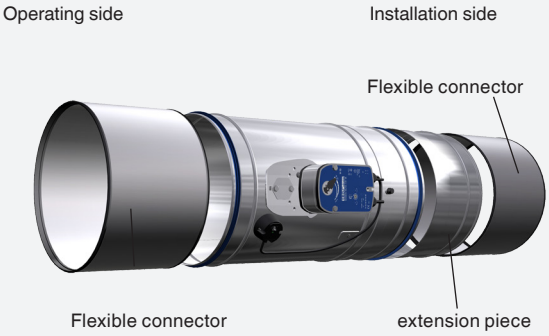
Flexible connectors must meet the following requirements:

- Minimum length of 100 mm (flexible length when installed)
- Fire rating class B2 or higher according to DIN 4102 (normally flammable)

If flexible connectors are used, potential equalisation must be ensured. → P. 22

Flexible ducting made of aluminium may be connected to the fire damper without any need for flexible connectors.

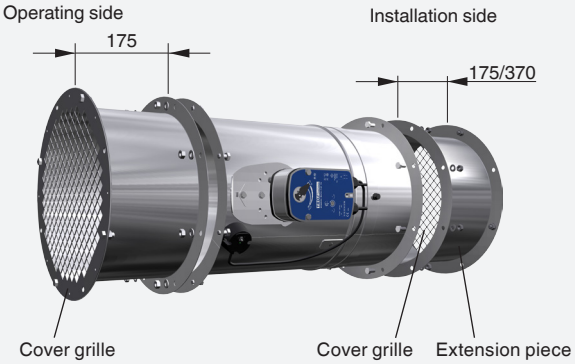
Arrangement of extension pieces; see table below



Cover grille

If only one end is to be ducted on site, the other end must have a cover grille.

Arrangement of extension pieces; see table below



Inspection access

The interior of the fire damper must remain accessible for maintenance work and cleaning. Depending on the installation configuration it may be necessary to provide inspection panels in the connecting ducts.

FKR-EU length of extension pieces Dimensions in mm

Nominal size	Operating side		Installation side	
	Cover grille	Flexible connector	Cover grille	Flexible connector
315	175	–	175	175
355	175	–	175	175
400	175	–	175	175
450	175	–	370	370
500	175	–	370	370
560	175	–	370	370
630	175	–	370	370
710	175	–	370	370
800	175	175	370	370

FKR-EU-FL length of extension pieces Dimensions in mm

Nominal size	Operating side		Installation side	
	Cover grille	Flexible connector	Cover grille	Flexible connector
315	–	–	175	175
355	–	–	175	175
400	–	–	175	175
450	–	–	175	175
500	–	–	370	370
560	–	–	370	370
630	–	–	370	370
710	–	175	370	370
800	175	175	370	370

8 Electrical connection

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 power supply before working on any electrical equipment.

For any wiring work comply with the guidelines of the VDE (Association for Electrical, Electronic and Information Technologies).

Potential equalisation

If potential equalisation is a requirement, there must be an electrical earth connection from the flexible connector to the ducting.

In case of a fire, mechanical loads from the potential equalisation must not affect the fire damper.

Limit switches for FKR-EU with fusible link

The limit switches must be connected according to the wiring example opposite.

Indicator lights or relays can be connected as long as the performance specifications are taken into consideration.

The limit switches can be used as make or break contacts for signalling purposes.

FKR-EU with spring return actuator

The FKR-EU fire damper may be equipped with a spring return actuator for a supply voltage of 230 V AC or 24 V AC/DC. Observe the performance data on the rating plate. Connect the spring return actuator according to the wiring example opposite.

Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.

BF24-T-ST-2 TR/BLF24-T-ST TR must only be connected to safety transformers.

The connecting cables of the BF24-T-ST-2 TR/BLF24-T-ST TR are fitted with plugs. The connection to the TROX AS-i bus system can be established quickly.

For connection to the terminals, shorten the connecting cable.

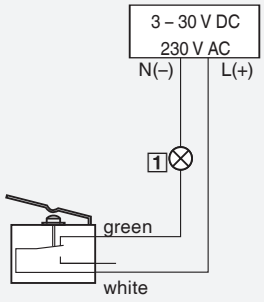
AS-i/LON modules

To connect AS-i or LON modules refer to the project-specific wiring diagrams.

For further information on AS-i and LON refer to our website: www.troxtechnik.com.

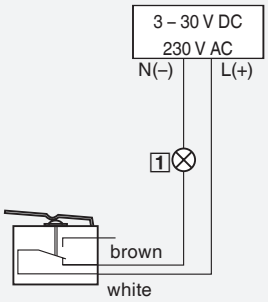
Wiring example for limit switch

CLOSED or OPEN position not reached – limit switch is not actuated



Break contact: green/white

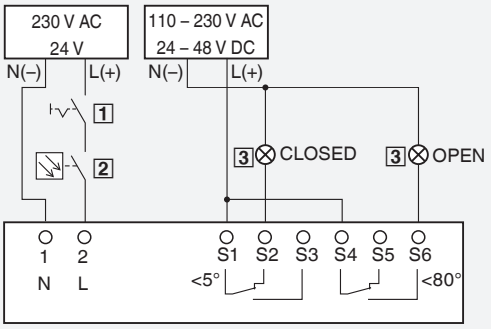
CLOSED or OPEN position reached – limit switch is actuated



Make contact: brown/white

1 Indicator light or relay, supplied by others

Wiring example for spring return actuator



1 Switch for opening and closing, supplied by others

2 Optional release mechanism, e.g. TROX smoke detector type RM-O-3-D or RM-O-VS-D

3 Indicator light, supplied by others

9 Functional test

General information

During operation at normal temperatures, the damper blade is open. A functional test involves closing the damper blade and opening it again. The procedures are different for the FKR-EU with a fusible link and for the FKR-EU with spring return actuator. → P. 24

Important!
Danger of injury during the operation of the fire damper.

There is a danger of injury in the damper blade area and in the swivelling range of the operating lever.

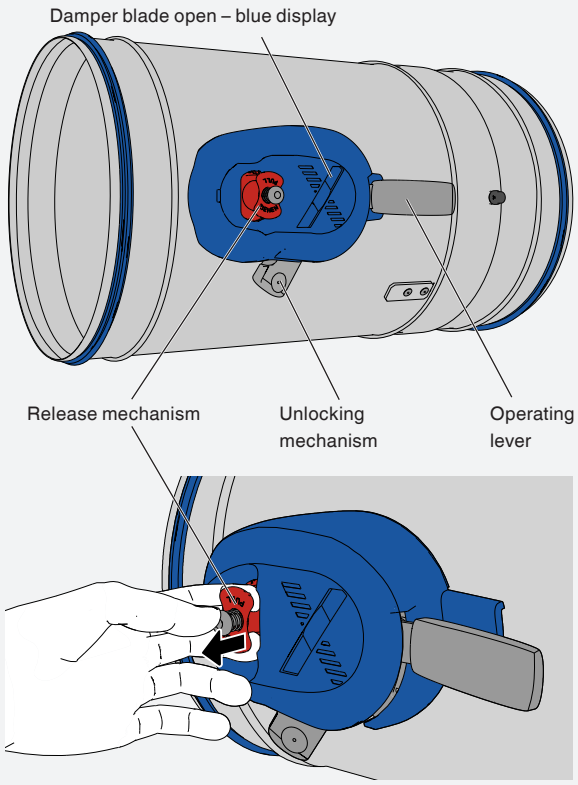
Do not reach into the fire damper swivelling range of the operating lever while actuating the release mechanism.

FKR-EU with fusible link

Closing the damper blade

To close the damper blade (manual release), proceed as follows:

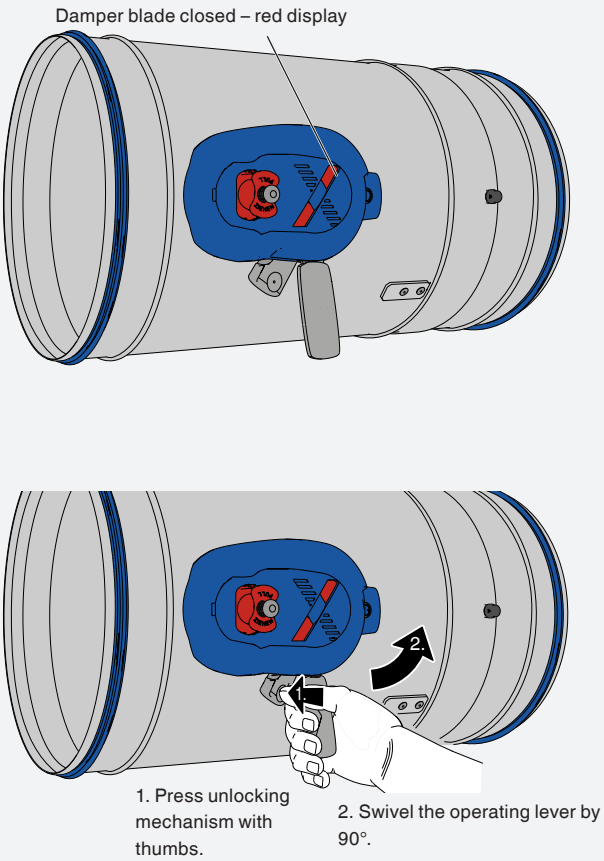
1. Grasp the release mechanism as shown with the thumb and middle fingers.
2. Pull the release mechanism towards you with both fingers. The damper blade closes automatically and locks into the CLOSED position.



Opening the damper blade

To open the damper blade, proceed as follows:

1. With your right hand, grasp the handle as shown and press down the unlocking mechanism with your thumb.
2. After that, turn the handle anti-clockwise to the travel stop. The damper blade engages in the OPEN position.



9 Functional test

FKR-EU with spring return actuator

Important!
Danger of injury when reaching into the fire damper while the damper blade is moving.

Do not reach into the fire damper while actuating the release mechanism. Make sure that the damper blade cannot be released inadvertently.

Closing/opening the damper blade with spring return actuator

When power is supplied to the actuator, the functional test can be performed either by remote control from the central BMS or by actuating the release mechanism on the fire damper.

To perform a functional test locally, proceed as follows:

1. Interrupt the power supply by pressing and holding the button. The spring return actuator closes the damper blade.
2. Reconnect the power supply by letting go of the toggle switch. The spring return actuator opens the damper blade.

Opening the damper blade using the crank handle

Warning!
Danger due to a malfunction of the fire damper.

If the damper blade has been opened by means of the crank handle (without power supply), it will no longer be triggered by a temperature increase, i.e. in case of a fire. In other words, the damper blade will not close.

To create the function the power supply must be connected.

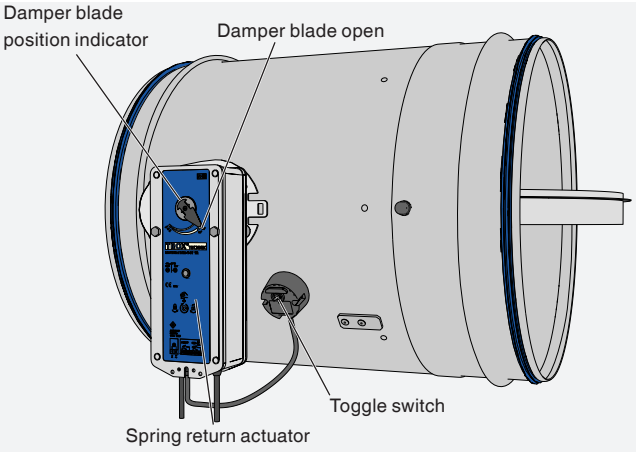
To open the damper blade, proceed as follows:

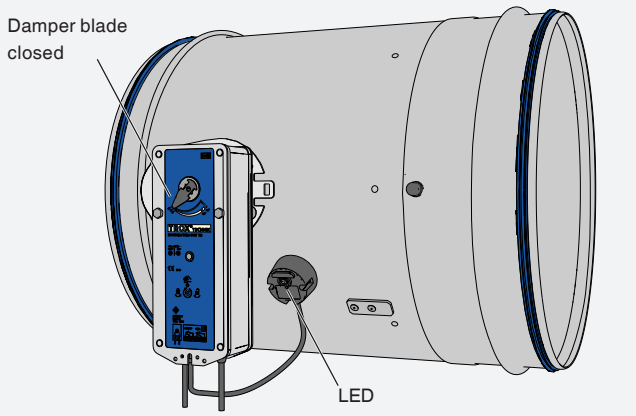
1. Insert the crank handle into the opening for the spring-winding mechanism. (The crank handle is fixed to the connecting cable.)
2. Turn the crank handle anti-clockwise to just short of the travel stop.
3. Then turn the hand crank clockwise quickly by about 90°. The damper blade remains in the OPEN position.
4. Remove the crank handle.

Closing the damper blade using the crank handle

To close the damper blade (manual release), proceed as follows:

1. Insert the crank handle into the opening for the spring-winding mechanism.
2. Turn the crank handle anti-clockwise by about 90° until a click can be heard. The spring return actuator closes the damper blade.
3. Remove the crank handle.

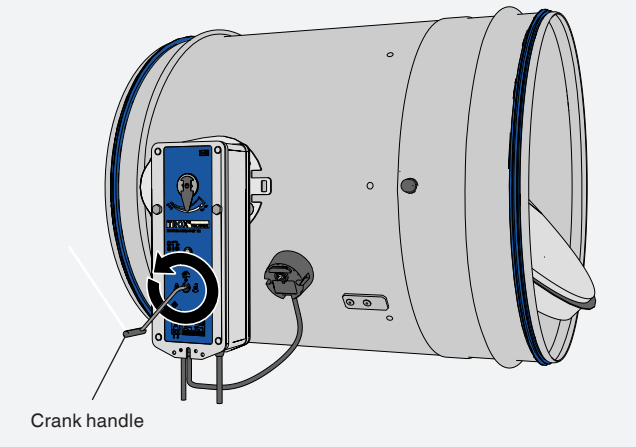




The indicator light is illuminated when all of the following conditions apply:

- power is supplied
- the thermal fuses are intact
- the pushbutton is not actuated

Opening the damper blade using the crank handle



10 Commissioning

Before commissioning, each fire damper must be inspected to determine and assess its actual condition.

The inspection measures to be taken are listed in the table on → P. 29.

Operation

After commissioning and the subsequent inspection, the fire damper will operate independently and require no intervention on the part of the plant operator.

During normal operation the damper blade is open to enable air passage through the ventilation system.

If the temperature in the duct or the ambient temperature rises in case of a fire, a thermal release mechanism is triggered and closes the damper blade.

11 Maintenance

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 power supply before working on any electrical equipment.

Important!
Danger due to inadvertently actuating the fire damper.

Inadvertent actuation of the damper blade or other parts can lead to injuries. Make sure that the damper blade cannot be released inadvertently.

Maintenance

Regular care and maintenance ensure operational readiness, functional reliability, and long service life of the fire damper.

Maintenance must comply with EN 13306 and DIN 31051.

The operator of the system is responsible for the maintenance of the fire damper. The operator is responsible for creating a maintenance plan, for defining the maintenance objectives, and for the functional reliability of the fire damper.

The FKR-EU fire damper and the spring return actuator are maintenance-free with regard to wear but fire dampers must still be included in the regular cleaning of the ventilation system.

Inspection

The fire damper must be inspected before commissioning.

After that, the functional reliability of the fire damper must be tested at least every six months. If two consecutive tests within six months are successful, the next test can be conducted one year later. Local requirements and building regulations must be complied with.

The inspection measures to be taken are listed in the table on → P. 29.

Each check must be documented and evaluated for each individual fire damper. If the requirements are not fully met, suitable remedial action must be taken.

Repair

For safety reasons, repair work must only be carried out by expert qualified personnel or the manufacturer. Only original replacement parts are to be used. A functional test is required after any repair work. → P. 23

11 Maintenance

Lubricating points

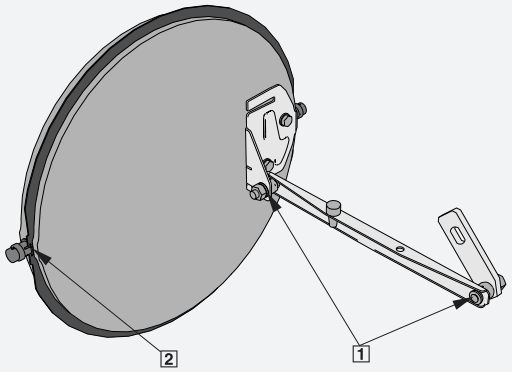
Lubricate the lubricating points 1 through 2 only if the fire damper cannot be opened or closed easily. Use only oil or grease that is free of resins or acids.

Warning!
Danger of injury when reaching into the fire damper while the damper blade is moving.

Make sure that the damper blade cannot be released inadvertently.

Do not touch the release mechanism or reach into the fire damper while actuating the release mechanism.

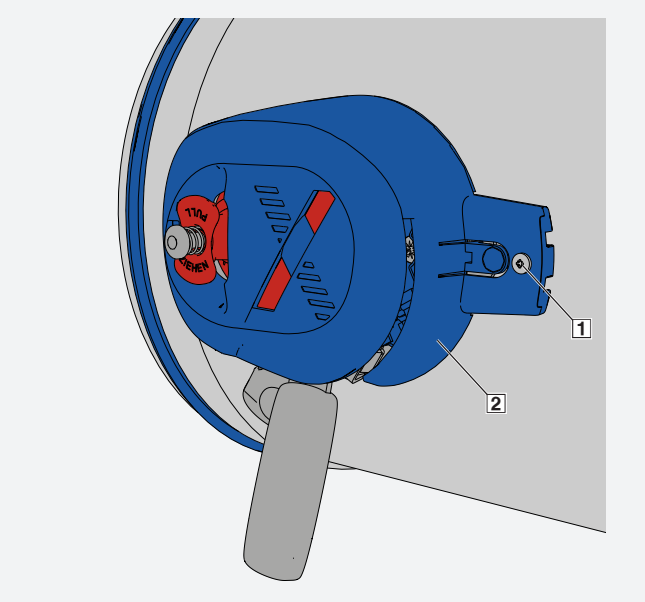
FKR-EU with fusible link and spring return actuator



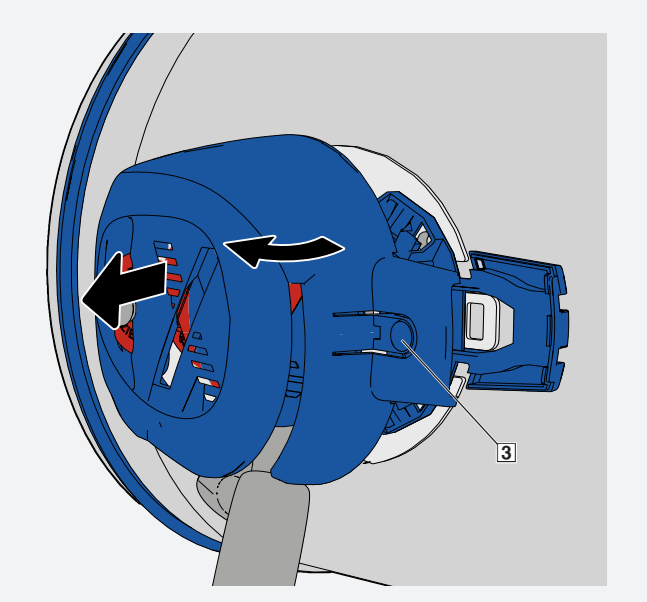
FKR-EU lubricating points		
Pos	**Interval**	**Description**
1	as required	Push rod bearings
2	as required	Damper blade bearings (both sides)

11 Maintenance

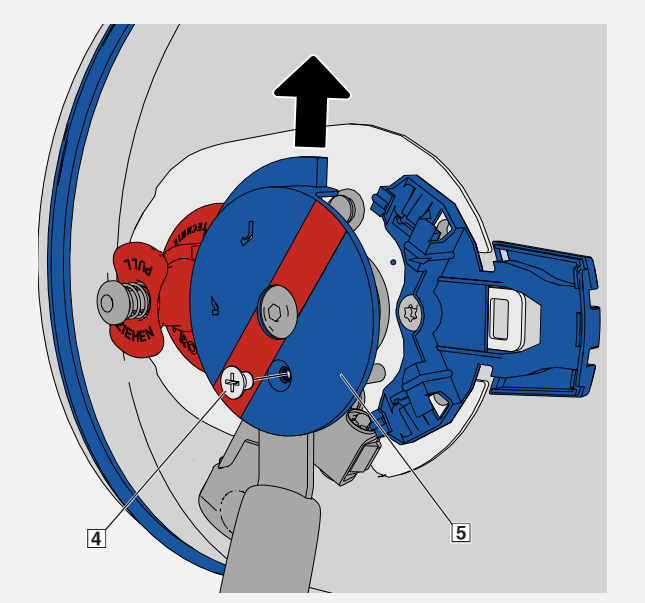
Replacing the fusible link



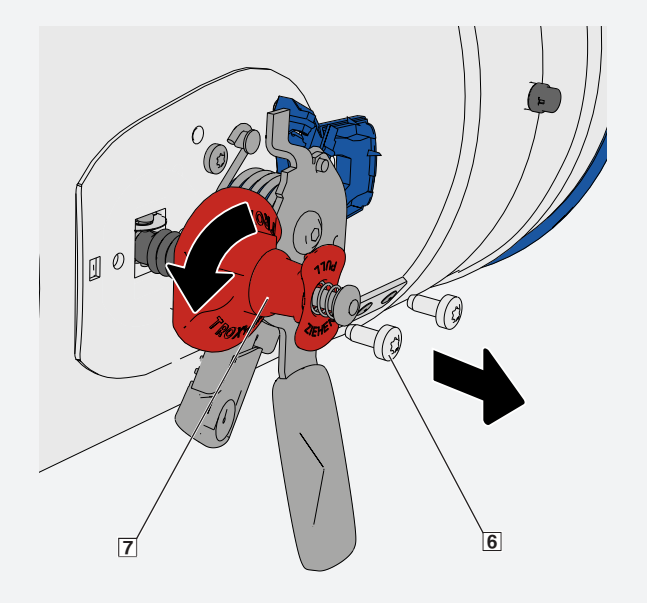
Close the damper blade. → P. 23
Loosen the screw 1 of the cover 2.



Press the button 3 on the cover 2 and swivel the cover in the direction of the arrow. Pull the cover forwards and off.



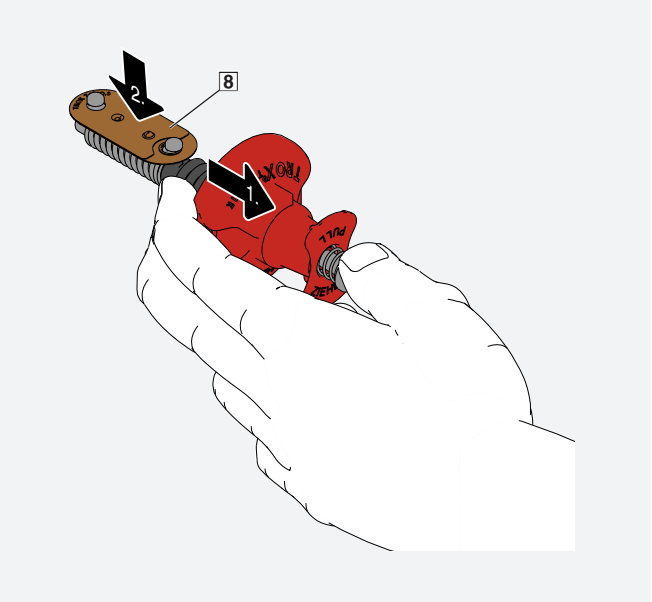
Loosen the screw 4 and pull off the graduated dial 5.



Release the screws 6 of the fusible link holder 7 and pull it forwards while turning the fusible link holder by 90°.

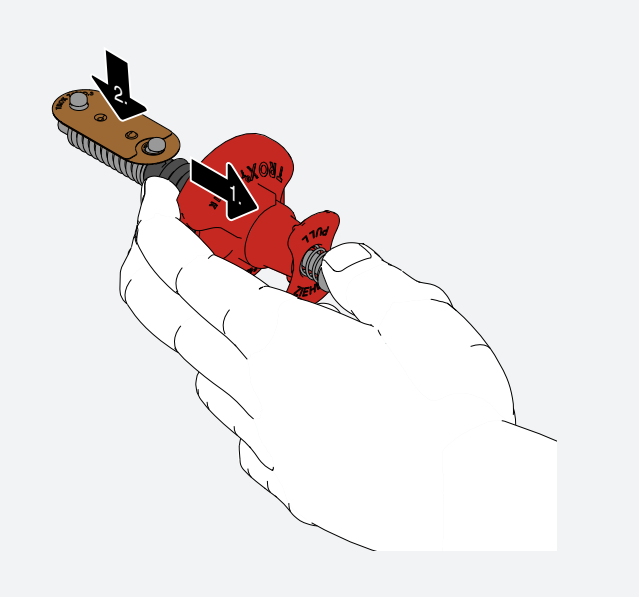
11 Maintenance

Replacing the fusible link



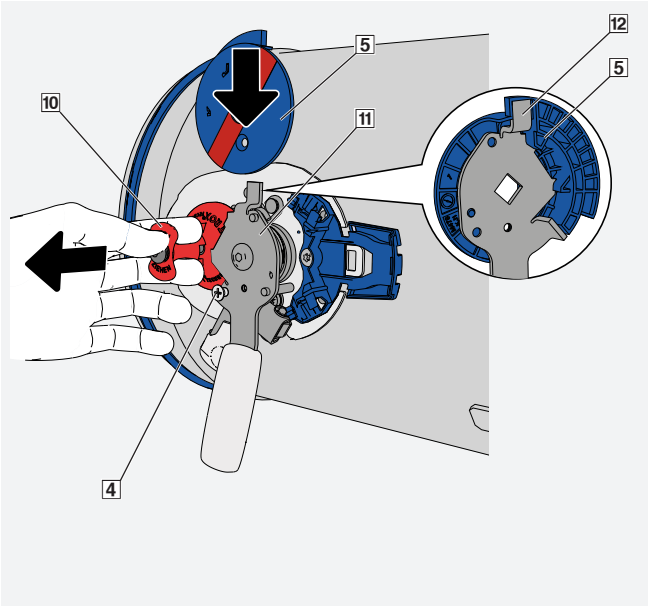
Grasp the fusible link holder as shown. Move your middle and index fingers in the direction of the arrow.

Remove the used fusible link [4].



Insert the new fusible link.

Put fusible link holder back into the fire damper and fix it with screws [1].

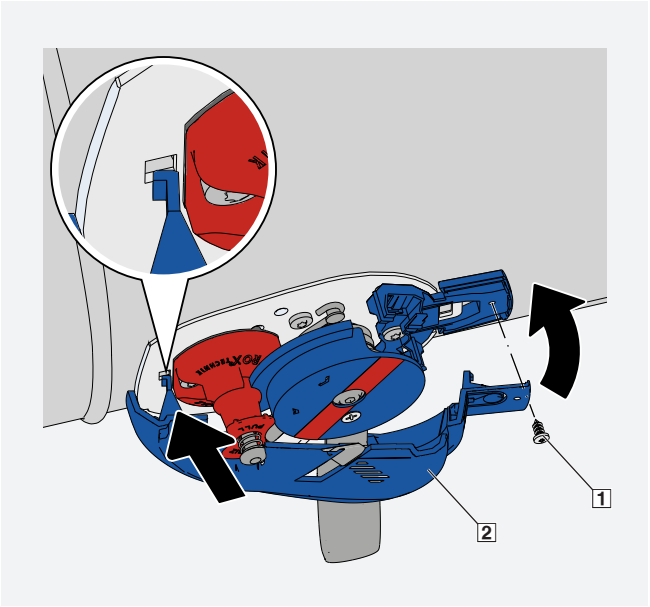


Pull the release mechanism [10] forwards and hold it.

Push the graduated dial [5] onto the lever [11] from the top.

In the process, make sure that the graduated dial engages in the bent lug [12].

Attach the graduated dial using a screw [4].



Hang the cover [2] into place and swivel it in the direction of the arrow.

The cover locks into place. Attach the cover with a screw [1].

Carry out a functional test.→ P. 23

11 Maintenance

Inspection, maintenance and repair measures

Item to be checked	Interval			Required condition	Remedial action if necessary
	Before commissioning	Regularly	As required		
Accessibility of the fire damper	×			Internal and external accessibility	Provide access.
Installation of the fire damper	×			Installation into walls/ceiling slabs according to the operating manual → P. 9 – 19	Install the fire damper correctly.
Transport/installation protection	×			Transport/installation protection has been removed	Remove transport/installation protection.
Ducting / cover grille / flexible connector	×			Connection according to the operating manual → P. 21	Establish correct connection.
Damage to the fire damper	×	×		No damage	Repair or replace the fire damper.
Power supply to the spring return actuator	×			Power supply acc. to spring return actuator rating plate	Provide correct power supply.
Contamination	×		×	No contamination inside	Clean the fire damper.
Damper blade and seal	×	×		Damper blade / seal OK	Replace the damper blade
Function of the release mechanism	×	×		Function OK	Replace the release mechanism.
Fusible link	×	×		Fusible link intact	Replace the fusible link.
Function of FKR-EU with fusible link, blade closure by manual release → P. 23	×	×		• Damper blade closes independently. • The tab on the handle locks into the CLOSED position and locks the damper blade.	Replace the release mechanism.
Function of FKR-EU with fusible link, blade opening by manual release → P. 23	×	×		• Damper blade can be opened manually. • Handle can be locked into the OPEN position using the release mechanism.	• Determine and eliminate the cause of the fault. • Replace the release mechanism. • Repair or replace the fire damper.
Function of FKR-EU with spring return actuator, blade closure→ P. 24	×	×		• Function of actuator OK • Damper blade closes	• Replace the spring return actuator. • Repair or replace the fire damper.
Function of FKR-EU with spring return actuator, blade opening→ P. 24	×	×		• Function of actuator OK • Damper blade opens	• Replace the spring return actuator. • Repair or replace the fire damper.
Function of the external smoke detectors	×	×		Function OK	Determine and eliminate the cause of the fault.
Function of limit switches	+	+		Function OK	Replace the limit switches.
Function of the external signalling (damper blade position indicator)	+	+		Function OK	Determine and eliminate the cause of the fault.

× = Required
\+ = Recommended

12 Decommissioning, removal and disposal

Final decommissioning

1. Switch off the ventilation system.
2. Switch off the power supply.

Removal

1. Disconnect the wiring.

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 power supply before working on any electrical equipment.

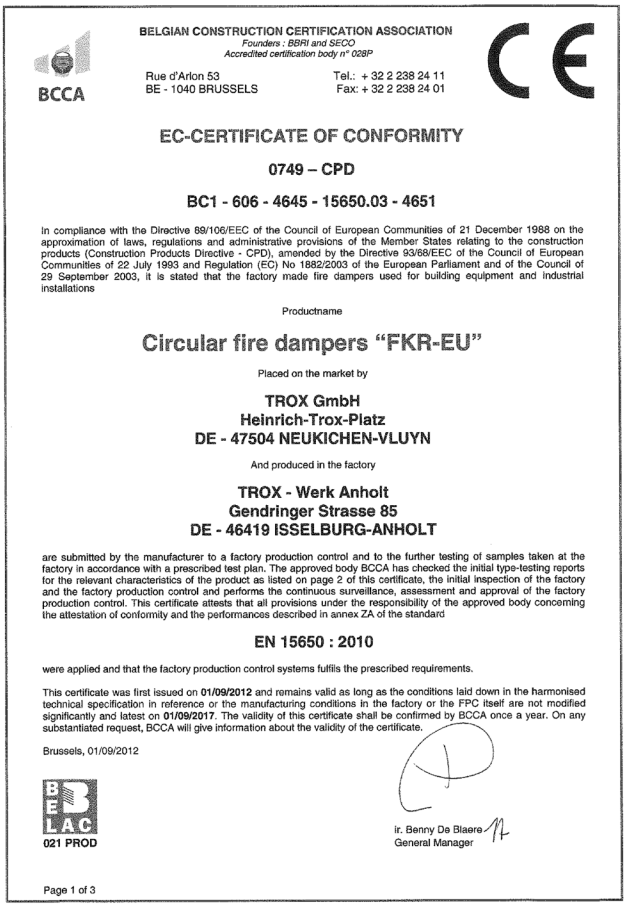
2. Remove the ducts.
3. Close the damper blade.
4. Remove the fire damper.

Disposal

For disposal, the fire damper must be disassembled.

Dispose of electronic components according to the local electronic waste regulations.

13 EC Certificate of Conformity



BELGIAN CONSTRUCTION CERTIFICATION ASSOCIATION
Founders : BBRI and SECO
Accredited certification body n° 026P

BCCA

Rue d'Arlon 53
BE - 1040 BRUSSELS

Tel.: + 32 2 238 24 11
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CE

EC-CERTIFICATE OF CONFORMITY

0749 – CPD

BC1 - 606 - 4645 - 15650.03 - 4651

In compliance with the Directive 89/106/EEC of the Council of European Communities of 21 December 1988 on the approximation of laws, regulations and administrative provisions of the Member States relating to the construction products (Construction Products Directive - CPD), amended by the Directive 93/68/EEC of the Council of European Communities of 22 July 1993 and Regulation (EC) No 1882/2003 of the European Parliament and of the Council of 29 September 2003, it is stated that the factory made fire dampers used for building equipment and industrial installations

Productname

Circular fire dampers "FKR-EU"

Placed on the market by

TROX GmbH
Heinrich-Trox-Platz
DE - 47504 NEUKICHEN-VLUYN

And produced in the factory

TROX - Werk Anholt
Gendringer Strasse 85
DE - 46419 ISSELBURG-ANHOLT

are submitted by the manufacturer to a factory production control and to the further testing of samples taken at the factory in accordance with a prescribed test plan. The approved body BCCA has checked the initial type-testing reports for the relevant characteristics of the product as listed on page 2 of this certificate, the initial inspection of the factory and the factory production control and performs the continuous surveillance, assessment and approval of the factory production control. This certificate attests that all provisions under the responsibility of the approved body concerning the attestation of conformity and the performances described in annex ZA of the standard

EN 15650 : 2010

were applied and that the factory production control systems fulfils the prescribed requirements.

This certificate was first issued on **01/09/2012** and remains valid as long as the conditions laid down in the harmonised technical specification in reference or the manufacturing conditions in the factory or the FPC itself are not modified significantly and latest on **01/09/2017**. The validity of this certificate shall be confirmed by BCCA once a year. On any substantiated request, BCCA will give information about the validity of the certificate.

Brussels, 01/09/2012

BELAC
021 PROD

ir. Benny De Blaere
General Manager

Page 1 of 3

Fire resistance according to 1366-2 and classification according to 13501-3 → P. 9

- Observance of the cross section (under E)
- Enclosure of space E
- Thermal insulation I
- Smoke leakage S
- Mechanical rigidity (under E)

Nominal conditions of activation/sensitivity according to ISO 10294-4 – Stressability of the temperature-sensitive measuring sensor – Temperature threshold of the temperature-sensitive measuring sensor	**Passed**
Response delay (response time) according to EN 1366-2 – Closing time	**Passed**
Operational safety according to 1366-2: – Cyclic testing	10000 cycles **Passed**
Stability of the response delay according to 1366-2 – Temperature-sensitive measuring sensor temperature threshold and stressability	**Passed**
Stability of the operational safety according to EN 15650 – Testing of the opening and closing cycle	B(L)F-(ST)-TR 10000 cycles **Passed**
Damper closed blade leakage according to EN 1751	**class 4**
Casing air leakage rate according to EN 1751	**Class C**