



# Fire damper

## Type KA-EU

with general building inspectorate licence Z-41.3-692

or

declaration of performance DoP / KA-EU / DE / 002



Read the instructions prior to performing any task!

**TROX<sup>®</sup> TECHNIK**

The art of handling air

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## General information

### About this manual

This operating and installation manual enables operating or service personnel to correctly install the TROX product described below and to use it safely and efficiently.

This operating and installation manual is intended for use by fitting and installation companies, in-house technicians, technical staff, properly trained persons, and qualified electricians or air conditioning technicians.

It is essential that these individuals read and fully understand this manual before starting any work. The basic prerequisite for safe working is to comply with the safety notes and all instructions in this manual.

The local regulations for health and safety at work and general safety regulations also apply.

This manual must be given to the system owner when handing over the system. The system owner must include the manual with the system documentation. The manual must be kept in a place that is accessible at all times.

Illustrations in this manual are mainly for information and may differ from the actual design.

### Other applicable documentation

If the fire damper is installed in Germany, general building inspectorate licence Z-41.3-692 applies in addition to this installation and operating manual.

If the fire damper is installed in other countries, DoP / KA-EU / DE / 002 applies in addition to this manual.

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### TROX Technical Service

To ensure that your request is processed as quickly as possible, please keep the following information ready:

- Product name
- TROX order number
- Delivery date
- Brief description of the fault

Online	<a href="http://www.troxtechnik.com">www.troxtechnik.com</a>
Phone	+49 2845 202-400

### Limitation of liability

The information in this manual has been compiled with reference to the applicable standards and guidelines, the state of the art, and our expertise and experience of many years.

The manufacturer does not accept any liability for damages resulting from:

- Non-compliance with this manual
- Incorrect use
- Operation or handling by untrained individuals
- Unauthorised modifications
- Technical changes
- Use of non-approved replacement parts

The actual scope of delivery may differ from the information in this manual for bespoke constructions, additional order options or as a result of recent technical changes.

The obligations agreed in the order, the general terms and conditions, the manufacturer's terms of delivery, and the legal regulations in effect at the time the contract is signed shall apply.

We reserve the right to make technical changes.

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## Safety notes

Symbols are used in this manual to alert readers to areas of potential hazard. Signal words express the degree of the hazard.

### DANGER!

Imminently hazardous situation which, if not avoided, will result in death or serious injury.

### WARNING!

Potentially hazardous situation which, if not avoided, could result in death or serious injury.

### CAUTION!

Potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

### NOTICE!

Potentially hazardous situation which, if not avoided, may result in property damage.

### ENVIRONMENT!

Environmental pollution hazard.

## Symbols used on the fire damper

### WARNING!

There is a danger of hand or finger crushing near the actuator mechanism. Do not reach into the actuator mechanism.

### **Read the installation and operating manual!**

Read this installation and operating manual before you start handling or working on the fire damper.

## Tips and recommendations



Useful tips and recommendations as well as information for efficient and fault-free operation.

## Safety notes as part of instructions

Safety notes may refer to individual instructions. In this case, safety notes will be included in the instructions and hence facilitate following the instructions. The above listed signal words will be used.

Example:

1. ▶ Untighten the screw.
2. ▶

### CAUTION!

**Danger of finger entrapment when closing the lid.**

Be careful when closing the lid.

3. ▶ Tighten the screw.

## Specific safety notes

The following symbols are used in safety notes to alert you to specific hazards:

Warning signs	Type of danger
	Warning – hand injuries.
	Warning – danger zone.

### Standards and guidelines

For any job performed on the fire damper, regulations and guidelines must be complied with in order to meet the requirements of the general building inspectorate licence or the declaration of performance. This applies in particular to the following German country specific regulations or as appropriate in the country where the product is to be installed:

- German Equipment and Product Safety Act
- Industrial Health and Safety Regulations (BetrSichV)
- Local building regulations
- Accident Prevention Regulations (BGV A1, BGV A3)
- Maintenance standards DIN 31051 and EN 13306
- VDI 2052 Ventilation equipment for kitchens
- German Muster-Lüftungsanlagen-Richtlinie M-LüAR (Ventilation System Guideline)
- Equipment for commercial kitchens - Components for ventilation in commercial kitchens, DIN EN 16282
- Any additional related fire protection standards and regulations

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# 1 Safety

## 1.1 General safety notes

### Sharp edges, sharp corners and thin sheet metal parts

#### CAUTION!

#### **Danger of injury from sharp edges, sharp corners and thin sheet metal parts!**

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

### Electrical voltage

#### 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.

## 1.2 Correct use

- The fire damper is used as a shut-off device to prevent fire and smoke from spreading through ducting.
- Only for in extract air or exhaust air systems of commercial kitchens.
- Upright or suspended ceiling installation. Airflow direction is critical with upright installation.
- Only other extract air ducts and exhaust air ducts of commercial kitchens may be connected to the lines, e.g. food distribution points.
- For indoor use only; do not expose the fire damper permanently to outdoor air.
- Maximum upstream velocity: 10 m/s.

### Incorrect use

#### WARNING!

#### **Danger due to incorrect use!**

Incorrect use of the fire damper can lead to dangerous situations.

Never use the fire damper

- in extract air ducts other than those of commercial kitchens
- in supply air ducts
- in areas with potentially explosive atmospheres
- outdoors without sufficient protection against the effects of weather
- installation in a way that prevents inspection or cleaning of the internal components of the fire damper
- for purposes other than fire protection
- for ventilation (the damper should not be opened and closed daily)

### Residual risks

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

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.

## 1.3 Qualified staff

#### WARNING!

#### **Danger of injury due to insufficiently qualified individuals!**

Incorrect use may cause considerable injury or damage to property.

- Only skilled qualified 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.

## Qualified staff

### **Specialist personnel**

Specialist personnel are individuals who have sufficient professional or technical training, knowledge and actual experience to enable them to carry out their assigned duties, understand any potential hazards related to the work under consideration, and recognise and avoid any risks involved.



## 2 Technical data

### 2.1 General data

Nominal sizes B × H	250 × 225 – 1200 × 500 mm
Casing lengths L	599 – 881 mm
Volume flow rate range	up to 6000 l/s up to 21600 m³/h
Temperature range	5 °C ... 40 °C
Release temperature	72 °C
EC conformity	<ul style="list-style-type: none"> <li>Construction Products Regulation (EU) no. 305/2011</li> <li>EN 15650 – Ventilation for buildings – Fire dampers</li> <li>EN 13501-3 – Classification – Part 3: Fire resisting ducts and fire dampers</li> <li>EN 1366-2 – Fire resistance tests for service installations – Part 2: Fire dampers</li> </ul>
Declaration of performance	DoP / KA-EU / DE / 002
General building inspectorate licence (only for Germany)	Z-41.3-692

<sup>1)</sup> Data applies to uniform upstream and downstream conditions for the fire damper

### Rating plate or licence plate

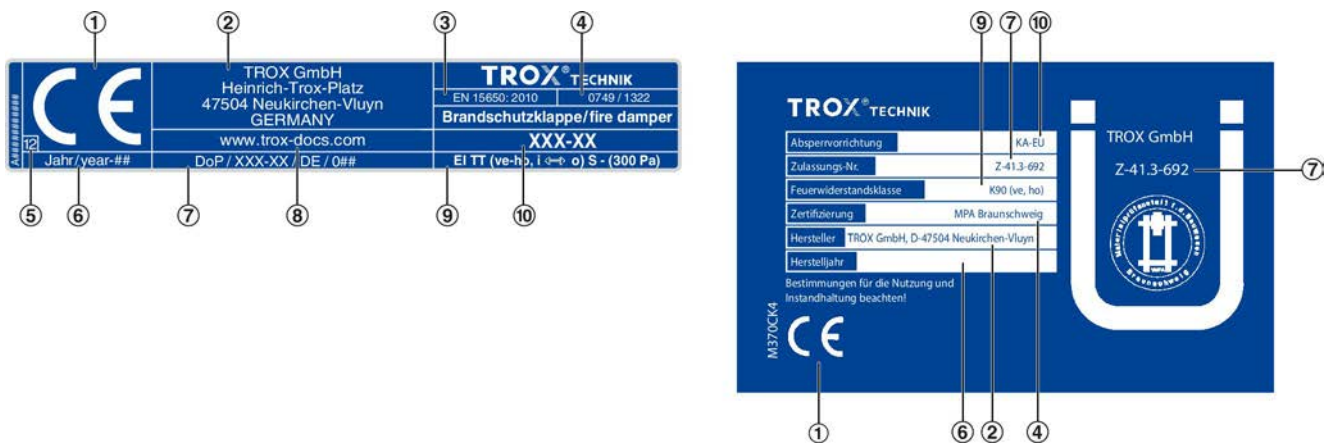


Fig. 1: Rating plate or licence plate (example)

- |   |   |    |  |
|---|---|----|--|
| 1 | CE mark   | 6  | Year of manufacture  |
| 2 | Manufacturer's address  | 7  | No. of the declaration of performance / Licence no.  |
| 3 | Number of the European standard and year of its publication         | 8  | Website from which the DoP can be downloaded   |
| 4 | Notified body   | 9  | Regulated characteristics; the fire resistance class depends on the application and may vary |
| 5 | The last two digits of the year in which the CE marking was affixed | 10 | Type   |

## 2.2 KA-EU without electric blade opening actuator

### Dimensions [mm]

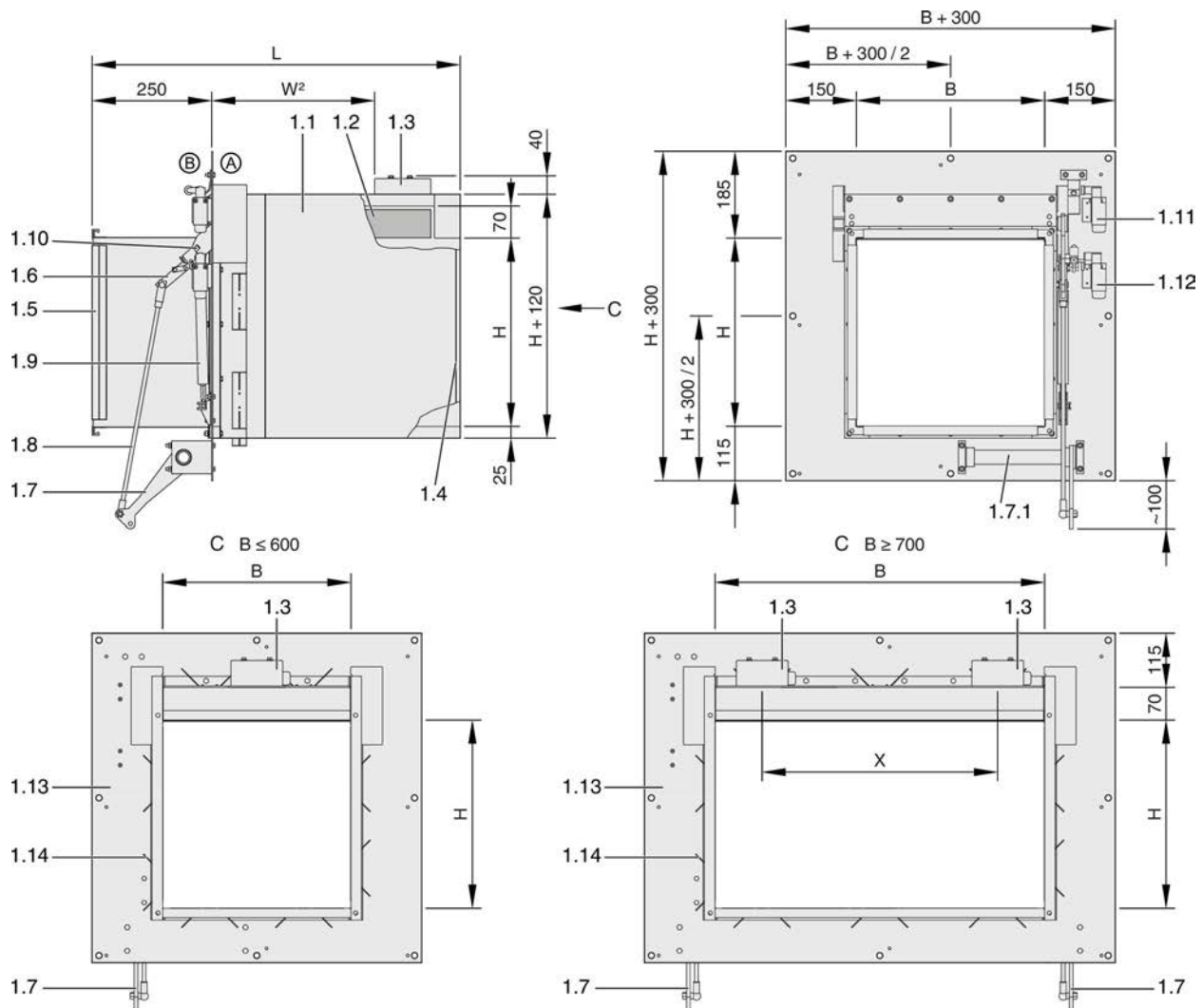


Fig. 2: KA-EU

- |       |   |              |   |
|-------|---|--------------|---|
| 1.1   | Casing  | 1.11         | Limit switch for damper blade position CLOSED |
| 1.2   | Damper blade                                    | 1.12         | Limit switch for damper blade position OPEN   |
| 1.3   | Electromagnet <sup>2</sup> with cover           | 1.13         | Floor mounting plate                          |
| 1.4   | Flange, installation side <sup>1</sup>          | 1.14         | Fixing tab                                    |
| 1.5   | Flange, operating side <sup>1</sup>             | Ⓐ            | Installation side                             |
| 1.6   | Blade opening lever (fixed to the damper blade) | Ⓑ            | Operating side                                |
| 1.7   | Blade opening lever on adjustable pipe          | B            | Width of the fire damper (side B)             |
| 1.7.1 | Adjustable pipe                                 | H            | Height of the fire damper (side H)            |
| 1.8   | Threaded rod                                    | L            | Length of the fire damper (casing length)     |
| 1.9   | Gas strut (from B ≥ 700 mm to gas struts)       | <sup>1</sup> | (SBM20) – up to B = 900 mm                    |
| 1.10  | Spring tab bolt                                 |              | (SBM30) – with B ≥ 1000 mm                    |

Electromagnet <sup>2</sup>							
B [mm]	250 – 600	700	800	900	1000	1100	1200
No. of electromagnets	1	2	2	2	2	2	2
Distance X between magnets [mm]	Central position	500	500	600	700	800	900

<sup>2</sup>The magnets should remain accessible for maintenance even after the KA-EU has been installed (for maximum wall thickness see table 21).

KA-EU without electric blade opening actuator

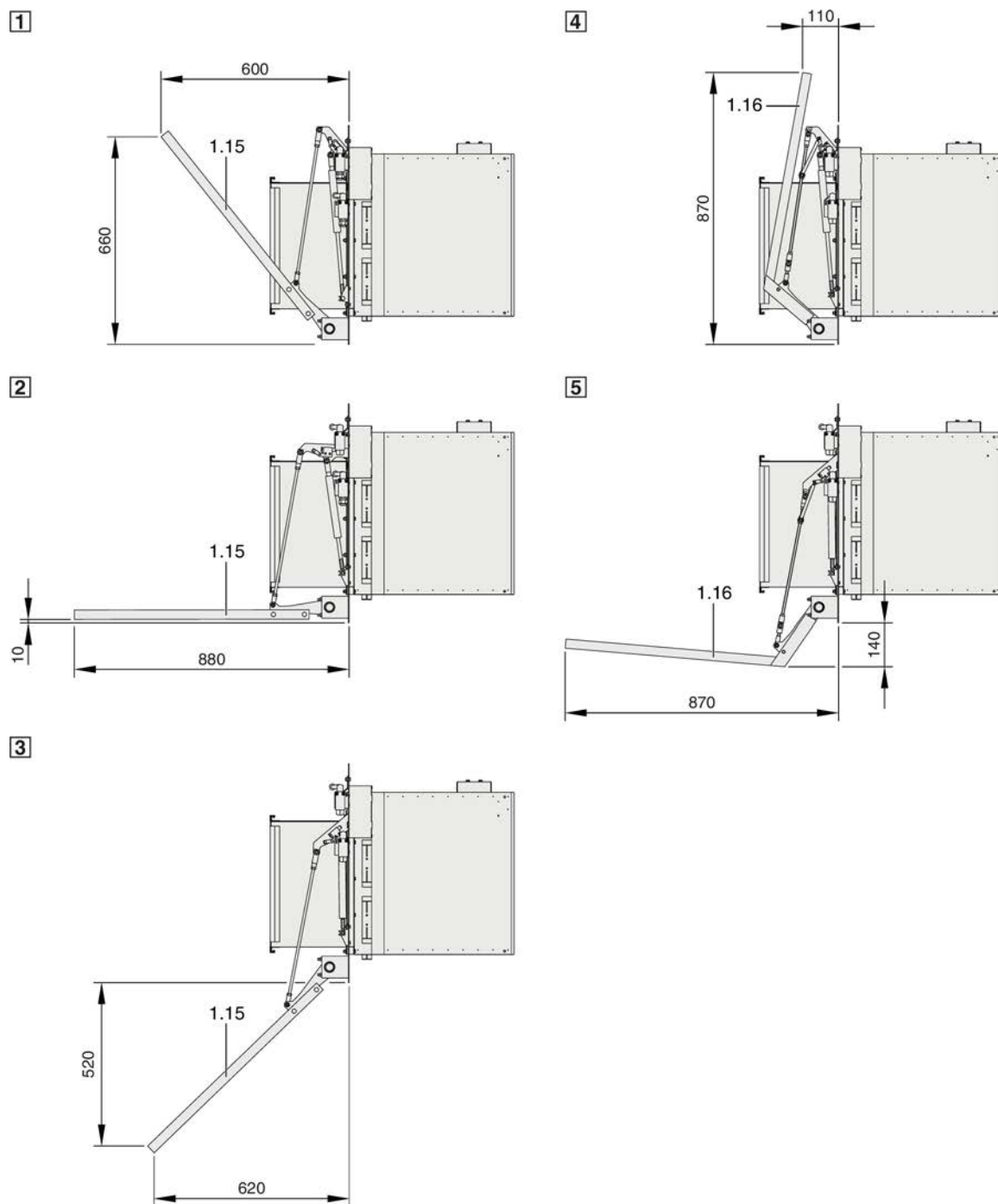


Fig. 3: KA-EU – Space required for opening lever<sup>3</sup>

Item **1** to **3**  
 1.15 Opening lever – straight (standard, part of supply package)

Item **4** and **5**  
 1.16 Opening lever – angled (to be ordered separately)

With  $B \geq 700$  mm (two gas struts) the opening lever may be placed on the left or right. If the manual lever is on the left, the blade has to be released from the right.

### 2.3 KA-EU with electric blade opening actuator

Dimensions [mm]

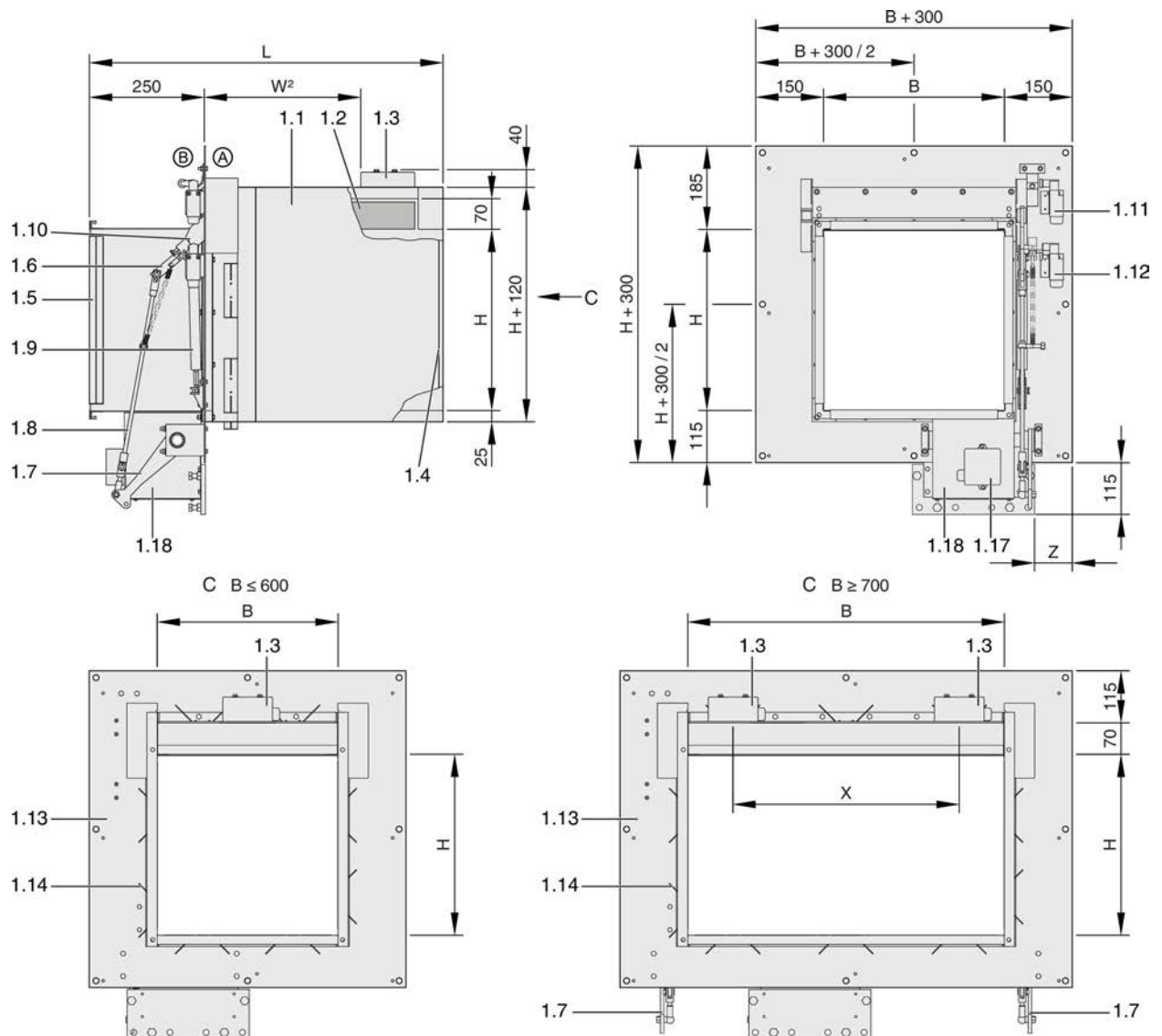


Fig. 4: KA-EU with electric blade opening actuator

- 1.1 – 1.14 see KA-EU 10
- 1.17 Junction box
- 1.18 Electric blade opening actuator (standard);  
for other positions see Fig. 5
- Ⓐ Installation side
- Ⓑ Operating side
- B Width of the fire damper (side B)
- H Height of the fire damper (side H)
- L Length of the fire damper (casing length)
- 1<sup>1</sup> (SBM20) – up to B = 900 mm  
(SBM30) – with B ≥ 1000 mm

Electromagnet <sup>2</sup>							
B [mm]	250 – 600	700	800	900	1000	1100	1200
No. of electromagnets	1	2	2	2	2	2	2
Distance X between magnets [mm]	Central position	500	500	600	700	800	900

<sup>2</sup>The magnets should remain accessible for maintenance even after the KA-EU has been installed (for maximum wall thickness see table 21).

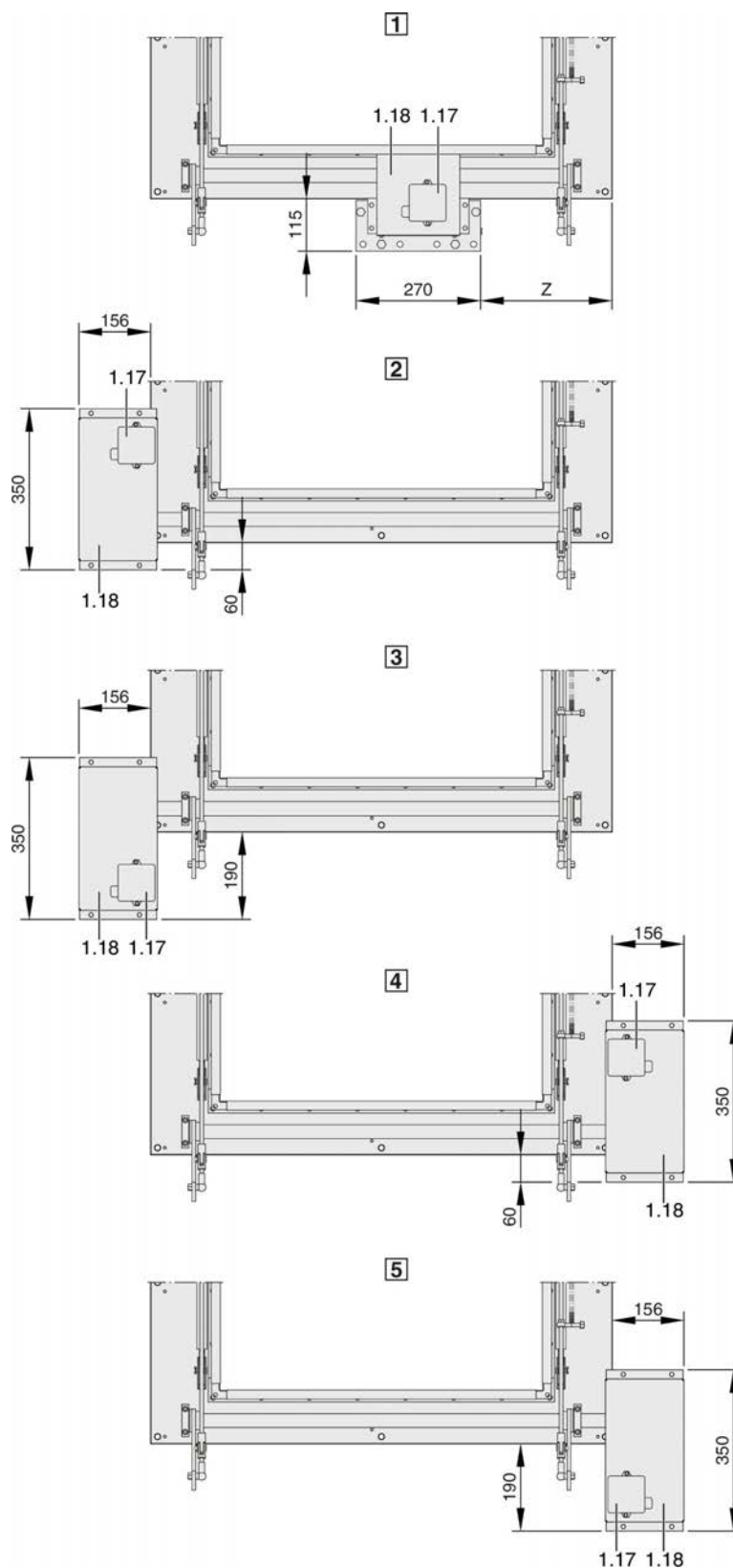


Fig. 5: Positions of the electric blade opening actuator

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li><b>1</b> Bottom centre (standard)</li> <li><b>2</b> Top left (only with B ≥ 700 mm)</li> <li><b>3</b> Bottom left (only with B ≥ 700 mm)</li> <li><b>4</b> Top right</li> </ul> | <ul style="list-style-type: none"> <li><b>5</b> Bottom right</li> <li>1.17 Junction box</li> <li>1.18 Electric blade opening actuator</li> </ul> |
|--|--|

## 2.4 Dimensions and weight

### Dimensions and weight

Dimensions [mm] and weight [kg]													
Dimensions					Weight <sup>1</sup>	Position of electric blade opening actuator <sup>2</sup>							
B	H	L	W	Z		Top left	Bottom left	Top right	Bottom right				
250	225	599	160	85	26	Not possible		Possible					
300					28								
400					34								
500					38								
600					43								
700				285	49	Possible							
800				335	56								
900				385	60								
1000				435	66								
1100				485	70								
1200				535	75								
300				300	684		253	85	30	Not possible		Possible	
400	40												
500	45												
600	50												
700	285	59	Possible										
800	335	63											
900	385	68											
1000	435	74											
1100	485	80											
1200	535	84											
400	400	784				335		85	45	Not possible		Possible	
500									53				
600			59										
700			285	70	Possible								
800			335	73									
900			385	78									
1000			435	85									
1100			485	90									
1200			535	96									

<sup>1</sup>KA-EU with electric blade opening actuator: weight + 11 kg.

<sup>2</sup>Centre position (standard) is possible for all dimensions.

Dimensions [mm] and weight [kg]											
Dimensions					Weight <sup>1</sup>	Position of electric blade opening actuator <sup>2</sup>					
B	H	L	W	Z		Top left	Bottom left	Top right	Bottom right		
500	500	881	435	85	60	Not possible		Possible			
600				58							
700				285	79	Possible					
800											
900											
1000											
1100											
1200											

<sup>1</sup>KA-EU with electric blade opening actuator: weight + 11 kg.

<sup>2</sup>Centre position (standard) is possible for all dimensions.

## 2.5 Attachments

### Limit switch

Limit switch	
<b>Standards and guidelines</b>	IEC/EN 60947-5-1, VDE 0660-200 and others
<b>Construction</b>	EN 50047
<b>Casing</b>	Glass fibre reinforced thermoplastic, selbstverlöschend
<b>Protection level</b>	IP 67 to EN 60529
<b>Contact material</b>	Silver alloy (AgNi)
<b>Type of switch</b>	Changeover contact with double break function, form Zb, or 2 NC contacts with galvanically isolated contact bridges
<b>Switching system</b>	IEC 60947-5-1; snap action
<b>Connecting cable length/cross section</b>	1 m / 2 × 0.75 mm <sup>2</sup>
<b>Rated impulse withstand voltage Uimp</b>	6 kV
<b>Rated insulation voltage Ui</b>	500 V AC, 600 V DC
<b>Thermal continuous current Ithe</b>	10 A
<b>Ambient temperature</b>	-25 °C ... 80 °C
<b>Mechanical service life</b>	20 million switching cycles



Electromagnet 500-15	
Supply voltage	230 V AC
Frequency	40 ... 60 Hz
Power	5 W
Protection level	IP 65
Maximum duty cycle	100%
Electromagnetic force	Approx. 700 N
Connecting cable	2.5 m / flexible, 3 × 0.25 m <sup>2</sup>

Gas strut		
	Type 310 (H < 400 mm)	Type 410 (H ≥ 400 mm)
Compressed	110 mm	160 mm
Extended	310 mm	400 mm
Force	400 ... 1000 N	
Ambient temperature	-30 °C ... 80 °C	

Electric blade opening actuator	
Supply voltage	From control module FSM 1
Protection level	IP 50
Insulation class	E (120 °C)
Dimensions B × H × T	270 × 220 × 230 mm (without adjustable pipe)

Capillary tube sensor TLR-72	
Release temperature	Set to 72 °C
Supply voltage	24...230 V AC, 50/60 Hz
Breaking capacity	5(8)A, with 24 V AC at least 150 mA
Protection level	IP 54
IEC protection class	I
Contact	Changeover
Bulb and capillary tube	Copper
Max. sensor temperature	82 °C
Ambient temperature	-15 °C ... 80 °C

Control module FSM 10	
Supply voltage	230 V AC, 50 Hz ... 60 Hz
Power consumption	12 VA max.
Switching voltage	230 V AC max.
Switching current	2 A max.
Switching current	I
Protection level	IP 67 with protective cover
Operating temperature	5 °C ... 40 °C
Casing and cover	Plastic
Installation	For surface mounting
Cable glands	9 × M16 × 1.5
Dimensions B × H × T	185 × 180 × 96 mm
Fixing	3 × Ø4.0 mm

Control module FSM 1	
Supply voltage	230 V AC, 50 ... 60 Hz
Power consumption	200 VA max.
Switching voltage	230 V AC max.
Switching current	2 A max.
IEC protection class	I
Protection level	IP 54
Operating temperature	5 °C ... 40 °C
Casing and cover	Plastic
Installation	For surface mounting
Cable glands	10 × M20 × 1.5
Dimensions B × H × T	180 × 260 × 110 mm
Fixing	4 × Ø4.0 mm

## 3 Transport and storage

### 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 KA-EU with attachments
- Opening lever
- Control module FSM 10 or FSM 1 when an electric blade opening actuator is used
- Capillary tube sensor TLR 72
- Operating manual (1 per shipment)

### Transport on site

If possible, take the product in its transport packaging up to the installation location.

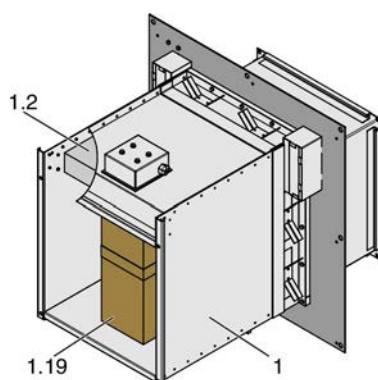
### Storage

For temporary storage please note:

- Remove shipping box and any plastic wrapping.
- Protect the product from dust and contamination.
- Store the product in a dry place and away from direct sunlight.
- Do not expose the unit to the effects of weather (not even in its packaging).
- Do not store the product below 5 °C or above 50 °C.

### Transport protection

Type KA-EU fire dampers are shipped with a transport protection 1.19.



*Fig. 6: Transport protection*

- 1 KA-EU
- 1.2 Damper blade
- 1.19 Transport protection

### Packaging

Properly dispose of the packaging material.

## 4 Parts and function

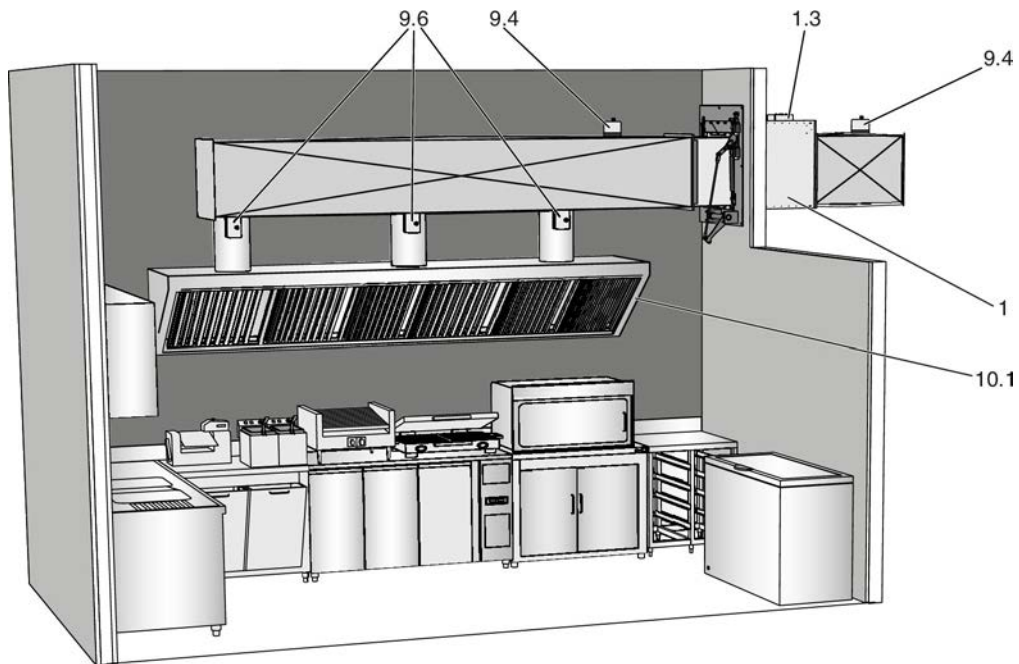


Fig. 7: KA-EU

- |     |   |      |                                  |
|-----|---|------|----------------------------------|
| 1   | KA-EU   | 9.6  | Capillary tube sensor (optional) |
| 1.3 | Electromagnet   | 10.1 | Cooker hood                      |
| 9.4 | Capillary tube sensor TLR 72, no. depending on use, see Fig. 24 |      |                                  |

### 4.1 Functional description

Type KA-EU fire dampers are used as safety related components in extract and exhaust air systems of commercial kitchens. The fire damper is used as a shut-off device to prevent fire and smoke from spreading through ducting.

During normal operation the damper blade is open to enable air passage through the extract air system. The damper blade is kept open by one or two electromagnets. (KA-EU must not be used for ventilation; the design is not suitable for daily opening and closure.)

If in the event of a fire the temperature in the extract air duct rises to 72 °C, the capillary tube sensor sends a signal to the control module, which then interrupts the power supply to the electromagnet.

As a consequence, the damper blade is released and is closed by force of the gas strut or struts. The extract air fan is turned off as the fire damper closes.

To ensure proper functioning of the fire damper, a test can be carried out, see ↻ 56.

The fire damper is equipped with two limit switches. The top limit switch 1.11 that indicates damper blade position CLOSED can be used by the central BMS or by the fire alarm system. The bottom limit switch 1.12 that indicates damper blade position OPEN is used to switch off the fan. This ensures that the fan can run only while the damper blade is fully open.

### 4.2 Control module FSM 10

Control module FSM 10 is used to close the KA-EU fire damper in a controlled manner at the push of a button; it is also used to signal the damper blade position to the central BMS. Pressing the push button interrupts the power supply to the electromagnets, and the gas struts close the KA-EU as a consequence.

### 4.3 Control module FSM 1 and electric blade opening actuator

Control module FSM 1 is used to comfortably operate the fire damper and to signal the damper blade position to the central BMS. Pressing the 'Test' push button interrupts the power supply to the magnets, and the gas struts close the KA-EU as a consequence.

Pressing the 'Reset' push button activates the blade opening actuator, i.e. the damper blade opens. Once the damper blade is fully open, it is kept open by the electromagnets.

The electric blade opening actuator has no fire protection function. Its purpose is to simplify opening the damper blade of the KA-EU for maintenance or for functional tests, but not to open or close the damper blade on a daily basis.

### 4.4 Push button


Control module FSM 10 can be connected to an external push button DKT 2.2\_A (optional), which allows for closing the damper blade from an external source.

Control module FSM 1 with electric blade opening actuator can additionally be connected to two external push buttons, DKT 2.2\_A and DKT 2.3\_R. Push button DKT 2.2\_A is used for closing the KA-EU damper blade. Push button DKT 2.3\_R is used to open the KA-EU damper blade with the electric blade opening actuator.






The external push buttons DKT 2.2\_A and DKT 2.3\_R have the same function as the integral push buttons of the control modules.

## 5 Installation

### 5.1 Installation situations

 **Note**

The class of performance or fire resistance of a fire damper may be different from the class of performance or fire resistance of the wall or ceiling where the fire damper is installed. However, the lower performance class or fire resistance determines the performance class or fire resistance of the overall system.

Installation situations						
Supporting construction	Installation location/ Construction	Minimum thickness [mm]	Class of performance EI TT (v <sub>e</sub> -h <sub>o</sub> , i ↔ o) S up to	Fire resistance	Installation type	Installation information
<b>Solid walls</b> made of concrete, aerated concrete or lightweight concrete	in	100	EI 90 S	K90	N	 31
<b>Solid walls</b> made from bricks	in	115	EI 90 S	K90	N	 31
<b>Solid ceiling slabs</b>	in	150	EI 90 S	K90	N	 32
<b>Lightweight partition walls</b>	in, with metal support structure, cladding on both sides	100	EI 90 S	K90	N	 34
<b>Compartment walls</b>	in, with metal support structure, cladding on both sides	100	EI 90 S	K90	N	 34

N = Mortar-based installation

### 5.2 Safety notes regarding installation

#### Sharp edges, sharp corners and thin sheet metal parts

 **CAUTION!**

**Danger of injury from sharp edges, sharp corners and thin sheet metal parts!**

Sharp edges, sharp corners and thin sheet metal parts may cause cuts or grazes.

- Be careful when carrying out any work.
- Wear protective gloves, safety shoes and a hard hat.

## 5.3 General installation information

### ! NOTICE!

#### Risk of damage to the fire damper

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

Please note:

- Control elements, electromagnets and electric blade actuator must remain accessible for maintenance.
- Loads imposed on the casing may impair the function of the fire damper. Install and connect the damper in such a way that no loads will be imposed on the installed damper.
- Remove the transport protection before you install the fire damper.
- Before installation: Perform a functional test, then close the fire damper.
- Installation orientation only as shown.
- Actuating the opening lever requires space; be sure to leave that space, see Fig. 3 KA-EU – Space required for manual opening lever, page 12.
- Ducts connected to the fire damper must have an inspection access panel right before or right after the fire damper.
- Design and install the ventilation system in such a way that the KA-EU cannot be damaged due to pressure surges in the ventilation system.
- Protect the fire damper from humidity and condensation as they will damage the fire damper.
- If you connect the fire damper to [weiterführende] ducts made of metallic materials that are different from the fire damper casing material, be sure to take the redox potential (electrochemical series) into consideration.

## Removing the transport protection

### ! CAUTION!

Risk of damage to the fire damper from incorrect handling.

Make sure that the damper blade does not fall shut when you remove the transport protection.

If the damper blade closes unexpectedly, the closing mechanism may become damaged.

Remove the transport protection before you install the fire damper.

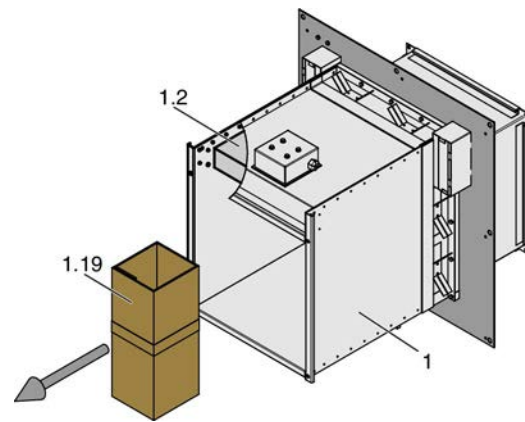


Fig. 8: Transport protection

- 1 KA-EU
- 1.2 Damper blade
- 1.19 Transport protection

- Press the damper blade 1.2 up with your hand.
- Pull the transport protection 1.19 out.
- Close the damper blade manually.

### Packaging

Properly dispose of packaging material.

### Installing the gas strut

The gas strut 1.9 is factory fixed at one end only (note that dampers from width B ≥ 700 mm have two gas struts). Install the gas struts 1.19 before you install the fire damper in a wall or ceiling.

- Use the blade opening lever 1.6 to close the damper blade 1.2. Ensure that the spring tab bolt 1.10 locks into position and that the damper blade does not swivel out further than 90° toward the ducting, see Fig. 9 Display A and Detail B and "Functional test" ↻ 56.
- Remove bolt 1.22 and locking spring 1.23 from the console 1.21, see Fig. 9 Detail C and D.
- Guide the joint head 1.20 of the gas strut 1.9 into the console 1.21, see Fig. 9 Detail E.
- Insert bolt 1.22 and secure with locking spring 1.23, see Fig. 9 Detail F and G.
- If necessary, adjust the position of the damper blade 1.2 by turning the adjustment device 1.24 on the gas strut 1.9 such that the CLOSED damper blade is at 90° to the duct, see Fig. 9, detail H.
- Unscrew the locking nut M8 1.36 from the angle joint 1.52, see Fig. 9 Detail I.
- Push the threaded end on the angle joint 1.52 through the drilled hole Ø8 mm on the blade opening lever 1.7 (note the marking on the blade opening lever 1.7 and the angle joint 1.52). Screw and tighten the locking nut M8 1.36 to the threaded end on the angle joint 1.52, see Fig. 9 Detail J.

## General installation information

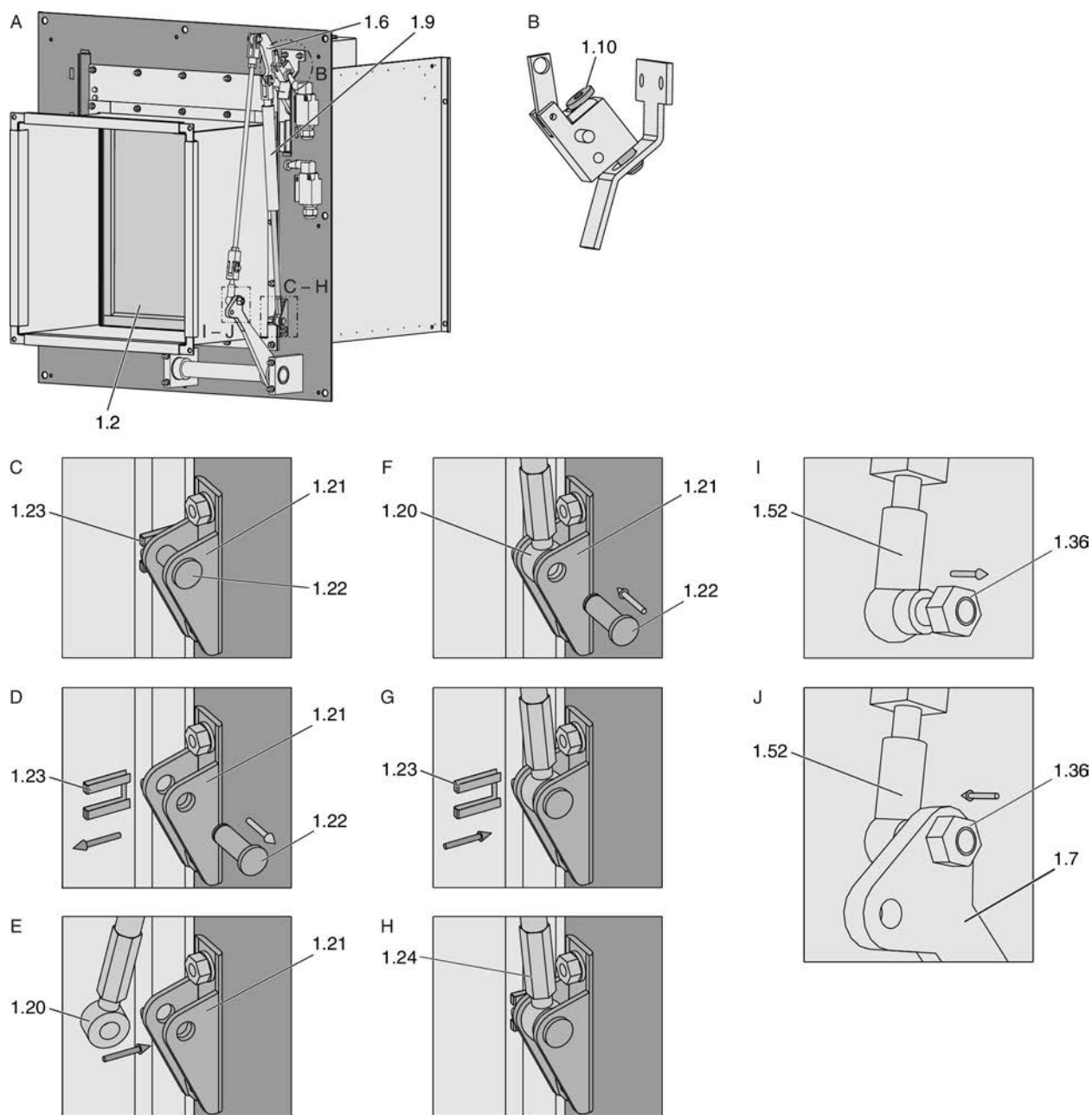


Fig. 9: Installing the gas strut

- |      |  |      |                      |
|------|--|------|----------------------|
| 1.2  | Damper blade                                   | 1.21 | Mounting bracket     |
| 1.6  | Blade opening lever                            | 1.22 | Bolt                 |
| 1.9  | Gas strut (from B $\geq$ 700 mm to gas struts) | 1.23 | Locking spring       |
| 1.10 | Spring tab bolt                                | 1.24 | Gas strut adjustment |
| 1.20 | Joint head                                     |      |                      |



### Opening the fire damper without blade opening actuator / functional test before installation

To ensure the correct function of the fire damper, a functional test is required before installation. Proceed as follows:

- Secure the fire damper so that it cannot move
- Attach the opening lever 1.15 or 1.16 to the blade opening lever 1.7 and secure it with a nut 1.36.
- Pull the operating lever on the spring tab bolt 1.10 forwards by hand until the locking mechanism loosens.
- Slowly move the opening lever 1.15 or 1.16 downwards until the damper blade 1.2 is fully open.
- Then slowly close the damper blade again.
- Make sure that the movement of the damper blade is not impaired in any way, such as by a deformed casing.
- Open the nut 1.36 on the opening lever 1.15 or 1.16 and remove the opening lever. Keep the opening lever and the nut for later use.

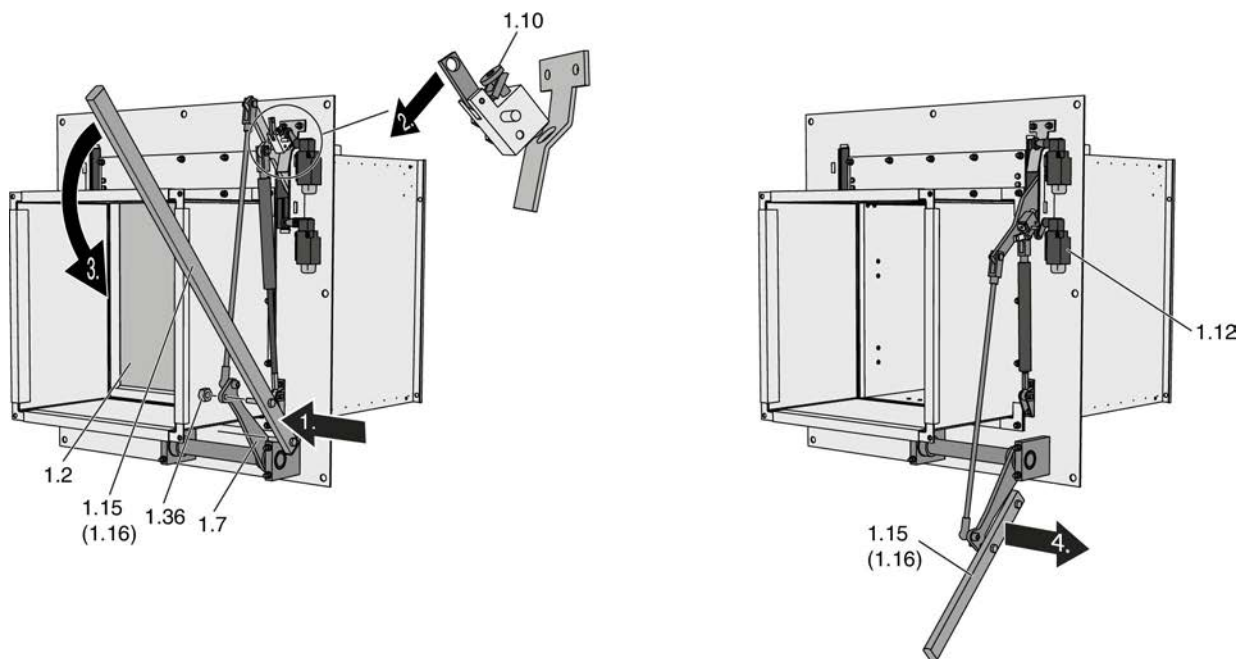


Fig. 10: Opening the damper blade

1.2	Damper blade	1.15	Opening lever – straight
1.7	Blade opening lever	1.16	Opening lever – angled
1.10	Spring tab bolt	1.36	Nut
1.12	Limit switch for damper blade position OPEN		

## Fire damper with transport protection and props before installation

Open the damper blade and secure it with the transport protection 9.3.1. Protect the damper casing 1.1 with props 9.3.2 so that it cannot be deformed when the damper is being mortared in.

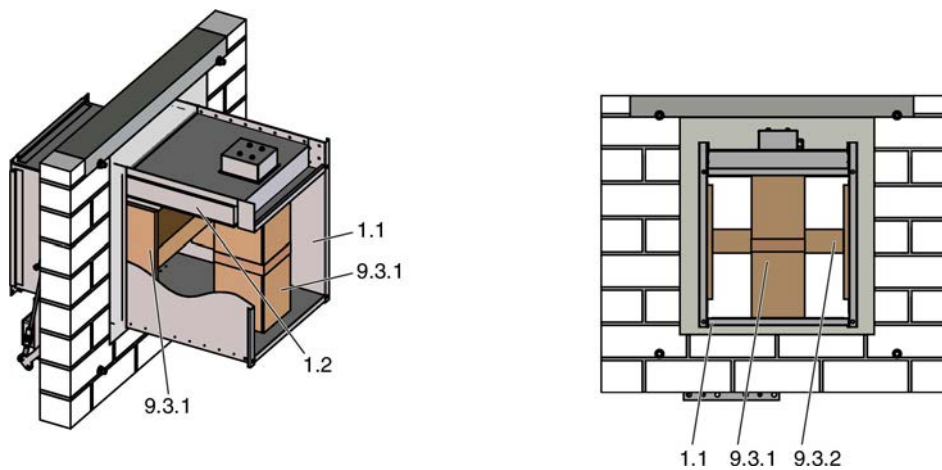


Fig. 11: Transport protection and props

- 1.1 Casing
- 1.2 Damper blade

- 9.3.1 Transport protection
- 9.3.2 Prop

**Fixing the mounting plate**

**Brick walls**

If the wall is a brick wall, fix the fire damper mounting plate using threaded rods M10 (push through).

- Use threaded rods 5.4, washers and nuts 5.13 to fix the mounting plate 1.13 to the brick wall 3.1. For the number of screws see .

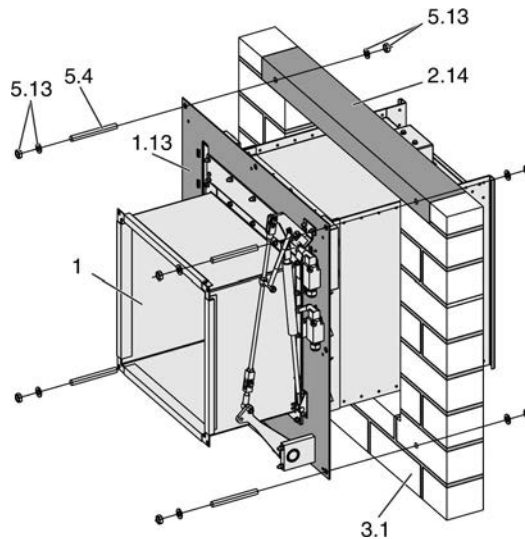


Fig. 12: Installation in a solid wall (push through installation – brick wall)

1	KA-EU	3.1	Solid wall
1.13	Floor mounting plate	5.4	Threaded rod
2.14	Lintel (if required)	5.13	Washer and nut

**Walls or ceilings made of reinforced concrete**

If a wall or ceiling is made of steel reinforced concrete, you can also use Metallspreizdübeln for installation.

- Use threaded rods 5.4, anchors 5.12, washers and nuts 5.13 to fix the mounting plate 1.13 to the solid wall 3.1 or solid ceiling slab 4.1.

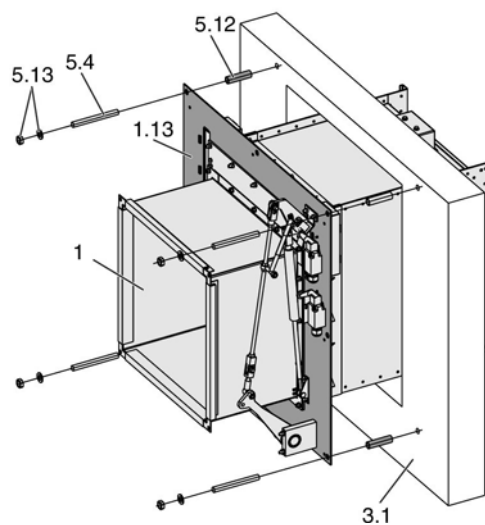


Fig. 13: Installation in solid wall (with anchors – concrete wall)

1	KA-EU	5.4	Threaded rod
1.13	Floor mounting plate	5.12	Anchors
3.1	Solid wall	5.13	Washer and nut

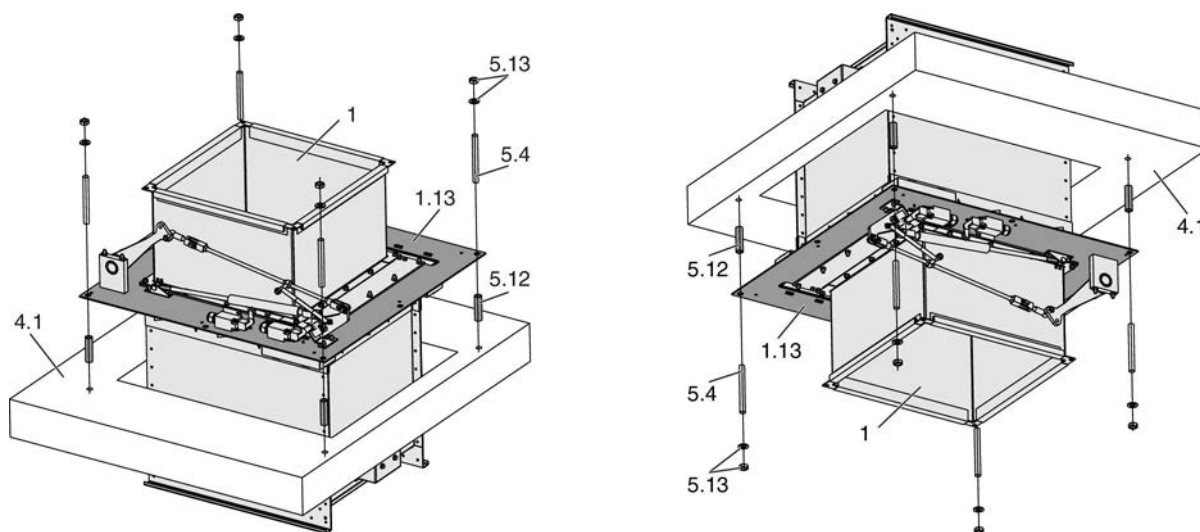


Fig. 14: Installation in solid ceiling slabs, standing or suspended (with anchors)

1	KA-EU	5.4	Threaded rod
1.13	Floor mounting plate	5.12	Anchors
4.1	Solid ceiling slab	5.13	Washer and nut

### Lightweight partition walls / compartment walls

For lightweight partition walls and compartment walls you have to use dry wall screws  $\varnothing 6 \times 70$  mm.

- Use dry wall screws 5.1 to fix the mounting plate 1.13 to the lightweight partition wall or compartment wall 3.2.

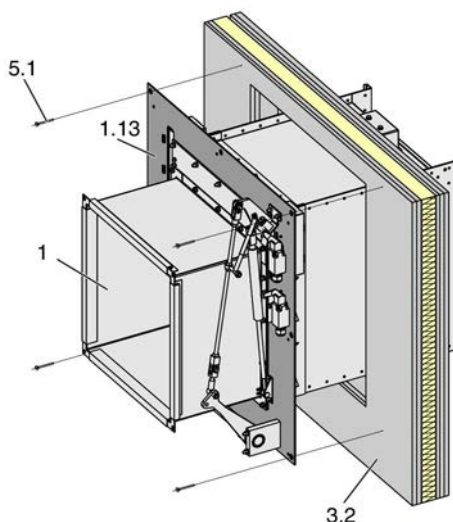


Fig. 15: Installation in lightweight partition walls (with dry wall screws)

1	KA-EU	3.2	Lightweight partition wall or compartment wall
1.13	Floor mounting plate	5.1	Dry wall screw

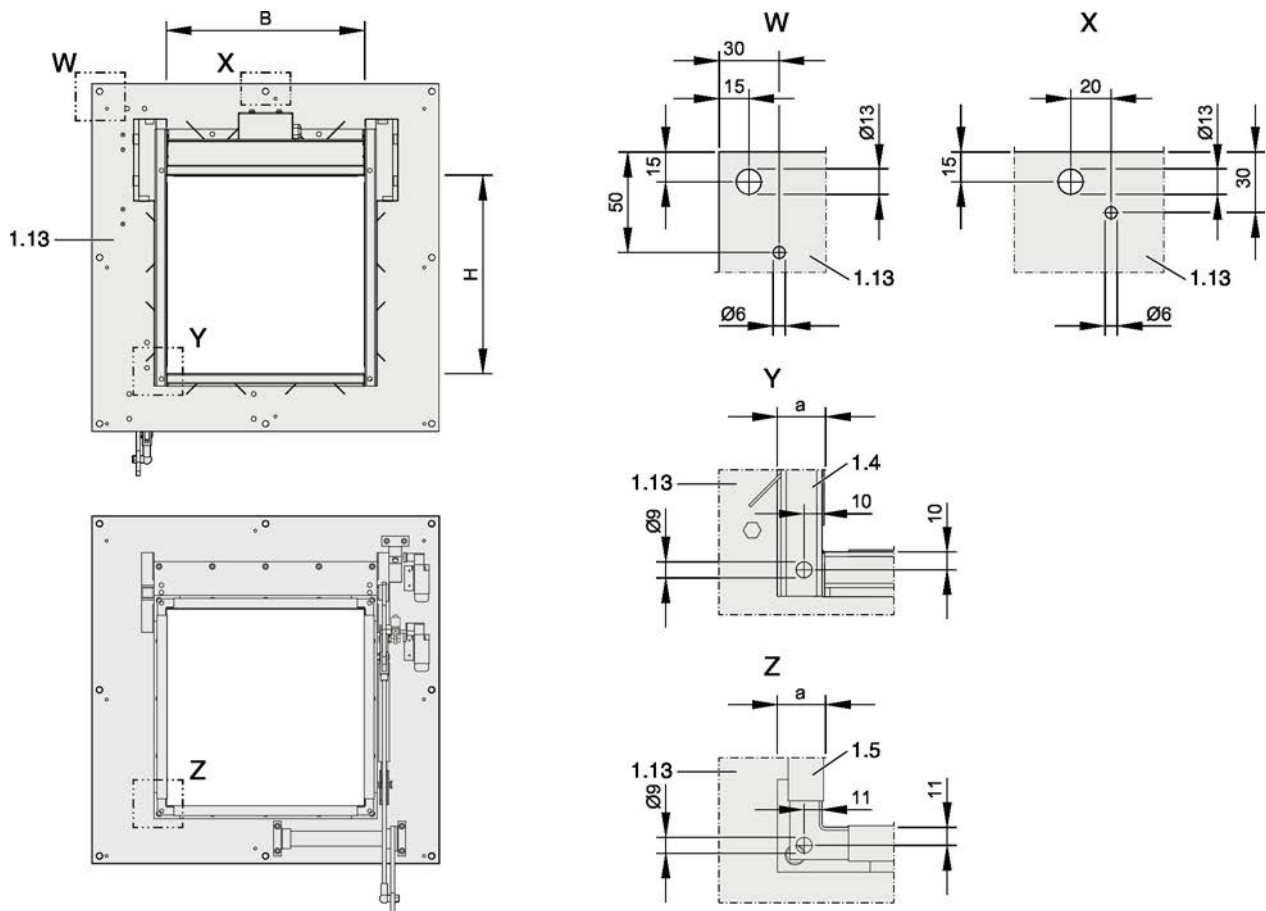


Fig. 16: Mounting plate and connecting flange – drilled holes

- 1.4 Flange 1
- 1.5 Flange 2
- 1.13 Floor mounting plate

The mounting plate has factory drilled holes for fixing the fire damper:

- Solid walls or solid ceilings:  
Ø13 mm for screws or threaded rods M10
- Lightweight partition walls or compartment walls  
Ø6 mm for screws Ø6 × 70

The flanges have factory drilled holes for fixing the duct:

- a = 20 mm (SBM20) – to B = 900 mm
- a = 30 mm (SBM30) – to B ≥ 1000 mm

H [mm]	No. of screws										
	H [mm]										
	250	300	400	500	600	700	800	900	1000	1100	1200
225	4 × M10 or at least 4 × Ø6 × 70					6 × M10 or at least 6 × Ø6 × 70					
300	–	4 × M10 or at least 4 × Ø6 × 70				6 × M10 or at least 6 × Ø6 × 70					
400	–	–	4 × M10 or at least 4 × Ø6 × 70			6 × M10 or at least 6 × Ø6 × 70					
500	–	–	–	4 × M10 or at least 4 × Ø6 × 70		6 × M10 or at least 6 × Ø6 × 70					

## Acceptable mortars for mortar-based installation

In case of mortar-based installation, the open spaces between the fire damper casing and the wall or ceiling slab must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth has to be equal to the thickness of the wall or ceiling.

The following mortars are acceptable:

- DIN 1053: Groups II, IIa, III, IIIa; fire protection mortar of groups II, III
- EN 998-2: Classes M 2.5 to M 10 or fire protection mortar of classes M 2.5 to M 10
- Equivalent mortars that meet the requirements of the above standards, gypsum mortar or concrete

### 5.3.1 After installation

- Clean the fire damper.

#### Once the mortar has cured

- Remove prop 9.3.2, see Fig. 11.
- Install the blade opening actuator, ☞ 41 or ☞ 43.
- Test the function of the fire damper ☞ 56.
- Connect the ductwork.
- Fit the capillary tube sensors, see 39.
- Make electrical connections ☞ 47 or ☞ 50.

## 5.4 Solid walls

### 5.4.1 Mortar-based installation

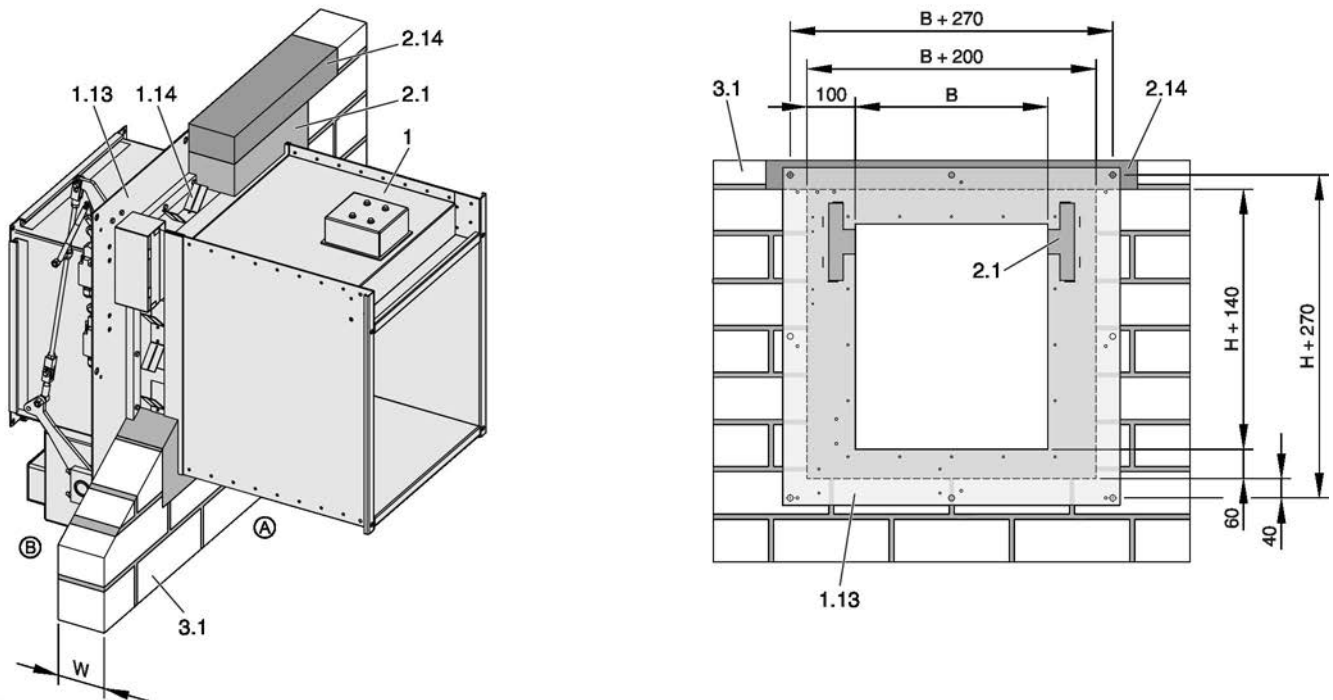


Fig. 17: Mortar-based installation into a solid wall

1	KA-EU	2.14	Lintel (if required)
1.13	Floor mounting plate	3.1	Solid wall
1.14	Fixing tab	Ⓐ	Installation side
2.1	Mortar	Ⓑ	Operating side

#### Personnel:

- Specialist personnel

#### Materials:

- Mortar ↗ 'Acceptable mortars for mortar-based installation' on page 30

#### Requirements

- Class of performance up to EI 90 S / fire resistance up to K90
- Solid walls or compartment walls made of, for example, concrete, aerated concrete, masonry, or solid gypsum wallboards according to EN 12859 (without open spaces), gross density  $\geq 500 \text{ kg/m}^3$  and  $W \geq 100 \text{ mm}$
- $\geq 75 \text{ mm}$  distance between the mounting plate and load-bearing structural elements
- No distance required between the mounting plates of two fire dampers (in case of push through installation; otherwise a minimum distance may be required for the anchors used)
- Sufficient clearance for the movement of the manual opening lever or of the electric blade opening actuator, see Fig. 3 and Fig. 4

#### Installation after completing the wall

To install the fire damper into a completed solid wall, proceed as follows:

- Create a wall opening with  $B / H + 200 \text{ mm}$ .
- Bend and twist the fixing tabs 1.14 on the fire damper.
- Push the fire damper into the wall opening and adjust its position.
- Fix the mounting plate to the wall, either with threaded rods (push through) or with suitable anchors (suitability certificate).
- Protect the damper casing against deformation, ↗ 26.
- Close off the perimeter gap with mortar.

## 5.5 Solid ceiling slabs

### 5.5.1 Mortar-based installation

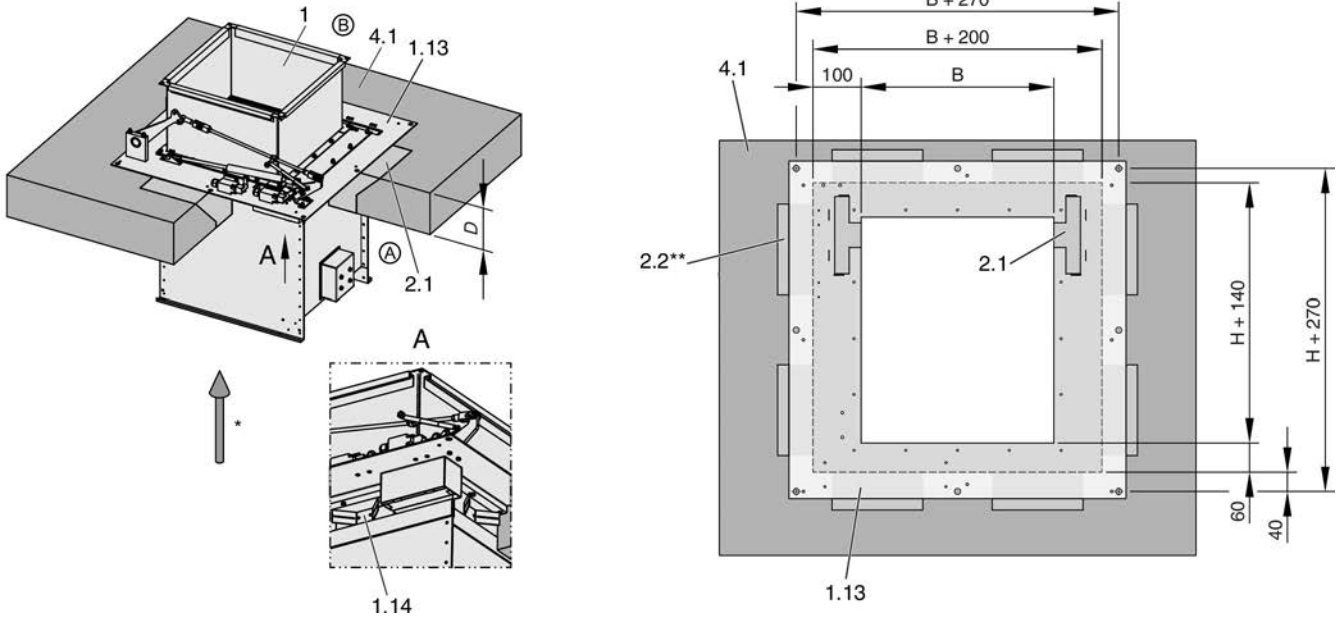


Fig. 18: Mortar-based installation into solid ceiling slab, upright

- 1 KA-EU
- 1.13 Floor mounting plate
- 1.14 Fixing tab
- 1.2 Damper blade
- 2.1 Mortar or concrete

- 4.1 Solid ceiling slab
- \* Correct airflow direction
- \*\* Chamfer to facilitate mortaring
- Ⓐ Installation side
- Ⓑ Operating side

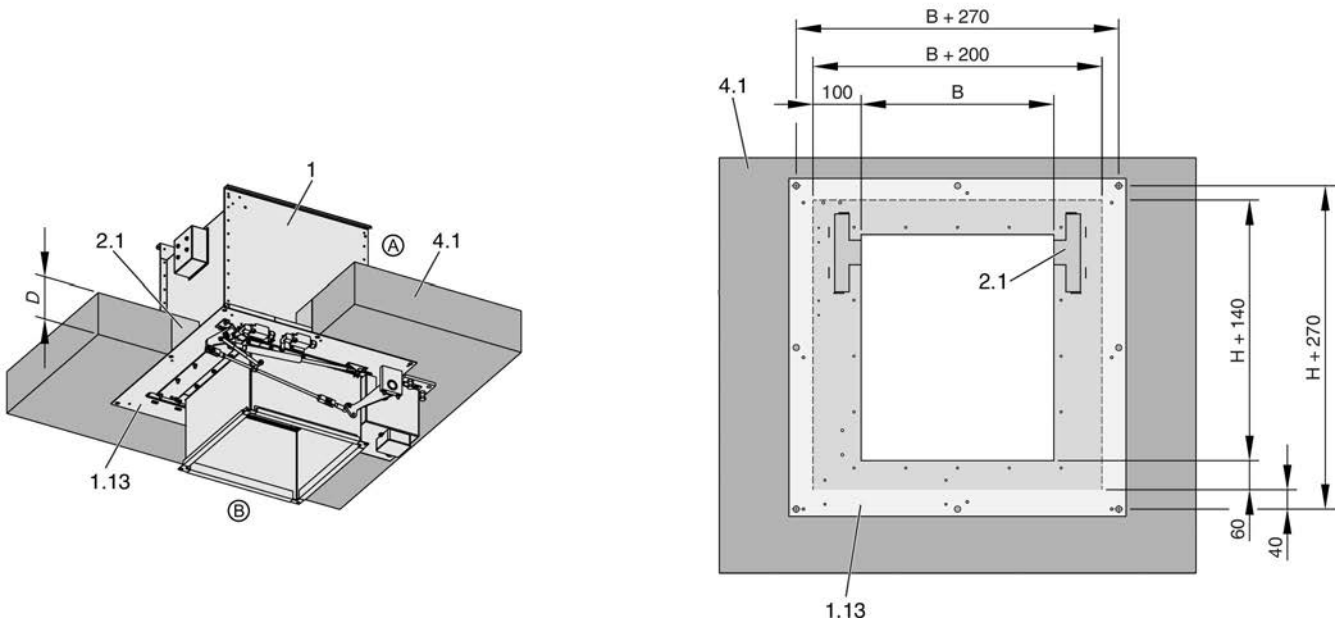


Fig. 19: Mortar-based installation into solid ceiling slab, suspended

- 1 KA-EU
- 1.13 Floor mounting plate
- 2.1 Mortar or concrete

- 4.1 Solid ceiling slab
- Ⓐ Installation side
- Ⓑ Operating side



**Personnel:**

- Specialist personnel

**Materials:**

- Mortar ↪ *'Acceptable mortars for mortar-based installation' on page 30*

**Requirements**

- Class of performance up to EI 90 S / fire resistance up to K90
- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density  $\geq 600 \text{ kg/m}^3$  and  $D \geq 150 \text{ mm}$
- $\geq 75 \text{ mm}$  distance between the mounting plate and load-bearing structural elements
- No distance required between the mounting plates of two fire dampers
- Each KA-EU fire damper to be installed in an individual installation opening
- Sufficient clearance for the movement of the manual opening lever or of the electric blade opening actuator, see Fig. 3 and Fig. 4

**Installation while erecting the solid ceiling slab**

The fire damper can be concreted into the ceiling slab 4.1 during construction. To install the fire damper, proceed as follows:

- Position the fire damper in the installation opening and secure it.
- Make sure that the mounting plate 1.13 rests on the face of the ceiling slab.
- Protect the damper casing against deformation, ↪ 26.
- Protect the inside of the damper and the control elements, e.g. with plastic.
- Concrete the damper into the ceiling slab; ensure that the structural properties of the ceiling slab are not compromised.

**Installation after completing the ceiling slab**

To install the fire damper into a completed solid wall, proceed as follows:

- Create an installation opening,  $B / H + 200 \text{ mm}$ .
- Bend and twist the fixing tabs 1.14 on the fire damper.
- Upright installation with the operating side facing up: Chamfering the edges of the installation opening will facilitate filling the gap 2.2 with mortar
- Push the fire damper into the installation opening, adjust its position and secure it.
- Protect the damper casing against deformation, ↪ 26.
- Protect the inside of the damper and the control elements, e.g. with plastic.
- Close off the perimeter gap with mortar or concrete.

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

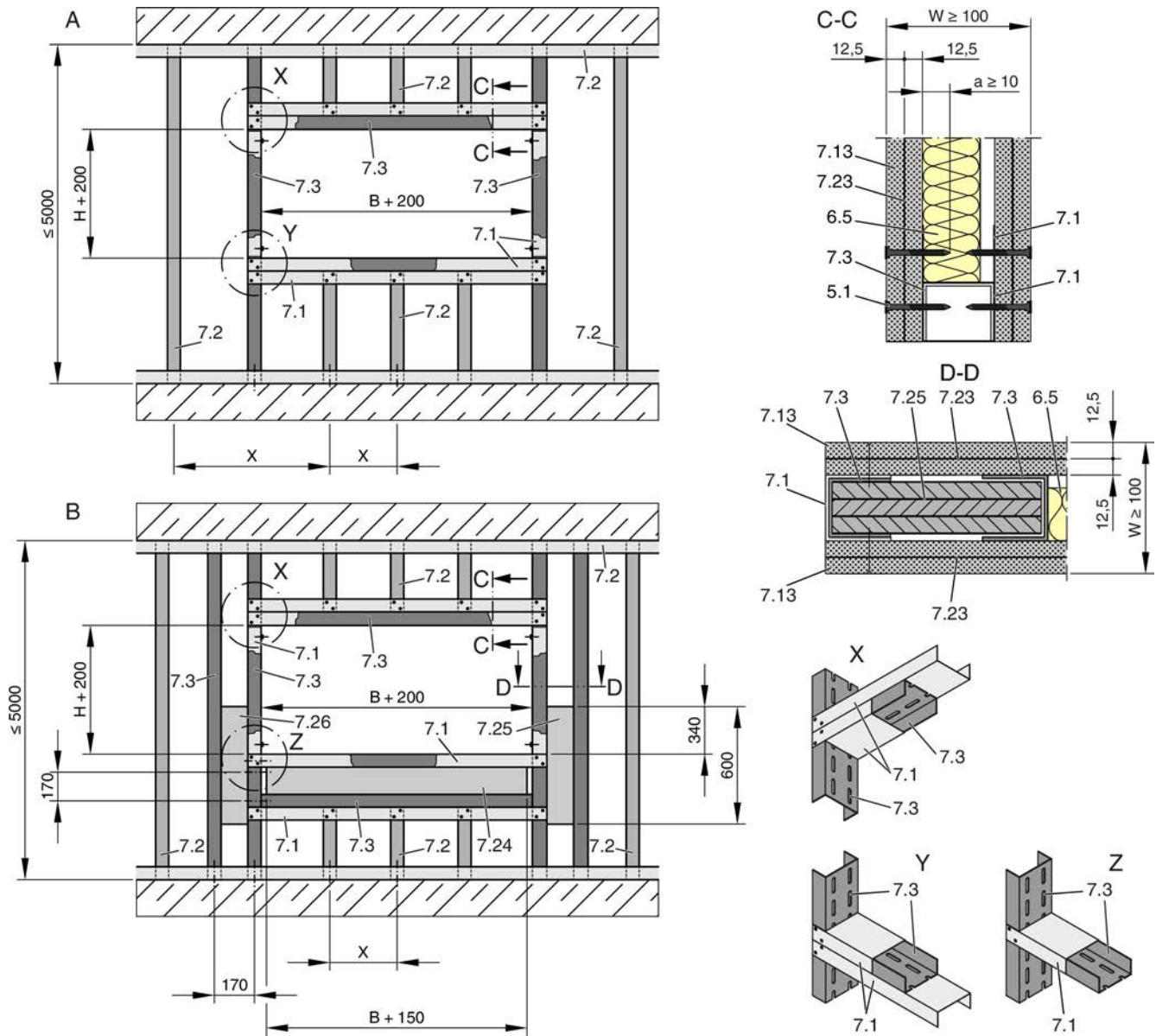


Fig. 20: Lightweight partition wall or compartment wall with metal support structure and cladding on both sides

A	Lightweight partition wall* / compartment wall* – without fixing block for the electric blade opening actuator	7.23	Fold the tab inward or cut it off
		7.24	Fixing block** for the electric blade opening actuator; actuator positioned in the centre, for details 41
B	Lightweight partition wall* / compartment wall* – with fixing block for the electric blade opening actuator	7.25	Fixing block** for the electric blade opening actuator; actuator positioned on the right, for details 43
5.1	Dry wall screw	7.26	Fixing block** for the electric blade opening actuator; actuator positioned on the left, for details 43
6.5	Mineral wool (depending on wall construction)	*	For details on how to erect the lightweight partition wall or compartment wall see the wall manufacturer's information.
7.1	UW section	**	If the wall thickness is > 100 mm, extend the width of the fixing block such that it equals the inside dimension of the UA section.
7.2	Metal support structure, CW section ≥ 50 × 40 × 0.6 mm (DIN 18182)		
7.3	UA section (DIN 18182)		
7.13	Cladding, fire resistant, on both sides of the metal stud system		

X Metal support structure:  $\leq 625$  mm distance from lightweight partition wall;  $\leq 312.5$  mm distance from compartment wall

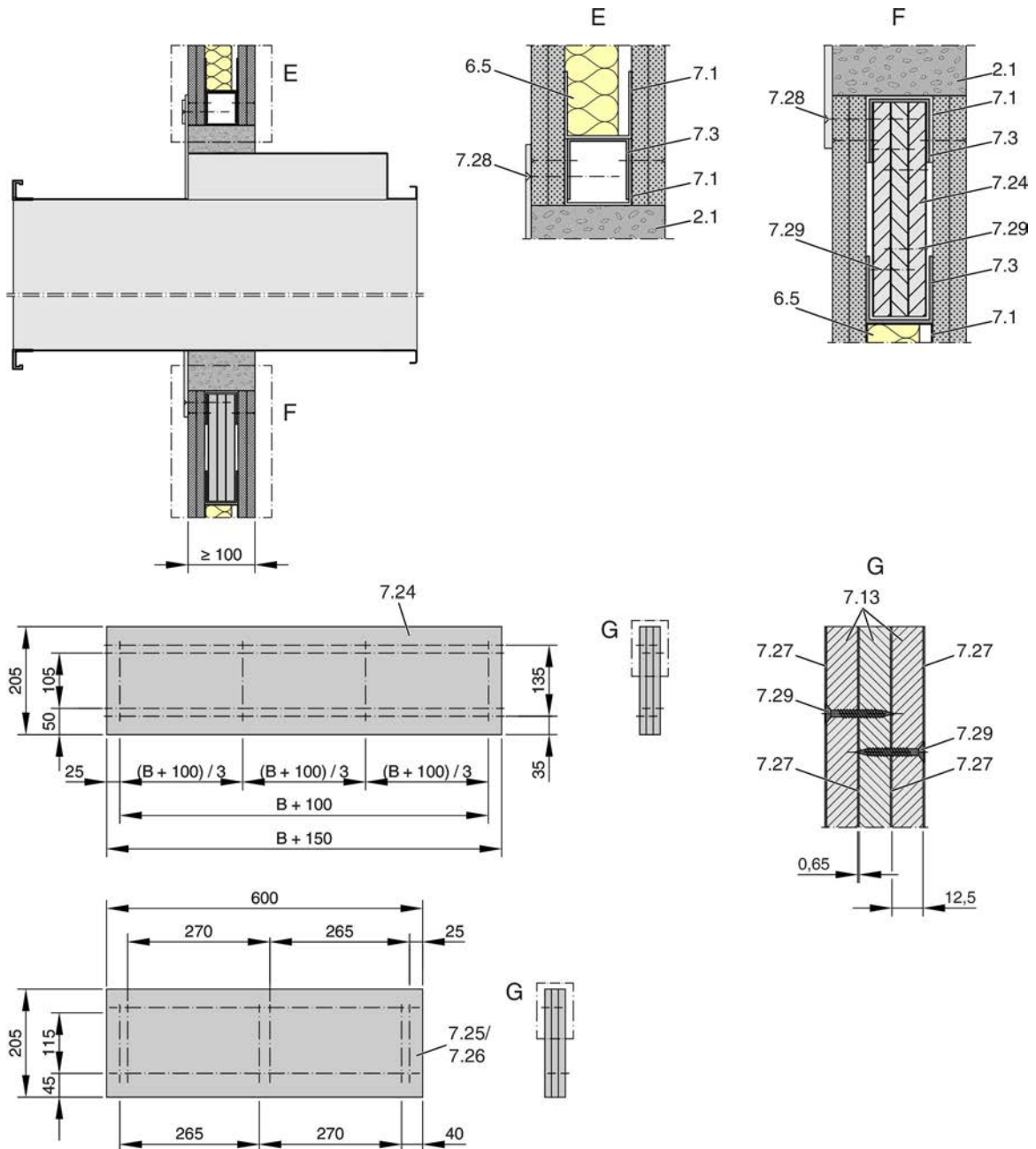


Fig. 21: Fixing blocks for the electric blade opening actuator

- |      |   |      |   |
|------|---|------|---|
| 2.1  | Mortar  | 7.25 | Fixing block** for the electric blade opening actuator; actuator positioned on the right  |
| 6.5  | Mineral wool (depending on wall construction)   | 7.26 | Fixing block** for the electric blade opening actuator; actuator positioned on the left   |
| 7.1  | UW section  | 7.27 | Galvanised sheet steel, 0.65 mm   |
| 7.3  | UA section (DIN 18182)  | 7.28 | Dry wall screw $\varnothing 6 \times 70$ mm   |
| 7.13 | Cladding or fixing block made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum, or fire-rated calcium silicate boards | 7.29 | Chipboard screw $\varnothing 4 \times 30$ mm  |
| 7.24 | Fixing block** for the electric blade opening actuator; actuator positioned in the centre   | **   | If the wall thickness is $> 100$ mm, extend the width of the fixing block such that it equals the inside dimension of the UA section. |

Lightweight partition walls and compartment walls with metal support structure ...

## Personnel:

- Specialist personnel

## Requirements

- Lightweight partition wall or compartment wall with metal support structure and cladding on both sides
- Wall thickness  $W \geq 100$  mm
- Use according to general building inspectorate licence  
With fire resistance class F90, erection of the wall according to general appraisal certificate  
Lightweight partition wall: cladding on both sides made of gypsum bonded or cement bonded panel materials  
Compartment wall: cladding on both sides made of gypsum bonded panel materials or fire-rated calcium silicate boards
- Use according to declaration of performance  
With European classification to EN 13501-2 or equivalent national classification  
Lightweight partition wall: cladding on both sides made of gypsum bonded panel materials or fibre-reinforced gypsum  
Compartment wall: cladding on both sides made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards
- $\leq 625$  mm distance between metal studs;  $\leq 312.5$  mm for compartment walls
- Additional steel inserts, additional layers of cladding (up to two layers if stated in the usability certificate for the wall) and double stud constructions are approved
- Installation in Germany: Duct connection with suitable flexible connectors, fire rating class at least B2 to DIN 4102-1, at least 10 cm long (when installed)
- Installation in other European countries: We recommend the same conditions as for installation in Germany
- Trim panels have to be screw-fixed to the support structure

## Erecting a wall and creating an installation opening

- Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening, see Fig. 20

### 5.6.1 Mortar-based installation

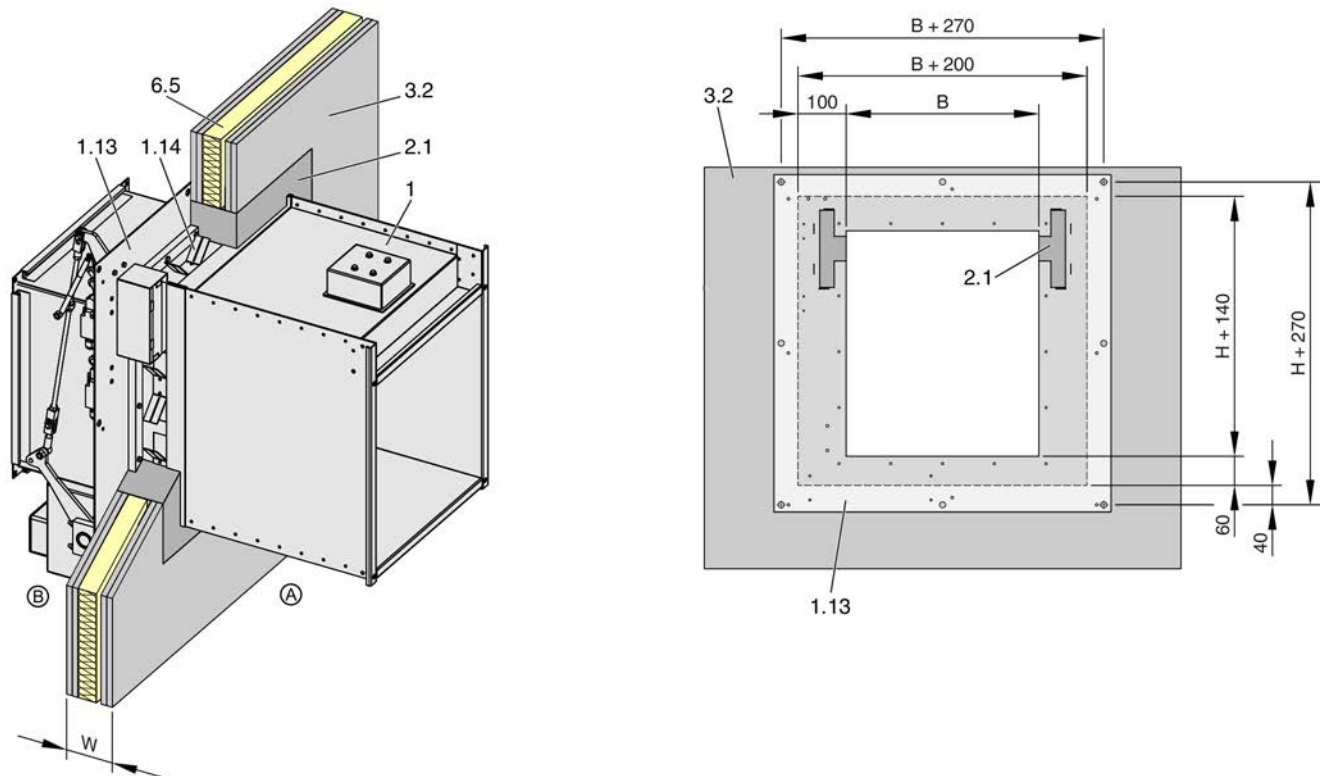


Fig. 22: Mortar-based installation into a lightweight partition wall or compartment wall

1	KA-EU	3.2	Lightweight partition wall or compartment wall with metal support structure, cladding on both sides
1.13	Floor mounting plate	6.5	Mineral wool (depending on wall construction)
1.14	Fixing tab	Ⓐ	Installation side
2.1	Mortar	Ⓑ	Operating side

#### Personnel:

- Specialist personnel

#### Materials:

- Mortar ↪ 'Acceptable mortars for mortar-based installation' on page 30

#### Requirements

- Class of performance up to EI 90 S / fire resistance up to K90
- Lightweight partition walls or compartment walls with metal support structure and cladding on both sides,  $W \geq 100$  mm; detailed specification on p. 35
- Wall height 5000 mm max. (compartment walls)
- $\geq 75$  mm distance between the mounting plate and load-bearing structural elements
- No distance required between the mounting plates of two fire dampers
- Each KA-EU fire damper to be installed in an individual installation opening
- Sufficient clearance for the movement of the manual opening lever or of the electric blade opening actuator, see Fig. 3 and Fig. 4

#### Installation

To install the fire damper, proceed as follows:

- Erect the lightweight partition wall or compartment wall according to the manufacturer's instructions
- Create an installation opening in the metal support structure; for details see Fig. 20
- Fire dampers with electric blade opening actuator: Reinforce the lightweight partition wall or compartment wall with a fixing block; for details see Fig. 21

- Bend and twist the fixing tabs 1.14
- Push the fire damper into the wall opening and adjust its position; fix the mounting plate with dry wall screws 6 × 70mm to the metal support structure; make sure that the mounting plate 1.13 rests on the face of the wall.
- Protect the damper casing against deformation, ↺ 26.
- Close off the perimeter gap with mortar.

## 6 Installing the capillary tube sensor

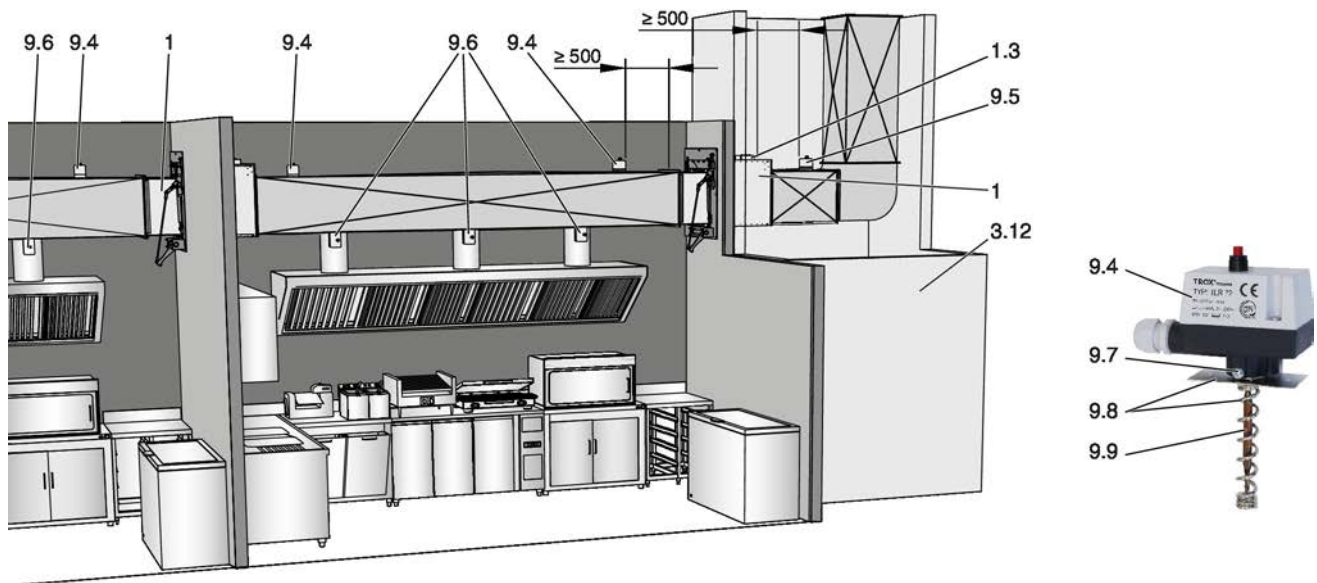


Fig. 23: Installing the capillary tube sensor

1	KA-EU	9.6	Capillary tube sensor (optional)
1.3	Electromagnet <sup>1</sup>	9.7	Screws for fixing the capillary tube sensor to the protective coil
3.12	Fire-resistant shaft F90	9.8	Protective coil with flange
9.4	Capillary tube sensor TLR 72, no. depending on use, see Fig. 24	9.9	Bulb
9.5	Capillary tube sensor (not required for a fire-resistant F90 shaft)	<sup>1</sup>	The electromagnets should remain accessible even after the fire damper has been installed.

Installing the capillary tube sensor – please note:

- The KA-EU fire damper includes a capillary tube sensor. Additional capillary tube sensors (part no. M536KA0) may be required for some installation locations, see Fig. 24). Up to 10 capillary tube sensors can be connected in series.
- On both sides of the fire damper a capillary tube sensor has to be installed in the duct connected to the fire damper. If one side of the fire damper is connected to a fire-resistant F90 shaft, no capillary tube sensor is required on that side; there have to be measures, however, that prevent a fire from spreading towards the kitchen, even when the ventilation system has been turned off. If a duct connected to the shaft does not immediately lead to the outside, but crosses another fire compartment, a capillary tube sensor is required where the duct leaves the shaft.
- Distance between the capillary tube sensor and the fire damper flange:  $\geq 500$  mm.
- In horizontal ducts the capillary tube sensors have to be installed in the upper half of the ducts.
- Closure of the fire damper in the event of a fire has to be ensured with at least one capillary tube sensor.
- In case of a power failure in the kitchen all fire dampers have to close, and the corresponding extract air fan or exhaust air fan has to be switched off.
- Additional capillary tube sensors (optional) may be installed to ensure that the extract air system is switched off as soon as possible in the event of a fire.

### 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.

### Installation

- Unscrew both screws 9.7
- Pull the capillary tube sensor 9.4 with the bulb 9.9 out of the protective coil 9.8
- Decide where to fix the sensor on the duct
- Drill a hole  $\varnothing$  21 mm into the duct
- Use two [Blechschnidschrauben]  $\varnothing$  4 mm to fix the protective coil by its flange 9.8 to the duct
- Insert the capillary tube sensor with the bulb into the protective coil and fix it with the two screws 9.7

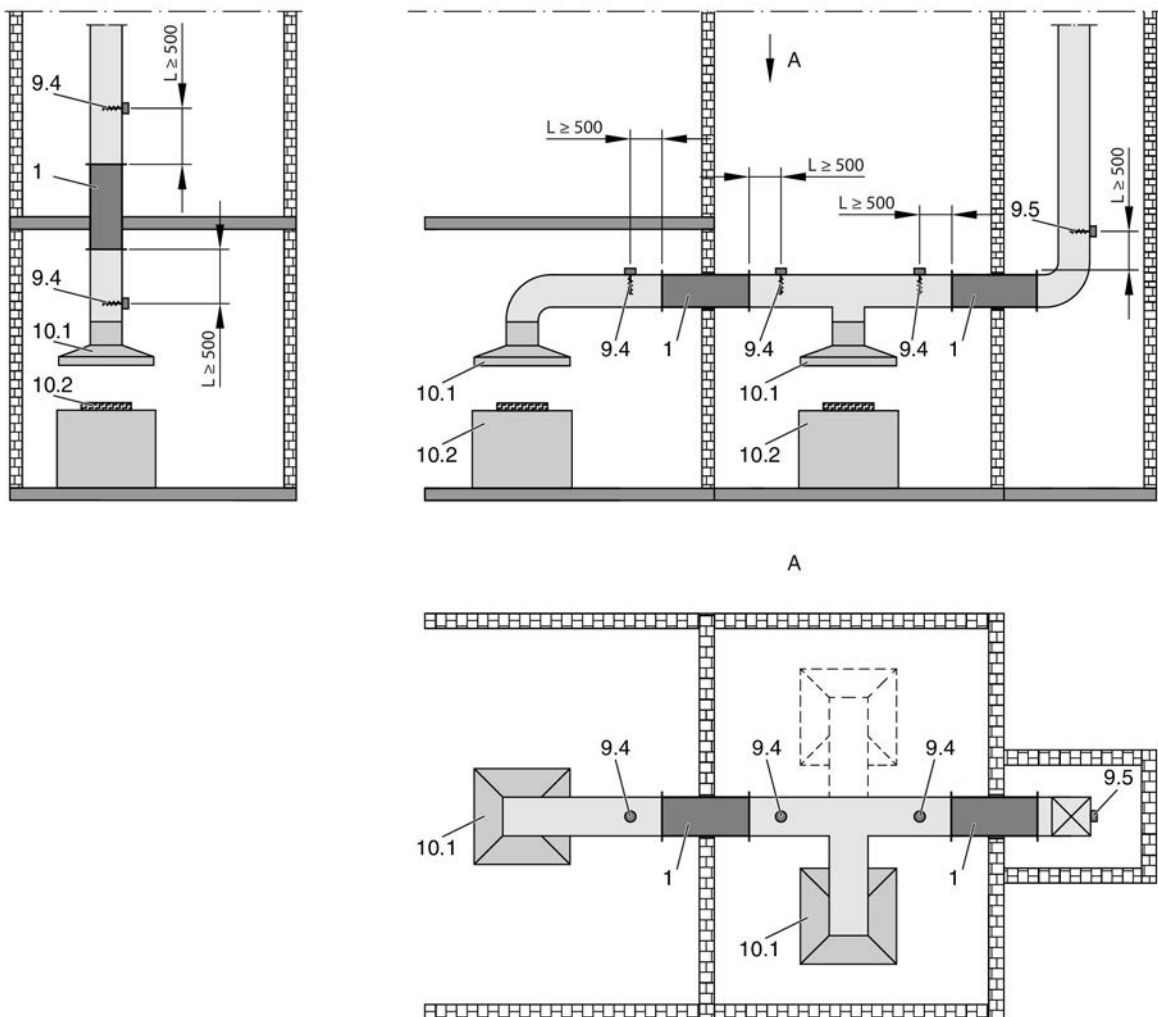


Fig. 24: More installation examples

1	KA-EU	10.1	Cooker hood
9.4	Capillary tube sensor TLR 72	10.2	Cooker
9.5	Capillary tube sensor (not required for a fire-resistant F90 shaft)		



## 7 Installing the electric blade opening actuator

### Functional description and electrical connection

Install the electric blade opening actuator after the fire damper has been installed.

Some details of the blade actuator position in the illustrations shown here may differ from the fire damper you have actually ordered, but the sequence of the installation steps is the same.

For an overview of the different blade actuator positions see p. 14

#### ! NOTICE!

The electric blade opening actuator can only be installed when the damper blade is closed.

The mortar needs to have completely cured.

### 7.1 Bottom centre installation

#### Step 1

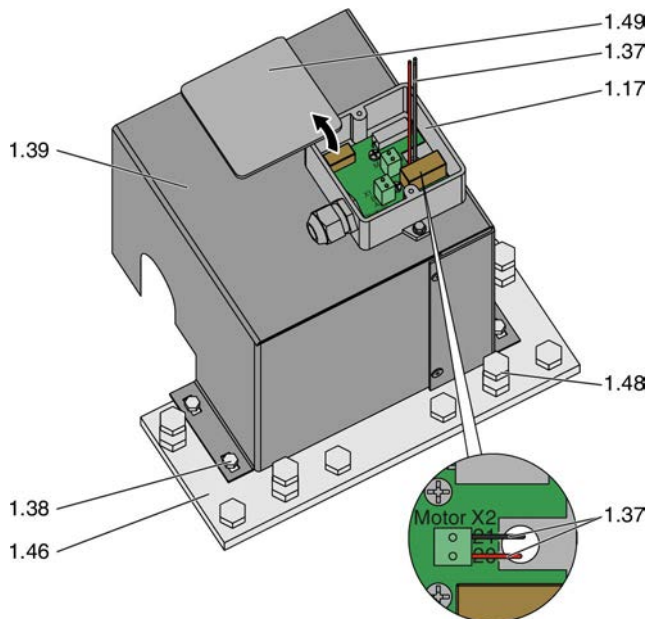


Fig. 25: Step 1 – Bottom centre installation

Remove the cover 1.49 of the junction box 1.17 and disconnect the wires of the connecting cable 1.37 from terminals X20 and X21 (see table for terminal connections). Unscrew the [Skt.-Schrauben] 1.38 on the cover 1.39 and feed the wires 1.37 through the [Durchführung] in the bottom of the junction box 1.17.

Installation position	1.37 Wire (red)	1.37 Wire (black)
Bottom centre	Terminal 20	Terminal 21

#### Step 2

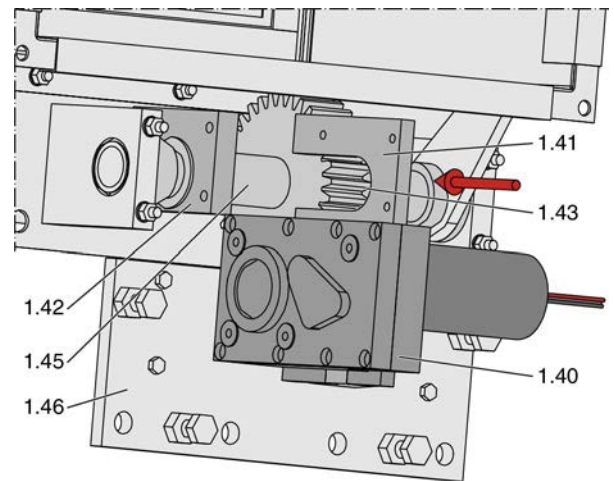


Fig. 26: Step 2 – Bottom centre installation

Push the actuator mounting plate 1.46 and the actuator 1.40 with the [bracket] 1.41 between the [counter bearing] 1.42 and the large gear 1.43 onto the [adjustment bar] 1.45 .

#### Step 3

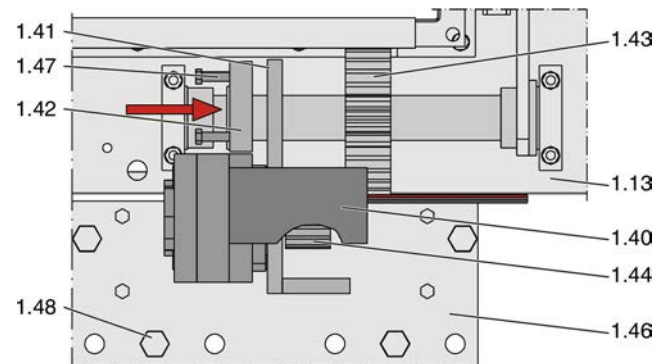


Fig. 27: Step 3 – Bottom centre installation

Push the small gear 1.44 from the actuator 1.40 onto the large gear 1.43.

## Bottom centre installation

### Step 4

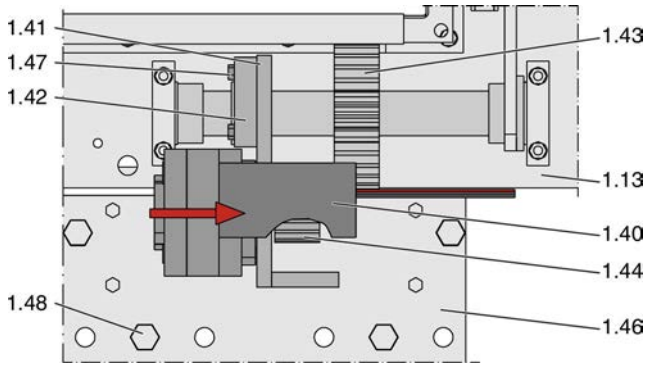


Fig. 28: Step 4 – Bottom centre installation

Push the counter bearing 1.42 up to the bracket 1.41 of the actuator mounting plate 1.46 and fix it with three Allen screws M6 × 25 mm 1.47.

Make sure that the small gear 1.44 engages in the large gear 1.43. Make sure that there is a gap of approx. 5 mm between the bracket 1.41 and the large gear 1.43.

Fixing to lightweight partition walls or compartment walls:

- Use the 4 holes in the actuator mounting plate 1.51 as a template for drilling holes into the wall or ceiling slab; fix the mounting plate with 4 threaded rods M10 (push through).
- Make sure that there is no tension on the actuator mounting plate. If necessary, use the 4 adjustment screws 1.48 to adjust any gap between the wall or ceiling slab and the actuator mounting plate 1.46.
- The actuator mounting plate 1.46 has to be parallel to the damper mounting plate 1.13.

Fixing:

- 4 wall plugs (part of the supply package)
- 4 × hexagon screws, Ø10 × 80 (part of the supply package)
- 4 threaded rods M10 (to be provided by others)
- 8 washers (to be provided by others)
- 8 nuts M10 (to be provided by others)

### Step 5

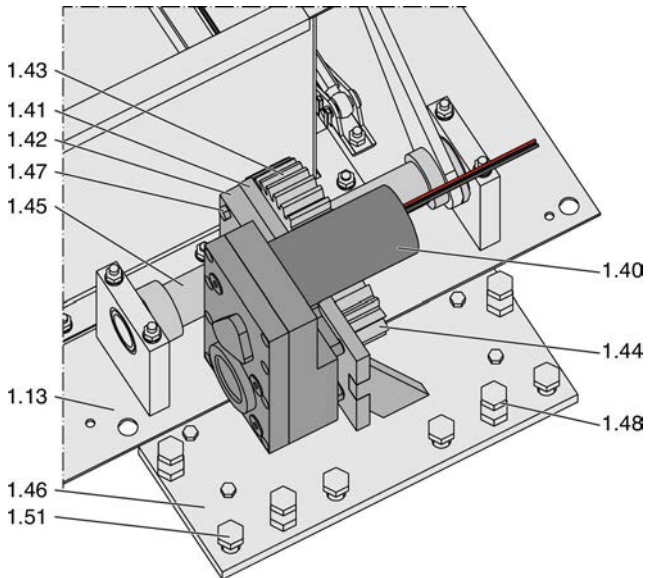


Fig. 29: Step 5 – Bottom centre installation

Fixing to walls or ceiling slabs made of bricks or concrete:

- Fix the actuator mounting plate 1.46 to the wall or ceiling slab using 4 wall plugs and screws 10 × 70 mm 1.51 or threaded rods M10 (push through). Use the drilled holes in the actuator mounting plate for fixing it to the wall or ceiling slab.

**Step 6**

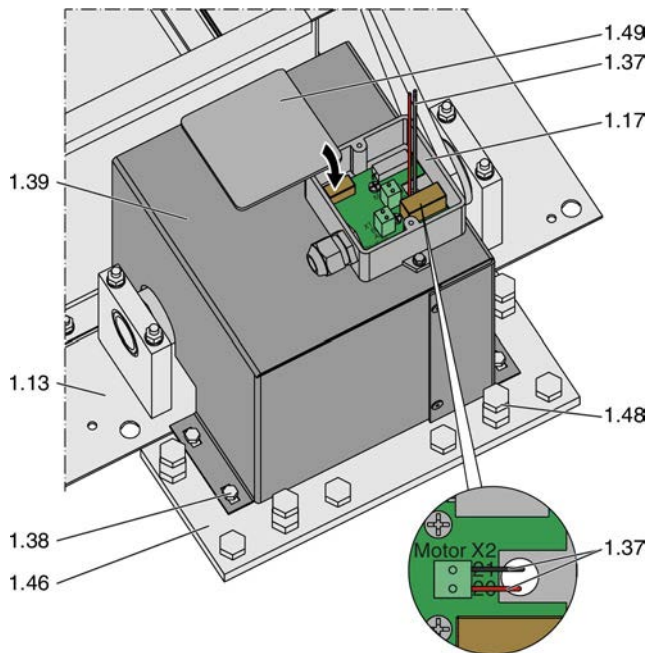


Fig. 30: Step 6 – Bottom centre installation

Feed the connecting cable 1.37 of the actuator 1.40 completely into the junction box 1.17. Fix the wires of the connecting cable 1.37 to terminals X20 and X21 (see table for terminal connections), then close the cover 1.49 of the junction box 1.17.

Push the cover 1.39 onto the actuator. Fix the cover 1.39 with 4 hexagon head screws M6 × 12 1.38 to the actuator mounting plate 1.46.

Installation position	1.37 Wire (red)	1.37 Wire (black)
Bottom centre	Terminal 20	Terminal 21

**7.2 Left side or right side installation**

**Step 1**

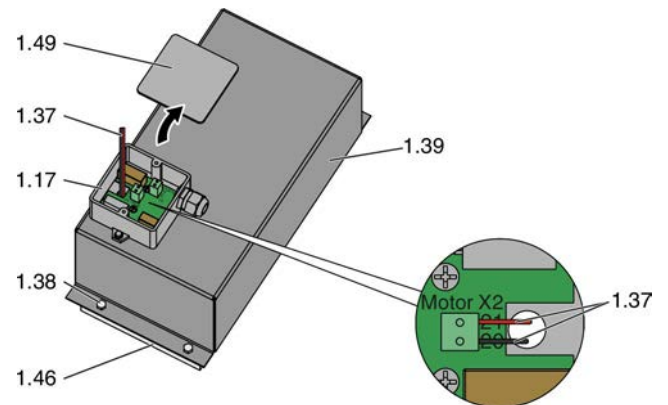


Fig. 31: Step 1 – Left side or right side installation

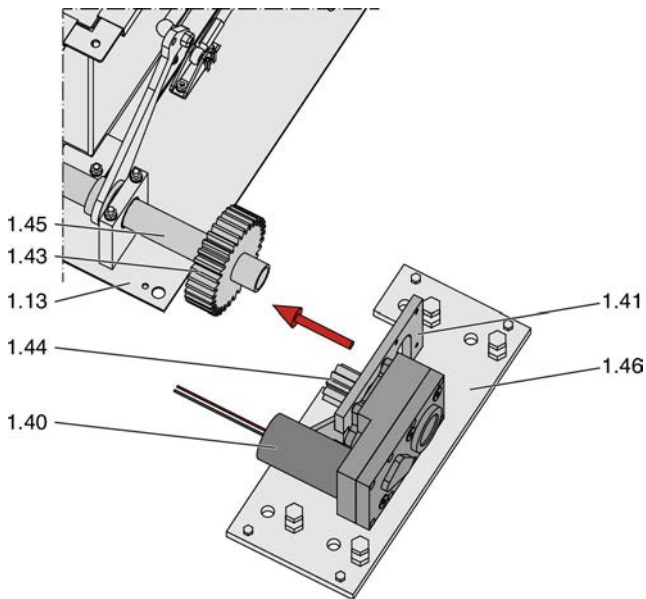
Remove the cover 1.49 of the junction box 1.17 and disconnect the wires of the connecting cable 1.37 from terminals X20 and X21 (see table for terminal connections). Unscrew the [Skt.-Schrauben] 1.38 on the cover 1.39 and feed the wires 1.37 through the [Durchführung] in the bottom of the junction box 1.17.

Installation position	1.37 Wire (red)	1.37 Wire (black)
Top left	Terminal 20	Terminal 21
Bottom left	Terminal 20	Terminal 21
Top right	Terminal 21	Terminal 20
Bottom right	Terminal 21	Terminal 20

**When installation of the electric blade opening actuator is complete**

- Connect control module FSM 1, see ↪ 59.
- Connect and set the limit switches, see ↪ 53.
- Set the interlock, see ↪ 54.
- Test the function of the fire damper, see ↪ 56.

## Step 2

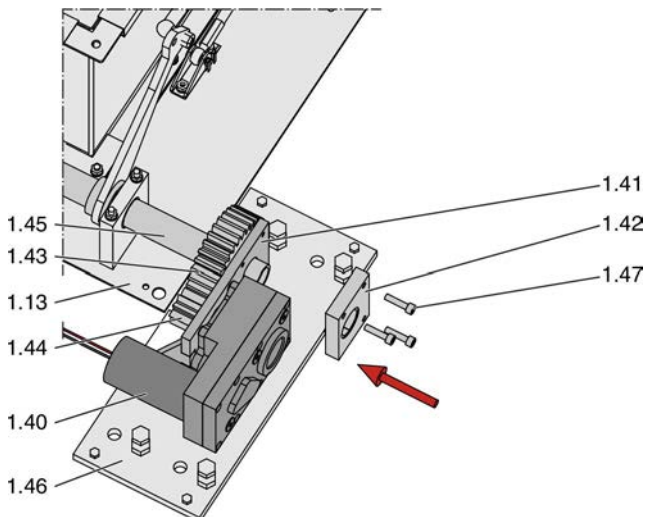


*Fig. 32: Step 2 – Left side or right side installation*

Push the actuator mounting plate 1.46 and the actuator 1.40 with the [bracket] 1.41 onto the adjustment bar 1.45. Make sure that the small gear 1.44 engages in the large gear 1.43.

Make sure that there is a gap of approx. 5 mm between the bracket 1.41 and the large gear 1.43.

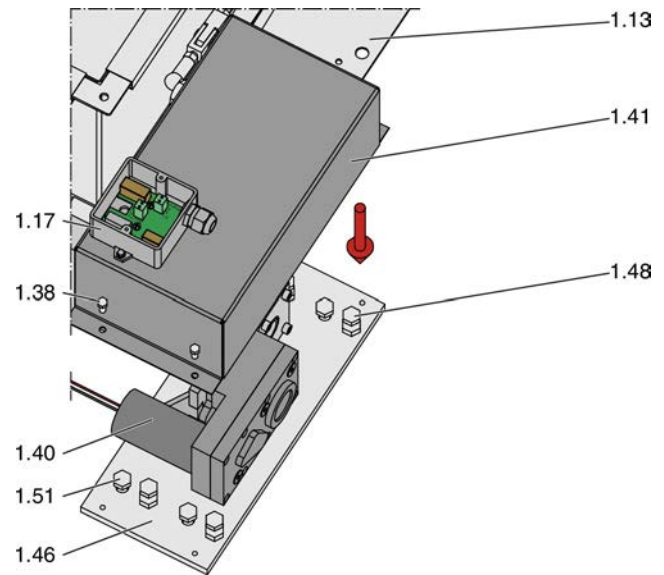
## Step 3



*Fig. 33: Step 3 – Left side or right side installation*

Push the counter bearing 1.42 onto the adjustment bar 1.45 and up to the bracket 1.41 of the actuator mounting plate 1.46. Then fix it with three Allen screws M6 × 25 mm 1.47.

## Step 4



*Fig. 34: Step 4 – Left side or right side installation*

Fixing to walls or ceiling slabs made of bricks or concrete:

Fix the actuator mounting plate 1.46 to the wall or ceiling slab using 4 wall plugs and screws 10 × 70 mm 1.51 or threaded rods M10 (push through). Use the drilled holes in the actuator mounting plate for fixing it to the wall or ceiling slab.

Fixing to lightweight partition walls or compartment walls:

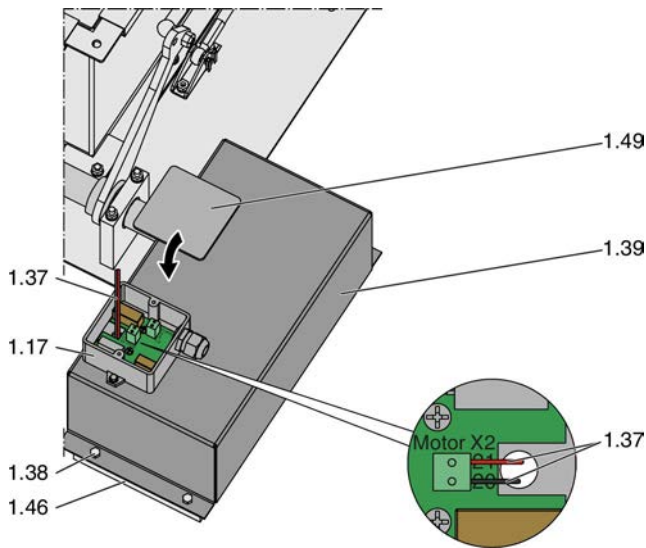
Use the 4 holes in the actuator mounting plate 1.51 as a template for drilling holes into the wall or ceiling slab; fix the mounting plate with 4 threaded rods M10 (push through).

Make sure that there is no tension on the actuator mounting plate. If necessary, use the 4 adjustment screws 1.48 to adjust any gap between the wall or ceiling slab and the actuator mounting plate 1.46.

The actuator mounting plate 1.46 has to be parallel to the damper mounting plate 1.13.

Fixing:

- 4 wall plugs (part of the supply package)
- 4 × hexagon screws, Ø10 × 80 (part of the supply package)
- 4 threaded rods M10 (to be provided by others)
- 8 washers (to be provided by others)
- 8 nuts M10 (to be provided by others)

**Step 5**

*Fig. 35: Step 5 – Left side or right side installation*

Feed the connecting cable 1.37 of the actuator 1.40 completely into the junction box 1.17. Fix the wires of the connecting cable 1.37 to terminals X20 and X21 (see table for terminal connections), then close the cover 1.49 of the junction box 1.17.

Push the cover 1.39 onto the actuator. Fix the cover 1.39 with 4 hexagon head screws M6 × 12 1.38 to the actuator mounting plate 1.46.

Installation position	1.37 Wire (red)	1.37 Wire (black)
Top left	Terminal 20	Terminal 21
Bottom left	Terminal 20	Terminal 21
Top right	Terminal 21	Terminal 20
Bottom right	Terminal 21	Terminal 20

**When installation of the electric blade opening actuator is complete**

- Connect control module FSM 1, see ↗ 59.
- Connect and set the limit switches, see ↗ 53.
- Set the interlock, see ↗ 54.
- Test the function of the fire damper, see ↗ 56.

**Note:**

Once the electric blade opening actuator has been installed, you have to make the electrical connections before you start operating the damper. If you fail to electrically connect the actuator, it may become damaged when the damper blade closes.

## 8 Connecting the ductwork

### 8.1 Ducts

Fire dampers must only be connected to ducts made of galvanised sheet steel or [stainless steel]; be sure to take the redox potential (electrochemical series) into consideration.

### 8.2 Limiting duct expansion

Installation in Germany:

- If the fire damper is installed into a lightweight partition wall or compartment wall with metal support structure and cladding on both sides, suitable flexible connectors are required on both sides; the connectors have to be at least 10 cm long (when installed) and made of material that is fire-rated normally flammable or higher (fire rating class B2 to DIN 4102-1). For further information please refer to the guideline regarding fire protection requirements on ventilation systems (Lüftungsanlagen-Richtlinie, LüAR).

Installation in countries other than Germany:

- We recommend the same conditions as for installation in Germany.

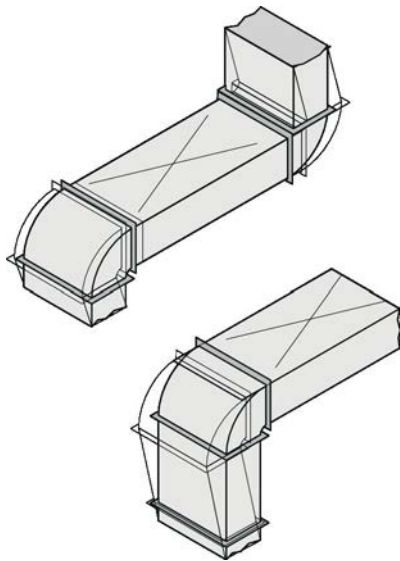


Fig. 36: Limiting loads

Ducting must be installed in such a manner that it does not impose any significant loads on the fire damper in the event of a fire.

The expansion of ducts in the event of a fire can be compensated by brackets and turns, Fig. 36.

## 9 Electrical connection

### General 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 power supply before working on any electrical equipment.

#### Personnel:

- Skilled qualified electrician

### 9.1 Equipotential bonding

If necessary, bridge flexible connectors with an equipotential bonding cable.

The equipotential bonding must not lead to any mechanical load being imposed on the fire damper in the event of a fire.

### 9.2 Control module FSM 10

#### Functional description and electrical connection

Control module FSM 10 is used to close the KA-EU fire damper and to display the status of the capillary tube sensors. There is a push button for closing the KA-EU as well as a red LED. The LED normally off. It is illuminated if the capillary tube sensors (TLR) have been triggered. Pressing the push button interrupts the power supply to the electromagnet such that the damper blade closes. If the capillary tube sensors have been triggered (LED is illuminated), pressing the RESET push button resets the TLR 72. You can then open the damper with the opening lever. If control module FSM 10 is to be used, you have to connect it according to the circuit diagram Fig. 38. Contacts 10 - 12 can be used to signal a fire alarm, and contacts 13 - 16 can be used to signal the damper blade position (OPEN or CLOSED) to the switch cabinet or to the central BMS. The control module FSM 10 can be connected to an external push button DKT 2.2\_A (optional). The supply voltage can be applied directly to the FSM 10, contacts 1-3, without the use of a push button. The control module FSM 10 should be fitted on the adjacent component in close proximity to the KA-EU.

#### Switching off the fan

Terminals 15 - 16 of control module FSM 10 are used to switch off the fan. This ensures that the fan runs only while the damper blade is fully open. Note: If you use these contacts also for damper blade position indication, be sure to avoid any different potentials, or use auxiliary relays.

#### Push button (optional)

The optional push button DKT\_2.2A interrupts the voltage supply to control module FSM 10 such that the KA-EU closes (remote controlled).

## Control module FSM 10

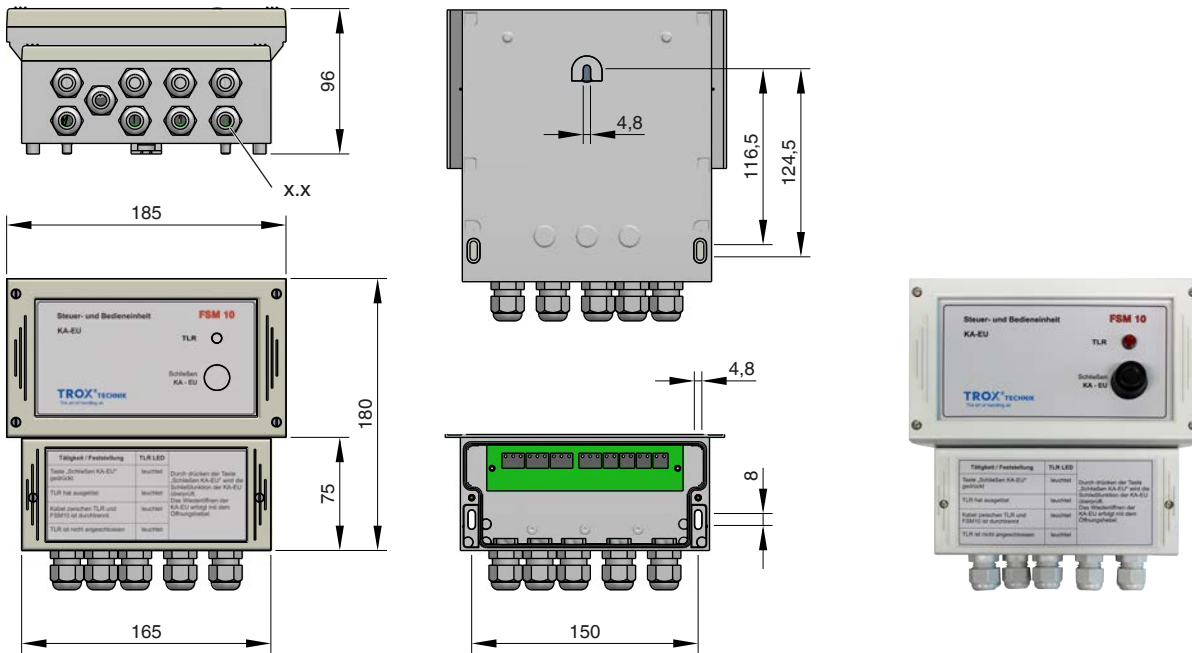


Fig. 37: Control module FSM 10

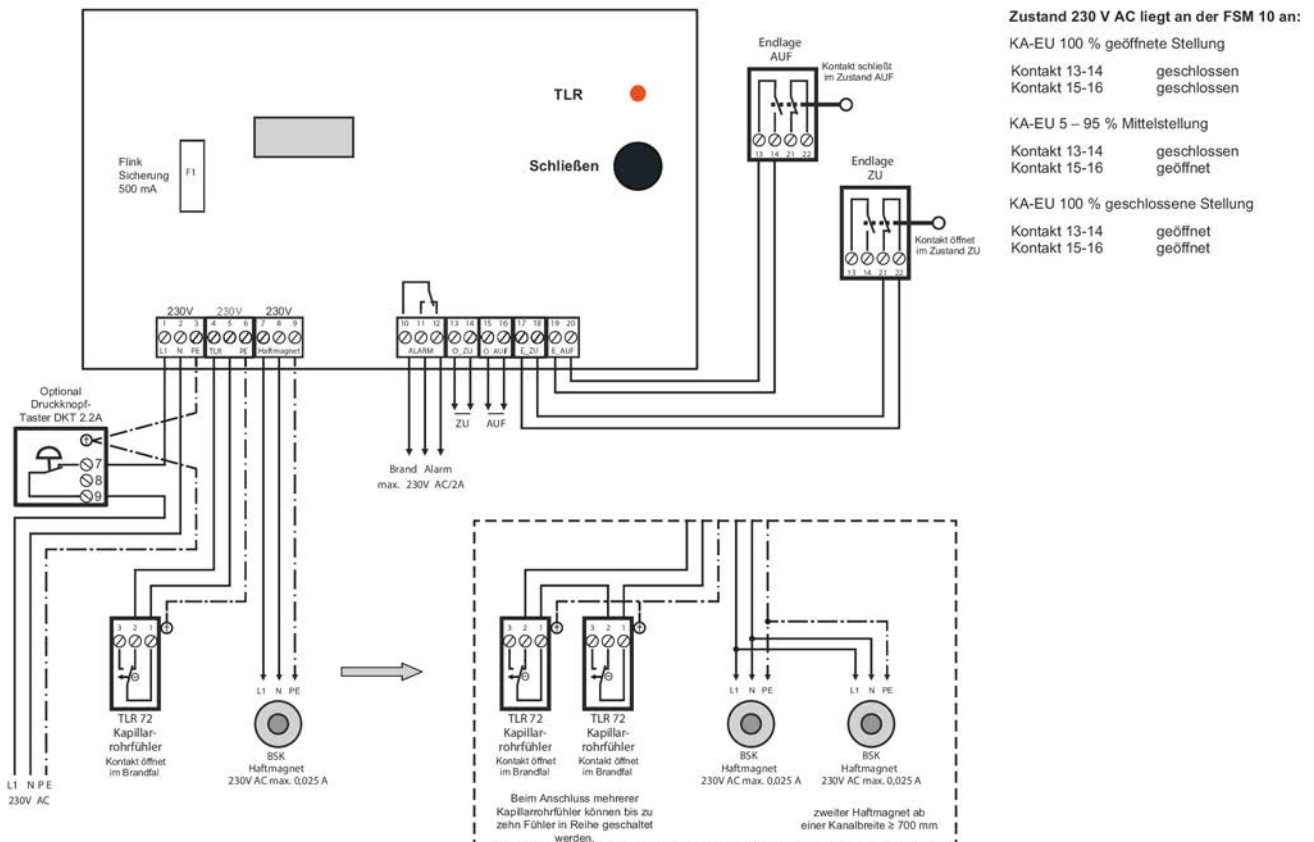


Fig. 38: Circuit diagram for control module FSM 10 (example)



Control module status LEDs		
LED		Explanation
LED red	Illuminated	Push button for closing the KA-EU has been pressed
LED red	Illuminated	TLR has been triggered
LED red	Illuminated	The cable between TLR and FSM 10 has been cut
LED red	Illuminated	TLR has not been connected

Control module function buttons			
LED		Action required	Damper blade position
Operation (red)	Illuminated	Press 'Test' push button	The damper blade closes

## 9.3 Control module FSM 1 and electric blade opening actuator

### Functional description and electrical connection

Control module FSM 1 is required for the electric blade opening actuator and is used for operation and status displays. If the capillary tube sensor is triggered, the KA-EU closes and the alarm LED is illuminated. If you press the 'Reset' push button of the TLR 72, the alarm LED goes off and the power supply to the electromagnets is re-established. If you then press *Anschließend wird durch Drücken der RESET-Taste am Steuergerät FSM 1 die KA-EU mit der elektrischen Auffahrhilfe wieder geöffnet.* Pressing the TEST push button interrupts the power supply to the electromagnet so that the fire damper closes. If the RESET button is pressed, the KA-EU is opened again with the electric blade opening actuator. The wiring must be carried out according to the wiring diagram Fig. 40. Contacts 9 - 11 can be used to signal a fire alarm, and contacts 12 - 17 can be used to signal the damper blade position (OPEN or CLOSED) to the switch cabinet or to the central BMS. Use contacts 1 and 2 to connect the capillary tube sensor; you can connect up to 10 capillary tube sensors in series. The control module FSM 1 should be fitted on the adjacent component in close proximity to the KA-EU.

### Switching off the fan

Terminals 15 - 16 of control module FSM 1 are used to switch off the fan. This ensures that the fan runs only while the damper blade is fully open.

### Connecting the electric blade opening actuator

Use terminals 18 - 19 to connect the electric blade opening actuator to control module FSM 1; see the circuit diagram for details. The direction of rotation of the actuator is determined by terminals 20 - 21 in the junction box. Depending on the arrangement of the electric blade opening actuator, the motor is connected in the junction box via the terminals 20 - 21 (see table on terminal connections)

### 'Test' push button

Use terminals 26 - 27 to connect the optional 'Test' push button to control module FSM 1; see the circuit diagram or details. As standard, there is a wire link between terminals 26 - 27; to connect push button DKT 2.2\_A, remove the wire link. You can use the push button to close the KA-EU via remote control.

### 'Reset' push button (optional)

Use terminals 27 - 28 to connect the optional 'Reset' push button DKT\_2.3\_R to control module FSM 1; see the circuit diagram or details. You can use this push button to activate the electric blade opening actuator such that the damper blade opens. If you do not connect the optional 'Test' push button, leave the wire link between terminals 26 - 27 in place.



*In case of a remote reset (push button DKT 2.3\_R), make sure that the input signal remains no longer than 1 s on terminals 27 and 28. Only activate the electric blade opening actuator if the damper blade is fully closed and if the electric blade opening actuator is not moving yet.*

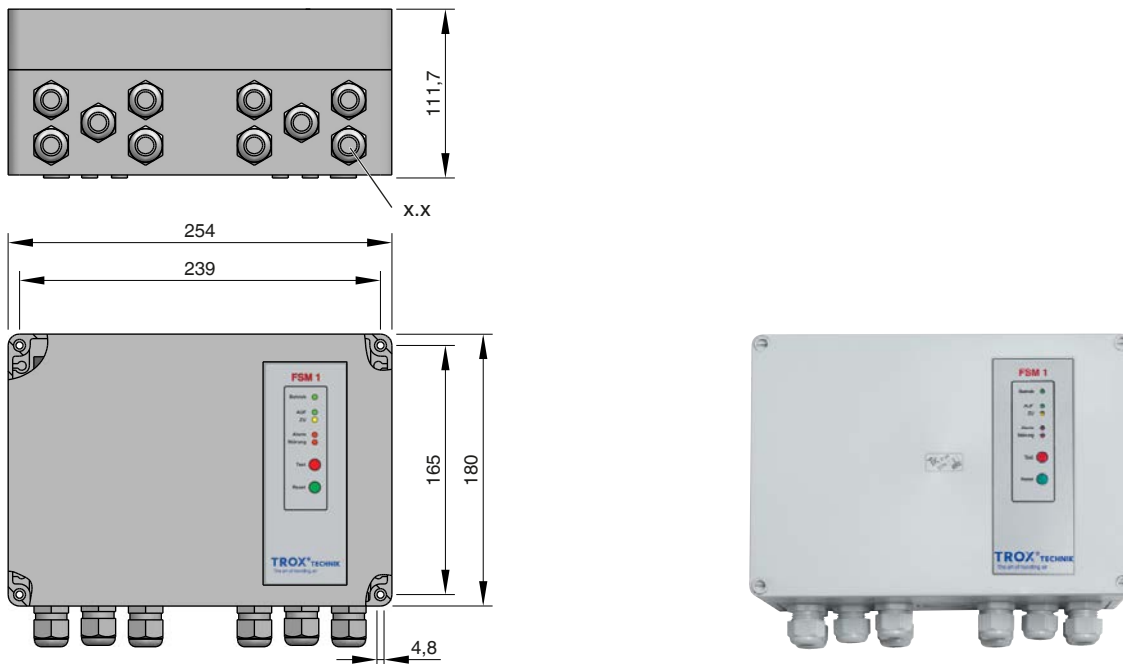


Fig. 39: Control module FSM 1

x.x Cable gland M20 x 1.5, 10 pieces

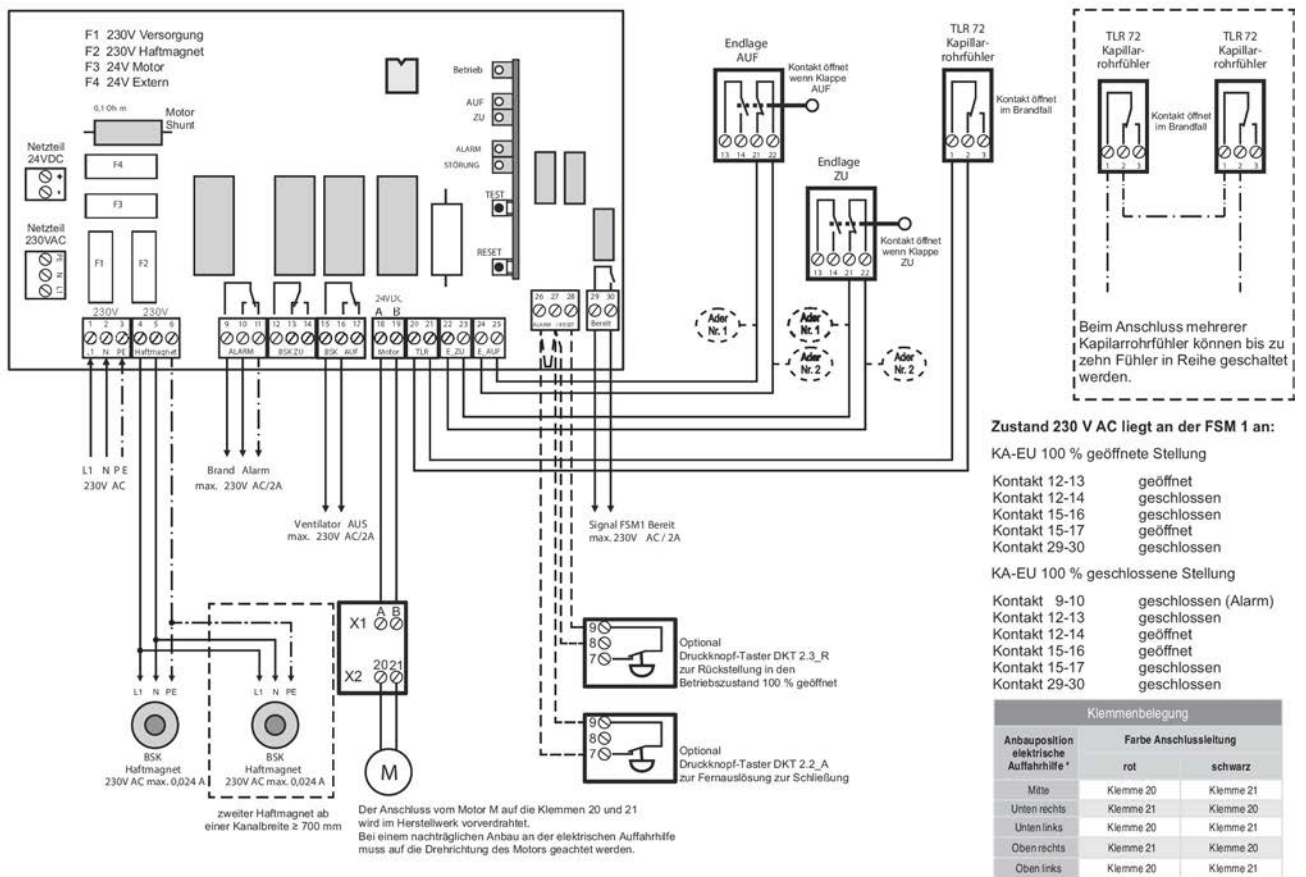


Fig. 40: Circuit diagram for control module FSM 1 with electric blade opening actuator (example)

Control module status LEDs		
LED		Explanation
Operation (green)	Illuminated	230 V AC voltage is supplied
OPEN (green)	Illuminated	Damper blade is open
CLOSED (yellow)	Illuminated	Damper blade is closed
Alarm (red)	Illuminated	Temperature on the capillary tube sensor > 72 °C

Control module function buttons			
LED		Action required	Damper blade position
Operation (green)	Illuminated	Press 'Reset' push button	With electric blade opening actuator: Actuator opens the damper blade
CLOSED (yellow)	Goes off --> OPEN (green) is illuminated		
Operation (green)	Illuminated	Press 'Test' push button	The damper blade closes
OPEN (green)	Goes off --> CLOSED (yellow) is illuminated		
Operation (green)	Illuminated	Release of the capillary tube sensor with hot air apparatus (setting 72 – 75 °C)	Damper blade is open; closes after triggering
OPEN (green)	Goes off --> CLOSED (yellow) is illuminated		
Alarm (red)	Illuminated		

## 10 Settings

### 10.1 Setting the limit switches

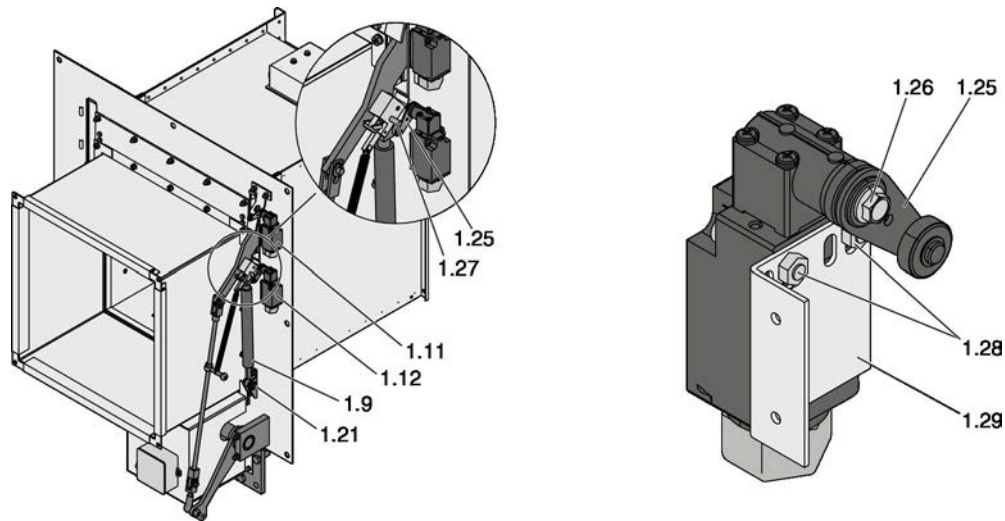


Fig. 41: Setting the limit switches

1.9	Gas strut (from B ≥ 700 mm to gas struts)	1.26	Roller lever fixing screw
1.11	Limit switch for damper blade position CLOSED	1.27	Screw for operating the roller lever (transmitter)
1.12	Limit switch for damper blade position OPEN	1.28	Limit switch screws
1.21	Mounting bracket	1.29	Bracket
1.25	Roller lever		

End positions OPEN and CLOSED are factory set. However, some adjustment may be necessary after installation. The following description refers to the OPEN limit switch. The CLOSED limit switch is set in the same way.

#### 1. ▶ Adjusting the limit switch

- If the switching point is not reached, loosen the screws 1.28 of the limit switch on the bracket 1.29 and push the limit switch slightly (approx. 1 mm) in the direction of the transmitter.
- If necessary, repeat until the switching point is correct.

#### 2. ▶ Adjusting the roller lever

If the switching point is not reached by adjusting the limit switch, it can be reached by adjusting the roller lever:

- Unscrew fixing screw 1.26.
- Adjust the roller lever 1.25 by 10°. To do this, pull the roller lever from the toothed crankshaft and push it back on the teeth again one notch up.
- Tighten fixing screw 1.26 again.
- Unscrew the two screws 1.28.
- The limit switch is moved about 5 mm away from the transmitter on the bracket 1.29.
- Tighten the screws 1.28 again.
- If necessary, repeat until the switching point is correct.

Setting the interlock (only with electric blade opening actuator)

Troubleshooting		
Errors	Cause	Adjustment
Limit switch OPEN is activated although the damper blade has not reached the electromagnet yet.	The switching point of the limit switch has been reached prematurely.	Remove the fixing screws of limit switch OPEN and push the entire switch away from the [setting lever] (approx. 1 mm); then screw-fix it again.  Move the roller lever on the OPEN limit switch one position downwards (10°).
Limit switch OPEN is not activated although the damper blade has reached the electromagnet yet.	The switching point of the limit switch has not been reached.	Remove the fixing screws of the OPEN limit switch and push the entire limit switch toward the blade opening lever (approx. 1 mm); then screw-fix it again.  Move the roller lever on the OPEN limit switch one position upwards (10°).

## 10.2 Setting the interlock (only with electric blade opening actuator)

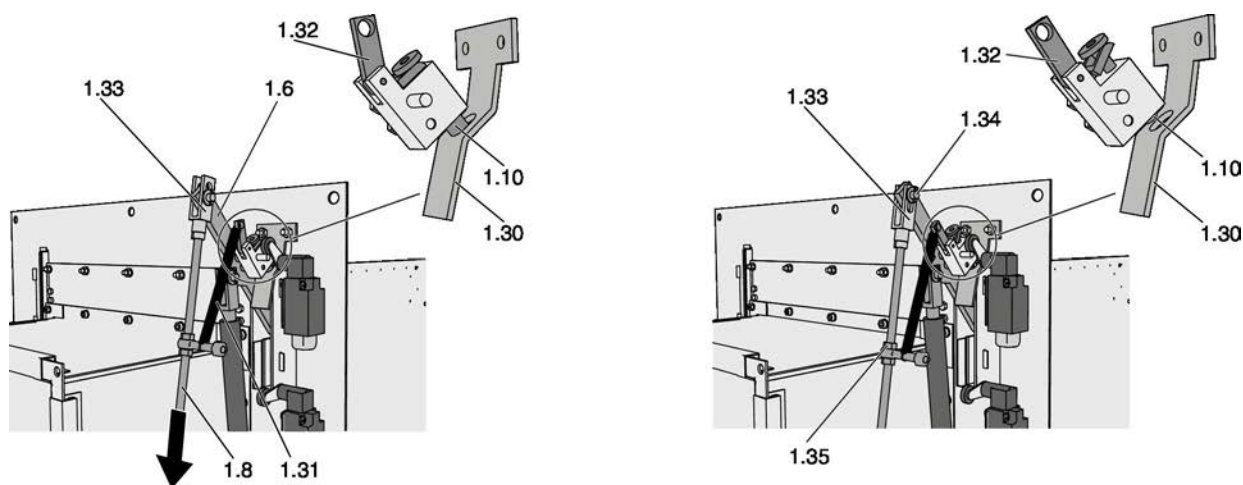


Fig. 42: Setting the interlock

- |      |                     |      |                 |
|------|---------------------|------|-----------------|
| 1.6  | Blade opening lever | 1.32 | Operating lever |
| 1.8  | Threaded rod        | 1.33 | Fork head       |
| 1.10 | Spring tab bolt     | 1.34 | Bolt            |
| 1.30 | Spring tab          | 1.35 | Adjustment nut  |
| 1.31 | Spring              |      |                 |

Proceed as follows:

- Pulling the threaded rod 1.8 moves the fork head 1.33 downwards until the slotted hole touches the bolt 1.34.
- The spring 1.31 has to pull on the lever 1.32 and pull the spring tab bolt 1.10 out of the spring tab 1.30. The functioning can be adjusted using the adjusting nut 1.35 (direction of rotation way from fork head).
- Checking the locking/unlocking by repeatedly moving the threaded rod back and forth

### 10.3 Setting the electromagnets

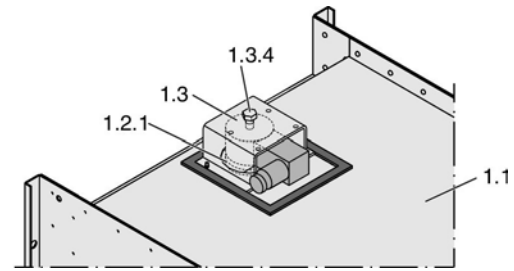
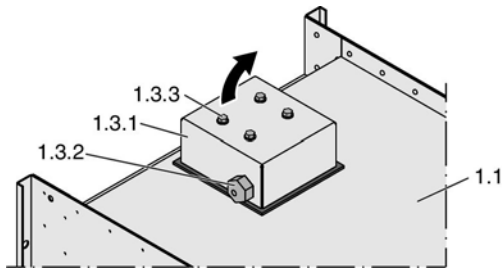


Fig. 43: Setting the electromagnets

1.1	KA-EU casing	1.3.2	Cable gland
1.2.1	Contact disc (on damper blade 1.2)	1.3.3	Screw M6 × 25 mm
1.3	Electromagnet	1.3.4	Screw M8 × 25 mm
1.3.1	Magnet cover		

The casing 1.1 is fitted with an electromagnet 1.3 (from duct width > 600 mm two electromagnets) which you can set. To do so, proceed as follows:

- Remove screws M6 x 25 mm 1.3.3.
- Unscrew cable gland 1.3.2.
- Lift the magnet cover 1.3.1 off the casing 1.1.

When open, the contact disc 1.2.1 must be identified under the electromagnet 1.3. If the contact disc 1.2.1 does not touch the electromagnet or if the electromagnet can be rotated in the magnet bracket, the magnet must be placed lower.

- Hold the electromagnet 1.3 and unscrew the screw M8 × 25 mm 1.3.4 (max. 2 full rotations)
- Ensure that the electromagnet is securely seated. If the electromagnet 1.3 touches the contact disc 1.2.1 correctly, the electromagnet cannot be rotated.
- Replace the magnet cover 1.3.1.
- Fix the magnet cover 1.3.1 with the four screws M 6 × 25 mm 1.3.3. Only tighten the screws 1.3.3 slightly.
- Tighten the cable gland 1.3.2.
- Carry out functional test.

## 11 Functional test

### General

During operation at normal temperatures, the damper blade is open. A functional test involves closing the damper blade and opening it again.

The exact procedure may differ for each fire damper variant.

Before you start the functional test, ensure that the electric components of the fire damper are supplied with voltage.

#### **WARNING!**

Be careful when the fire damper has been triggered as there is a risk of injury from the linkage and the damper blade.

Do not reach into the fire damper or into the linkage while the blade is opening or closing.

A functional test includes:

- Switching off the fan.
- Checking all screw-fixed parts for secure seating.
- Checking the gas strut(s) for damage.
- Checking the interior of the damper for contamination (inspection access panel in the duct).
- Switching the fan on again.



### 11.1 KA-EU with control module FSM 10

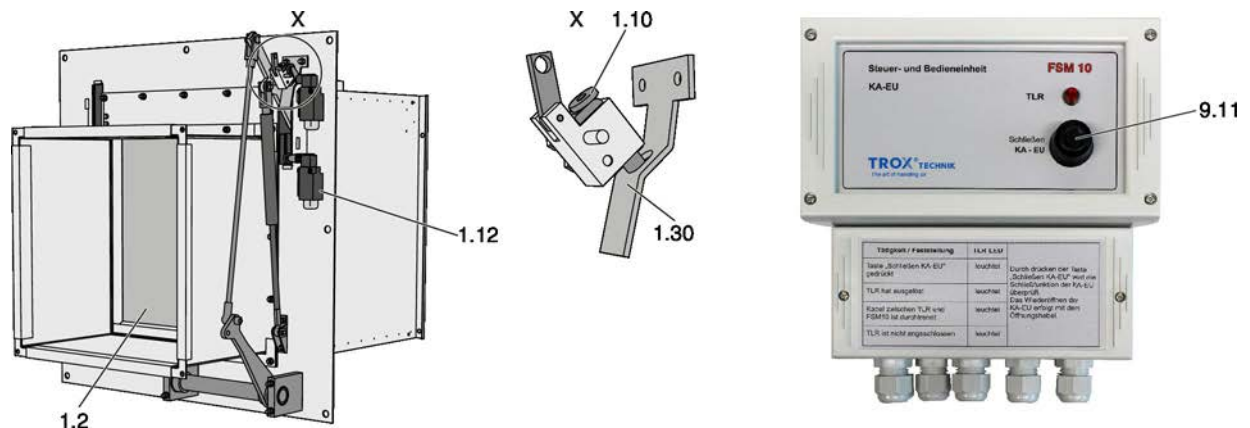


Fig. 44: Closing the damper blade

- 1.2 Damper blade
- 1.10 Spring tab bolt
- 1.12 Limit switch for damper blade position OPEN

- 1.30 Spring tab
- 9.11 Push button "Close KA-EU", control module FSM 10

#### Closing the damper blade

1. ▶ Close the fire damper by pressing the push button "Close KA-EU" 9.11 on the control module FSM 10. The damper blade 1.2 closes automatically and the spring tab bolt 1.10 locks on to the spring tab 1.30
2. ▶ When the damper blade position is CLOSED, the OPEN limit switch 1.12 must be inactive, and the fan must be off; the fan must be switched off as soon as the damper blade starts closing.

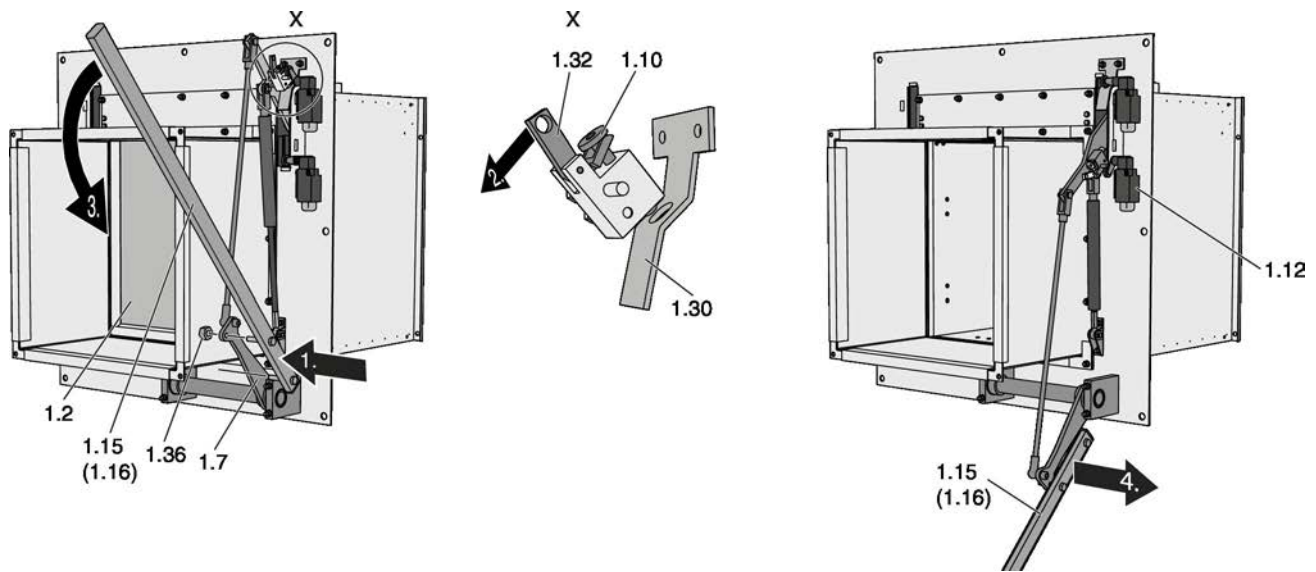


Fig. 45: Opening the damper blade

1.2	Damper blade	1.15/1.16	Opening lever
1.7	Blade opening lever	1.30	Spring tab
1.10	Spring tab bolt	1.36	Nut
1.12	Limit switch for damper blade position OPEN		

### Opening the damper blade

1. ▶ Attach the opening lever 1.15 or 1.16 to the blade opening lever 1.7 and secure it with a nut 1.36.

#### **WARNING!**

Risk of injury from an incorrectly fitted opening lever.

Before you open the damper blade, ensure that the opening lever has been secured on the setting lever with a nut.

2. ▶ Pull the operating lever 1.32 on the spring tab bolt 1.10 forwards by hand until the locking mechanism loosens.
3. ▶ Slowly open the damper blade, against the force of the gas strut, until the damper blade is kept OPEN by the electromagnets.
4. ▶ Open the nut 1.36 on the opening lever 1.15 or 1.16 and remove the opening lever. Keep the opening lever and the nut for later use.
5. ▶ When the damper blade is OPEN, the OPEN limit switch 1.12 must be active.

## 11.2 KA-EU with electric blade opening actuator and control module FSM 1

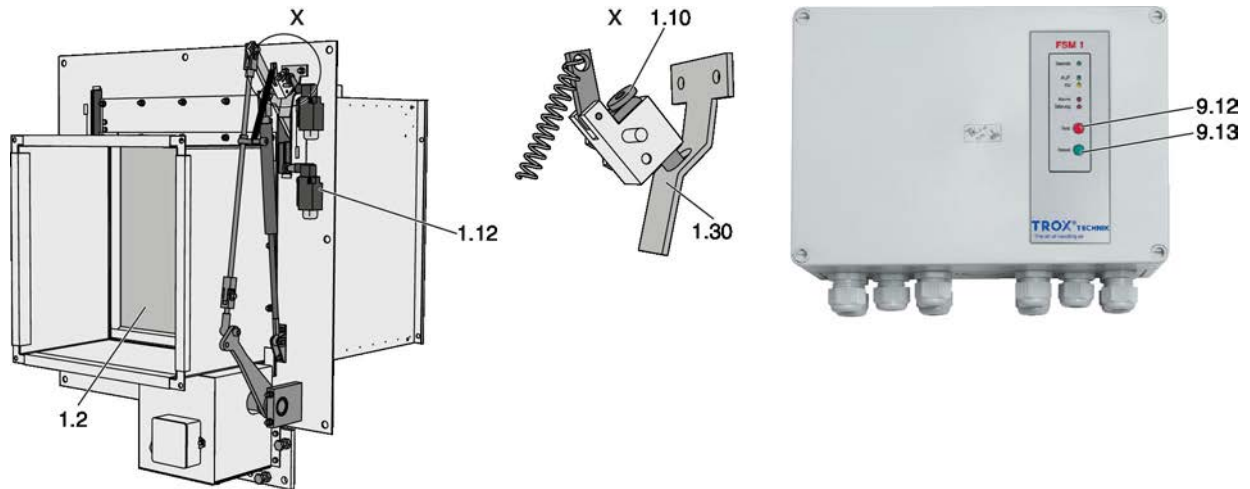


Fig. 46: Closing the damper blade

1.2	Damper blade	1.30	Spring tab
1.10	Spring tab bolt	9.12	'Test' push button on control module FSM 1
1.12	Limit switch for damper blade position OPEN	9.13	'Reset' push button on control module FSM 1

### Closing the damper blade

1. ▶ Press the 'Test' push button 9.12 on control module FSM 1 to close the damper blade. The damper blade 1.2 closes automatically and the spring tab bolt 1.10 locks on to the spring tab 1.30
2. ▶ When the damper blade position is CLOSED, the OPEN limit switch 1.12 must be inactive, and the fan must be off; the fan must be switched off as soon as the damper blade starts closing.

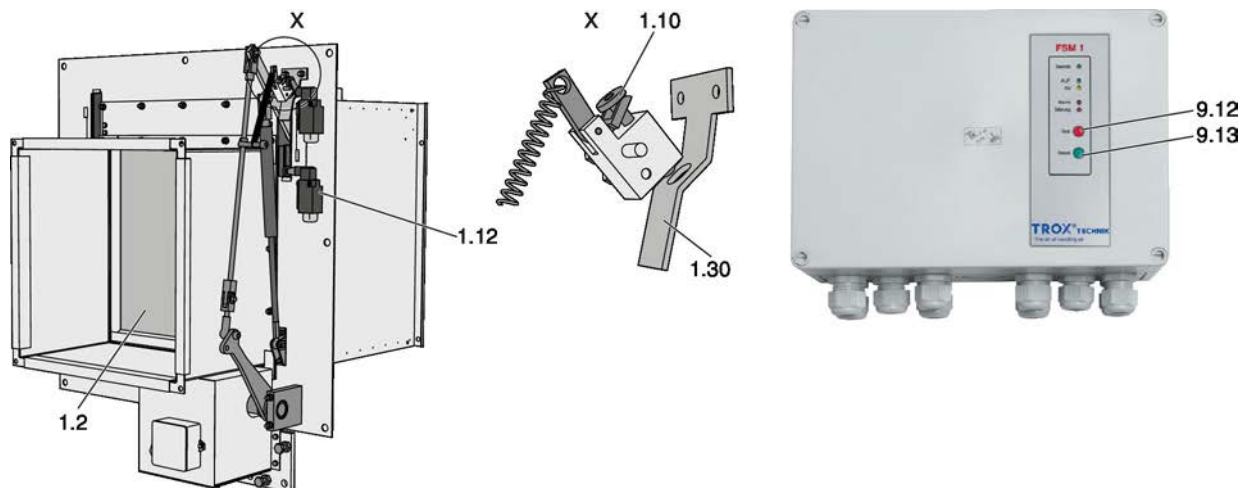


Fig. 47: Opening the damper blade

1.2	Damper blade	9.9	Bulb
1.10	Spring tab bolt	9.12	'Test' push button on control module FSM 1
1.12	Limit switch for damper blade position OPEN	9.13	'Reset' push button on control module FSM 1
1.30	Spring tab		

### Opening the damper blade with the electric blade opening actuator

1. ▶ Press the 'Reset' push button 9.13 on control module FSM 1 to open the damper blade. The electric blade opening actuator opens the damper blade.
2. ▶ The damper blade is kept open by the electromagnets.
3. ▶ When the damper blade is OPEN, the OPEN limit switch 1.12 must be active.

## 11.3 Functional test with thermal release

Instead of the above functional tests you can simulate a thermal release of the damper blade:

- If necessary, remove the capillary tube sensor from the ducting.
- Set the hot air apparatus to 75 °C and heat the sensor 9.9 until the fire damper releases.

### CAUTION!

A capillary tube sensor may become damaged due to high temperatures.

When performing a thermal release, do not set the temperature on the hot air apparatus to over 75 °C.

The damper blade closes automatically and the spring tab bolt 1.10 locks on to the spring tab. The fan has to be switched off as soon as the damper blade starts closing.

After a thermal release on a capillary tube sensor, the RESET button 9.10 must be pressed (after the temperature falls) before the fire damper opens.

The damper blade is opened as described above.


### NOTICE!

The 'Reset' push button 9.10 on the capillary tube sensor is only used to reset the capillary tube sensor after a thermal release; it has no fire protection function.

## 12 Commissioning

### Before 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  on page 64.

### Operation

Once commissioning (including inspection) has been completed, the controller will operate independently and require no intervention from the system owner.

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

If the temperature in the duct rises in the event of a fire ( $\geq 72$  °C), the thermal release mechanism is triggered and closes the damper blade.

## 13 Maintenance

### 13.1 General

#### General 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 power supply before working on any electrical equipment.

#### CAUTION!

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.

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

The owner or 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.

#### Functional test

The functional reliability of the fire damper must be tested at least every six months; this has to be arranged by the system owner. If two consecutive tests, one 6 months after the other, are successful, the next test can be conducted one year later.

The functional test must be carried out in compliance with the basic maintenance principles of the following standards:

- EN 13306
- DIN 31051

#### Maintenance

The fire damper and the electric blade opening actuator are maintenance-free with regard to wear but fire dampers must still be included in the regular cleaning of the ventilation system.

#### Cleaning

General information on cleaning ↗ 63.

#### Inspection

The fire damper must be inspected before commissioning. After commissioning, the function has to be tested in regular intervals. Local requirements and building regulations must be complied with. The inspection measures to be taken are listed under ↗ 64. The test of each fire damper must be documented and evaluated. 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 ↗ 56.

## 13.2 Cleaning the fire damper

### General information on cleaning

Fire dampers must not be cleaned mechanically, with high-pressure equipment or with hot steam. Cleaning with an automatic brush design (Mulch) is also not permitted.

The fire damper can be cleaned with slightly alkaline cleaning solutions, e.g. Mint 2000 Plus from the company Ultra Spezialchemie or equivalent cleaning agents.

Clean the fire damper at least every six months, or earlier if required.

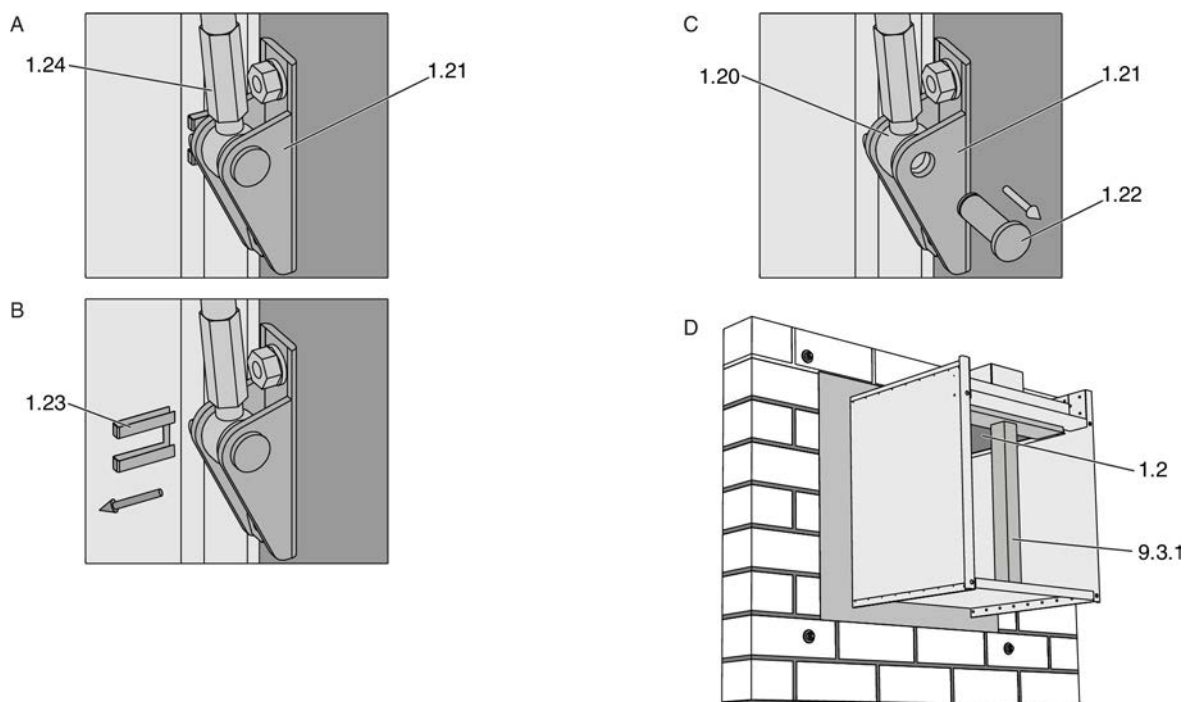


Fig. 48: Removing the gas strut

1.2	Damper blade	1.23	Locking spring
1.20	Joint head	1.24	Gas strut adjustment
1.21	Mounting bracket	9.3	Prop
1.22	Bolt		

- Provide access to the fire damper, either through cleaning openings or by removing the extract air duct.
- Close the damper blade and interrupt the voltage supply.
- Loosen the setting of the gas struts 1.24 on the console 1.21, see Detail A. To do this, remove the locking spring 1.23 and the bolt 1.22, see Details B and C.
- Open the fire damper and fix the damper blade 1.2, e.g. with support 9.3.1, see Detail D.
- Remove contamination from the damper blade and in the area where the blade moves.
- Hold the damper blade with your hand, then remove the prop. Slowly close the damper blade.
- Reinstall the gas struts, see p. 24.
- Check setting lever, gas struts etc. for correct seating.
- Close the cleaning openings or reconnect the extract air duct.
- Connect the power supply and carry out a functional test.



Once the bolt 1.22 has been removed, the shut-off unit can be swivelled over the closed position. A swing-through movement over the closed position can damage the damper and should be prevented.



## 13.3 Maintenance

Item to be checked	Interval			Required condition	Remedial action if necessary
	Before commissioning	Regularly	As required		
Access to the fire damper and inspection access panels	x			Internal and external accessibility	Provide access
Transport and installation protection	x			Transport/installation protection removed	Remove transport/installation protection
Installation of the fire damper	x			Installation into walls/ceiling slabs according to this manual, ↗ 21	Install the fire damper correctly.
Connection of duct/flexible connector	x			Connection according to this manual	Establish correct connection
Airflow direction with upright installation in ceiling slabs	x			Upward airflow with upright installation in ceiling slabs	Reinstall fire damper or change the airflow direction
Attachments	x	x		Firmly attached	Fix attachments
Check fire damper for damage	x	x		Fire damper intact	Repair or replace the fire damper.
Gas struts	x	x		Fixed and intact	Fix or replace gas struts, ↗ 23
Bolts, split pins and locking plate(s)	x	x		In place	Replace bolts, split pins and locking plate(s)
Locking (spring tab)	x	x		Easy to move	<ul style="list-style-type: none"> <li>■ Adjust the spring tab</li> <li>■ Lubricate the spring tab</li> </ul>
Locking plate	x	x		Intact	Replace the locking plate
Contamination	x	x	x	No contamination inside (no grease, no oil)	Clean the fire damper.
Seal	x	x		Perimeter seal under the scraper OK	Replace seal
Teflon seal (white)	x	x		Intact	Replace seal
Functional test with control module FSM 10, ↗ on page 57	x	x		<ul style="list-style-type: none"> <li>■ Damper blade is kept open by electromagnets</li> <li>■ Damper blade closes when triggered</li> <li>■ Spring tab bolt locks into the CLOSED position and locks the damper blade</li> </ul>	<ul style="list-style-type: none"> <li>■ Determine and eliminate the cause of the fault, adjust electromagnets if necessary</li> <li>■ If necessary, adjust the CLOSED position of the damper blade on the gas pressure absorber</li> <li>■ Repair or replace the fire damper.</li> </ul>

x = Required

+ = Recommended



Item to be checked	Interval			Required condition	Remedial action if necessary
	Before commissioning	Regularly	As required		
Functional test with electric blade opening actuator and control module FSM 1,  on page 59	x	x		<ul style="list-style-type: none"> <li>■ Damper blade is kept open by electromagnets</li> <li>■ Damper blade closes when triggered</li> <li>■ Spring tab bolt locks into the CLOSED position and locks the damper blade</li> <li>■ Control module FSM 1 displays operating status correctly (OPEN, CLOSED, operation)</li> <li>■ Electric blade opening actuator opens the damper blade</li> </ul>	<ul style="list-style-type: none"> <li>■ Determine and eliminate the cause of the fault, adjust electromagnets if necessary</li> <li>■ If necessary, adjust the CLOSED position of the damper blade on the gas pressure absorber</li> <li>■ Check supply voltage and electrical connections</li> <li>■ Replace electric blade opening actuator</li> <li>■ Repair or replace the fire damper.</li> </ul>
Function of limit switch OPEN	x	x		Fan is switched off unless the damper blade is fully open	<ul style="list-style-type: none"> <li>■ Adjust limit switch,  53</li> <li>■ Replace the limit switches</li> </ul>
Function of limit switch CLOSED	+	+		Function OK	
Function of the external signalling (damper blade position indicator)	+	+		Function OK	Determine and eliminate the cause of the fault

x = Required

+ = Recommended

## 14 Troubleshooting

If a fault occurs even though the electrical components have been correctly connected to control module FSM 10 or FSM 1, proceed according to the tables below.

Control module FSM 10		
Fault	Cause	Measure
Red TLR LED is illuminated.	<ul style="list-style-type: none"> <li>■ The push button "Close KA-EU" or DKT 2_2A is pressed.</li> <li>■ TLR 72 has been triggered; reset required.</li> <li>■ The cable between TLR 72 and FSM 10 has been cut.</li> <li>■ TLR 72 has not been connected.</li> </ul>	<ul style="list-style-type: none"> <li>■ Release push button.</li> <li>■ Reset TLR 72.</li> <li>■ Correct wiring.</li> <li>■ Connect TLR 72.</li> </ul>

Control module FSM 1		
Fault	Cause	Measure
LED "OPERATION" (green) does not light up.	<ul style="list-style-type: none"> <li>■ Check 230 V AC supply voltage on terminals 1, 2 and 3 of FSM 1.</li> </ul>	<ul style="list-style-type: none"> <li>■ Replace defective fuse. F1 4 A slow-blowing (230 V supply)</li> </ul>
Fire damper remains closed.	<ul style="list-style-type: none"> <li>■ Check fuse F3 on the PCB.</li> </ul>	<ul style="list-style-type: none"> <li>■ Replace defective fuse. F3 4 A fast-acting (actuator)</li> </ul>
Red 'Alarm' LED is illuminated. Fire damper remains closed.	<ul style="list-style-type: none"> <li>■ TLR 72 has been triggered.</li> <li>■ TLR 72 has not been connected, or has not been connected correctly. Remote triggering of terminal 26 and 27 is in the closed position. Push button DKT 2.2_A has been pushed.</li> </ul>	<ul style="list-style-type: none"> <li>■ Reset TLR 72.</li> <li>■ Connect TLR 72 correctly.</li> <li>■ Wire link or push button DKT 2.2_A is missing.</li> <li>■ Check DKT 2.2_A.</li> </ul>
Green OPEN LED is illuminated. Yellow CLOSED LED is illuminated. Fire damper remains closed.	<ul style="list-style-type: none"> <li>■ Limit switches for OPEN and CLOSED damper blade have not been connected.</li> </ul>	<ul style="list-style-type: none"> <li>■ Connect limit switches; adjust them, if necessary.</li> </ul>
Green OPEN LED is illuminated. Fire damper remains closed.	<ul style="list-style-type: none"> <li>■ Limit switch OPEN has been wired to the terminals for limit switch CLOSED.</li> </ul>	<ul style="list-style-type: none"> <li>■ Connect limit switch OPEN to the correct terminals (both wires).</li> </ul>
Yellow CLOSED LED is illuminated. The damper blade is OPEN. Green OPEN LED is illuminated.	<ul style="list-style-type: none"> <li>■ Limit switch CLOSED has not been connected.</li> </ul>	<ul style="list-style-type: none"> <li>■ Connect limit switch CLOSED to the correct terminals (both wires).</li> </ul>

Control module FSM 1		
Fault	Cause	Measure
LED "FAULT" (red) lights up for about 1 minute, then flashes.	<ul style="list-style-type: none"> <li>■ The direction of rotation of the actuator is wrong, which is why the setting lever has hit the wall or ceiling slab.</li> <li>■ The damper blade has opened and is protruding from the duct because the OPEN limit switch has not stopped the movement.</li> </ul>	<ul style="list-style-type: none"> <li>■ Both wires of the actuator are connected incorrectly on the terminals 20 and 21, connect the wires correctly, see Fig. 31 and Fig. 35</li> <li>■ Adjust limit switch OPEN, ↻ 53</li> </ul>
The fire damper opens but does not remain open.	<ul style="list-style-type: none"> <li>■ Shortly before the electromagnet(s) is(are) reached, the actuator is switched off via the OPEN limit switch.</li> <li>■ The electromagnet is not supplied with power.</li> </ul>	<ul style="list-style-type: none"> <li>■ Adjust limit switch OPEN.</li> <li>■ Check the wiring of the electromagnet / F2 800 mA fast-acting (electromagnet 230 V)</li> </ul>
The damper blade opens, remains briefly open, then closes again.	<ul style="list-style-type: none"> <li>■ Electromagnet(s) is(are) not fully reached.</li> </ul>	<ul style="list-style-type: none"> <li>■ Adjust electromagnets, ↻ 55</li> </ul>

## 15 Decommissioning, removal and disposal

### Final decommissioning

- Switch off the ventilation system.
- Switch off the power supply.

### Removal

#### **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.

1. ▶ Disconnect the wiring.
2. ▶ Remove the ducts.
3. ▶ Close the damper blade.
4. ▶ Remove the fire damper.

### Disposal

For disposal, the fire damper must be disassembled.

#### **ENVIRONMENT!**

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

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