



Smoke control damper

Type EK2-EU

according to EN12101-8

Declaration of Performance DoP / EK2-EU / 001



TROX[®] 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, instructed 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.

Copyright

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This applies in particular to:

- Publishing content
- Copying content
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- Saving content to electronic systems and editing it

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	www.troxtechnik.com
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.

Warranty claims

The provisions of the respective delivery terms apply to warranty claims. For purchase orders placed with TROX GmbH, these are the regulations in section "VI. Warranty claims" of the Delivery and Payment Terms of TROX GmbH, see www.trox.de/en/.

Safety notes

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

Comply with all safety instructions and proceed carefully to avoid accidents, injuries and damage to property.

DANGER!

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

WARNING!

Potentially hazardous situation which, if not avoided, may 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.

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. ▶ Loosen 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:

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	Warning – danger zone.

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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

Type EK2-EU smoke control dampers are used in heat and exhaust systems to remove smoke or heat and to supply air in case of an incident.

Daily use for room air change is possible within the described operating conditions (ambient temperature, humidity).

- Type EK2-EU smoke control dampers may be used with the following systems:
 - mechanical (i.e. powered) smoke exhaust systems
 - pressurisation systems (RDA), e.g. fire brigade hoists
 - heat exhaust systems
 - gas fire extinguishing systems
- Operation of smoke control dampers is allowed only in compliance with installation regulations and the technical data in this installation and operating manual.
- Modifying the smoke control damper or using replacement parts that have not been approved by TROX is not permitted.

New provisions regarding use have been added:

- Country-specific guidelines, directives and model regulations must be observed.
- Use in accordance with a fire protection concept that is based on the protection goal can authorise further installation options in air conditioning and ventilation systems as well.

Incorrect use

WARNING!

Danger due to incorrect use!

Incorrect use of the smoke control damper can lead to dangerous situations.

Never use the smoke control damper:

- in areas with potentially explosive atmospheres
- outdoors without sufficient protection against the effects of weather
- in atmospheres where chemical reactions, whether planned or unplanned, may cause damage to the smoke control damper or lead to corrosion

1.3 Qualified staff

WARNING!

Danger of injury due to insufficiently qualified individuals!

Incorrect use may cause considerable injury or damage to property.

- Only specialist personnel must carry out work.

Personnel:

- Skilled qualified electrician
- Specialist personnel

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.

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	200 × 200 – 1500 × 800 mm
Volume flow rate range	up to 12000 l/s up to 43200 m³/h
Differential pressure range	Pressure level 3, –1500 to 500 Pa
Operating temperature	-30 °C...50 °C the temperature should not fall below the dew point
Upstream velocity ¹	≤ 10 m/s with the maximum size >10...15 m/s with smaller sizes, up to 43,200 m³/h
Closed blade air leakage	EN 1751, at least class 3
Casing air leakage	EN 1751, Class C
EC conformity	<ul style="list-style-type: none"> ■ EU Construction Products Regulation no. 305/2011 ■ EN 12101-8 – Smoke and heat control systems – Smoke control dampers ■ EN 1366-10 – Fire resistance tests for service installations – Smoke control dampers ■ EN 1366-2 – Fire resistance tests for service installations – Part 2: Fire dampers ■ EN 13501-4 – Fire classification of construction products and building elements – Fire resistance tests on components of smoke control ■ EN 1751 – Ventilation for buildings – Air terminal devices
Declaration of performance	DoP/EK2-EU/001

1) If there is a guarantee that actuation does not occur over 10 m/s (change of damper blade position, leaving of end position), the smoke control damper can be used up to its maximum dimensions with an upstream velocity of 15 m/s.

Rating plate



Fig. 1: Product sticker (example)

- | | | | |
|---|--|----|---|
| 1 | Type | 7 | Manufacturer's address and website from which the DoP can be downloaded |
| 2 | No. of the declaration of performance | 8 | CE mark |
| 3 | Number of the European standard and year of its publication | 9 | The last two digits of the year in which the CE marking was affixed |
| 4 | Regulated characteristics; the fire resistance class depends on the application and may vary | 10 | Order code |
| 5 | Notified body | 11 | Order number |
| 6 | Year of manufacture | | |

2.2 Dimensions and weight

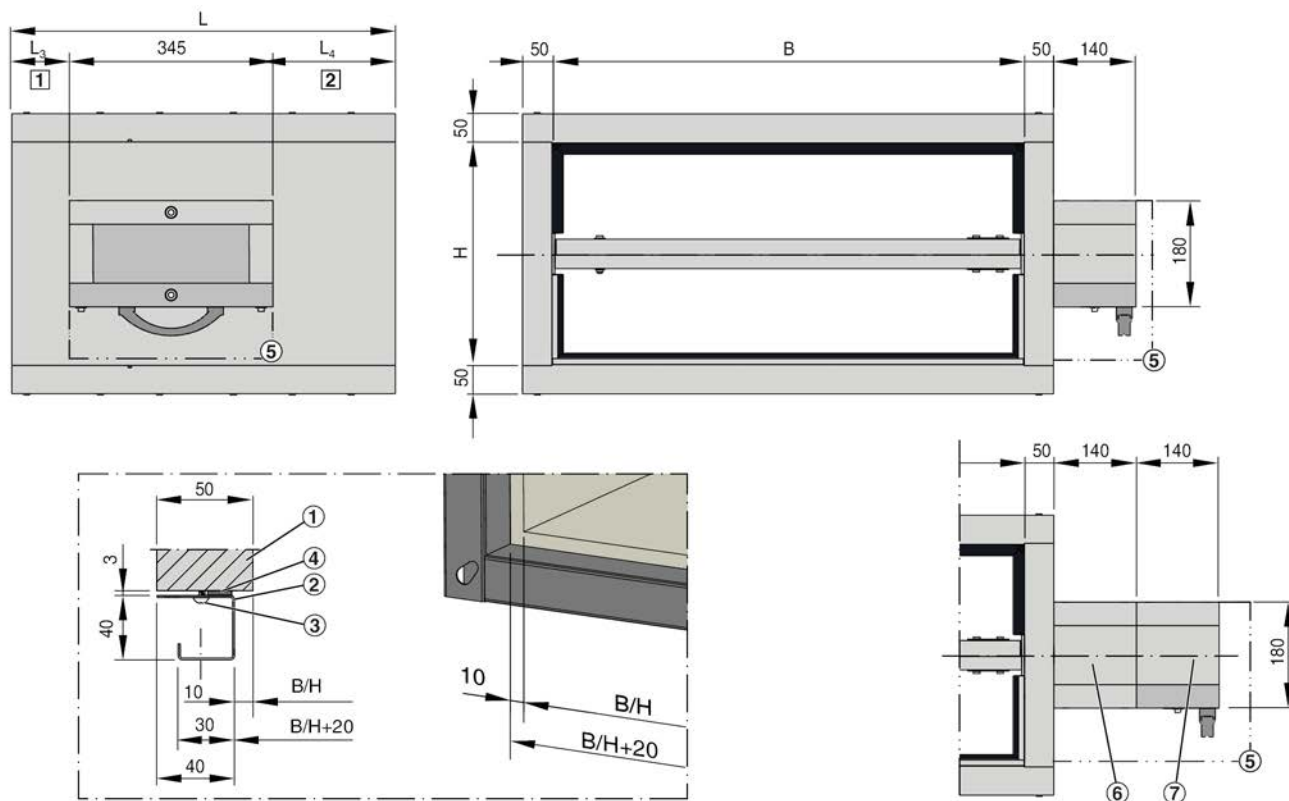


Fig. 2: EK2-EU size S

- 1 Operating side
- 2 Installation side
- ① EK2-EU
- ② Connecting subframe (optional)
- ③ Fixing screw
- ④ Seal
- ⑤ Keep clear to provide access to the actuator encasing Fig. 4
- ⑥ Actuator encasing
- ⑦ Module encasing

Dimensions [mm]				
Size	H	L	L ₃	L ₄
S	200...380	650 (only without inspection access panel)	97	208
		750 (with inspection access panel)	197	208

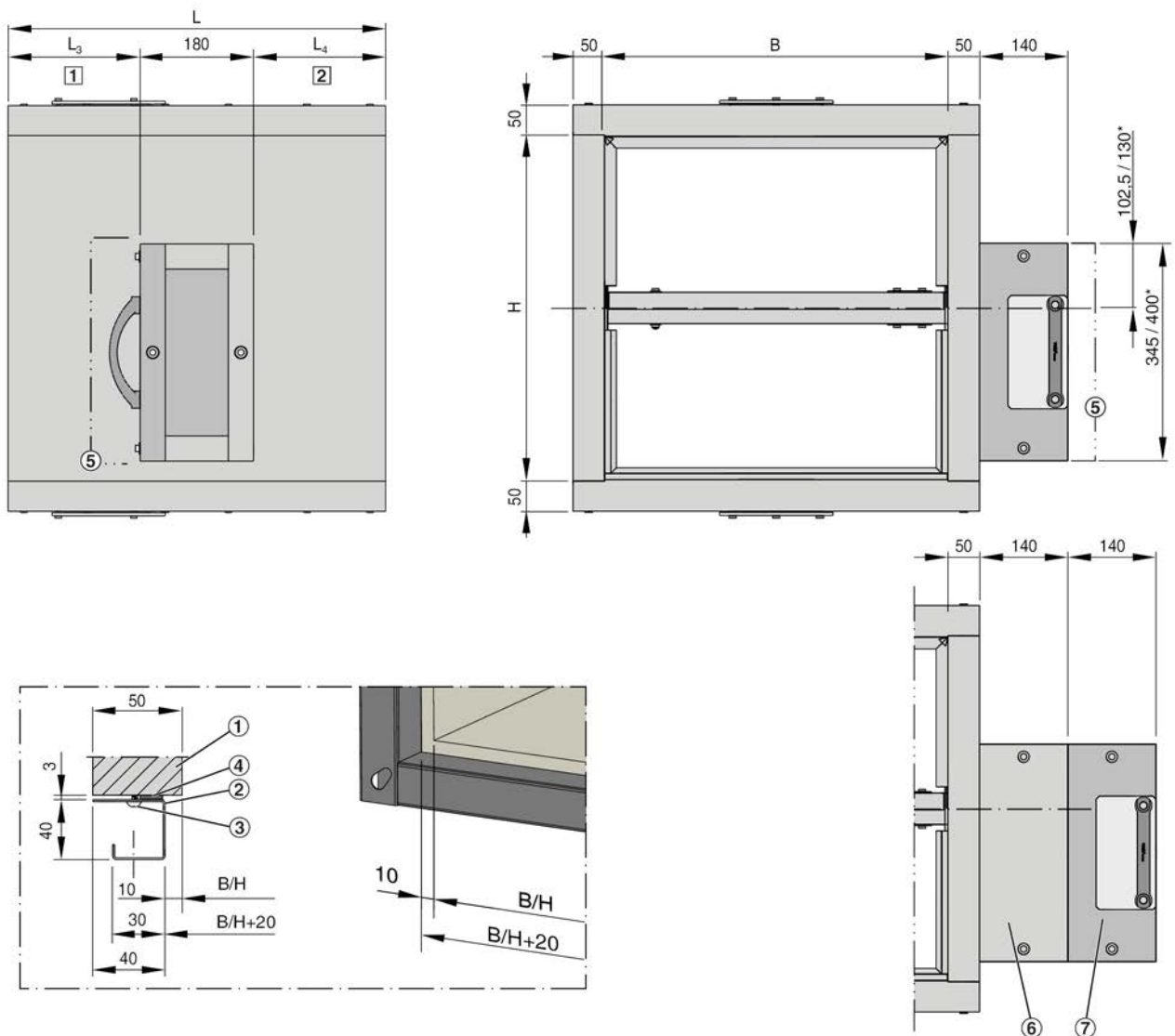


Fig. 3: EK2-EU size M and L

- 1** Operating side
- 2** Installation side
- * For size L, the actuator/module encasing is supplied in two versions, depending on the drive required. For 15 Nm and 25 Nm (small), for 40 Nm (large).
- ① EK2-EU
- ② Connecting subframe (optional)
- ③ Fixing screw
- ④ Seal
- ⑤ Keep clear to provide access to the actuator encasing Fig. 4
- ⑥ Actuator encasing
- ⑦ Module encasing

Dimensions [mm]				
Size	H	L	L ₃	L ₄
M	385...545	600	210	210
L	550...800	800	310	310

Weights [kg] (standard lengths)																
Size	H [mm]	L [mm]	B [mm]													
			200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
S	200	650	31	36	41	46	51	55	60	65	70	75	80	84	89	94
	250		33	39	44	49	54	59	64	69	74	79	84	89	94	99
	300		36	41	47	52	57	62	67	72	77	83	88	93	98	103
	380		38	44	49	55	60	65	71	76	81	86	92	97	102	108
M	400	600	39	44	49	55	60	65	70	75	81	86	91	96	101	107
	450		41	47	52	57	63	68	73	79	84	90	95	100	106	111
	500		44	49	55	60	66	71	77	82	88	93	99	104	110	116
	545		46	51	57	63	69	74	80	86	91	97	103	108	114	120
L	600	800	60	67	74	81	88	96	103	110	117	124	131	138	146	153
	650		63	70	77	85	92	99	107	114	121	129	136	143	150	158
	700		66	73	81	88	96	103	110	118	125	133	140	148	155	163
	750		69	76	84	91	99	107	114	122	130	137	145	153	160	168
	800		72	79	87	95	103	110	118	126	134	142	150	157	165	173

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:

- Smoke control damper(s)
 - Attachments/accessories, if any
- Installation and operating manual (one per shipment)



Fixing and installation material

Fixing and installation material is not part of the supply package (unless stated otherwise), but has to be provided by others; it has to be suitable for the installation situation.

Transport on site

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

Transport protection devices

The EK2-EU is delivered with cardboard transport protection that stabilises the casing during transport and installation. Only remove the transport protection after the installation work has been completed or, in the case of mortar-based installation, only after the mortar has cured.

Bearing

For temporary storage please note:

- Remove 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).
- Storage temperature: -30 °C to 50 °C, no condensation.

Packaging

Properly dispose of packaging material.

4 Parts and function

Smoke control dampers are used in mechanical smoke extract systems. They are used for extracting smoke gases and for providing additional supply air to one or more fire compartments.

Smoke control dampers are made from calcium silicate boards, and the electric actuator and the optional control module are encased so that the functional reliability is ensured even in the event of a fire.

Regular maintenance of the smoke control damper is required to ensure its functional reliability ↪ 9 'Maintenance' on page 54 .

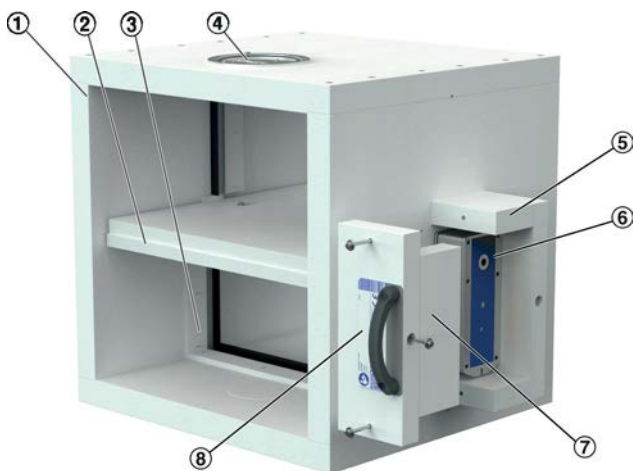


Fig. 4: Smoke control damper EK2-EU

- ① Casing
- ② Damper blade
- ③ Travel stop
- ④ Inspection access (optional)
- ⑤ Actuator encasing
- ⑥ Actuator
- ⑦ Cover of the actuator encasing (open)
- ⑧ Rating plate

Smoke extract

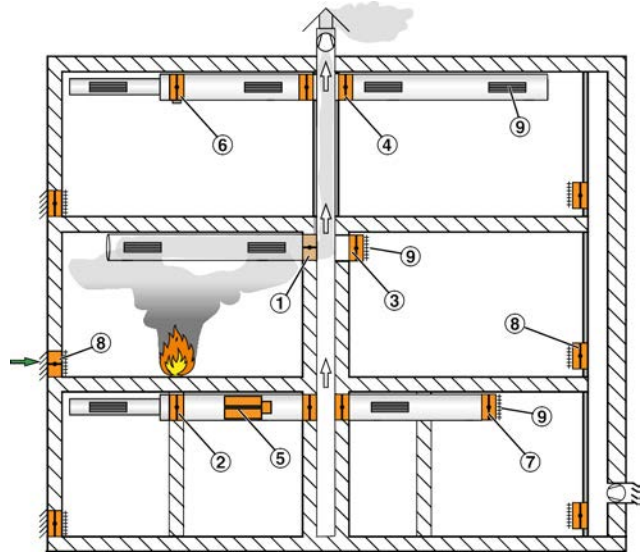


Fig. 5: Smoke extract system

- ① EK2-EU in a solid shaft wall
- ② EK2-EU in a solid wall and a duct
- ③ EK-JZ on a vertical solid shaft wall
- ④ On a vertical smoke extract duct (shaft)
- ⑤ On a horizontal smoke extract duct
- ⑥ In a horizontal smoke extract duct
- ⑦ At the end of a horizontal smoke extract duct
- ⑧ EK2-EU as additional supply air inlet
- ⑨ Cover grilles

During normal operation, Type EK2-EU smoke control dampers remain closed. For smoke extract, the smoke control dampers in the affected fire compartment open so that smoke can be extracted. All other smoke control dampers remain closed.

In the event of a fire, smoke control dampers that are used as additional supply air inlets in the affected fire compartment also open so that smoke can be extracted. To ensure the creation of a layer that is nearly free from smoke, smoke control dampers used as additional supply air inlets should be installed near the ground.

The control input signal for the actuator may come from a duct smoke detector or from the central fire alarm system. Using cables with specific circuit integrity for the supply voltage ensures that the actuator is supplied with voltage even in the event of a fire and hence that its function and the communication are maintained.

Supply air and smoke extraction in ventilation systems

When authorised by building authorities or authorised bodies, smoke extract and supply air applications as well as ventilation can be enabled in combined systems with smoke control dampers. Depending on the system layout, the damper blade can be fully opened, fully closed or in the intermediate position. Depending on where the dampers are installed, country-specific regulations may apply to ventilation applications.

5 Installation

5.1 Installation situations

The overview of all possible installation types of the smoke control damper EK2-EU are listed in the declaration of performance; they can be downloaded from the TROX homepage.

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!

Be careful to not damage the smoke control damper

- Protect the smoke control damper from contamination and damage.
- Cover the flange openings and the actuator (e.g. with plastic) to protect them from mortar and dripping water.

Please note:

- Smoke control damper and electric actuator (encasing) must remain accessible for maintenance.
- Make sure that no loads are imposed on the casing as this may impair the function of the smoke control damper.
- Install the smoke control damper without torsion (horizontal/vertical).
- Mortar-based installation: The perimeter gap »s« must be large enough so that mortar can be filled in even in case of thicker walls.

Requirements for wall and ceiling systems

EK2-EU smoke control dampers may be installed in wall and ceiling systems if these walls and ceilings have been erected in compliance with the relevant regulations and according to the manufacturers' instructions, and if the information on the respective installation situation applies and the following requirements are met.

Provide any installation openings according to the installation details in this manual.

Solid walls or solid shaft walls

- Solid walls or solid shaft walls made of, for example, concrete, aerated concrete or bricks, gross density $\geq 500 \text{ kg/m}^3$.
- Wall thickness $W \geq 100 \text{ mm}$.
- Provide each installation opening according to the local and structural conditions and with regard to the dimensions of the smoke control damper.

Solid ceiling slabs

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density $\geq 500 \text{ kg/m}^3$.
- Ceiling thickness $D \geq 150 \text{ mm}$.
- Provide each installation opening according to the local and structural conditions and with regard to the dimensions of the smoke control damper.

Lightweight partition walls with metal support structure

- Lightweight partition wall with metal support or steel support structure, with European classification to EN 13501-2 or equivalent national classification.
- Cladding on both ends made from plasterboard fire barriers.
- Wall thickness $W \geq 100 \text{ mm}$.
- $\leq 625 \text{ mm}$ distance between metal studs.
- Create an installation opening with studs.
- If necessary, provide trim panels and screw-fix them to the support structure.
- Additional layers of cladding (if stated in the usability certificate for the wall) and double stud constructions are approved.
- Connect the metal sections near the installation opening according to the installation details in this manual.

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 should be equal to the thickness of the wall but must be at least 100 mm.

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

Mineral wool as filling material

Unless otherwise stated in the installation details, mineral wool with a gross density of $\geq 80 \text{ kg/m}^3$ and a melting point of $\geq 1000 \text{ }^\circ\text{C}$ must be used.

High-temperature sealing tape

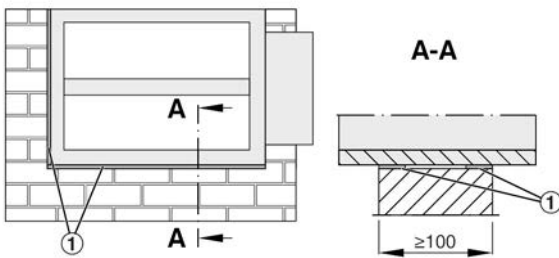


Fig. 6: Affixing the sealing tape

Affix the high-temperature sealing tape (Fig. 6 /1) with trim panel thickness (flush at front and rear) to the damper frame (if necessary, mark the trim panel thickness beforehand).

Permitted use (depending on installation situation)

- Lower installation gap
- Side installation gap

The high temperature sealing tape (melting point $1200 \text{ }^\circ\text{C}$) can be ordered as an accessory.

5.3.1 Installation position

The smoke control damper can be installed so that the damper blade shaft is horizontal or vertical. The position of the actuator is not critical but it must remain accessible for maintenance.

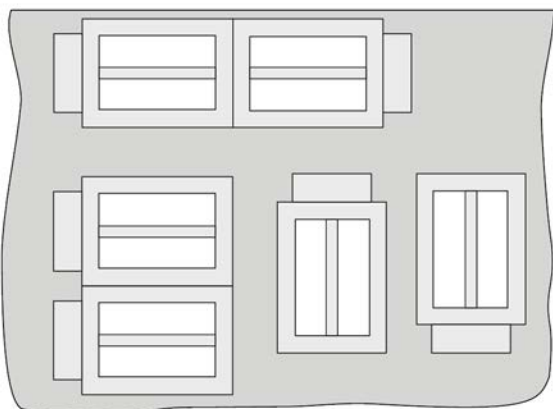


Fig. 7: Blade shaft horizontal or vertical

5.3.2 Adjoined damper installation

Side by side

The casings are screwed in to the vertical H parts (opposite the actuator encasing) on both sides of the damper (installation and operating side).

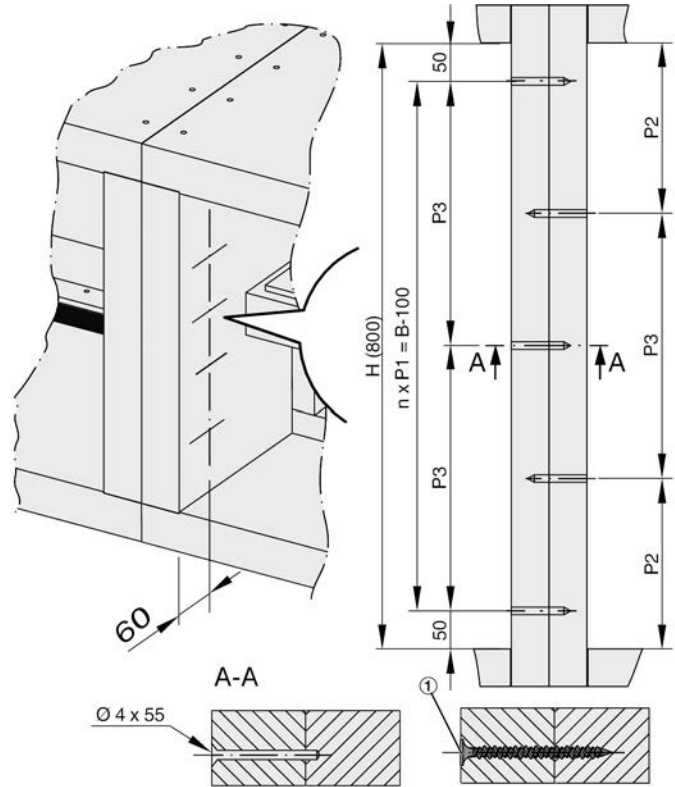


Fig. 8: EK2-EU side by side

- 1 m x dry wall screw $6 \times 80 \text{ mm}$ (by others)
- n $H - 100 / 200$ (round up if necessary)
- P1 $H - 100 / n$ ($\leq 200 \text{ mm}$)
- P2 $P1 + 50$
- P3 $P1 \times 2$
- m $n + 1$ (number of screws)

Calculation example:

- H = 800 mm
- n = $800 - 100 / 200 = 3.5 \rightarrow 4$
- P1 = $800 - 100 / 4 = 175 \text{ mm}$
- P2 = $175 + 50 = 225$
- P3 = $175 \times 2 = 350$
- m = $4 + 1 = 5$

On top of each other

The casings are screwed in to the horizontal B parts on both sides of the damper (installation and operating side).

Insert screws both from the top damper and from the bottom damper; do not insert all screws in one line, but pre-drill in an offset pattern.

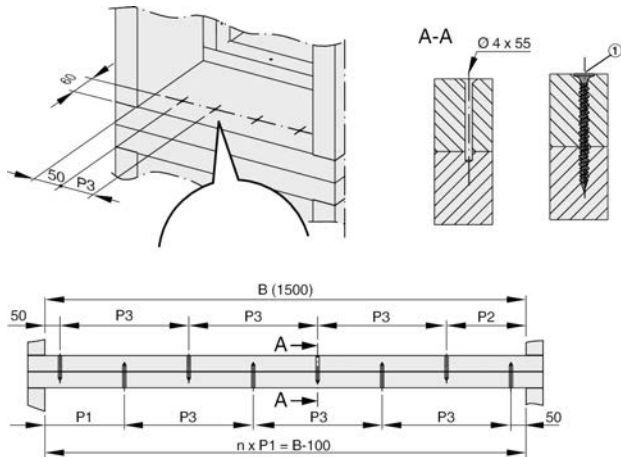


Fig. 9: EK2-EU on top of each other

- 1 m × dry wall screw 6 × 80 mm (by others)
- n B - 100 / 200 (round up if necessary)
- P1 B - 100 / n (≤200 mm)
- P2 P1 + 50
- P3 P1 × 2
- m n + 1 (number of screws)

Calculation example:

$$B = 1500 \text{ mm}$$

$$n = 1500 - 100 / 200 = 7$$

$$P1 = 1500 - 100 / 7 = 200 \text{ mm}$$

$$P2 = 200 + 50 = 250$$

$$P3 = 200 \times 2 = 400$$

$$m = 7 + 1 = 8$$

5.3.3 Installation opening

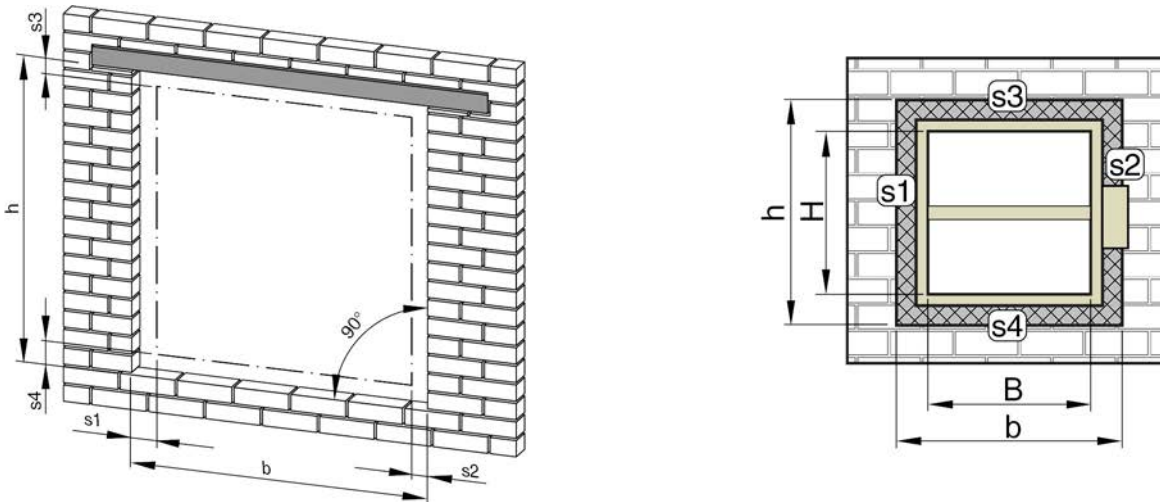


Fig. 10: Ideal installation opening

B Rated dimension, width EK2-EU
b Width of installation opening

H Rated dimension, height EK2-EU
h Height of installation opening

Calculation of installation opening

$$b = (B + 100 \text{ mm}) + S1 + S2$$

$$h = (H + 100 \text{ mm}) + S3 + S4$$

The dimensions for the installation gaps S1 – S4 can be found in the respective installation descriptions.

Adapting the installation opening in solid walls and shaft walls

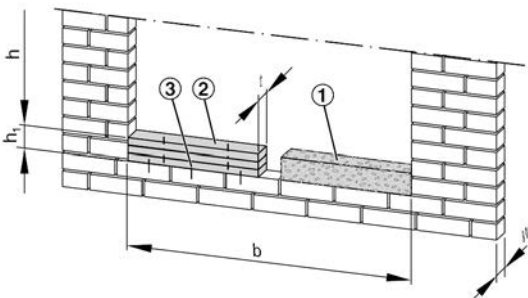


Fig. 11: Installation opening with concrete or calcium silicate boards for height adjustment

$t = W$ (100 mm min., 250 mm max.)

h_1 See Table

To adapt the height of the installation opening you can fill in concrete (Fig. 11 /1) or calcium silicate boards (Fig. 11 /2) at the bottom.

Be sure to attach the boards to each other and also to attach them to the brick structure. To do so, use glue or screws (Fig. 11 /3); screws should be at ≤ 200 mm from each other.

Boards	Thickness [mm]	h_1 [mm]
Promatect LS	35	35 - 210
Promatect H	25	25 - 200
Promatect H	10 - 20	10 - 100

Glue: Promat K84

Additional information upon request.

5.3.4 After installation

- Remove the transport protection device (in case of mortar-based installation, do this after the mortar has cured)
- Clean the smoke control damper.
- Carry out functional test. ⚡ 53
- Connect the smoke extract duct.
- Make electrical connections.

Boards	Thickness [mm]	h_1 [mm]
Promatect MT	40	40 - 200

5.4 Supporting construction – solid walls

5.4.1 Dry mortarless installation

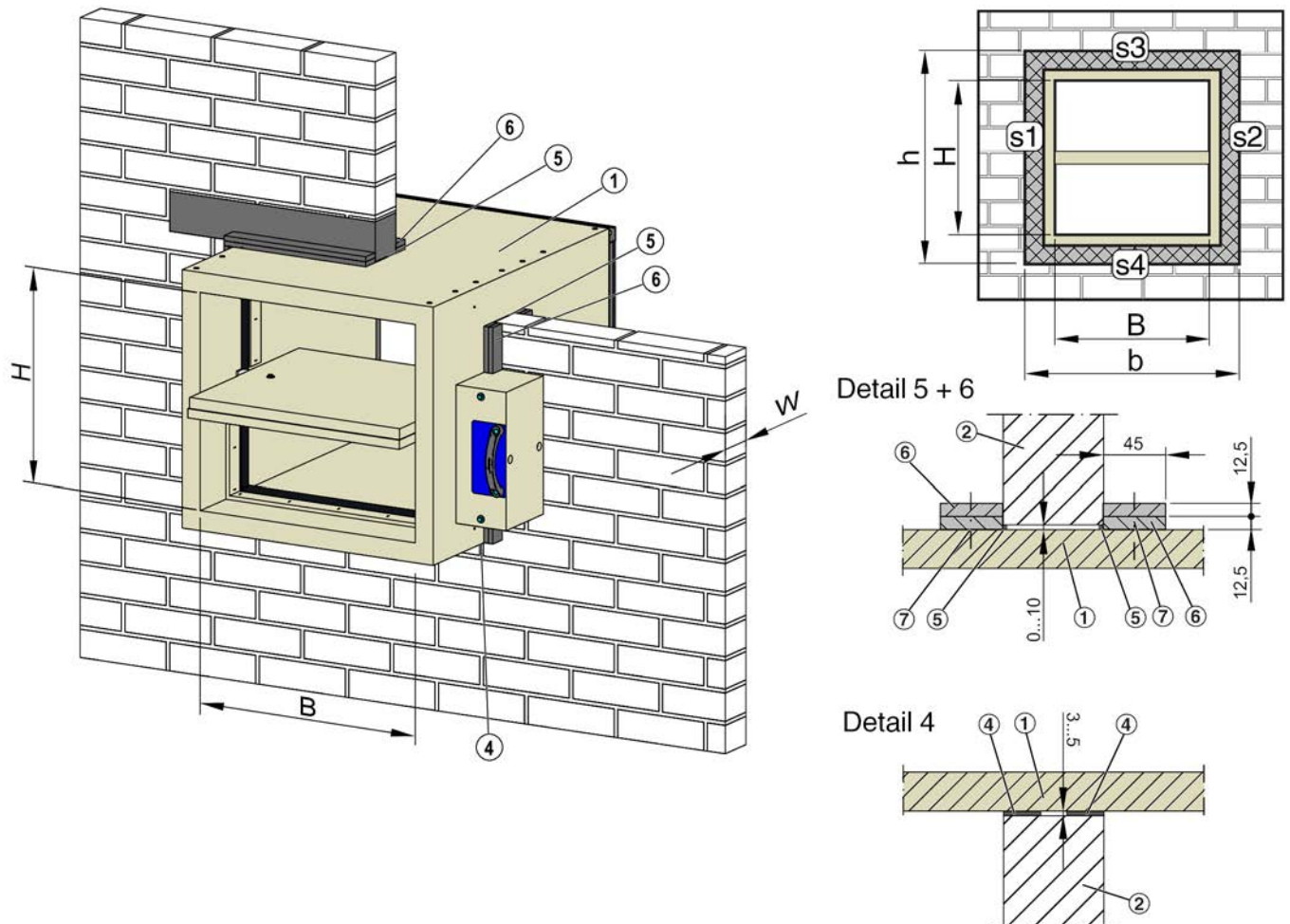


Fig. 12: Dry mortarless installation in solid wall, installation variant b, classification index: v_{ew}

- ① EK2-EU, vertical or horizontal installation position
- ② Solid wall made of brick, concrete or aerated concrete
- ④ High-temperature sealing tape
- ⑤ Fire protection acrylic bead
- ⑥ Annular gap cover, 2 pieces, 12.5 x 45 mm
- ⑦ Steel wire clip
- W Wall thickness ≥ 100 mm

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
a	EI90...S	Annular gap cover	Annular gap cover	Annular gap cover	Annular gap cover
b	EI90...S	Annular gap cover	Annular gap cover	Annular gap cover	HT sealing tape
c	EI90...S	HT sealing tape	Annular gap cover	Annular gap cover	HT sealing tape
days	EI90...S	Annular gap cover	HT sealing tape	Annular gap cover	HT sealing tape

* Part of the classification key

HT sealing tape = high-temperature sealing tape, \Rightarrow detail 4

Annular gap cover = annular gap cover on both sides of the wall, \Rightarrow detail 5 + 6

Personnel:

- Specialist personnel

Materials:

- High-temperature sealing tape ↗ *'High-temperature sealing tape' on page 14*
- For annular gap cover: PROMATECT®-H fire protection board d = 25 mm or strips of plasterboard 2 x 12.5 mm x 45 mm
- Steel staples 63/11.2/1.53 mm
- Fire protection acrylic

Requirements:

- Solid walls,

**Installation alternatives outside the wall**

To prevent sleeve joints between the damper and the duct in the wall, the damper can alternatively be placed outside the wall in the flow of the approved smoke extract duct ↗ 5.7 *'Fire-resistant smoke extract ducts' on page 31*.

Create an appropriate opening

1. ▶ Create an installation opening according to Fig. 12 .

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$

Example: B x H = 1200 x 750 mm, s1 = 5 mm, s2 = 5 mm, S3 = 10 mm, s4 = 3 mm

- $b = 1200 + 100 + (5 + 5 \text{ mm}) = 1310 \text{ mm}$
- $h = 750 + 100 + (10 + 3 \text{ mm}) = 863 \text{ mm}$

2. ▶

**In case of installation variant b, c, d**

Stick the high-temperature sealing tape on the damper housing in the trim panel thickness on the damper housing, ⇒ detail 4, ↗ *'High-temperature sealing tape' on page 14*

Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length L 1/2, centred in the wall.

3. ▶ Create the installation gap "s" according to the installation variant; see the table above.

Making the annular gap cover ⇒ detail 5 + 6

Before fitting the annular gap cover, seal the installation gap with fire protection acrylic on both sides of the wall. Fix the annular gap cover to the damper casing on both sides of the wall with steel wire clips.

Connecting the smoke extract duct to EK2-EU

4. ▶ ↗ 6 *'Smoke extract duct and cover grille' on page 40*
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.4.2 Wet-dry mortarless installation

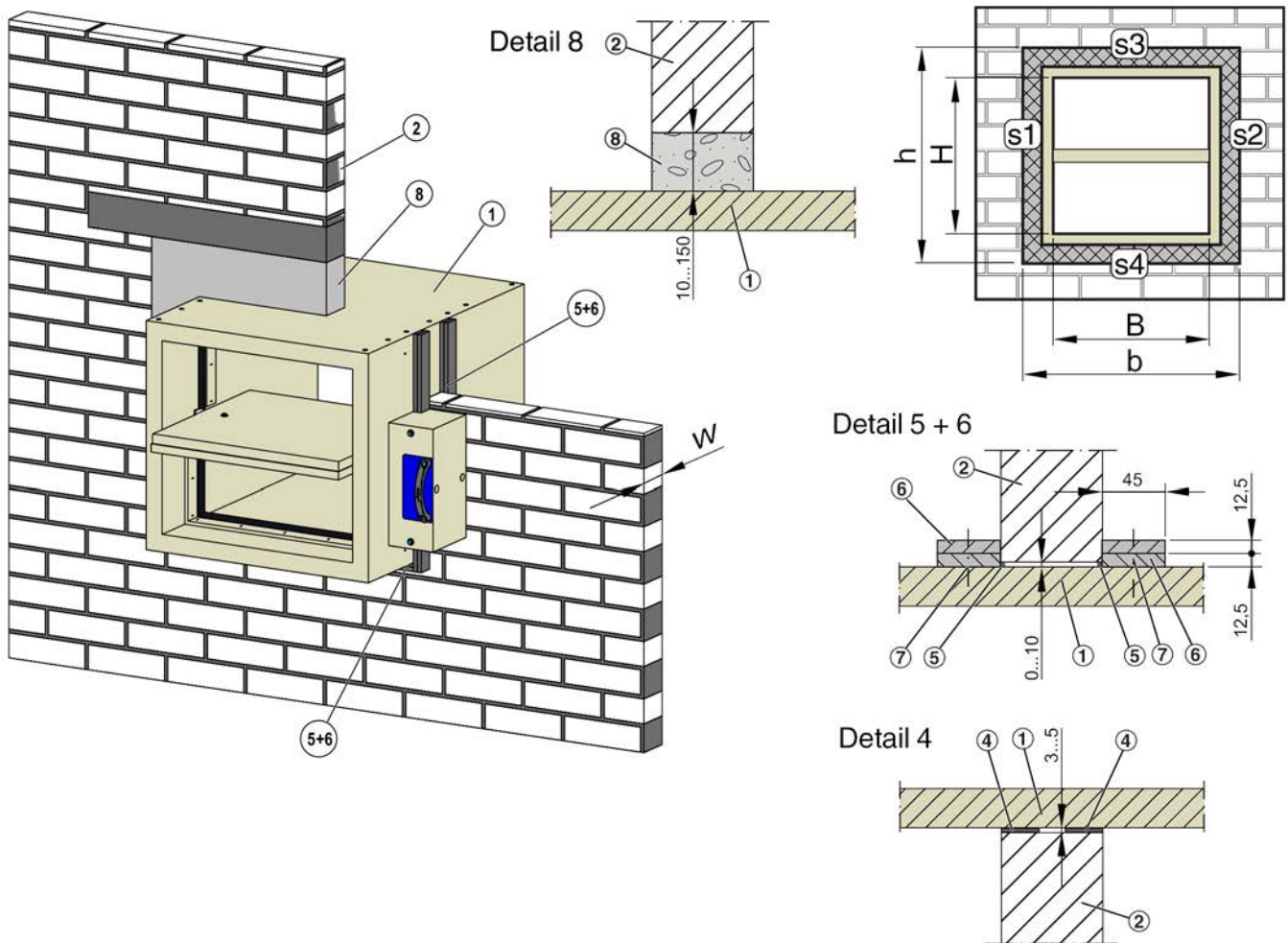


Fig. 13: Wet-dry mortarless installation in solid wall, installation variant 2a, classification index: v_{ew}

- ① EK2-EU, vertical or horizontal installation position
- ② Solid wall made of brick, concrete or aerated concrete
- ④ High-temperature sealing tape
- ⑤ Fire protection acrylic bead
- ⑥ Annular gap cover, 2 pieces, 12.5 x 45 mm
- ⑦ Steel wire clip
- ⑧ Mortar
- W Wall thickness ≥ 100 mm

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
2a	EI90...S	Mortar	Annular gap cover	Mortar	Annular gap cover
2b	EI120...S	Mortar	HT sealing tape	Mortar	HT sealing tape
2c	EI90...S	Mortar	HT sealing tape	Mortar	Annular gap cover
2d	EI90...S	Mortar	Annular gap cover	Mortar	HT sealing tape
3a	EI120...S	Mortar	Mortar	Mortar	HT sealing tape

* Part of the classification key

HT sealing tape = high-temperature sealing tape, \Rightarrow detail 4

Annular gap cover = annular gap cover on both sides of the wall, \Rightarrow detail 5 + 6

Mortar = close off installation gap with mortar, \Rightarrow detail 8

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
3b	EI90...S	Mortar	Mortar	Mortar	Annular gap cover
4	EI180...S	only possible in connection with an additional housing insulation (doubling) of $t \geq 20 \times H = 100 \times L$. Additional information upon request			

* Part of the classification key

HT sealing tape = high-temperature sealing tape, \Rightarrow detail 4

Annular gap cover = annular gap cover on both sides of the wall, \Rightarrow detail 5 + 6

Mortar = close off installation gap with mortar, \Rightarrow detail 8

Personnel:

- Specialist personnel

Materials:

- High-temperature sealing tape \hookrightarrow 'High-temperature sealing tape' on page 14
- For annular gap cover: PROMATECT®-H fire protection board $d = 25$ mm or strips of plasterboard 2×12.5 mm \times 45 mm
- Steel staples 63/11.2/1.53 mm
- Fire protection acrylic
- Mortar \hookrightarrow 'Acceptable mortars for mortar-based installation' on page 13

Requirements:

- Solid walls,

Create an appropriate opening

- ▶ Create an installation opening according to Fig. 13 .

Installation opening $b \times h$:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$

Example: $B \times H = 1200 \times 750$ mm, $s1 = 50$ mm, $s2 = 5$ mm, $s3 = 100$ mm, $s4 = 5$ mm

- $b = 1200 + 100 + (50 + 5 \text{ mm}) = 1355$ mm
- $h = 750 + 100 + (100 + 5 \text{ mm}) = 955$ mm

- ▶



In case of installation variant 2b, 2c, 2d, 3b

Stick the high-temperature sealing tape on the damper housing in the trim panel thickness on the damper housing, \Rightarrow detail 4, \hookrightarrow 'High-temperature sealing tape' on page 14

Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length $L/2$, centred in the wall.

- ▶ Create the installation gap "s" according to the installation variant; see the table above.

Making the annular gap cover \Rightarrow detail 5 + 6

Before fitting the annular gap cover, seal the installation gap with fire protection acrylic on both sides of the wall. Fix the annular gap cover to the damper casing on both sides of the wall with steel wire clips.

Mortar \Rightarrow detail 8

Close off the perimeter gap "s" (2 or 3) completely with mortar depending on the installation variant. The mortar bed depth must be at least 100 mm.

Connecting the smoke extract duct to EK2-EU

- ▶ \hookrightarrow 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.4.3 Mortar-based installation

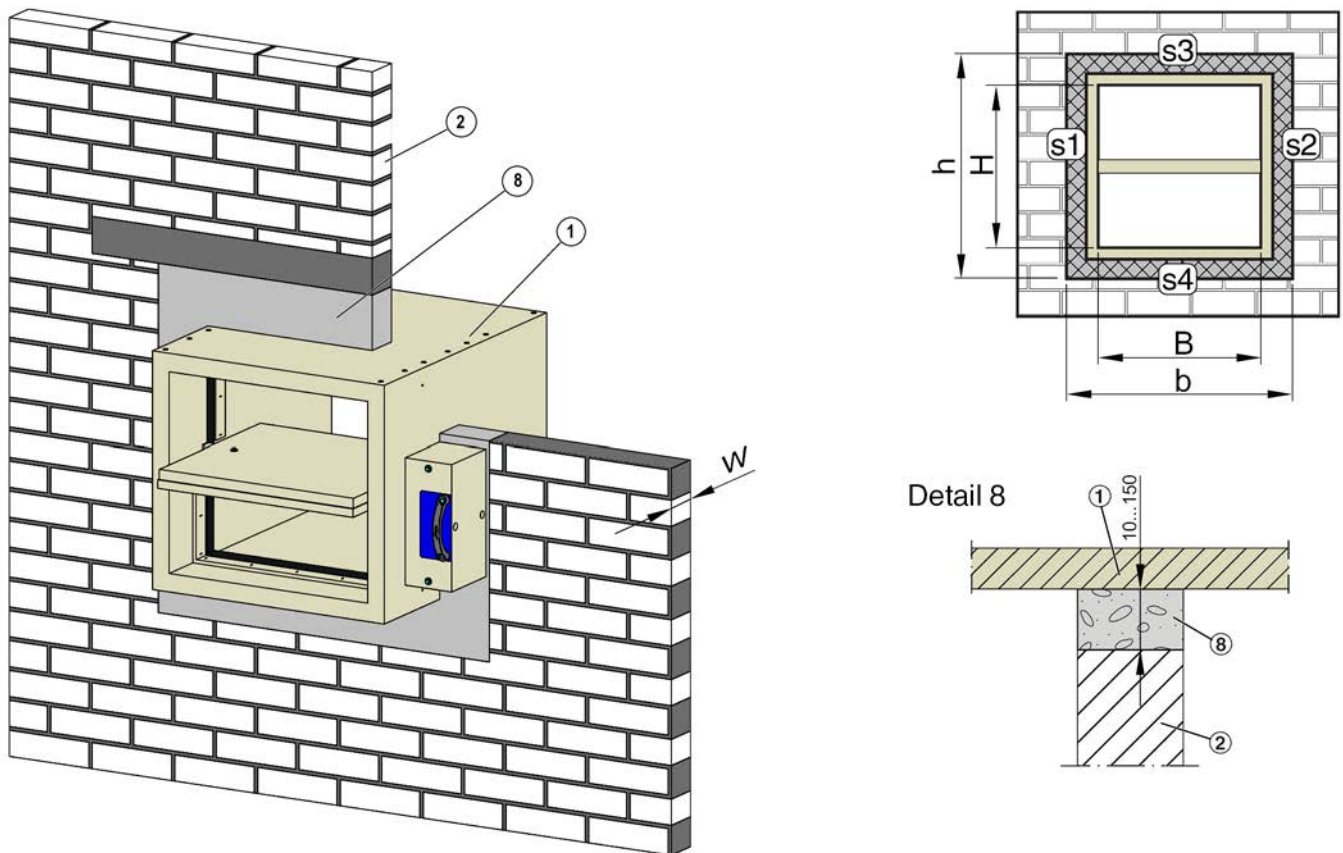


Fig. 14: Wet-dry mortarless installation in solid wall, installation variant a, classification index: v_{ew}

- ① EK2-EU, vertical or horizontal installation position
- ② Solid wall made of brick, concrete or aerated concrete
- ⑧ Mortar
- W Wall thickness ≥ 100 mm

i Recommended

We recommend the use of wall connectors for installation with mortar.

Wall connectors can be ordered as accessories.

Screw the wall connector to the damper casing with dry wall screws $\varnothing 6 \times 30$ mm (by others); pre-drill with $\varnothing 3 \times 25$ mm.

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
a	EI120...S	Mortar	Mortar	Mortar	Mortar

* Part of the classification key

Mortar = close off installation gap with mortar, \Rightarrow detail 8

Personnel:

- Specialist personnel

Materials:

- Mortar ↪ *'Acceptable mortars for mortar-based installation'* on page 13

Requirements:

- Solid walls,

Create an appropriate opening

1. ▶ Create an installation opening according to Fig. 14 .

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$

Example: B x H = 1200 x 750 mm, s1 = 50 mm, s2 = 50 mm, S3 = 50 mm, s4 = 50 mm

- $b = 1200 + 100 + (50 + 50 \text{ mm}) = 1400 \text{ mm}$
- $h = 750 + 100 + (50 + 50 \text{ mm}) = 950 \text{ mm}$

2. ▶ Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length L 1/2, centred in the wall.

3. ▶ **Mortar** ⇒ **detail 8**

Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 100 mm.

Connecting the smoke extract duct to EK2-EU

4. ▶ ↪ 6 *'Smoke extract duct and cover grille'* on page 40

Follow the manufacturer's instructions of the smoke extract duct here as well.

5.5 Supporting construction – solid ceiling slabs

5.5.1 Mortar-based installation

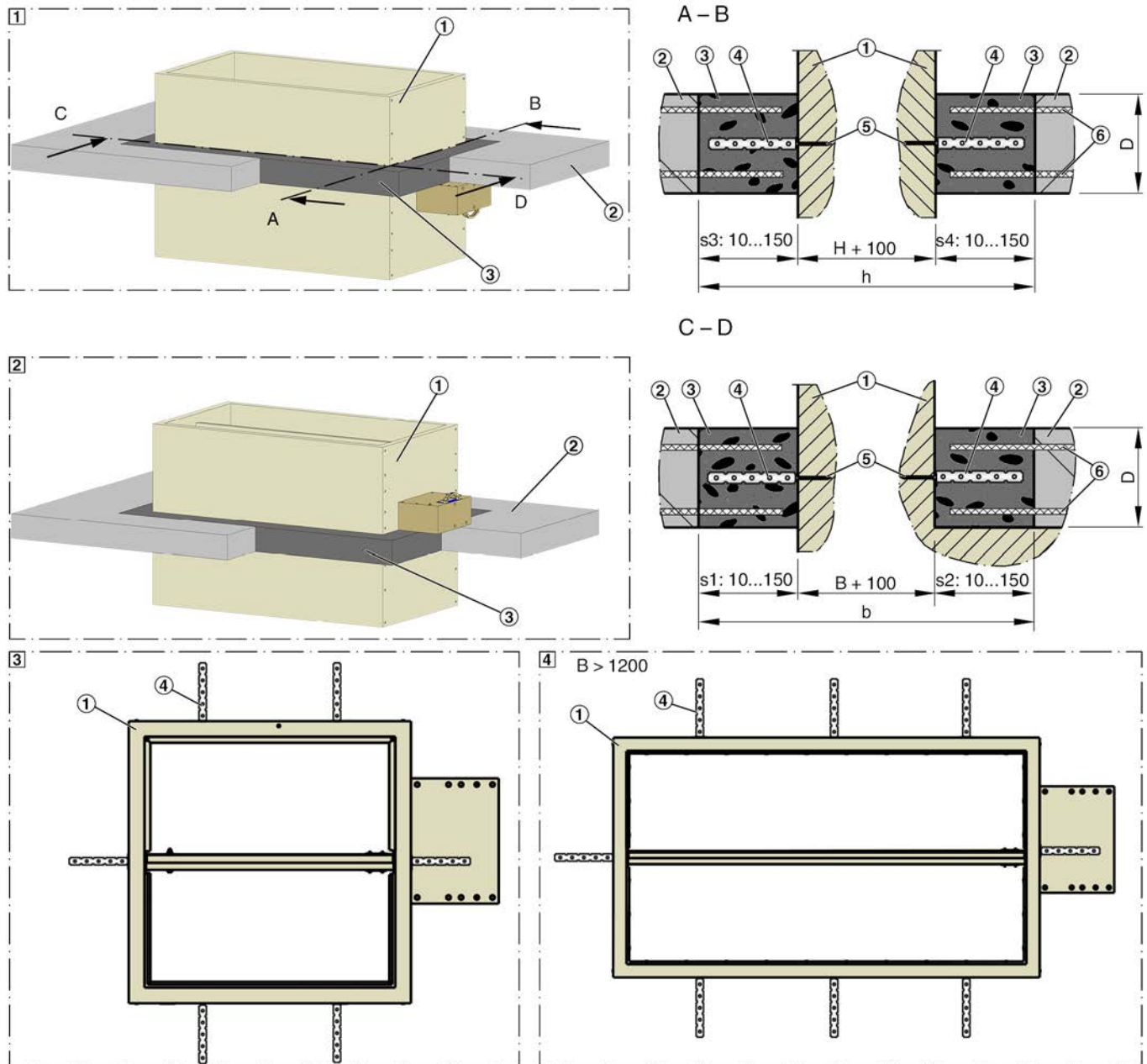


Fig. 15: Mortar-based installation in solid ceiling slab, classification index: h_{ow}

- | | | | |
|---|---|--------------|--|
| 1 | EK2-EU, actuator encasing underneath ceiling slab | 4 | Wall connectors (available as accessories) |
| 2 | EK2-EU, actuator encasing above ceiling slab | 5 | Dry wall screw $\varnothing 6 \times 30$ mm (by others); pre-drill with $\varnothing 3 \times 25$ mm |
| 3 | Arrangement of wall connectors $B \leq 1200$ mm | 6 | Reinforcement irons for connecting the mortar bed to the ceiling slab (by others) |
| 4 | Arrangement of wall connectors $B > 1200$ mm | | |
| 1 | EK2-EU | | |
| 2 | Solid ceiling slab | $B \times H$ | Nominal size (damper cross section, inside) |
| 3 | Mortar | $b \times h$ | Installation opening |
| | | $s1-s4$ | Perimeter gap 10...150 mm |
| | | D | Ceiling thickness ≥ 150 mm |

Personnel:

- Specialist personnel

Materials:

- Mortar ↪ 'Acceptable mortars for mortar-based installation' on page 13

- Dry wall screws 4 × 40 mm

Requirements:

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density $\approx 600 \text{ kg/m}^3$ and $D \geq 150 \text{ mm}$
- ▶ Create an installation opening according to Fig. 15 .

DANGER!

Danger of displacement due to the falling of the damper

Secure the damper against falling with suitable means!

In addition to attaching the wall connectors to the damper, we recommend providing a connection reinforcement for the connection of the mortar bed to the ceiling slab to prevent the damper from falling. If no reinforcement is present, it can be inserted into the ceiling slab trim panel at a later date.

Alternatively, the damper can also be secured against falling with brackets or means suspensions from the ceiling slab.

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$


$s \leq 10 \dots 150 \text{ mm}$, leave enough space for mortaring of the perimeter gap, the connection reinforcement and the wall connectors

Example: $B \times H = 1200 \times 750 \text{ mm}$, $s1 = 30 \text{ mm}$, $s2 = 60 \text{ mm}$, $s3 = 70 \text{ mm}$, $s4 = 70 \text{ mm}$

- $b = 1200 + 100 + 30 + 60 = 1390 \text{ mm}$
- $h = 750 + 100 + 70 + 70 = 990 \text{ mm}$

- ▶ Fasten the wall connectors to the damper casing with dry wall screws (pre-drill with $\varnothing 3 \text{ mm}$).
Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the ceiling slab.
- ▶ Close off the perimeter gap »s« with mortar. The mortar bed depth must be at least 150 mm.


Connecting the smoke extract duct to EK2-EU

- ▶  6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

Installation while constructing the solid ceiling slab

- ▶ Fasten the wall connectors to the damper casing with dry wall screws (pre-drill with $\varnothing 3 \text{ mm}$).
Position the smoke control damper and secure it. Make sure that the actuator encasing rests on the face of the ceiling slab.
- ▶ Protect the inside of the damper/connecting subframe/cover grille, e.g. with plastic.
- ▶ Cast concrete around the smoke control damper and leave the concrete to harden.

Connecting the smoke extract duct to EK2-EU

- ▶  6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.6 Supporting construction – lightweight partition wall

5.6.1 Dry mortarless installation

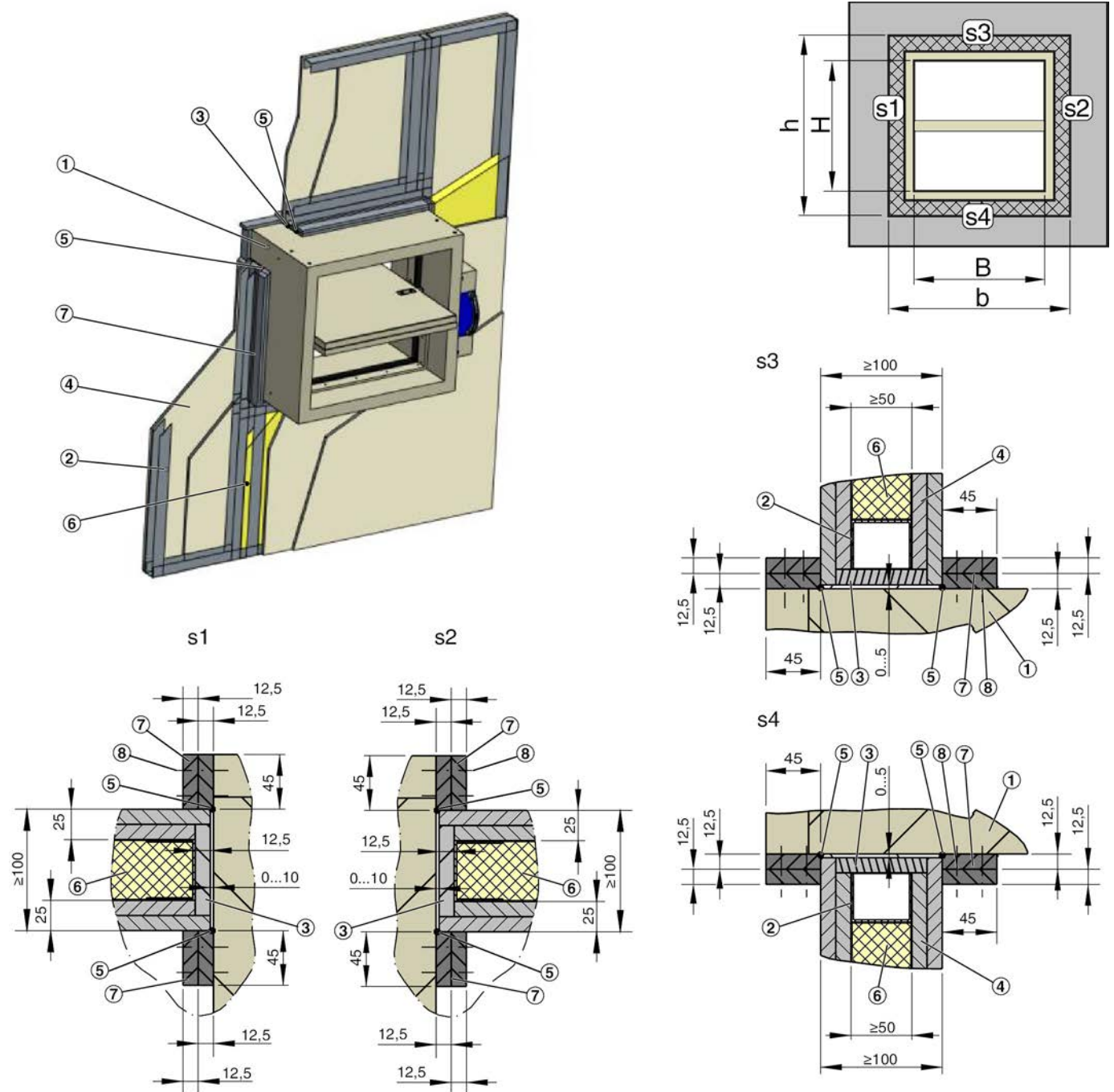


Fig. 16: Dry mortarless installation in lightweight partition wall, installation variant b, classification index: v_{ew}

- | | |
|---|---|
| ① EK2-EU, vertical or horizontal installation position | ⑥ Mineral wool, A1 |
| ② Metal stud system | ⑦ Annular gap cover, 2 pieces, 12.5 x 45 mm |
| ③ Trim panels | ⑧ Steel wire clip |
| ④ Cladding, fire-rated plasterboard fire barrier 2 x 12.5 | W Wall thickness ≥ 100 mm |
| ⑤ Fire protection acrylic bead, peripheral sealing | |

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
a	EI90...S	Annular gap cover	Annular gap cover	Annular gap cover	Annular gap cover

* Part of the classification key

Annular gap cover = annular gap cover on both sides of the wall, ⇒ position 5, 7, 8

Personnel:

- Specialist personnel

Materials:

- For ring gap covering: Provide strips of plasterboard 2 x 12.5 mm x 45 mm per ring gap and side.
- Steel staples 63/11.2/1.53 mm
- Fire protection acrylic

Requirements:

- Lightweight partition walls

Create an appropriate opening

- ▶ Create an installation opening according to Fig. 16 .

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$

Example: B x H = 1200 x 750 mm, s1 = 5 mm, s2 = 5 mm, S3 = 10 mm, s4 = 5 mm

- $b = 1200 + 100 + (5 + 5 \text{ mm}) = 1310 \text{ mm}$
- $h = 750 + 100 + (10 + 5 \text{ mm}) = 865 \text{ mm}$

For the metal stud frame, additionally consider the trim panel thickness!

- ▶ Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length L 1/2, centred in the wall.
- ▶ Create the installation gap "s" according to the installation variant; see the table above.

Making the annular gap cover ⇒ position 5, 7, 8

Before fitting the annular gap cover, seal the installation gap with fire protection acrylic on both sides of the wall. Fix the annular gap cover to the damper casing on both sides of the wall with steel wire clips.

Connecting the smoke extract duct to EK2-EU

- ▶ 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.6.2 Wet-dry mortarless installation

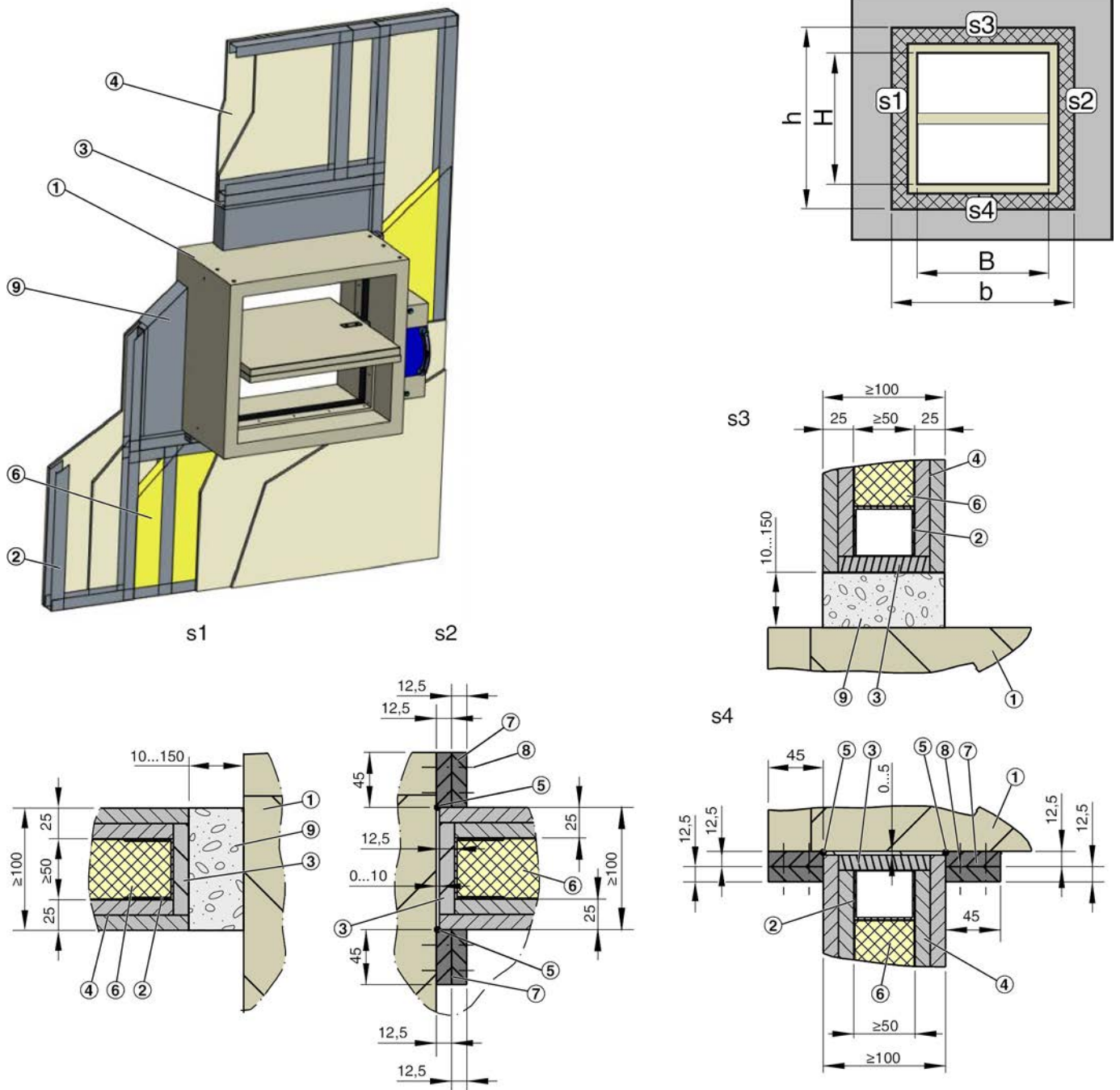


Fig. 17: Wet-dry mortarless installation in lightweight partition wall, installation variant a, classification index: v_{ew}

- | | |
|---|---|
| ① EK2-EU, vertical or horizontal installation position | ⑥ Mineral wool, A1 |
| ② Metal stud system | ⑦ Annular gap cover, 2 pieces, 12.5 x 45 mm |
| ③ Trim panels | ⑧ Steel wire clip |
| ④ Cladding, fire-rated plasterboard fire barrier 2 x 12.5 | ⑨ Mortar |
| ⑤ Fire protection acrylic bead, peripheral sealing | W Wall thickness ≥ 100 mm |

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
a	EI90...S	Mortar	Annular gap cover	Mortar	Annular gap cover
b	EI90...S	Mortar	Mortar	Mortar	Annular gap cover

* Part of the classification key

Annular gap cover = annular gap cover on both sides of the wall, ⇒ position 5, 7, 8

Mortar = close off the installation gap with mortar, ⇒ position 9

Personnel:

- Specialist personnel

Materials:

- For ring gap covering: Provide strips of plasterboard 2 x 12.5 mm x 45 mm per ring gap and side.
- Steel staples 63/11.2/1.53 mm
- Fire protection acrylic

Requirements:

- Lightweight partition walls

Create an appropriate opening

- ▶ Create an installation opening according to Fig. 16 .

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$

Example: B x H = 1200 x 750 mm, s1 = 50 mm, s2 = 5 mm, S3 = 50 mm, s4 = 3 mm

- $b = 1200 + 100 + (50 + 5 \text{ mm}) = 1355 \text{ mm}$
- $h = 750 + 100 + (50 + 5 \text{ mm}) = 905 \text{ mm}$

For the metal stud frame, additionally consider the trim panel thickness!

- ▶ Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length L 1/2, centred in the wall.
- ▶ Create the installation gap "s" according to the installation variant; see the table above.

Making the annular gap cover ⇒ position 5, 7, 8

Before fitting the annular gap cover, seal the installation gap with fire protection acrylic on both sides of the wall. Fix the annular gap cover to the damper casing on both sides of the wall with steel wire clips.

Mortar ⇒ position 9

Close off the perimeter gap "s" (s1, s3 and 2 if pertinent) completely with mortar depending on the installation variant. The mortar bed depth must be at least 100 mm.

Connecting the smoke extract duct to EK2-EU

- ▶ 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.6.3 Mortar-based installation

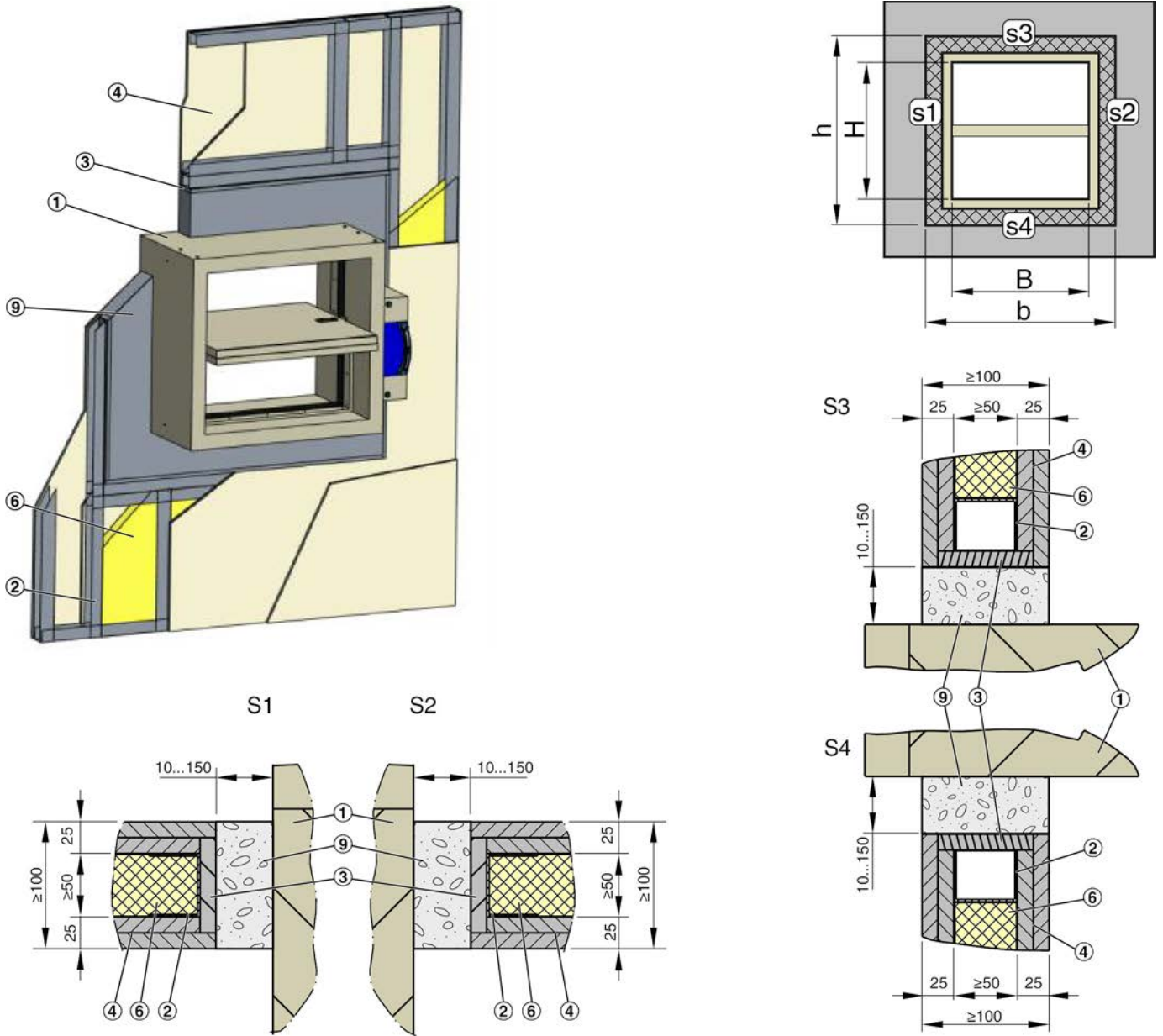


Fig. 18: Dry mortarless installation in lightweight partition wall, installation variant b, classification index: v_{ew}

- ① EK2-EU, vertical or horizontal installation position
- ② Metal stud system
- ③ Trim panels
- ④ Cladding, fire-rated plasterboard fire barrier 2 x 12.5
- ⑥ Mineral wool, A1
- ⑨ Mortar
- W Wall thickness ≥ 100 mm

Installation variant	Classification*	Installation gap			
		s1 (left)	s2 (right)	s3 (top)	s4 (bottom)
a	EI90...S	Mortar	Mortar	Mortar	Mortar

* Part of the classification key
Mortar = close off the installation gap with mortar, \Rightarrow position 9

Personnel:

- Specialist personnel

Requirements:

- Lightweight partition walls

Create an appropriate opening

1. ▶ Create an installation opening according to Fig. 16 .

Installation opening b x h:

- $b = B + 100 + s1 + s2$
- $h = H + 100 + s3 + s4$


Example: B x H = 1200 x 750 mm, s1 = 50 mm, s2 = 50 mm, S3 = 50 mm, s4 = 50 mm

- $b = 1200 + 100 + (50 + 50 \text{ mm}) = 1400 \text{ mm}$
- $h = 750 + 100 + (50 + 50 \text{ mm}) = 950 \text{ mm}$

For the metal stud frame, additionally consider the trim panel thickness!

2. ▶ Push the smoke control damper into the installation opening and secure it. Make sure that the actuator encasing rests on the face of the wall or freely positioned up to a total length L 1/2, centred in the wall.
3. ▶ Close off the perimeter gap (s1, s2, s3 and s4) completely with mortar. The mortar bed depth must be at least 100 mm.

Connecting the smoke extract duct to EK2-EU

4. ▶  6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.7 Fire-resistant smoke extract ducts

5.7.1 In vertical and horizontal smoke extract ducts

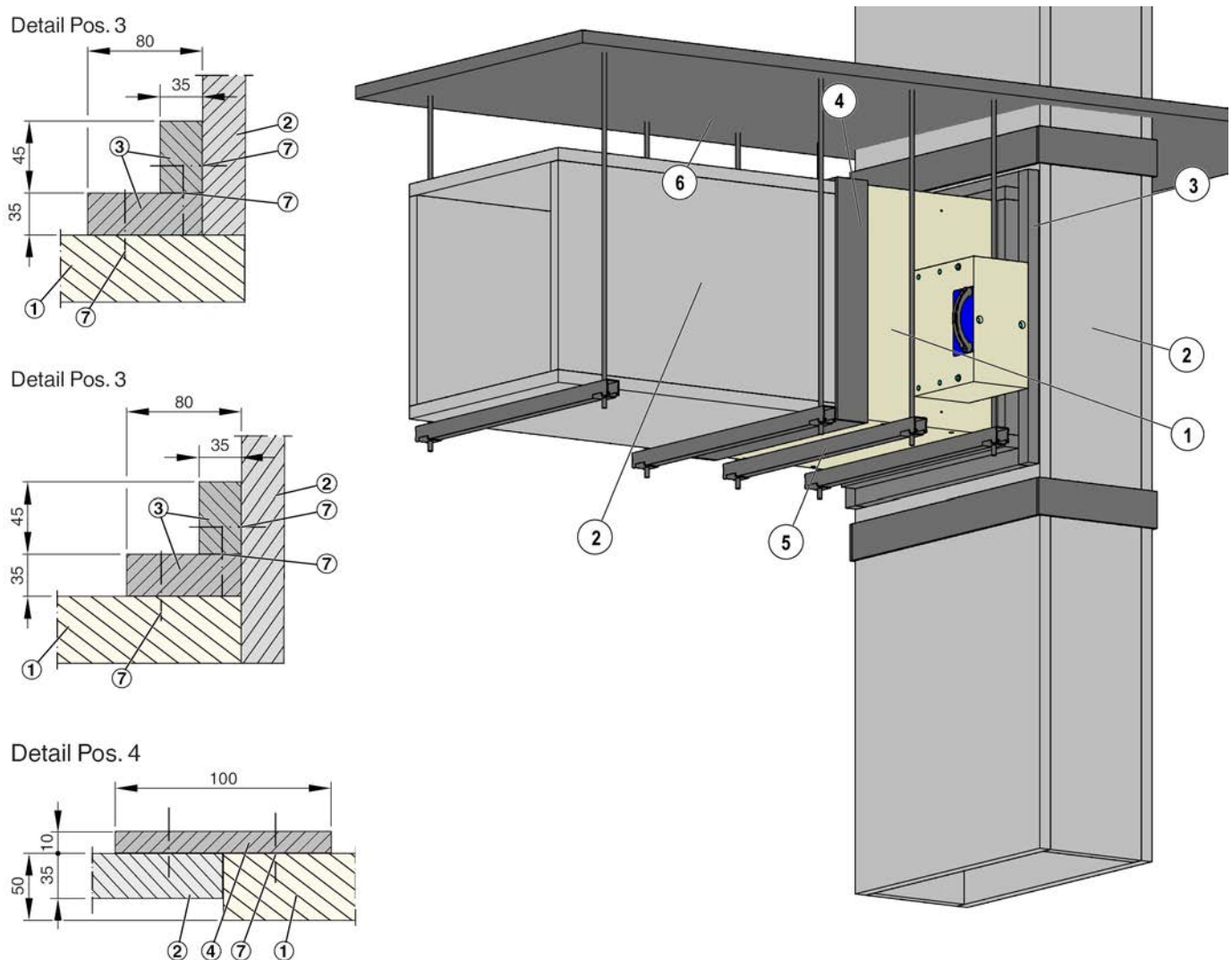


Fig. 19: Installation leading from vertical fire-resistant smoke extract ducts, classification index: v_{ed}

- | | |
|--|--|
| ① EK2-EU in or on a vertical air duct, see detail pos. 3 | ⑤ Suspension system ζ 39 |
| ② Fire-resistant smoke extract duct | ⑥ Solid ceiling slab |
| ③ Angle section (by others) | ⑦ Steel staples \geq 63/11.2/1.53 mm |
| ④ Connection ζ 40 | |

i Solid smoke extract duct (shaft)

In addition to the use shown here in vertical, calcium silicate smoke extract ducts, the EK2-EU is also suitable for use leading from vertical smoke extract ducts with a solid design (shaft). Here, installation is in the wall, as per ζ 5.4 'Supporting construction – solid walls' on page 17.


Personnel:

- Specialist personnel


Materials:

- For angle section: strips of fire-rated PROMATECT®-LS board $d = 35$ mm or equivalent e.g. Promat type AD40 or L500 $d = 40$ mm
- Glue e.g. Promat K84 or equivalent
- Steel staples 63/11.2/1.53 mm

Requirements:

- Smoke extract duct, fire-resistant, tested to EN 1366-8, gross density $\approx 500 \text{ kg/m}^3$, wall thickness $\geq 35 \text{ mm}$ or equivalent, e.g. Promat type AD40 or L500, $d = 40 \text{ mm}$
- 1. ▶ Suspend the smoke control damper  39.
- 2. ▶ Connect the fire-resistant smoke extract duct to the smoke control damper by placing an angle section (Fig. 19 /3) between the duct and the damper. Apply glue to the angle sections at the joints, at the smoke extract duct and the smoke control damper, then link the sections with steel staples, distance $\leq 150 \text{ mm}$.

Connecting the smoke extract duct to EK2-EU

- 3. ▶  6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.7.2 In horizontal smoke extract ducts

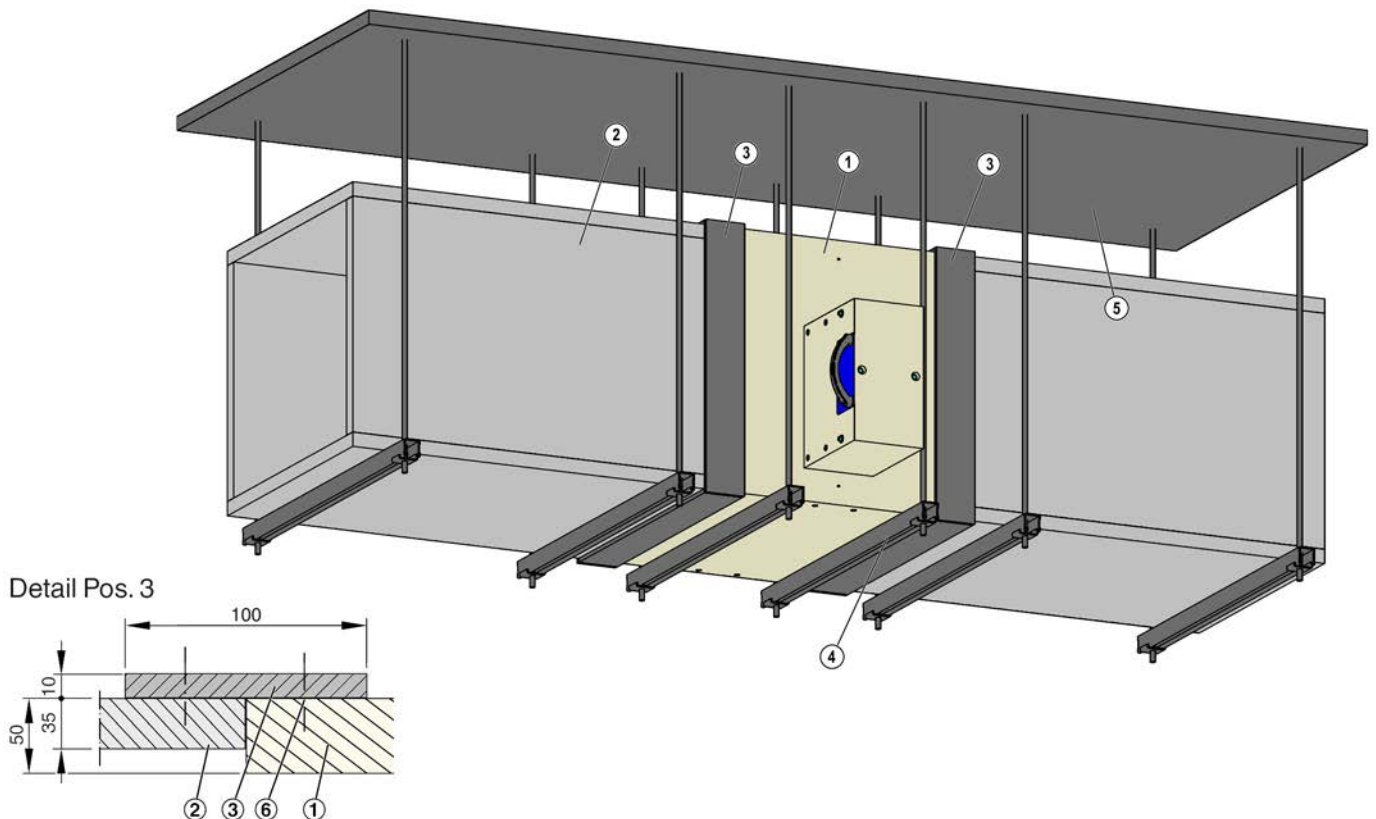


Fig. 20: Installation in a fire-resistant horizontal smoke extract duct, classification index: V_{ed}

- | | |
|-------------------------------------|--|
| ① EK2-EU | ④ Suspension system ↗ 5.8 'Suspending the smoke control damper' on page 39 |
| ② Fire-resistant smoke extract duct | ⑤ Solid ceiling slab |
| ③ Connection ↗ 40 | ⑥ Steel staples $\geq 63/11.2/1.53$ mm |

Personnel:

- Specialist personnel

Requirements:

- Smoke extract duct, fire-resistant, tested to EN 1366-8, gross density ≈ 500 kg/m³, wall thickness ≥ 35 mm, or equivalent, e.g. Promat type AD40 or L500, d = 40 mm
1. ▶ Insert smoke control damper into the fire-resistant smoke extract duct and suspend it ↗ 5.8 'Suspending the smoke control damper' on page 39 .
 2. ▶ Suspend the fire-resistant smoke extract duct according to the manufacturer's instructions.

Connecting the smoke extract duct to EK2-EU

3. ▶ ↗ 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.7.3 On horizontal smoke extract ducts

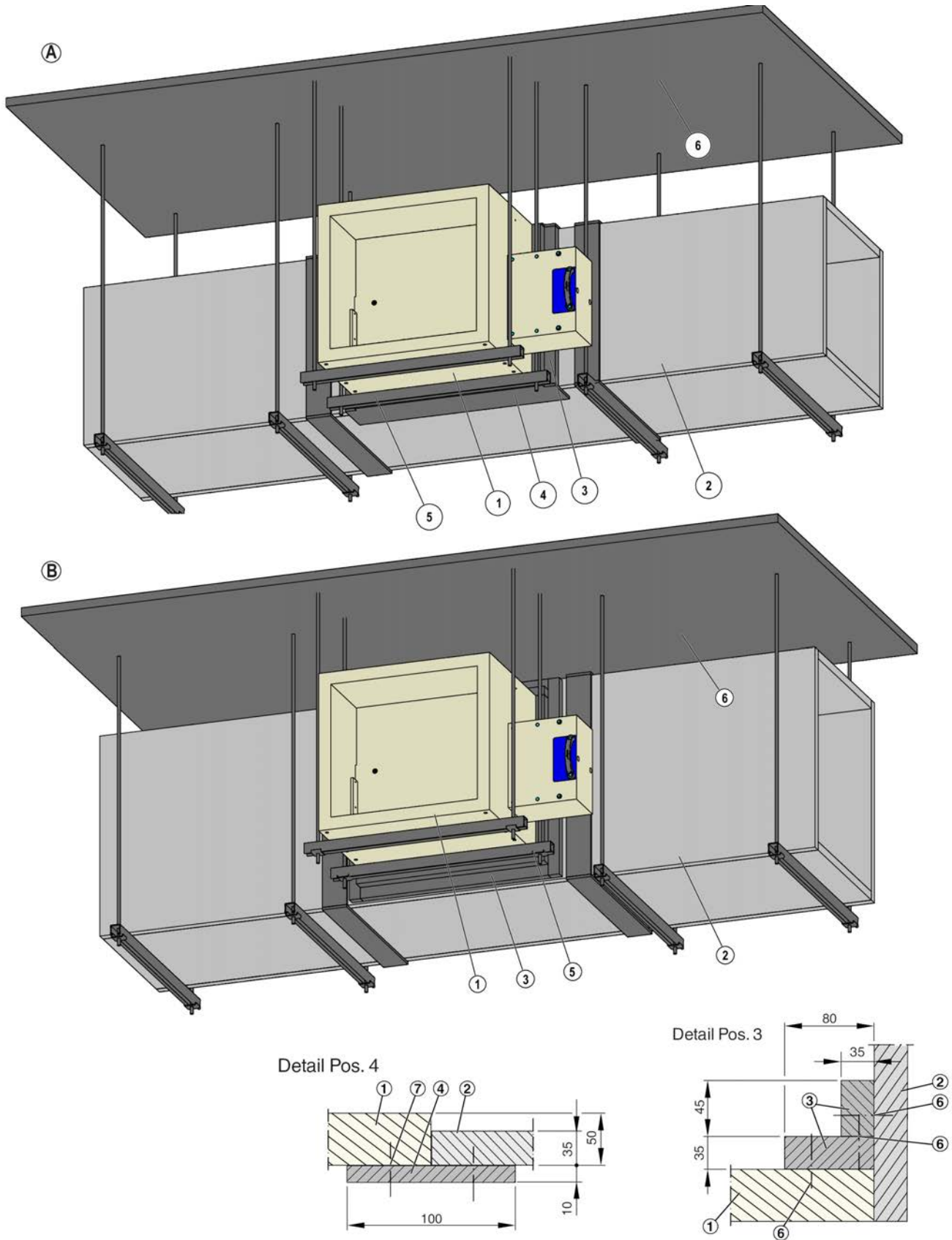


Fig. 21: Installation on fire-resistant horizontal smoke extract ducts, classification index: v_{ed}

A Installation flush at the top and bottom

③ Angle section (by others)
④ Suspension system ↺ 39

- | | | | |
|---|--|---|---------------------------|
| B | Installation with recess, with angle section, see pos. 3 | ⑤ | Solid ceiling slab |
| ① | EK2-EU | ⑥ | Steel staples (by others) |
| ② | Fire-resistant smoke extract ducts | | |


Personnel:

- Specialist personnel


Materials:

- For angle section: strips of fire-rated PROMATECT®-LS board d = 35 mm or equivalent e.g. Promat type AD40 or L500 d = 40 mm
- Glue e.g. Promat K84 or equivalent
- Steel staples 63/11.2/1.53 mm

Requirements:

- Smoke extract duct, fire-resistant, tested to EN 1366-8, gross density $\approx 500 \text{ kg/m}^3$, wall thickness $\geq 35 \text{ mm}$ or equivalent, e.g. Promat type AD40 or L500, d = 40 mm
1. ▶ Make and suspend a fire-resistant smoke extract duct from the smoke control damper according to the manufacturer's instructions.
 2. ▶ Suspend the smoke control damper  39 .
 3. ▶ Connect the fire-resistant smoke extract duct to the smoke control damper by placing an angle section (Fig. 21 /3) between the duct and the damper. Apply glue to the angle sections at the joints, at the smoke extract duct and the smoke control damper, then link the sections with steel staples, distance $\leq 150 \text{ mm}$.

Connecting the smoke extract duct to EK2-EU

4. ▶  6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.7.4 On top of horizontal smoke extract ducts

Detail X

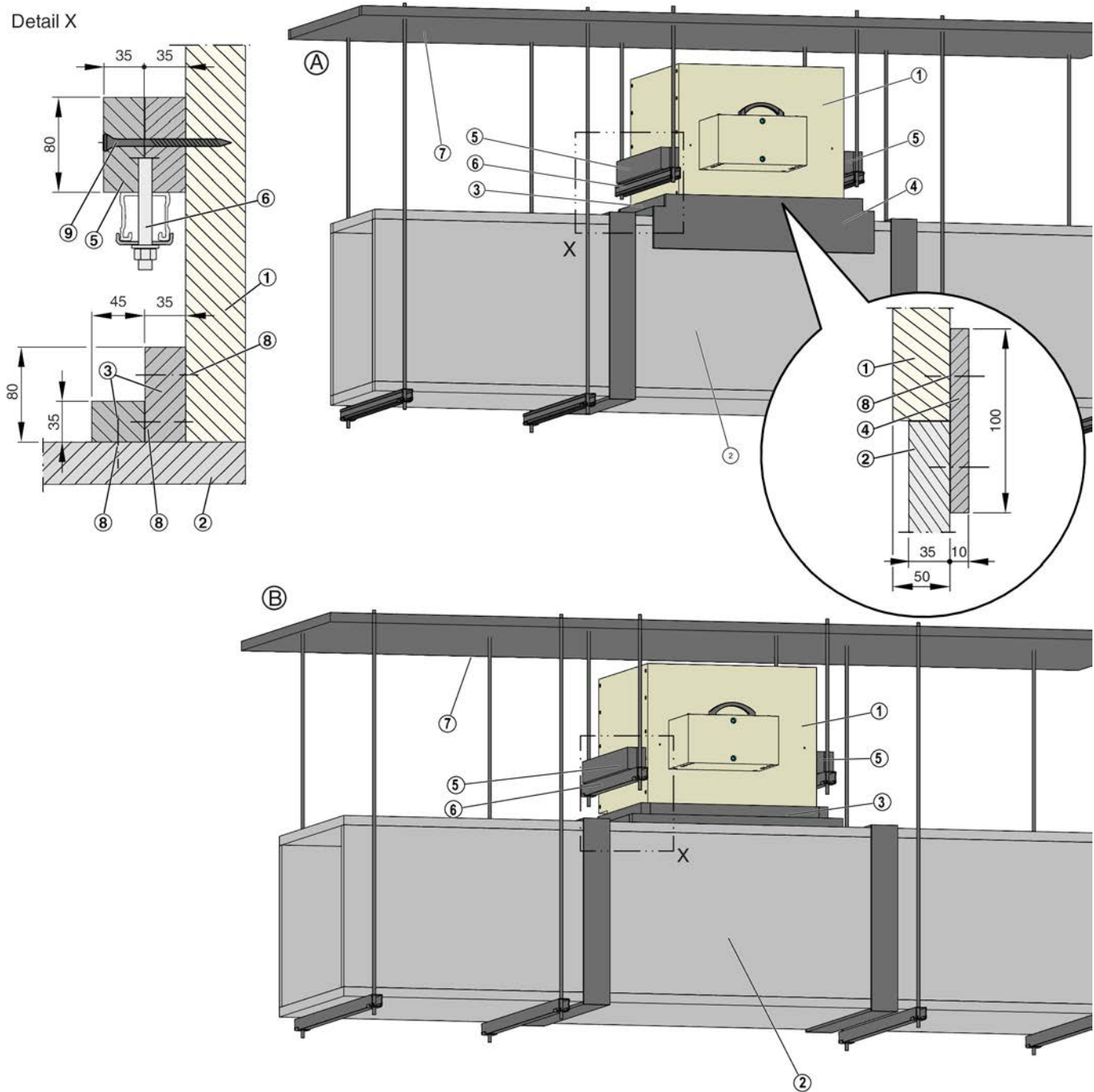


Fig. 22: Installation on fire-resistant horizontal smoke extract ducts, classification index: hod

- A Installation flush at the side
- B Installation with recess, with peripheral angle section, see pos. 3
- ① EK2-EU
- ② Fire-resistant smoke extract ducts
- ③ Angle section (by others)
- ④ Connection ↻ 40

- ⑤ Reinforcing strips of fire-rated PROMATECT®-LS board d = 35 mm or equivalent
- ⑥ Suspension system ↻ 39
- ⑦ Solid ceiling slab
- ⑧ Steel staples (by others)
- ⑨ Dry wall screws 4 × 100 mm

Personnel:

- Specialist personnel

Materials:

- For angle section: strips of fire-rated PROMATECT®-LS board d = 35 mm or equivalent e.g. Promat type AD40 or L500 d = 40 mm

- Glue e.g. Promat K84 or equivalent
- Dry wall screws 4 × 100 mm
- Steel staples 63/11.2/1.53 mm

Requirements:

- Smoke extract duct, fire-resistant, tested to EN 1366-8, gross density $\approx 500 \text{ kg/m}^3$, wall thickness $\geq 35 \text{ mm}$ or equivalent, e.g. Promat type AD40 or L500, d = 40 mm
1. ▶ Fix the reinforcing board (Fig. 22 /5) to the smoke control damper on both sides with dry wall screws; (pre-drill holes with $\varnothing 3 \text{ mm}$), $\leq 100 \text{ mm}$ distance between screws, use at least 2 screws.
 2. ▶ Suspend the smoke control damper ☞ 39 .
 3. ▶ Make and suspend a fire-resistant smoke extract duct underneath the smoke control damper according to the manufacturer's instructions.
 4. ▶ Connect the fire-resistant smoke extract duct to the smoke control damper by placing an angle section (Fig. 22 /3) between the duct and the damper. Apply glue to the angle sections at the joints, at the smoke extract duct and the smoke control damper, then link the sections with steel staples, distance $\leq 150 \text{ mm}$.

Connecting the smoke extract duct to EK2-EU

5. ▶ ☞ 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.7.5 At the end of horizontal smoke extract ducts

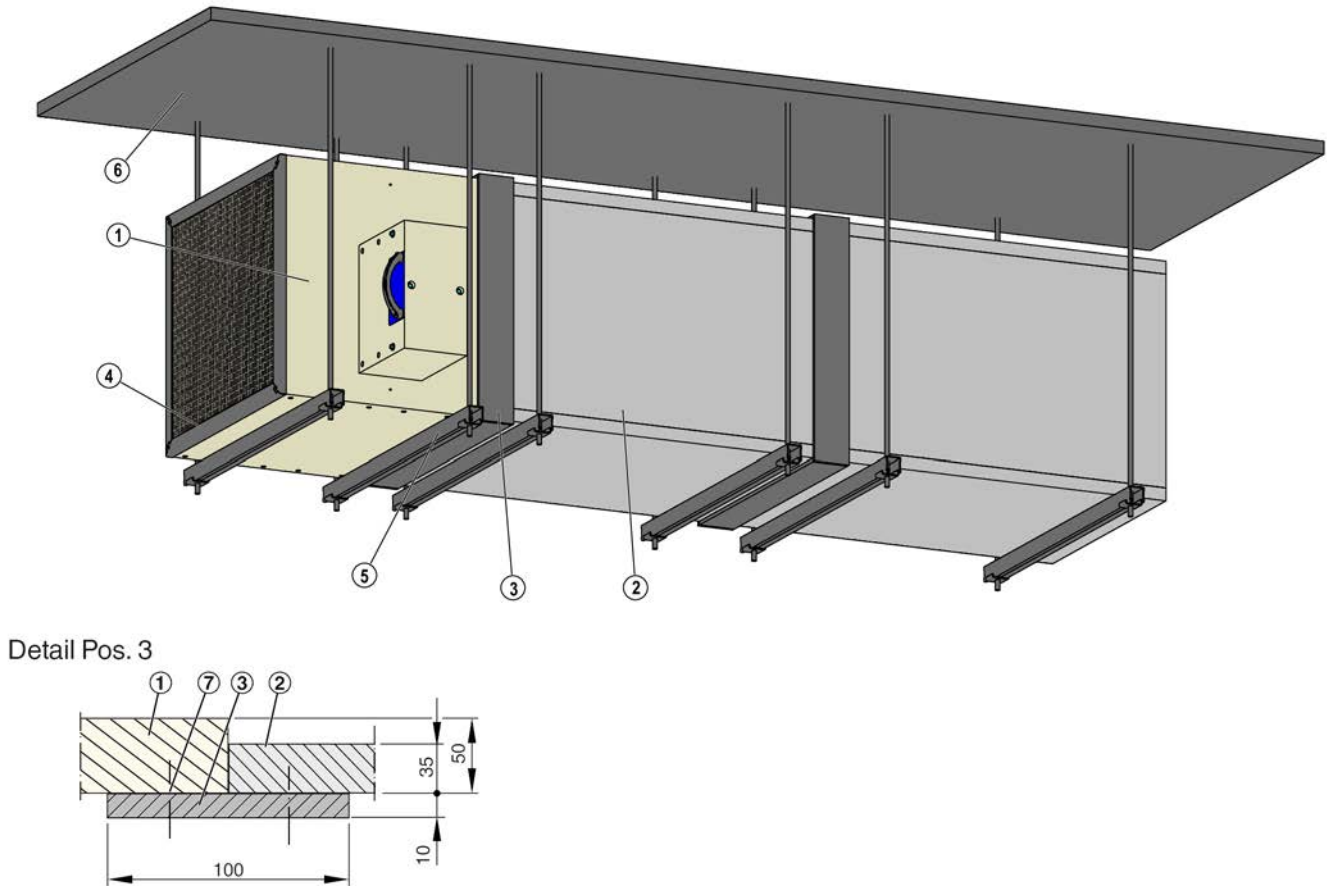


Fig. 23: Installation on fire-resistant horizontal smoke extract ducts, classification index: v_{ed}

- | | |
|--------------------------------------|-----------------------------|
| ① EK2-EU | ⑤ Suspension system ☞ 39 |
| ② Fire-resistant smoke extract ducts | ⑥ Solid ceiling slab |
| ③ Connection ☞ 40 | ⑦ Steel staples (by others) |
| ④ Grilles | |

Personnel:

- Specialist personnel

Materials:

- Steel staples 63/11.2/1.53 mm

Requirements:

- Smoke extract duct, fire-resistant, tested to EN 1366-8, gross density $\approx 500 \text{ kg/m}^3$, wall thickness $\geq 35 \text{ mm}$ or equivalent, e.g. Promat type AD40 or L500, $d = 40 \text{ mm}$
1. ▶ Make and suspend a fire-resistant smoke extract duct from the smoke control damper according to the manufacturer's instructions.
 2. ▶ Suspend the smoke control damper ☞ 39.

Connecting the smoke extract duct to EK2-EU

3. ▶ ☞ 6 'Smoke extract duct and cover grille' on page 40
Follow the manufacturer's instructions of the smoke extract duct here as well.

5.8 Suspending the smoke control damper

5.8.1 General

Smoke control dampers can be suspended from solid ceiling slabs using adequately sized threaded rods. Load the suspension system only with the weight of the smoke control damper.

Ducts must be suspended separately.

Suspension systems longer than 1.5 m require fire-resistant insulation.

Size of threaded rods

Thread	M8	M10	M12	M14	M16	M20
Fmax [N] per threaded rod	219	348	505	690	942	1470
Maximum loading [kg] per threaded rod	22	35	52	70	96	150

5.8.2 Fixing the unit to the ceiling slab

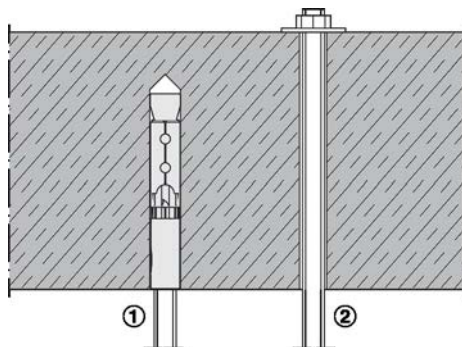


Fig. 24: Fixing to the ceiling slab

- 1 Fire-rated anchor (with suitability certificate)
- 2 Push through installation

Use only fire-rated steel anchors with suitability certificate. Instead of anchors, you can use threaded rods and secure them using nuts and washers.

5.8.3 Suspended installation

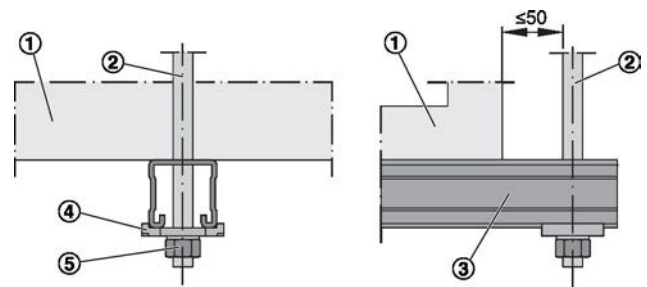


Fig. 25: Suspended installation of the smoke control damper (by others)

- ① Smoke control damper
- ② Threaded rod M8-M20
- ③ Hilti mounting rail MQ 41 × 3 or equivalent
- ④ Hilti MQZ-L drilled plate or equivalent
- ⑤ Nut, M8-M20, galvanised steel

6 Smoke extract duct and cover grille

Construction of the duct

Smoke control dampers for multi compartments may be used with ducts that have been tested to EN 1366-9 (Single compartment smoke extraction ducts) and to EN 1366-8 (Smoke extraction ducts) and that are constructed either from materials of the same density ($\rho \approx 520 \text{ kg/m}^3$) as the tested material or from the same material with a greater density or thickness.

Smoke extract ducts made from Promatect AD 40 or Promatect L 500 boards ($\rho \approx 500 \text{ kg/m}^3$) may also be used.

Smoke extract ducts with national general building inspectorate licences



Smoke extract ducts can also be connected with a national general building inspectorate licence or a national general appraisal certificate. If the smoke control damper is not exposed to mechanical forces, the functional stability of the smoke control damper is not affected (connection according to assembly and operating manual of the smoke control damper). The sizing of the smoke extract duct used remains the responsibility of the system installer and the system owner and must be approved with the respective national authority.

6.1 Smoke extract ducts

Calcium silicate smoke extract duct

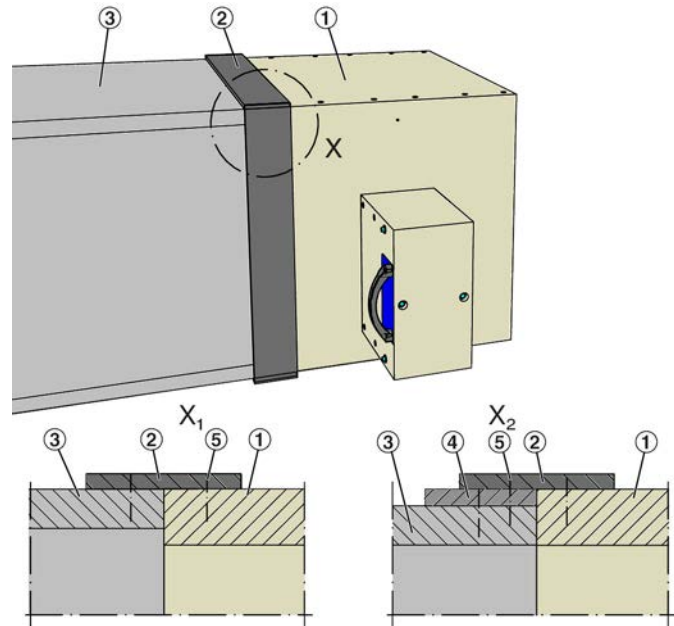


Fig. 26: EK2-EU connection to a calcium silicate smoke extract duct

- X₁ Smoke extract duct and EK2-EU flush on the outside
- X₂ Smoke extract duct and EK2-EU flush on the inside
- ① EK2-EU
- ② Connecting strips according to instructions from the manufacturer of the smoke extract duct
- ③ Calcium silicate smoke extract duct
- ④ Reinforcing strip
- ⑤ Steel staples

Sheet steel smoke extract duct

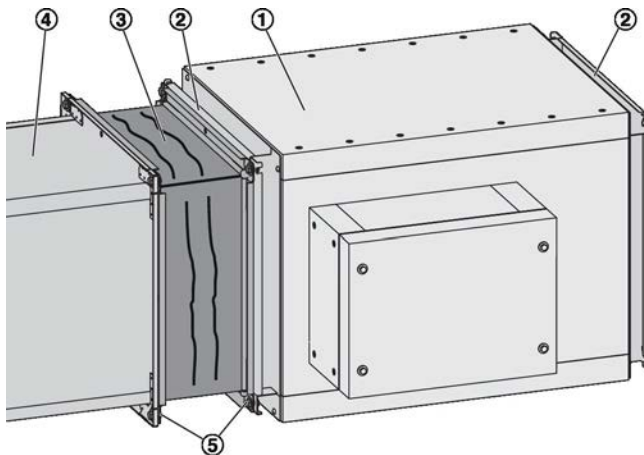


Fig. 27: EK2-EU connection to a sheet steel smoke extract duct

- ① EK2-EU
- ② Connecting subframe
- ③ Flexible connector (by others)
- ④ Sheet steel smoke extract duct (by others)
- ⑤ Screw connection (by others)

As ducts may expand and walls may become deformed in the event of a fire, we recommend using flexible connectors when connecting the damper to sheet steel smoke extract ducts: The flexible connectors should meet the specifications for the sheet steel smoke extract duct. Be sure to follow the manufacturer's instructions.

6.2 Cover grilles

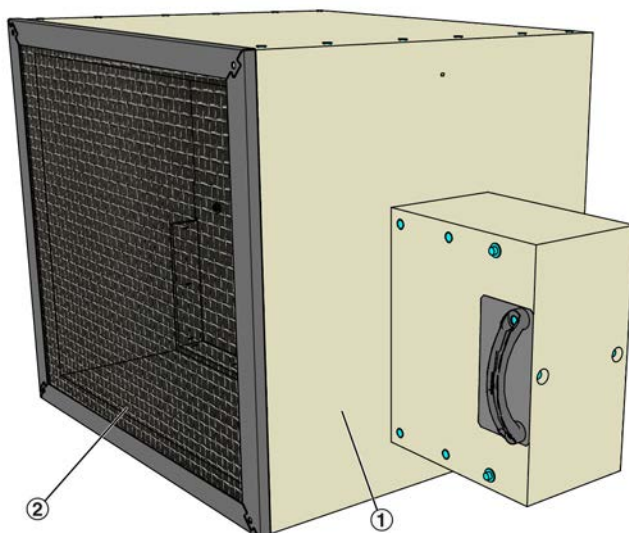


Fig. 28: Smoke control damper with cover grille

- ① EK2-EU
- ② Cover grilles

If no smoke extract duct is connected to the smoke control damper, a cover grille (galvanised steel, mesh aperture ≤ 20 mm) may be fixed instead to protect that side of the damper.

6.3 Inspection access

The interior of the smoke control damper must remain accessible for maintenance. Depending on the installation configuration and if the smoke control damper does not have an inspection access panel, it may be necessary to provide additional inspection access panels in the connecting ducts.

7 Electrical connection

7.1 General safety notes

Personnel:

- Skilled qualified electrician

⚠ 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.

7.2 Wiring and connection to the central BMS

- The smoke control damper may be equipped with a 230 V AC or a 24 V AC/DC actuator. See the performance data on the actuator rating plate.
- Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.
- Make electrical connections according to the examples below.

Electric cables and system

For manual release (MA), the electric cables and system must have at least 30 minutes circuit integrity. Depending on where a damper is installed, country-specific regulations may apply.

Actuators with 24 V AC/DC

Safety transformers must be used. The connecting cables are fitted with plugs. This ensures quick and easy connection to the TROX AS-i bus system. For connection to the terminals, shorten the connecting cable.

Feeding the cable into the actuator encasing

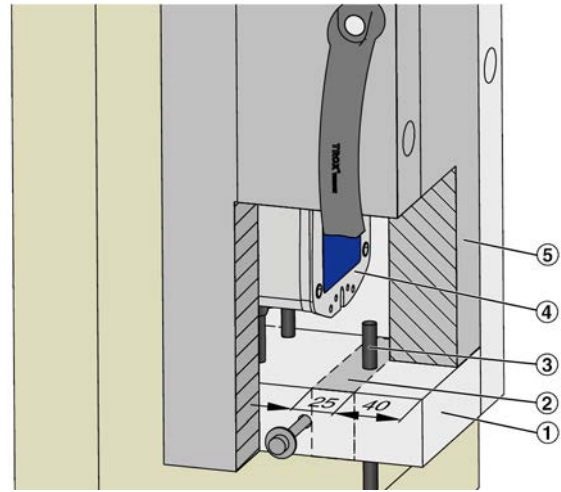


Fig. 29: EK2-EU insertion of the connecting cable

To feed the electrical connecting cable (3) into the actuator encasing (1), a drilled hole (Ø cable +1 mm) in the marked area (2) is required. Do not drill a hole into the cover (5)! Before you start drilling, remove the cover and make sure that no parts (e.g. control module) can be damaged by the drill.

A wire clamping bracket is required.

For manual release (MA) we recommend using a ceramic terminal to connect the AS-i cable to the actuator cable or to the cable of the AS-i module.

7.3 Actuators

Torque table

The actuators of the EK2-EU are designed according to the size depending on the torque and the order option (order code detail). The following tables can be used to identify the corresponding actuator. Select intermediate sizes with the next larger dimension.

For wiring examples and technical data, see the following pages.

		B														
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500	
H	S	200	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		250	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		300	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		350	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		380	15	15	15	15	15	15	15	15	15	15	15	15	15	15
	M	385	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		400	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		450	15	15	15	15	15	15	15	15	15	15	15	15	15	15
		545	15	15	15	15	15	15	15	15	15	15	15	25	25	25
	L	550	15	15	15	15	15	15	15	15	15	25	25	25	25	25
		600	15	15	15	15	15	15	15	25	25	25	25	25	25	40
		650	15	15	15	15	15	15	25	25	25	25	25	40	40	40
		700	15	15	15	15	15	25	25	25	25	40	40	40	40	40
		750	15	15	15	15	25	25	25	25	40	40	40	40	40	40
		800	15	15	15	25	25	25	25	40	40	40	40	40	40	40

		Antrieb / actuator		
		15 Nm	25 Nm	40 Nm
Bestellschlüssel / order code	B24	BEN24-ST TR	BEE24-ST TR	BE24-12-ST TR
	B230	BEN230 TR	BEE230 TR	BE230-12 TR
	B24-SR	BEN24-SR TR	BEE24-SR TR	–
	B24M	–	–	BE24-12-ST TR
	B230M	–	–	BE230-12 TR

7.3.1 B24

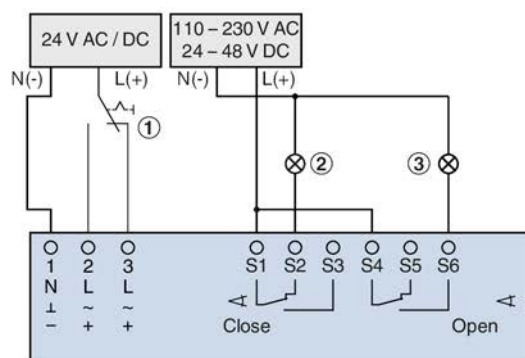


Fig. 30: Wiring example 24 V AC / DC

- ① Switch for opening and closing, to be provided by others
- ② Indicator light for CLOSED position, to be provided by others
- ③ Indicator light for OPEN position, to be provided by others

Technical data for open/close actuators

Order code detail		B24		
Actuator		BEN24-ST TR	BEE24-ST TR	BE24-ST TR
Supply voltage		AC 19.2...28.8 V, 50/60 Hz / DC 21.6...28.8 V, 50/60 Hz		
Power consumption – when running		3 W	2.5 W	12 W
Power consumption – when idle		0.1 W		0.5 W
Power consumption rating		6 VA	5 VA	18 VA
		8.2 A, I _{max.} (5 ms)		8.2 A, I _{max.} (5 ms)
Torque		15 Nm	25 Nm	40 Nm
Run time		< 30 s (90°)	< 60 s (90°)	< 60 s (90°)
Limit switch	Type of contact	2 changeover contacts		
	Switch rating	1 mA...3 A (0.5 A inductive),		1 mA...6 (0.5 A inductive),
	Switching voltage	5 VDC...250 VAC		
	Open	5°		3°
	Close	80°		87°
IEC protection class		III (SELV)		
Protection level		IP 54		
Operating temperature		-30...55 °C		
Connecting cable	Actuator	1 m, 3 x 0.75 mm ² , halogen-free		
	Limit switch	1 m, 6 x 0.75 mm ² , halogen-free		
CE conformity according to		2014/30/EU, 2014/35/EU		

7.3.2 B230

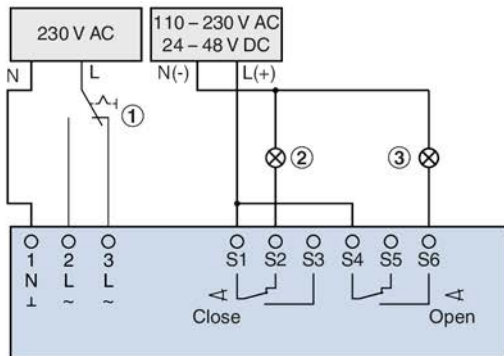


Fig. 31: Wiring example 230 V AC

- ① Switch for opening and closing, to be provided by others
- ② Indicator light for CLOSED position, to be provided by others
- ③ Indicator light for OPEN position, to be provided by others

Technical data for open/close actuators

Order code detail		B230		
Actuator		BEN230 TR	BEE230 TR	BE230 TR
Supply voltage		AC 198 ... 264 V 50/60 Hz		
Power consumption – when running		4 W	3.5 W	8 W
Power consumption – when idle		0.4 W		0.5 W
Power consumption rating		7 VA	6 VA	15 VA
		4 A, I _{max.} (5 ms)		7.9 A, I _{max.} (5 ms)
Torque		15 Nm	25 Nm	40 Nm
Run time		< 30 s (90°)	< 60 s (90°)	< 60 s (90°)
Limit switch	Type of contact	2 changeover contacts		
	Switch rating	1 mA...3 A (0.5 A inductive),		1 mA...6 A (0.5 A inductive),
	Switching voltage	5 V DC...250 V AC		
	Open	5°		3°
	Close	80°		87°
IEC protection class		II		
Protection level		IP 54		
Operating temperature		-30...55 °C		-30...50 °C
Connecting cable	Actuator	1 m, 3 x 0.75 mm ² , halogen-free		
	Limit switch	1 m, 6 x 0.75 mm ² , halogen-free		
CE conformity according to		2014/30/EU, 2014/35/EU		

7.3.3 B24-SR

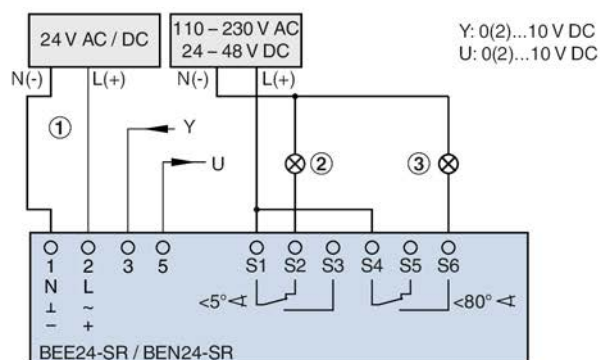


Fig. 32: Wiring example 24 V AC / DC, modulating

- ① Switch for opening and closing, to be provided by others
- ② Indicator light for CLOSED position, to be provided by others
- ③ Indicator light for OPEN position, to be provided by others

Y Input signal
U Output signal

Technical data, modulating actuators

Order code detail		B24-SR	
Actuator		BEN24-SR TR	BEE24-SR TR
Supply voltage		AC 19.2...28.8 V, 50/60 Hz / DC 21.6...28.8 V, 50/60 Hz	
Power consumption – when running		3 W	3 W
Power consumption – when idle		0.3 W	
Power consumption rating		6.5 VA	5.5 VA
		8.2 A, I _{max.} (5 ms)	
Torque		15 Nm	25 Nm
Run time		< 30 s (90°)	< 60 s (90°)
Work area Y		2...10 V DC	
Input resistance		100 kΩ	
Position feedback signal		2...10 V DC, max. 0.5 mA	
Positional accuracy		±5%	
Limit switch	Type of contact	2 changeover contacts	
	Switch rating	1 mA...3 A (0.5 A inductive), AC 250 V	
IEC protection class		III (SELV)	
Protection level		IP 54	
Operating temperature		-30...55 °C	
Connecting cable	Actuator	1 m, 4 x 0.75 mm ² , halogen-free	
	Limit switch	1 m, 6 x 0.75 mm ² , halogen-free	
CE conformity according to		2014/30/EU, 2014/35/EU	

7.4 Actuator with control module

Smoke control dampers in a smoke extract system can be activated individually or as part of an overall system and according to the control matrix set up for the event of a fire. In this case the control system of the mechanical smoke extract system or pressurisation system also controls and monitors the status of the dampers. If there are integral communication modules fitted inside the encasing, they can be connected to the actuator and establish the communication with the control system as well as the power supply.

7.4.1 TROXNETCOM B24A, B24AM, B24AS

- A controller (master) communicates with the control modules (slaves, up to 31 per master)
- Free bus topology of the two-wire cable for data and energy
- Simple and intelligent wiring system

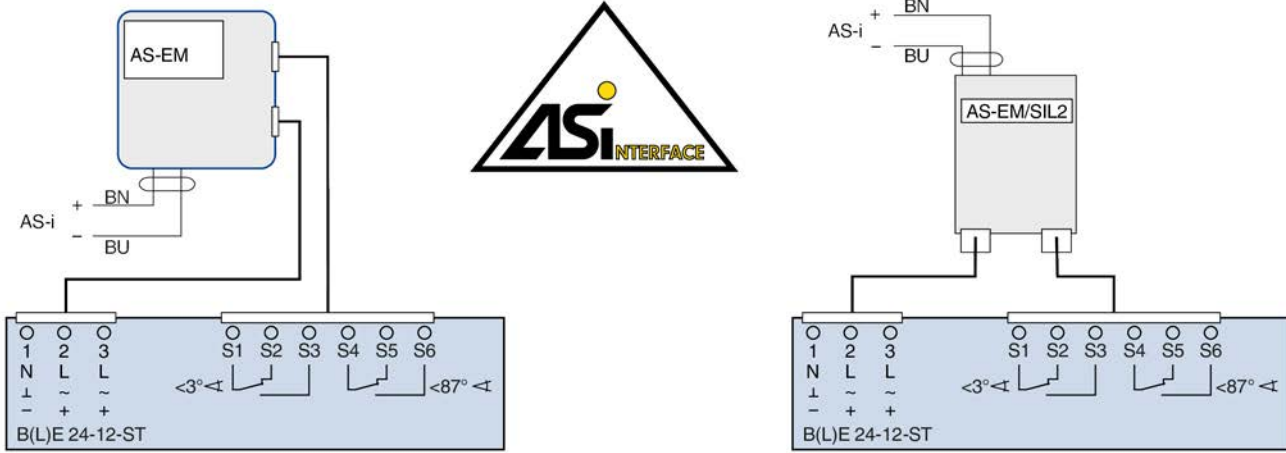


Fig. 33: Wiring example for attachments B24A and B24AS

BN Brown (+)
BU Blue (-)

The actuator and the AS-i control module are factory wired.

An AS-i bus (+/-) is used for both voltage supply and signals.

The connecting cables of the AS-EM/SIL module are fitted with wire end ferrules.

Technical data for the actuator, ↪ 7.3 'Actuators' on page 43 .

Technical data for the control module

Order code detail	B24A	B24AM	B24AS
Control module	AS-EM/EK	AS-EM/M	AS-EM/SIL2
Supply voltage	26.5 – 31.6 V DC		
Current consumption	450 mA	450 mA	< 400 mA from AS-i
Max. current load per output	400 mA	400 mA	340 mA
Max. current load per module	400 mA	400 mA	340 mA
Interfaces	4 inputs/3 outputs	4 inputs/3 outputs	2 outputs with transistor (typically 24 V DC from AS-i, voltage range 18 – 30 V)
Operating temperature	-5 to 75 °C	-5 to 75 °C	-20 to 70 °C
Storage temperature	-5 to 75 °C	-5 to 75 °C	-20 to 75 °C
Protection level	IP 42	IP 42	IP 54
AS-i profile	S7.A.E	S7.A.E	S-7.B.E (Safety at Work) and S7.A.E (motor module)

7.4.2 B24BKNE

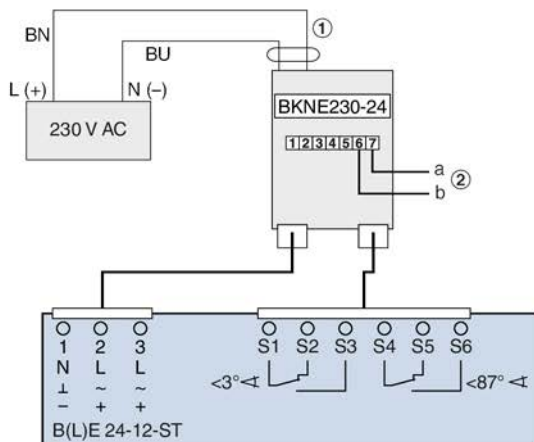


Fig. 34: Wiring example for attachment B24BKNE

BN Brown L (+)
 BU Blue N (-)

① Supply voltage
 ② 2-wire cable (signal)

The actuator and the control module are factory wired.

Connect the supply voltage to the connecting cable (approx. 1 m, with ferrules). 2-wire cable for signals (terminals 6 and 7).

Technical data for the actuator, ↪ 7.3 'Actuators' on page 43 .

Technical data for the control module

Order code detail	B24BKNE
Control module	BKNE230-24
Nominal voltage	AC 230 V 50/60 Hz
Functional range	AC 198...264 V
Rating	19 VA (including actuator)
Power consumption	10 W (including actuator)
Mains cable	Cable, 1 m (free of halogens, without plug)
2-wire cable	Screw terminals for wires, 2 x 1.5 mm ²
Recommended cable	JE-H (St) Bd FE180/E30-E90
IEC protection class	II (protective insulation)
Ambient temperature (normal operation)	-30...+50 °C
Storage temperature	-40...+80 °C

7.4.3 SLC technology - B24C

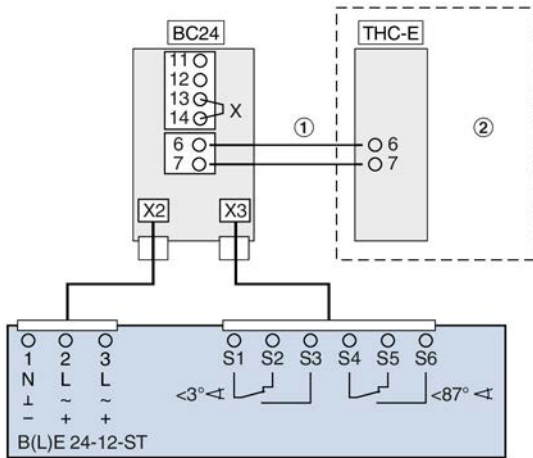


Fig. 35: B24C module

- 1 2-wire cable for supply voltage and signal
- 2 (THC-E, by others)
- X2 Socket for an actuator
- X3 Sockets for limit switches
- 6 / 7 2-wire cable to THC-E control module for signals and supply voltage, 2 x 1.5 mm², 150 m max., interchangeable cores
- 11 Not to be used
- 12 GND
- 13 24...27 V DC (30 mA max.)
- 14 IN

Terminals 12, 13 and 14 – duct smoke detector:

- If you want to connect a duct smoke detector, remove wire link X between terminals 13 and 14.
- You may use terminals 13 and 14 to connect a duct smoke detector or any other volt-free control contact, e.g. a fire alarm system. When the contact opens, the damper blades move to the defined safe position. For this case the terminals 13 and 14 of several BC24 modules can be switched in parallel.

The actuator and the control module are factory wired.

Technical data for the actuator, ↪ 7.3 'Actuators' on page 43.

Connection data

Order code detail	B24C
Control module	BC24
Supply voltage	Provided by the SLC control module
Power consumption	1 W
Contact load, terminals 13/14	30 mA max.
IEC protection class	III (protective extra-low voltage)

SLC wiring examples (THC-E)

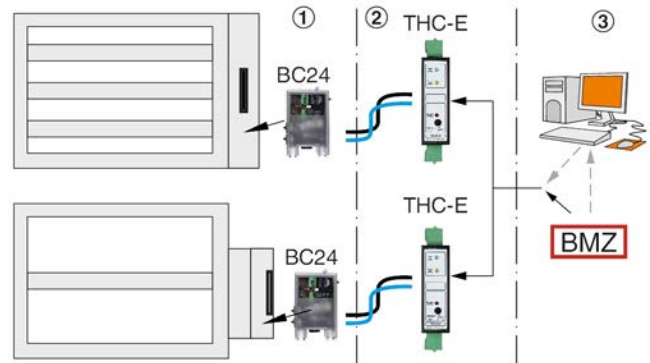


Fig. 36: Control signal from the central BMS

- 1 Smoke control damper with integral control module B24C
- 2 THC-E (switch cabinet)
- 3 Fire alarm system and central BMS (if any)

Advantages

- Control of one damper or many dampers simultaneously (in parallel)

Disadvantages

- Wiring is comparatively time consuming

SLC wiring examples (SLC24-8E)

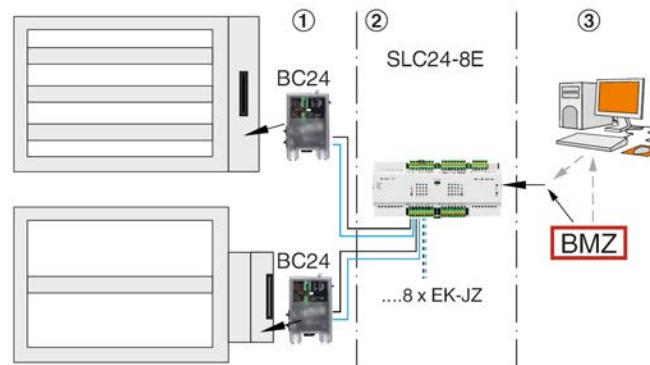


Fig. 37: Control signal from the central BMS

- 1 Smoke control damper with integral control module B24C
- 2 SLC24-8E (switch cabinet)
- 3 Fire alarm system and central BMS (if any)

Advantages

- Quick and easy wiring

Disadvantages:

- Only parallel control of several dampers

7.4.4 B24D and B230D

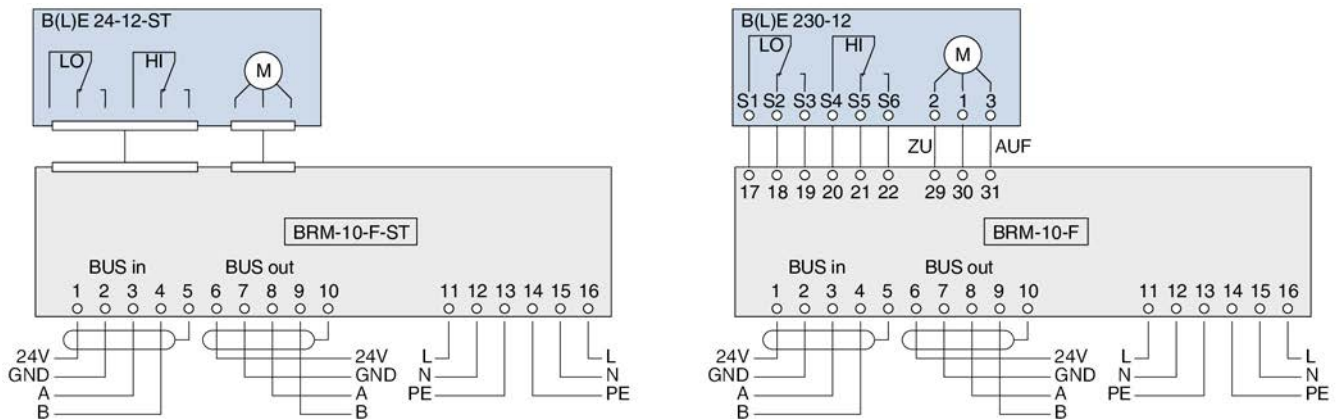


Fig. 38: Wiring example for attachments B24D and B230D

Check during commissioning whether the blades of the damper move correctly from OPEN to CLOSED.

The mode switch allows you to choose one of the following operating modes:

- Automatic (damper is controlled via the bus; status LEDs are not active)
- Maintenance (damper is controlled via the bus; status LEDs are not active)
- NC contact, manual (bus commands are overridden)
- NO contact, manual (bus commands are overridden)

The actuator and the control module are factory wired.

Technical data for the actuator, . ↪ 7.3 'Actuators' on page 43

Technical data

Order code detail		B24D	B230B
Control module		BRM-10-F-ST	BRM-10-F
Electrical data	Supply voltage	18 – 32 V DC (typically 24 V)	
	Current consumption	5 mA (typically), 26 mA max. (for 100 ms when relays close)	
	Protection level	IP 20 (EN 60529)	
	IEC protection class	II	
Construction	Digital inputs	2 for feedback from limit switches (volt-free)	
	Digital outputs	1 for signalling to the fire damper	
Outputs	Actuator	24 V DC	24 / 230 V AC
	Permanent current, max.	AC 5 A	DC 5 A
	Switch-on current, max. (< 15 ms)	AC 8 A	DC 8 A
	Switch rating	1250 VA / 150 W	
Terminals for damper input	Max. cross-sectional area of conductors	Solid core: 0.08 – 2.5 mm ² Multi-strand (without ferrule): 0.08 – 2.5 mm ² Multi-strand (insulated ferrule): 0.25 – 1.5 mm ² Multi-strand (non-insulated ferrule): 0.25 – 2.5 mm ²	
	Max. current, terminals	10A	
	Pre fuse	MCB, 10 A, characteristic B	

Actuator with control module > B24D and B230D

Order code detail		B24D	B230B
Control module		BRM-10-F-ST	BRM-10-F
Terminals for bus, feed-back, damper output	Cross-sectional areas of conductors	Solid core: 0.2 – 1.5 mm ² Multi-strand (without ferrule): 0.2 – 1.5 mm ² Multi-strand (insulated ferrule): 0.25 – 0.75 mm ² Multi-strand (non-insulated ferrule): 0.25 – 1.5 mm ²	
Ambient conditions	Ambient temperature	0 to 45 °C	
	Ambient humidity	0 – 90%	

8 Commissioning/functional test

8.1 Commissioning

Before commissioning, each smoke control damper must be inspected to determine and assess its actual condition. ↪ 'Inspection, maintenance and repair measures' on page 55.

8.2 Functional test

General

Smoke control dampers must be checked regularly. A functional test involves closing the smoke control damper and opening it again. This is typically done with an input signal from the central fire alarm system.

8.2.1 Manually, on the smoke control damper



The BE, BEE and BEN actuators can be operated without current by means of a crank handle or hex-agon socket spanner.

2. ▶ Turn the crank handle anti-clockwise until the position indicator (Fig. 39 /2) shows OPEN (Fig. 39 /3).
3. ▶ Remove the crank handle.

Manually close the smoke control damper.

Requirement

- The smoke control damper is open
1. ▶ Insert the crank handle into the socket (Fig. 39 /4) for the spring-winding mechanism (the crank handle is clip-fixed to the connecting cable).
 2. ▶ Turn the crank handle clockwise until the position indicator (Fig. 39 /2) shows CLOSED (Fig. 39 /1).
 3. ▶ Remove the crank handle.

Manually open the smoke control damper.



Fig. 39: Open/Close actuator (smoke control damper is open)

- ① CLOSED position
- ② Position indicator
- ③ OPEN position
- ④ Socket for the crank handle

Requirement

- The smoke control damper is closed
1. ▶ Insert the crank handle into the socket (Fig. 39 /4) (the crank handle is clip-fixed to the connecting cable).

9 Maintenance

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 smoke control 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 smoke control dampers.

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

Functional test

The functional reliability of the smoke control 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 12101-8
- EN 13306
- EN 15423
- Depending on where dampers are installed, country-specific regulations may apply.

Maintenance

The smoke control damper and the actuator are maintenance-free with regard to wear but smoke control dampers must still be included in the regular cleaning of the smoke extract system.


Inspection

Smoke control dampers 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 in  *'Inspection, maintenance and repair measures'* on page 55.

The test of each smoke control 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  *8 'Commissioning/functional test'* on page 53.

Any repair must be documented.

Cleaning

All surfaces of TROX components and systems, with the exception of electronic parts, may be wiped with a dry or damp cloth. Do not use cleaning agents that contain chlorine. All surfaces may also be cleaned with an industrial vacuum cleaner. To avoid any scratches, a soft brush should be used on the suction inlet. Equipment for removing stubborn contamination, e.g. scrubbing sponges or scouring cream, may damage the surfaces and must not be used.

Inspection, maintenance and repair measures

Interval	Maintenance work	Personnel
A	Accessibility of the smoke control damper <ul style="list-style-type: none"> ■ Internal and external accessibility <ul style="list-style-type: none"> – Provide access 	Specialist personnel
	Installation of the smoke control damper <ul style="list-style-type: none"> ■ Installation according to the operating manual ↪ 5 'Installation' on page 13 <ul style="list-style-type: none"> – Install the smoke control damper correctly 	Specialist personnel
	Connection of smoke extract ducts/cover grille/flexible connector ↪ 6 'Smoke extract duct and cover grille' on page 40 <ul style="list-style-type: none"> ■ Connection according to this manual <ul style="list-style-type: none"> – Establish correct connection 	Specialist personnel
	Supply voltage for the actuator <ul style="list-style-type: none"> ■ Power supply according to the actuator rating plate <ul style="list-style-type: none"> – Provide correct voltage 	Skilled qualified electrician
A / B	Check of the smoke control damper for damage <ul style="list-style-type: none"> ■ Smoke control damper, damper blade and seal must be intact <ul style="list-style-type: none"> – Repair or replace the smoke control damper 	Specialist personnel
	Functional test of the smoke control damper ↪ 8.2 'Functional test' on page 53 <ul style="list-style-type: none"> ■ Actuator function OK ■ Damper blade closes ■ Damper blade opens <ul style="list-style-type: none"> – Determine and eliminate the cause of the fault – Replace actuator – Repair or replace the smoke control damper 	Specialist personnel
C	Cleaning the smoke control damper <ul style="list-style-type: none"> ■ No contamination in the interior or on the exterior of the smoke control damper <ul style="list-style-type: none"> – Remove contamination 	Specialist personnel

Interval**A = Commissioning****B = Regularly**

The functional reliability of smoke control dampers must be tested at least every six months. If two consecutive tests are successful, the next test can be conducted one year later.

C = As required, depending on the degree of contamination**Maintenance work**

Item to be checked

- Required condition
 - Remedial action if necessary

10 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 smoke extract ducts.
3. ▶ Close the smoke control damper.
4. ▶ Remove the smoke control damper.

Disposal

ENVIRONMENT!

Risk of harm to the environment due to incorrect disposal of goods and packaging!

Incorrect disposal can harm the environment.

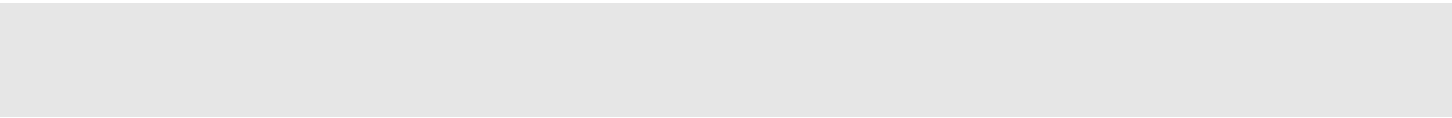
Have electronic waste and electronic components disposed of by an approved specialist disposal company.

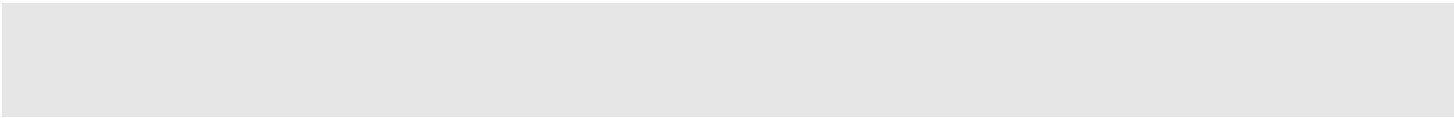
For disposal the smoke control damper must be completely disassembled.

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