Fire damper

Type FK2-EU

according to Declaration of Performance
DoP / FK2-EU / DE / 001

Read the instructions prior to performing any task!

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

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.

Defects liability

For details regarding defects liability please refer to Section VI, Warranty Claims, of the Delivery and Payment Terms of TROX GmbH.

The Delivery and Payment Terms of TROX GmbH are available at *www.troxtechnik.com*.

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. ▸ 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 – danger zone.

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 an automatic shut-off device to prevent fire and smoke from spreading through ducting.
- The fire damper is suitable for supply and extract air in HVAC systems.
- Operation of the fire dampers is allowed only in compliance with installation regulations and the technical data in this installation and operating manual.
- Modifying the fire damper or using replacement parts that have not been approved by TROX is not permitted.

If this fire damper is used in Germany:

- Do not use it in extract air systems in commercial kitchens.
- Not to be used as an air transfer damper.

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 areas with potentially explosive atmospheres
– as a smoke control damper
– outdoors without sufficient protection against the effects of weather
– in atmospheres where chemical reactions, whether planned or unplanned, may cause damage to the fire 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 B × H	200 × 100 – 800 × 200 mm
Casing lengths L	305 and 500 mm
Volume flow rate range	Up to 1920 l/s or 6900 m³/h
Differential pressure range	Up to 2000 Pa
Temperature range [1, 3]	-20 °C – 50 °C
Release temperature	72 °C or 95 °C (for warm air ventilation systems)
Upstream velocity [2]	≤ 8 m/s with fusible link, ≤ 12 m/s with spring return actuator
Closed blade air leakage	EN 1751, Class 2
Casing air leakage	EN 1751, Class C; (B + H) ≤ 700, Class B
EC conformity	■ Construction Products Regulation (EU) No. 305/2011 ■ EN 15650 – Ventilation for buildings – Fire dampers ■ EN 13501-3 – Classification: Fire resistant ducts and fire dampers ■ EN 1366-2 – Fire resistance tests for installations: Fire dampers ■ EN 1751 Ventilation for buildings – Air terminal devices
Declaration of performance	DoP / FK2-EU / DE / 001

[1] Temperatures may differ for units with attachments. Details for other applications are available on request.

[2] Data applies to uniform upstream and downstream conditions for the fire damper.

[3] Condensation and the intake of humid fresh air have to be avoided as otherwise operation will be impaired or not possible.

Rating plate

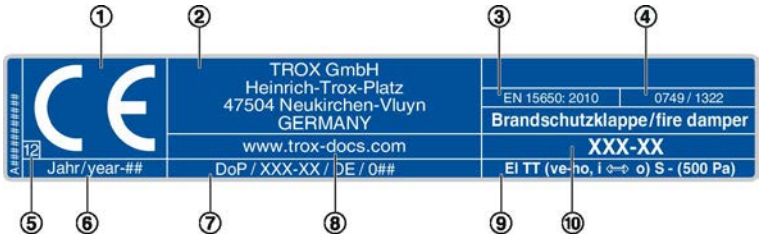


Fig. 1: Rating plate (example)

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

2.2 FK2-EU with fusible link

Dimensions and weight

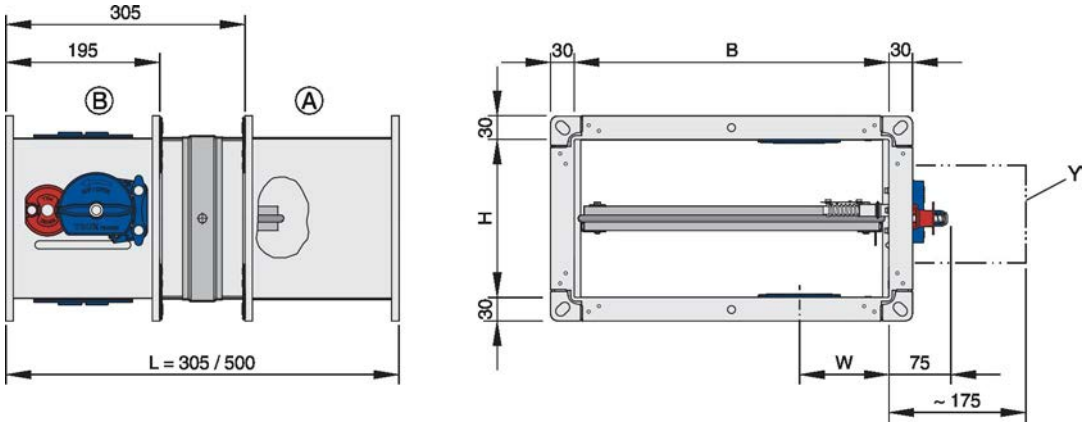


Fig. 2: FK2-EU with fusible link

B Width of the fire damper (side B)
H Height of the fire damper (side H)
L Length of the fire damper (casing length)
W: 115 mm

Y Keep clear to provide access for operation
A Installation side
B Operating side

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

Weight [kg] for casing length L = 305 [mm] / L = 500 [mm]													
H	**B [mm]**												
[mm]	**200**	**250**	**300**	**350**	**400**	**450**	**500**	**550**	**600**	**650**	**700**	**750**	**800**
100	4/5	4/6	5/6	5/7	6/8	6/9	7/9	7/10	8/11	8/11	9/12	9/13	10/13
150	4/6	5/7	5/7	6/8	7/9	7/10	8/10	8/11	9/12	9/13	10/13	10/14	11/15
200	5/7	6/7	6/8	7/9	7/10	8/11	9/12	9/12	10/13	10/14	11/15	12/16	12/16

Flange holes

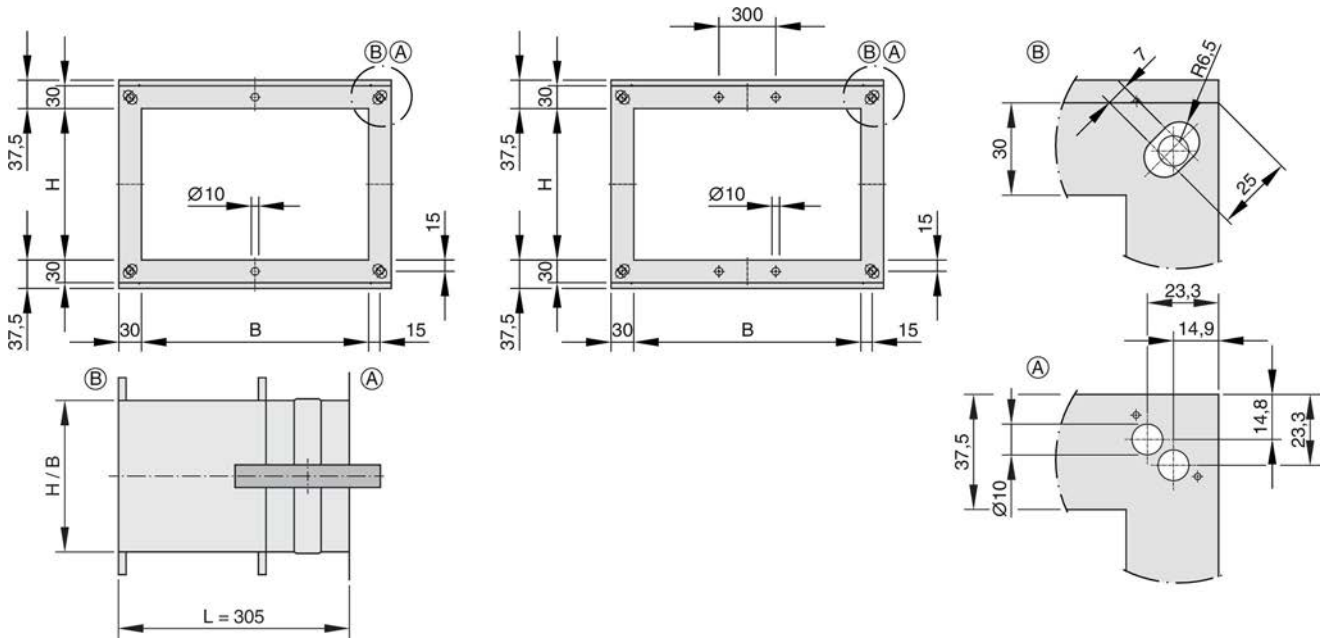


Fig. 3: Flange holes L = 305 mm – uneven and even number of holes

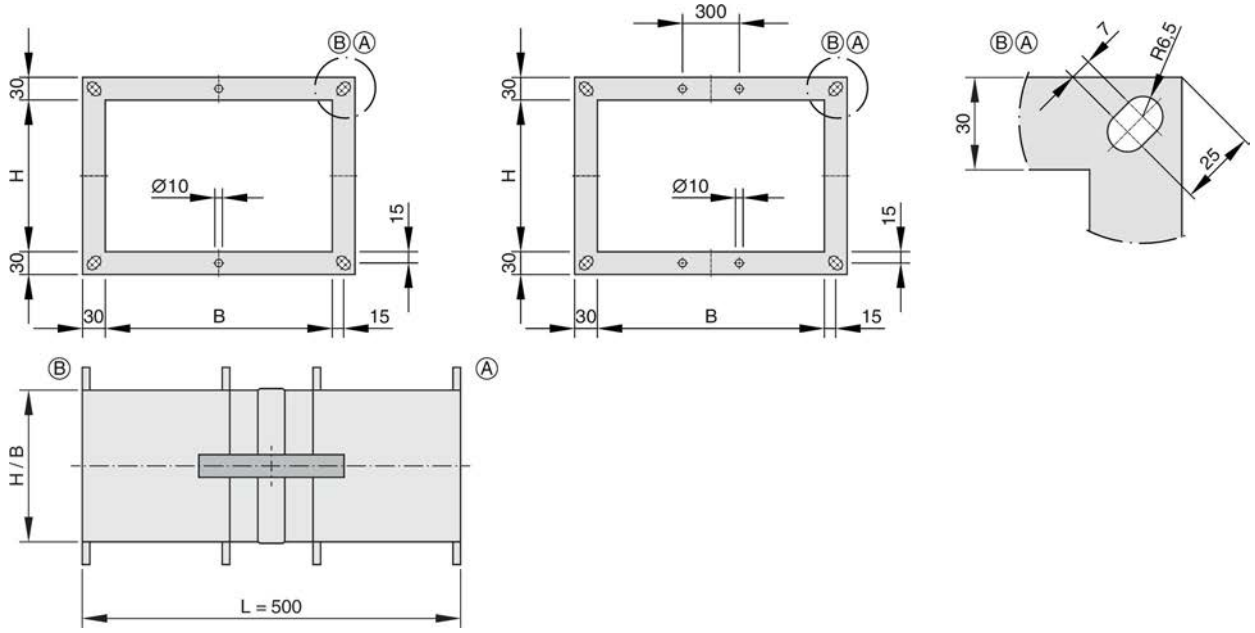


Fig. 4: Flange holes L = 500 mm – uneven and even number of holes

A Installation side
B Operating side

B or H [mm]	100 150	200	250 300	350	400	450 500	550 600	650 700	750 800
Number of holes, side B*	–	0	0	0	1	1	1	2	2
Number of holes, side H*	0	0	–	–	–	–	–	–	–

* Number of holes horizontally (B) or vertically (H), but without corner holes; B < 400 mm and H only with corner holes

2.3 FK2-EU with spring return actuator

Dimensions and weight

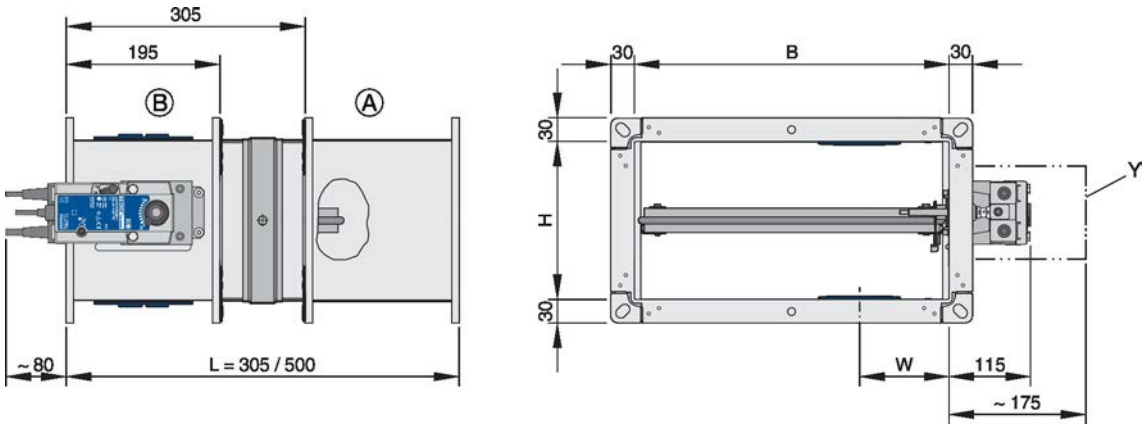


Fig. 5: FK2-EU with Belimo spring return actuator

B Width of the fire damper (side B)
H Height of the fire damper (side H)
L Length of the fire damper (casing length)
W: 115 mm

Y Keep clear to provide access for operation
A Installation side
B Operating side

- Weight of FK2-EU with fusible link + approx. 1 kg, see table *8*.

Spring return actuator BFL...			
Construction		**230-T TR**	**24-T-ST TR**
Supply voltage		230 V AC, 50/60 Hz	24 V AC/DC, 50/60 Hz
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 21.6 – 28.8 V DC
Power rating	Spring winding mechanism / hold position	3.5 W / 1.1 W	2.5 W / 0.8 W
	Rating	6.5 VA	4 VA
Running time	Actuator / spring return	< 60 s / < 20 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA – 3 (0.5 inductive) A	
	Contact resistance	< 1 Ω (when new)	
IEC protection class / IP protection		II / IP 54	
Storage temperature / ambient temperature		-40 – 55 °C / -30 – 55 °C [1]	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm² / 1 m, 6 × 0.75 mm² (free of halogens)	

[1] Up to 75 °C the safe position will definitely be reached.

Dimensions and weight

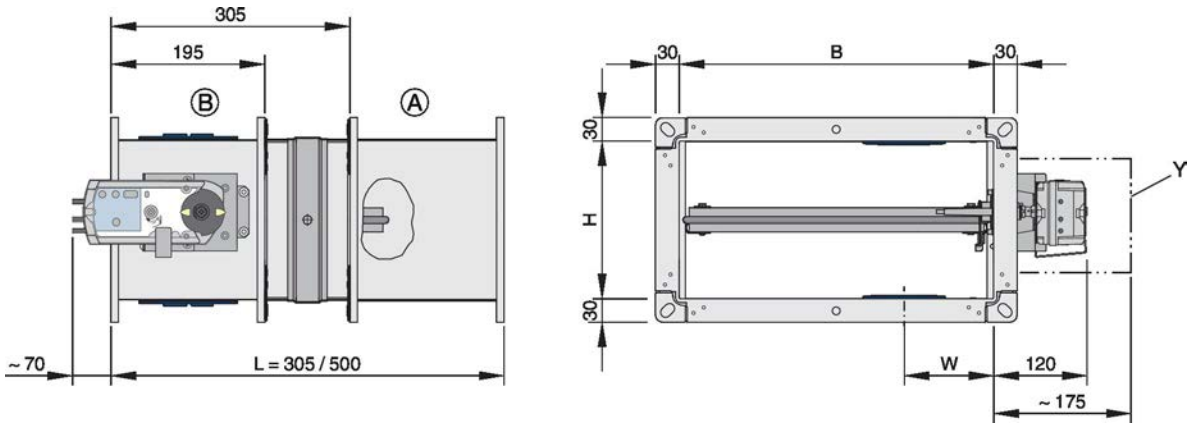


Fig. 6: FK2-EU with Siemens spring return actuator

B Width of the fire damper (side B)
H Height of the fire damper (side H)
L Length of the fire damper (casing length)
W: 115 mm
Y Keep clear to provide access for operation
A Installation side
B Operating side

- Weight FK2-EU with fusible link + approx. 1.4 kg, see table *8*.

Spring return actuator GRA...			
Construction		**326.1E**	**126.1E**
Supply voltage		230 V AC, 50/60 Hz	24 V AC, 50/60 Hz / 24 – 48 V DC
Functional range		198 – 264 V AC	19.2 – 28.8 V AC 19.2 – 57.6 V DC
Power rating	Spring winding mechanism	7 VA / 4.5 W	5 VA / 3.5 W
	Hold position	3.5 W	2 W
Running time	Actuator / spring return	90 s / 15 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	24 – 230 V AC / 12 – 30 V DC	
	Switching current	AC: 6 A (inductive 2 A) / DC: 2 A	
IEC protection class / IP protection		II / IP 42 or IP 54*	III / IP 42 or IP 54*
Storage temperature / ambient temperature		-20 to 50 °C / -20 to 50 °C	
Ambient humidity		< 95% rh, no condensation	
Connecting cable	Actuator / limit switch	0.9 m, 6 × 0.75 mm² (free of halogens)	

*Connecting cable at the bottom

FK2-EU with Joventa spring return actuator

The FK2-EU can also be supplied with Joventa spring return actuator on request:

- SFR 2.90 T
- SFR 1.90 T
- SFR 1.90 T SLC

2.4 FK2-EU with spring return actuator and duct smoke detector

Dimensions and weight

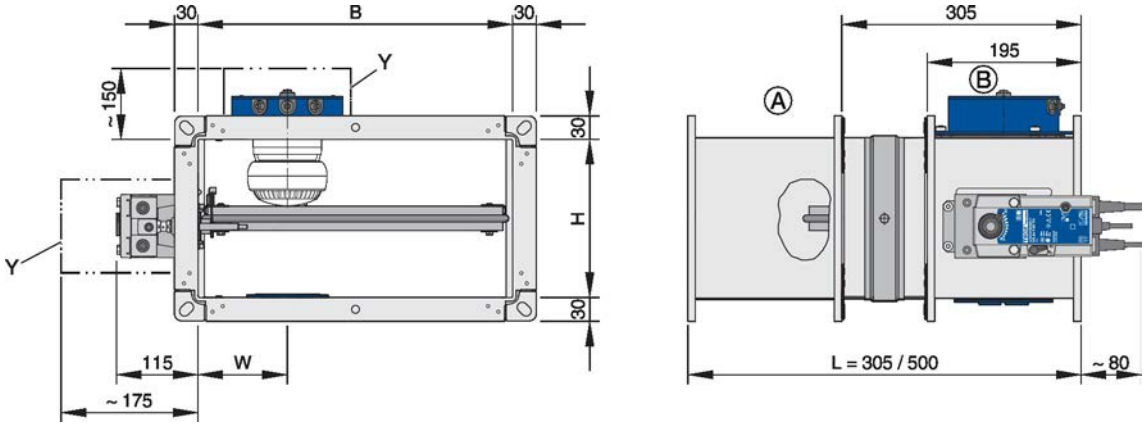


Fig. 7: FK2-EU with Belimo spring return actuator and duct smoke detector

B	Width of the fire damper (side B)	Y	Keep clear to provide access for operation
H	Height of the fire damper (side H)	A	Installation side
L	Length of the fire damper (casing length)	B	Operating side
W:	115 mm		

- Weight of FK2-EU with fusible link + approx. 2.5 kg, see table *8*.
- Technical data for spring return actuator, see table *10*
- The type RM-O-3-D duct smoke detector must be installed in the lower inspection access and arranged at the top when assembling the fire damper. For technical details on the duct smoke detector, see the operating and installation manual for the type RM-O-3-D duct smoke detector.

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.

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

> ***Colour hues on the damper blade***
>
> *The blades of fire dampers are treated with a greenish impregnating agent. Resulting colour hues on the damper blade are due to technical reasons and do not constitute a defect of any kind.*

Transport on site

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

Storage

If the unit has to be stored temporarily:

- Remove any plastic wrapping.
- Protect the unit from dust and contamination.
- Store the unit 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 unit below -40 °C or above 50 °C.

Packaging

Properly dispose of packaging material.

4 Parts and function

Fire dampers are used as safety related components in ventilation systems. 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 ventilation system.

If the temperature increases in the event of a fire, the damper blade closes. Release is triggered at 72 °C (95 °C in warm air ventilation systems). If the damper blade closes due to a temperature increase (i.e. in the event of a fire), it must not be reopened.

4.1 FK2-EU with fusible link

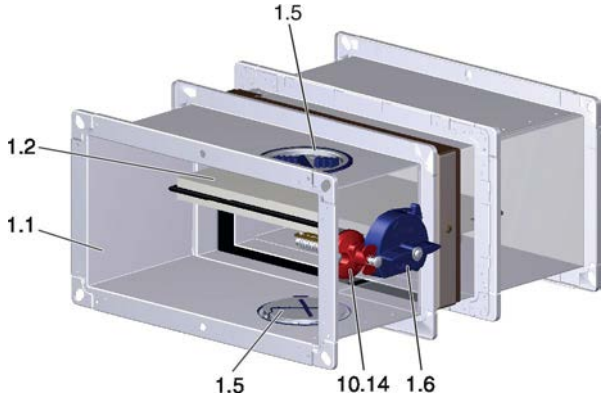


Fig. 8: FK2-EU with fusible link

1.1 Casing (galvanised)
1.2 Damper blade
1.5 Inspection access
1.6 Handle
10.14 Thermal release mechanism with fusible link

Functional description

In fire dampers with a fusible link, damper closure is triggered by the fusible link. If the temperature inside the fire damper rises to 72 °C or 95 °C, the fusible link triggers a coil spring mechanism. The coil spring mechanism then causes the fire damper to close.

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

4.2 FK2-EU with spring return actuator

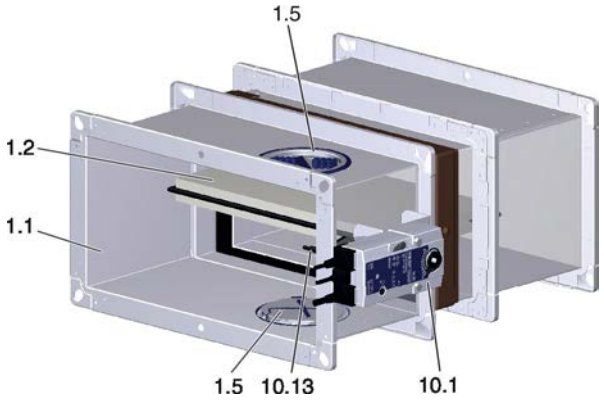


Fig. 9: FK2-EU with spring return actuator

1.1 Casing (galvanised)
1.2 Damper blade
1.5 Inspection access
10.1 Spring return actuator
10.13 Thermoelectric release mechanism with temperature sensor

Functional description

The spring return actuator enables the motorised opening and closing of the damper blade; it can be activated by the central BMS. Motorised fire dampers can be used to shut off ducts on a regular basis. As long as power is supplied to the actuator, the damper blade remains open. The spring return actuator closes the fire damper when one of the following events occur:

- Temperature in the fire damper > 72 °C or > 95 °C
- Ambient temperature outside the release mechanism > 72 °C
- The power supply is interrupted (power off to close)

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

4.3 FK2-EU with spring return actuator and duct smoke detector

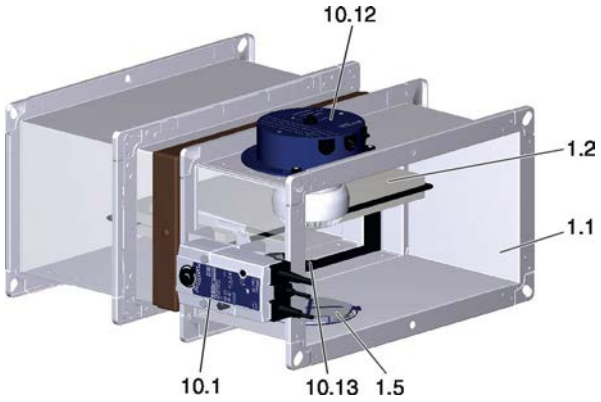


Fig. 10: FK2-EU with spring return actuator and duct smoke detector

1.1 Casing (galvanised)
1.2 Damper blade
1.5 Inspection access
10.1 Spring return actuator
10.12 Duct smoke detector RM-O-3-D (fixed with adapter metal sheet)
10.13 Thermoelectric release mechanism with temperature sensor

Functional description

If the duct smoke detector detects smoke, the spring return actuator closes the damper blade. This prevents smoke from being transferred via ductwork into adjacent fire compartments even before it reaches a temperature that would trigger the thermoelectric release mechanism.

As long as power is supplied to the actuator, the damper blade remains open. The spring return actuator closes the fire damper when one of the following events occur:

- The duct smoke detector detects smoke
- Temperature in the fire damper > 72 °C
- Ambient temperature outside the release mechanism > 72 °C
- The power supply is interrupted (power off to close)

5 Installation

5.1 Installation situations

> ***Note***
>
> *The performance classes of the fire damper and the wall or ceiling slab may differ. The lower performance class determines the performance class of the overall system.*

Installation situations						
Supporting construction	**Installation location**	**Minimum thickness [mm]**	**Class of performance up to EI TT (v_e–h_o, i ↔ o) S**	**Installation type/casing length L [mm]**		**Installation information**
				305 [3]	**500**	
Solid wall		100	EI 120 S	N	N	*30*
		100	EI 120 S	W	W	*39*
	partially with mineral wool	100	EI 90 S	N	N	*32*
	remote from	100	EI 90 S [4]	–	E	*36*
Solid ceiling slab		100 (125) [1]	EI 120 S	N	N	*41*
	with concrete base	100	EI 120 S	N	N	*44*
	in conjunction with wooden beam ceilings	125	EI 90 S	N	N	*45*
	in conjunction with solid wood ceilings	125	EI 90 S	N	N	*46*
	in conjunction with lightweight ceilings [2]	125	EI 90 S	N	N	*47*
	remote from (suspended underneath)	125	EI 90 S [4]	–	E	*48*
Lightweight partition wall	with metal support structure, also steel support structure, cladding on both sides	94	EI 120 S	N	N	*54*
		94	EI 90 S	–	E	*63*
		94	EI 120 S	W	W	*65*
	remote from	94	EI 90 S [4]	–	E	*63*
	Compartment wall with metal support structure, cladding on both sides	100	EI 120 S	N	N	*54*
		100	EI 90 S	–	E	61
		100	EI 120 S	W	W	67
	Timber stud wall (also timber panel construction), cladding on both sides	130	EI 120 S	N	N	*70*
		130	EI 90 S	–	E	*73*
		130	EI 120 S	W	W	*75*

[1] Thickness increased near the installation opening

[2] Cadolto system

[3] An extension piece may be required

[4] only horizontal installation position

N = Mortar-based installation

E = Installation kit

W = Fire batt

Installation situations						
Supporting construction	**Installation location**	**Minimum thickness [mm]**	**Class of performance up to EI TT (v_e–h_o, i ↔ o) S**	**Installation type/casing length L [mm]**		**Installation information**
				305 [3]	**500**	
		105	EI 30 S	N	N	*70*
		105	EI 30 S	–	E	*73*
		105	EI 30 S	W	W	*75*
	Half-timbered construction, cladding on both sides	140	EI 90 S	N	N	71
		140	EI 90 S	–	E	74
		140	EI 90 S	W	W	76
	Solid wood / cross-laminated timber	95	EI 90 S	N	N	*78*
		95	EI 90 S	–	E	*79*
		95	EI 90 S	W	W	*80*
Shaft wall	With metal support structure, or steel support structure, cladding on one side	90	EI 90 S	N	N	*83*
		90	EI 90 S	–	E	*86*

[1] Thickness increased near the installation opening

[2] Cadolto system

[3] An extension piece may be required

[4] only horizontal installation position

N = Mortar-based installation

E = Installation kit

W = Fire batt

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.
– Do not remove the transport and installation protection (if any) until installation is complete.

- Control elements, electric actuator and inspection access panel 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. Ducts of combustible or non-combustible materials may be connected to fire dampers if the ducts have been installed straight and without any torsion.
- Before installation: Perform a functional test, then close the fire damper ↳ *93*.
- Protect the fire damper from humidity and condensation as they will damage the fire damper.
- If the wall or ceiling is very thick, use an extension piece.
- ≥40 mm distance to load-bearing structural elements unless stated otherwise for a particular installation situation.
- When installing the FK2-EU, the statics of the support structure (wall / ceiling) must be ensured by others, even in the event of a fire.
- A maximum of two fire dampers can be installed in the same opening unless stated otherwise in the respective installation details.
- If several fire dampers are used on the same duct, the following has to be ensured: If one damper closes, the maximum permitted upstream velocity for the other fire dampers that remain open must not be exceeded. This has to be ensured by others; it can be ensured, for example, by switching off the fan or by using spring return actuators that prevent too many dampers closing at the same time.
- As ducts may expand and walls may become deformed in the event of a fire, we recommend using flexible connectors for the following installation situations:
  - Lightweight partition walls
  - Lightweight shaft walls
  - Fire batt systems

  The flexible connectors should be installed in such a way that they absorb both tension and compression. Flexible ducts can be used as an alternative.

  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. This can be achieved by a non-straight duct, i.e. by bends or elbows, for example. Be sure to comply with the relevant national guidelines and regulations.
- The interior of the fire damper must be accessible for maintenance work and cleaning. For this purpose, the type FK2-EU fire damper has two inspection accesses ↳ *14*. Depending on the installation configuration it may be necessary to provide additional inspection access points in the connecting ducts.

Equipotential bonding

The flange of the fire damper can be used for equipotential bonding; no holes must be drilled into the damper casing.

In the event of a fire, loads from the equipotential bonding must not affect the fire damper.

Thermal insulation

Suitable insulating materials especially for outdoor air or exhaust air components include AF/Armaflex used with Armaflex RS850 glue, or Armaflex Ultima used with Armaflex Ultima RS850 glue, from Armacell; the insulation must be glued to the entire surface. Alternatively, sheet insulation made from elastomer foam (synthetic rubber) of the fire rating class B - S3,D0 is permitted. Be sure to comply with the relevant national guidelines and regulations for combustible building materials.

Insulation is non-hazardous in terms of fire safety if the following requirements are met:

- The insulation does not impair the function of the fire damper.
- The fire damper remains accessible.
- The inspection accesses and the rating plate are accessible.
- The insulation does not penetrate walls or ceilings.

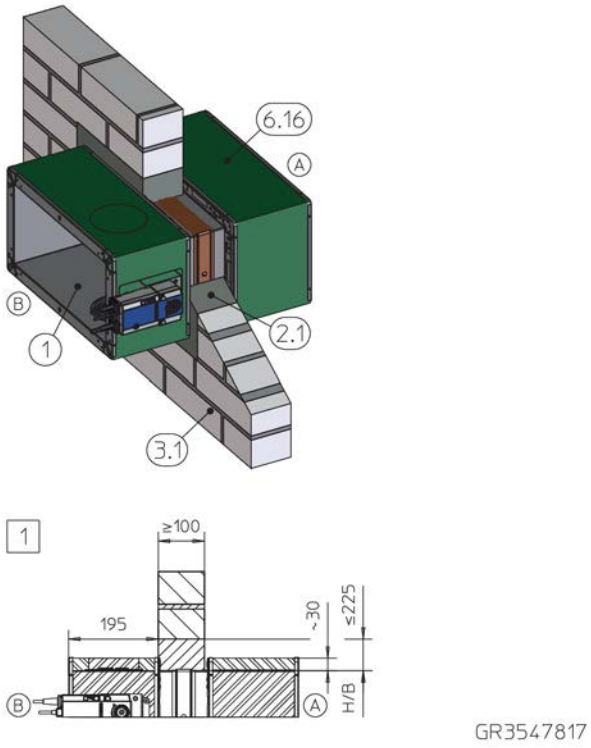


Fig. 11: Thermal insulation

1 FK2-EU
2.1 Mortar
3.1 Solid wall
6.16 Armaflex AF / Armaflex Ultima, around the perimeter, actuator and release mechanism as well as inspection accesses must be accessible
1 Up to EI 120 S
A Installation side
B Operating side

Note: The installation situation shown is representative of all support structures.

Extension pieces

To ensure that the fire damper can be connected to the ducting after installation even if the wall or ceiling is fairly thick, the fire damper should be extended with a suitable extension piece (attachment or by others) on the installation side, see also extension pieces *90*.

Installation positions

The fire damper may be installed so that the damper blade shaft is horizontal or vertical. The position of the release mechanism is not critical but the mechanism must remain accessible for maintenance (take application-specific restrictions into account).

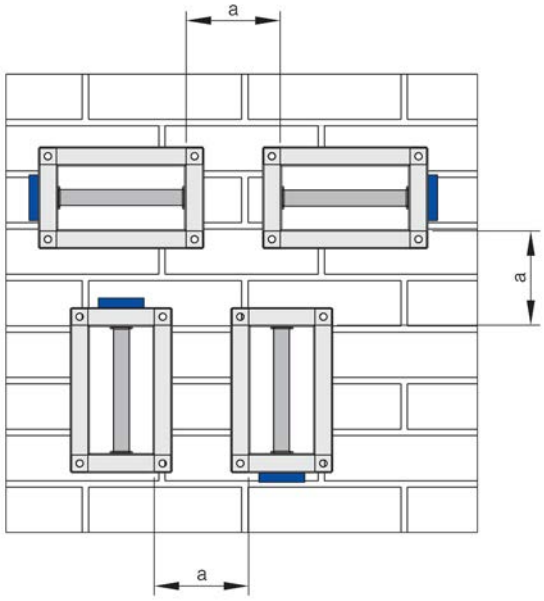


Fig. 12: Blade shaft horizontal or vertical

a Minimum distance between two fire dampers. Unless specified otherwise in the respective installation description, the installation is carried out in separate installation openings. The distance between two fire dampers is ≥ 200 mm.

The fire damper with assembled duct smoke detector must be installed in a horizontal installation position, duct smoke detector at the top, (deviations on request).

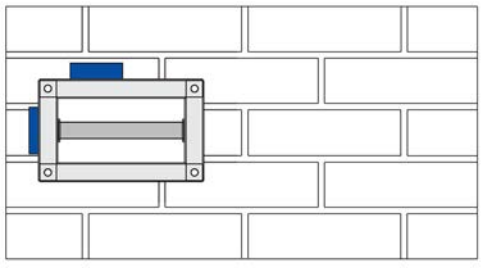


Fig. 13: Horizontal installation

Distances

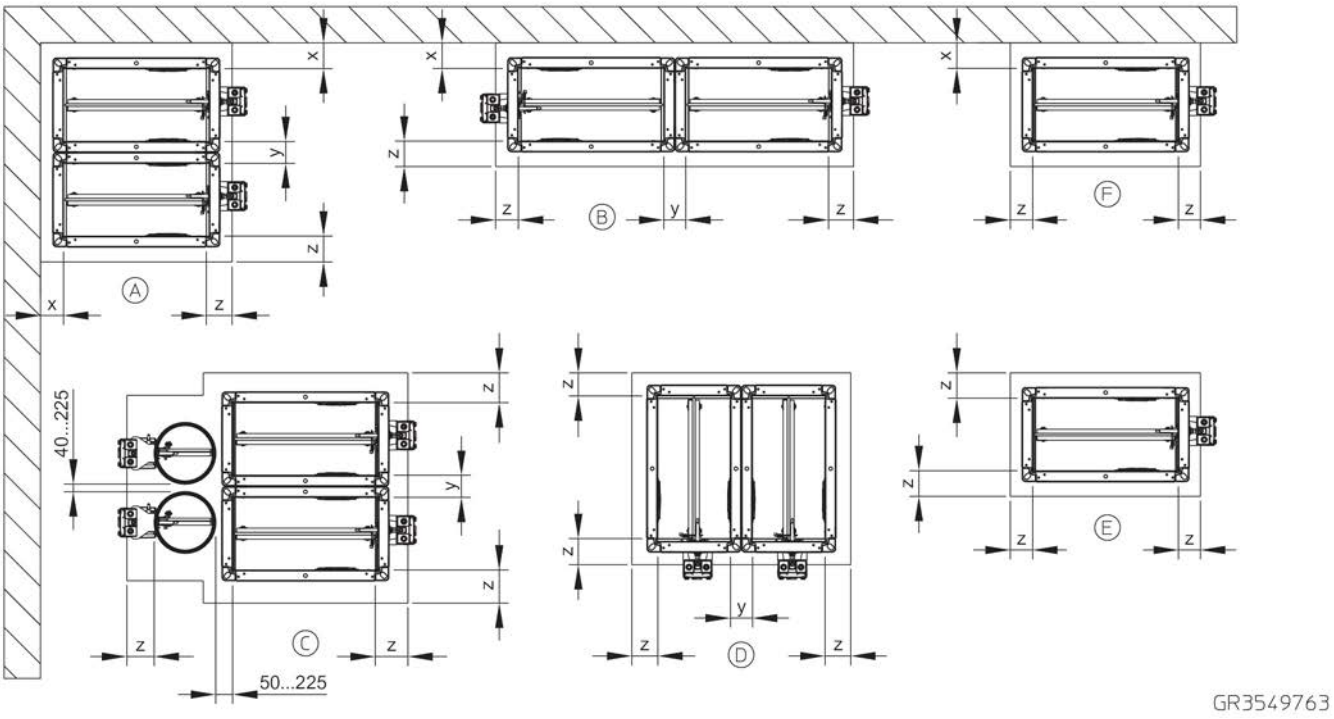


Fig. 14: Overview of distances

Installation type

Installation type	x [mm]	y [mm]	z [mm]
Mortar-based installation	40 – 225	60 – 225	≤ 225
Fire batt installation	40 – 600	≥ 200 [2]	40 – 600
Partial mortaring [1]	~ 40	60 – 225	≤ 225

[1] solid wall only

[2] installation in separate installation openings

Installation orientation

Supporting construction	Installation type		
	Mortar-based installation	Dry mortarless installation	Fire batt installation
Solid wall	A – F		E, F
Lightweight partition wall with metal support	A – F	E, F	E, F
Shaft wall	A – F	E, F	
Timber stud wall / half-timbered construction	A, B, D – F	E, F	E, F
Solid wood wall / cross-laminated timber wall	E, F	E, F	E, F
Solid ceiling slab	A, B, D – F		E, F
Wooden beam ceiling	E, F		

Supporting construction	Installation type		
	Mortar-based installation	Dry mortarless installation	Fire batt installation
Solid wood ceiling	E, F		
Lightweight ceiling (Cadolto system)	E, F		

Perimeter gap »s«

- With mortar-based installation the perimeter gap »s« must not exceed 225 mm (wall or ceiling). The perimeter gap »s« must be large enough so that mortar can be filled in even in case of thicker walls or ceilings. Be sure to close larger wall openings or holes beforehand and in a suitable way, i.e. depending on the type of wall. When there are larger openings in the solid ceiling slabs, the dampers may be encased in concrete when the ceiling section is created. The gap must be large enough so that mortar can be filled in. We recommend a gap of at least 20 mm (note the minimum installation opening size). Reinforcement should meet structural requirements.

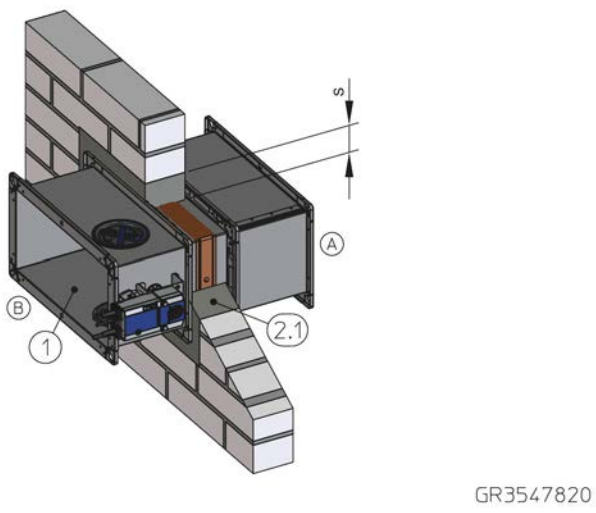


Fig. 15: Perimeter gap

1 FK2-EU
2.1 Mortar
s Perimeter gap »s«
A Installation side
B Operating side

Maximum gap widths are based on EN 15882-2. Larger gaps do not have an adverse effect with regard to fire protection and are in our opinion not critical. In case of mortar-based installation, the perimeter gap »s« must be completely closed off with mortar. Entrapped air is to be avoided. The mortar bed depth must be at least 100 mm. The mortar bed depth should be equal to the thickness of the wall. If trim panels with appropriate fire resistance are used, a mortar bed depth of 100 mm suffices.

Mortar-based installation

- In case of mortar-based installation it may be necessary to protect the sides of the fire damper casing against deformation, e.g. with a prop. Cover all openings and control elements of the fire damper (e.g. with plastic) to protect them from contamination. Position the fire damper in the centre of the installation opening, then push it in so that the distance between the operating side flange and the wall / ceiling is 195 mm.

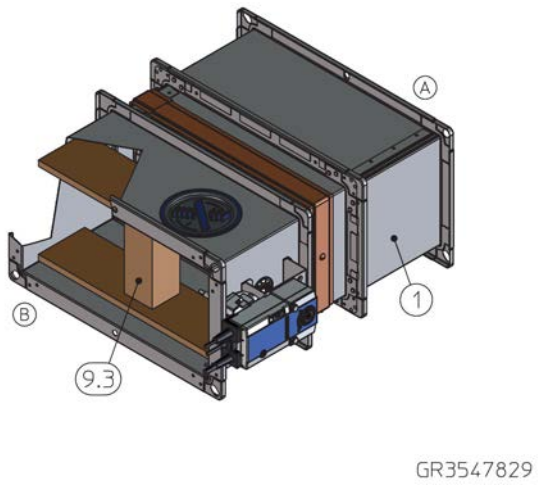


Fig. 16: FK2-EU with prop

1 FK2-EU
9.3 Prop
A Installation side
B Operating side

- If you install the fire damper as the solid wall or ceiling slab is being completed, perimeter gap »s« is not required. The open spaces between the fire damper and the wall must be closed off with mortar; for installation into solid ceiling slabs, use concrete. Reinforcement should meet structural requirements.

Mortar

- 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 ≥ 80 kg/m³ and a melting point of ≥ 1000 °C must be used.

Fire-resistant cladding

When using installation kit ES, the following materials are acceptable for the cladding of fire dampers and ducts:

- Promatect® LS35
- Promatect® L500
- Promatect® AD40

Installation with installation kit in walls

- The installation kit must be assembled by others in accordance with the planned use.
- Enough clear space is required to attach the installation kit to the wall, at least 120 mm around the perimeter
- The installation kit ES is fastened with dry wall screws ∅ 5.5 mm and brackets, whereby the dry wall screws must always engage with the metal support structure. The dry wall screws must be long enough so that the damper can be firmly fastened. The holes of the fixing points on the B side are made in the factory.
- For installation near the floor or ceiling, professionally shorten the installation kit on one side. Then use the brackets that were previously on sides B and fix them in the upper parts of sides H (see installation details). The holes must be pre-drilled to ∅ 4 mm.

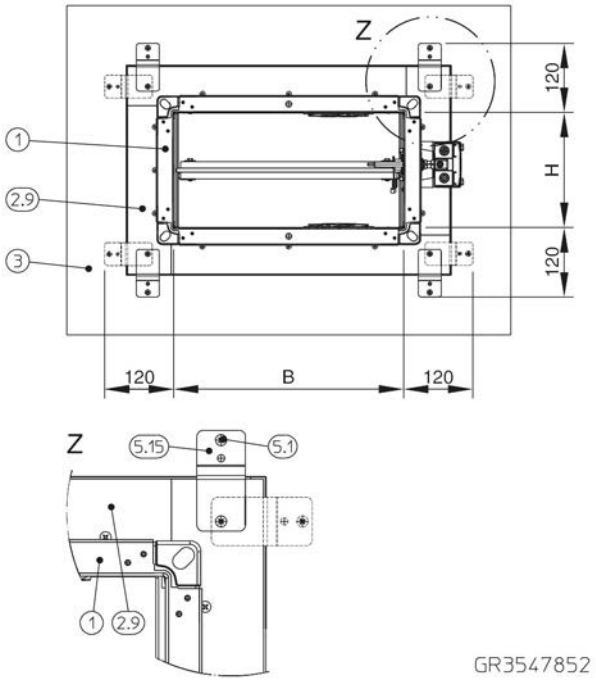


Fig. 17: Installation kit – free space (with normal installation)

1 FK2-EU
2.9 Installation kit ES
3 Wall
5.1 Dry wall screw, to be provided by others
5.15 Bracket

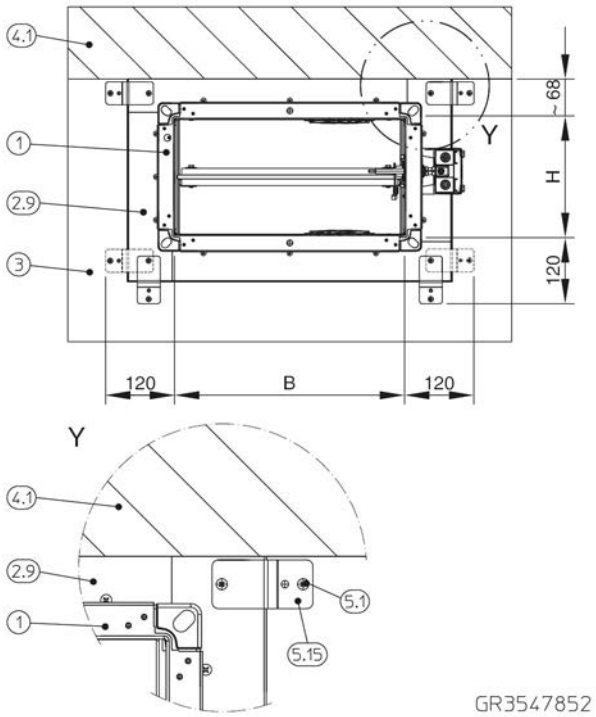


Fig. 18: Installation kit – free space (for installation near the floor or ceiling)

1 FK2-EU
2.9 Installation kit ES
3 Wall
4.1 Solid ceiling slab / solid floor
5.1 Dry wall screw, to be provided by others
5.15 Bracket

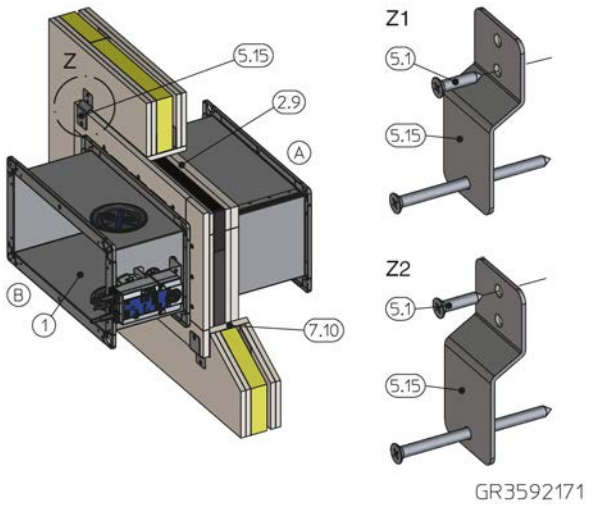
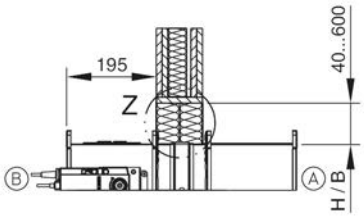


Fig. 19: Fastening the installation kit to the stud frame

1 FK2-EU
2.9 Installation kit ES
5.1 Dry wall screw, to be provided by others
5.15 Bracket
7.10 Trim panels
Z1 Fastening – with or without simple trim panels
Z2 Fastening – with double trim panels
A Installation side
B Operating side

Installation with fire batt

- The distance from the operating side flange to the wall or ceiling has to be 195 mm.
- Fire batt systems consist of two layers of mineral wool slabs, gross density ≥ 140 kg/m³.
- Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the installation opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant or coating. Use only sealant or coating that is suitable for the fire batt system.
- Apply ablative coating to the mineral wool slabs, joints, transitions and any imperfections on the coated mineral wool slabs; coating thickness ≥ 2.5 mm.
- No use in combination with a flexible ceiling joint.
- Fix fire dampers on both sides of the wall, see 89.
- If the ceiling is fairly thick, you may use additional layers of mineral wool slabs on side A.



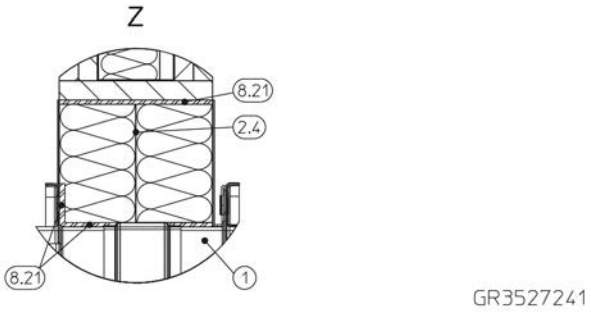


Fig. 20: Fire-resistant sealant

1 FK2-EU
2.4 Fire batt with ablative coating
8.21 Fire-resistant sealant
A Installation side
B Operating side

Fire batt systems

The following fire batt systems are acceptable (fire batt systems have to be provided by others). As for mineral wool slabs, all slabs that are part of the system and have been approved by the manufacturer may be used.

Promat®

- Ablative coating Promastop®-CC

Hilti

- Ablative coating CFS-CT and CP 673
- Fire-resistant sealant CFS-S ACR

HENSEL

- Ablative coating HENSOMASTIK® 5 KS Farbe
- Fire-resistant sealant HENSOMASTIK® 5 KS Spachtel

SVT

- Ablative coating PYRO-SAFE FLAMMOTECT-A Farbe
- Fire-resistant sealant PYRO-SAFE FLAMMOTECT-A Spachtel

OBO Bettermann

- Ablative coating PYROCOAT® ASX Farbe
- Fire-resistant sealant PYROCOAT® ASX Spachtel

Würth

- Ablative coating Würth Ablationsbeschichtung I ('Ablation coating I')

AGI

- Ablative coating PYRO-SAFE Flammotect Combi S90
- Fire-resistant sealant AGI Flammotect COMBI S90

Fire batt system	B max. [mm]	H max. [mm]
Promat®	≤ 3750	≤ 1840
Hilti	≤ 3000	≤ 2115
Hensel	≤ 1900	≤ 1400
SVT		
OBO Bettermann		
Würth		
AGI		

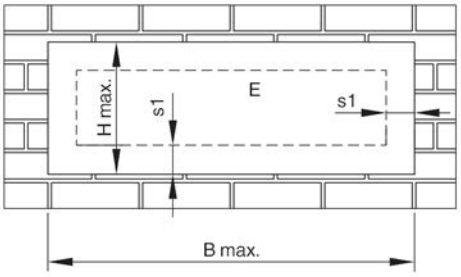


Fig. 21: Fire batt – installation in a solid wall, lightweight partition wall or timber stud wall

E Installation area

Dimensions and distances for fire batt systems for wall installation

Damper combination up to EI 90 S	s1 min. [mm]	s1 max. [mm]
FK2-EU	40	600

Requirements for wall and ceiling systems

FK2-EU fire 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

- 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 ≥ 350 kg/m³.
- Wall thickness W ≥ 100 mm.
- Provide each installation opening according to the local and structural conditions and with regard to the size of the fire damper.

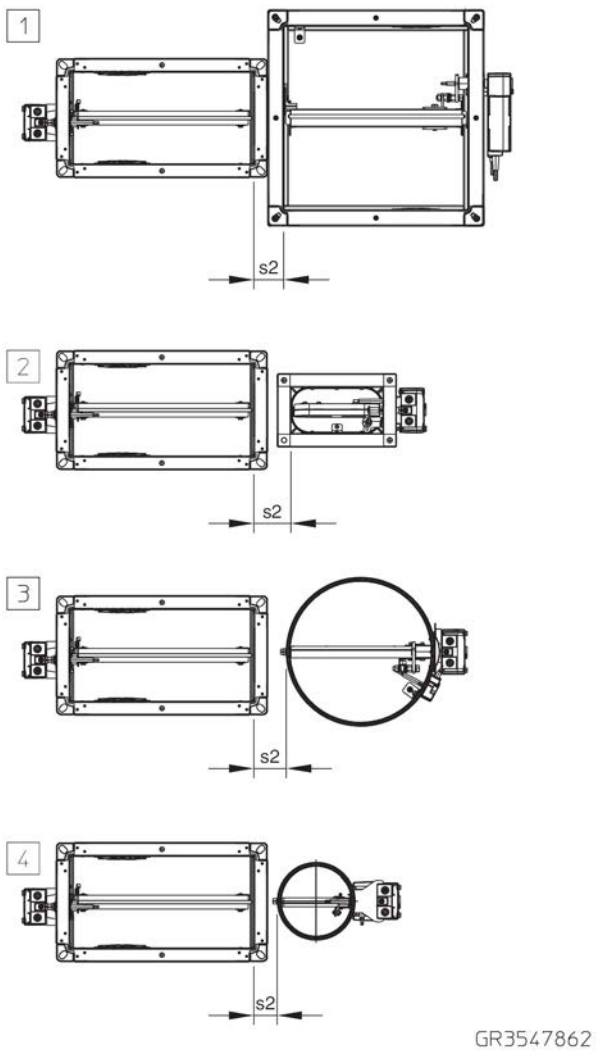


Fig. 22: Distance from the FK2-EU to other TROX fire dampers in mortar-based installation

Distance between different TROX fire dampers in mortar-based installation in solid walls (one installation opening)

Item no.	Damper combination up to EI 90 S	s2 [mm]
1	FK2-EU – FK-EU	65 – 225
2	FK2-EU – FKS-EU	80 – 150
3	FK2-EU – FKR-EU	70 – 120 (80 – 120 with flange construction)
4	FK2-EU – FKRS-EU	50 – 225

Solid ceiling slabs

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete (gross density ≥ 450 kg/m³).
- Ceiling thickness D ≥ 100 mm, thickness increased to D ≥ 125 mm. The additional concrete crown is permitted without reinforcement up to a height of 150 mm. For greater heights, a reinforced concrete base must be installed.
- In combination with fire-resistant wooden beam ceilings (gluelam also), solid wood ceilings and lightweight ceilings (Cadolto module ceiling system only).

Lightweight partition walls with metal support structure

- Lightweight partition walls, safety partition walls or walls to provide radiation protection, with metal support structure or steel support structure (box sections), with European classification to EN 13501-2 or equivalent national classification.
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Wall thickness W ≥ 94 mm (≥ 75 mm for F30), compartment walls or safety partition walls W ≥ 100 mm.
- Distance between metal studs ≤ 625 mm; distance between metal studs in compartment walls ≤ 312.5 mm.
- Compartment walls and safety partition walls may be provided with sheet steel inserts and may require less space between the metal studs.
- Create an installation opening with trimmers (studs and noggings).
- 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.

Lightweight partition walls with timber support structure / half-timbered construction

- Lightweight partition walls, either timber stud walls or half-timbered constructions, with European classification to EN 13501-2 or equivalent national classification.
- Cladding on both sides made of gypsum bonded or cement bonded panel materials or fibre-reinforced gypsum boards.
- Wall thickness W ≥ 130 mm (W ≥ 105 for F30); wall thickness of half-timbered constructions W ≥ 140 mm.
- Erect the half-timbered construction according to the manufacturer's instructions.
- Additional layers of cladding (if stated in the usability certificate for the wall) and double stud constructions are approved.
- Create an opening in the timber support structure with studs and trimmers.
- Trim panels and reinforcing boards have to be made of cladding material and have to be fixed to the frame.

Solid wood walls

- Fire-resistant solid wood walls or CLT walls with European or national certificate.
- Wall thickness W ≥ 95 mm (with reinforcing board W ≥ 100 mm near the installation opening).
- If required, additional gypsum bonded or cement bonded panel materials or fibre-reinforced gypsum board are permitted.

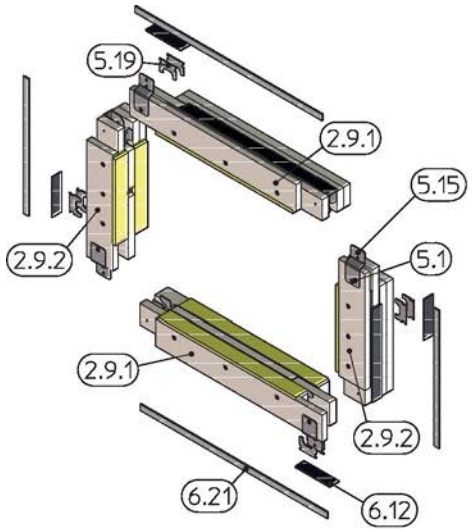
Shaft walls with metal support structure

- Shaft walls or additional leaves with metal support structure or steel support structure (box sections), with European classification to EN 13501-2 or equivalent national classification.
- Cladding on one side made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Wall thickness W ≥ 90 mm (cladding / reinforcing board according to installation details).
- ≤ 625 mm distance between metal studs.
- Be sure to follow the manufacturers' instructions for the height, width and thickness of walls.
- Create an installation opening with trimmers (studs and noggings).
- If necessary, provide trim panels and screw-fix them to the support structure
- Ensure accessibility to the shaft from the rear.
- Installation is carried out with the actuator on the outside of the shaft.

After installation

- Clean the fire damper.
- Remove transport and installation protection or the prop, if any. In case of mortar-based installation this protection must not be removed until the mortar has hardened.
- Test the function of the fire damper.
- Connect the ductwork.
- Make electrical connections.

5.3.1 Installation kit supply package and assembly ES



GR3548960

Fig. 23: Installation kit supply package ES for dry mortarless installation

2.9 Installation kit ES
2.9.1 B part (2 ×)
2.9.2 H part (2 ×)
5.1 Dry wall screw 5 × 50 mm (4 – 8 pieces, dependent on the damper size)
5.15 Bracket (4 – 8 pieces, dependent on the damper size)
5.19 Connecting clip (8 pieces)
6.12 Intumescent seal (4 pieces)
6.21 Kerafix 2000 sealing tape

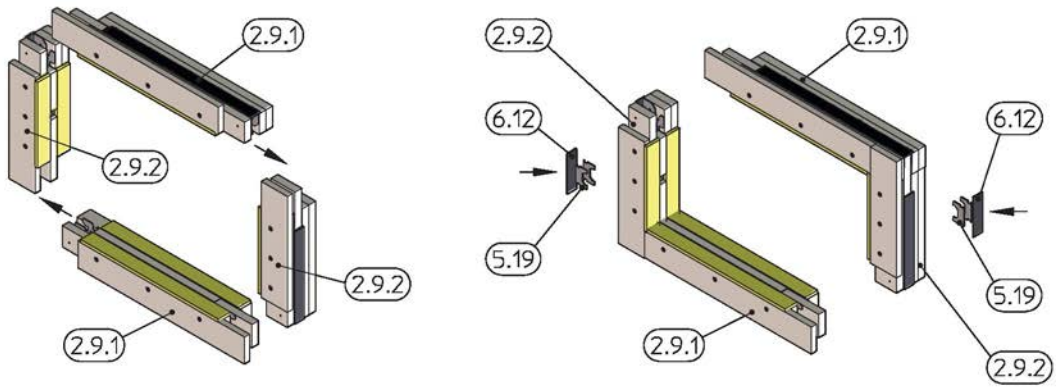


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Fig. 24: Assembly of installation kit ES for dry mortarless installation

2.9 Installation kit ES
2.9.1 B part (2 ×)
2.9.2 H part (2 ×)
5.19 Connecting clip (8 pieces)
6.12 Intumescent seal (4 pieces)

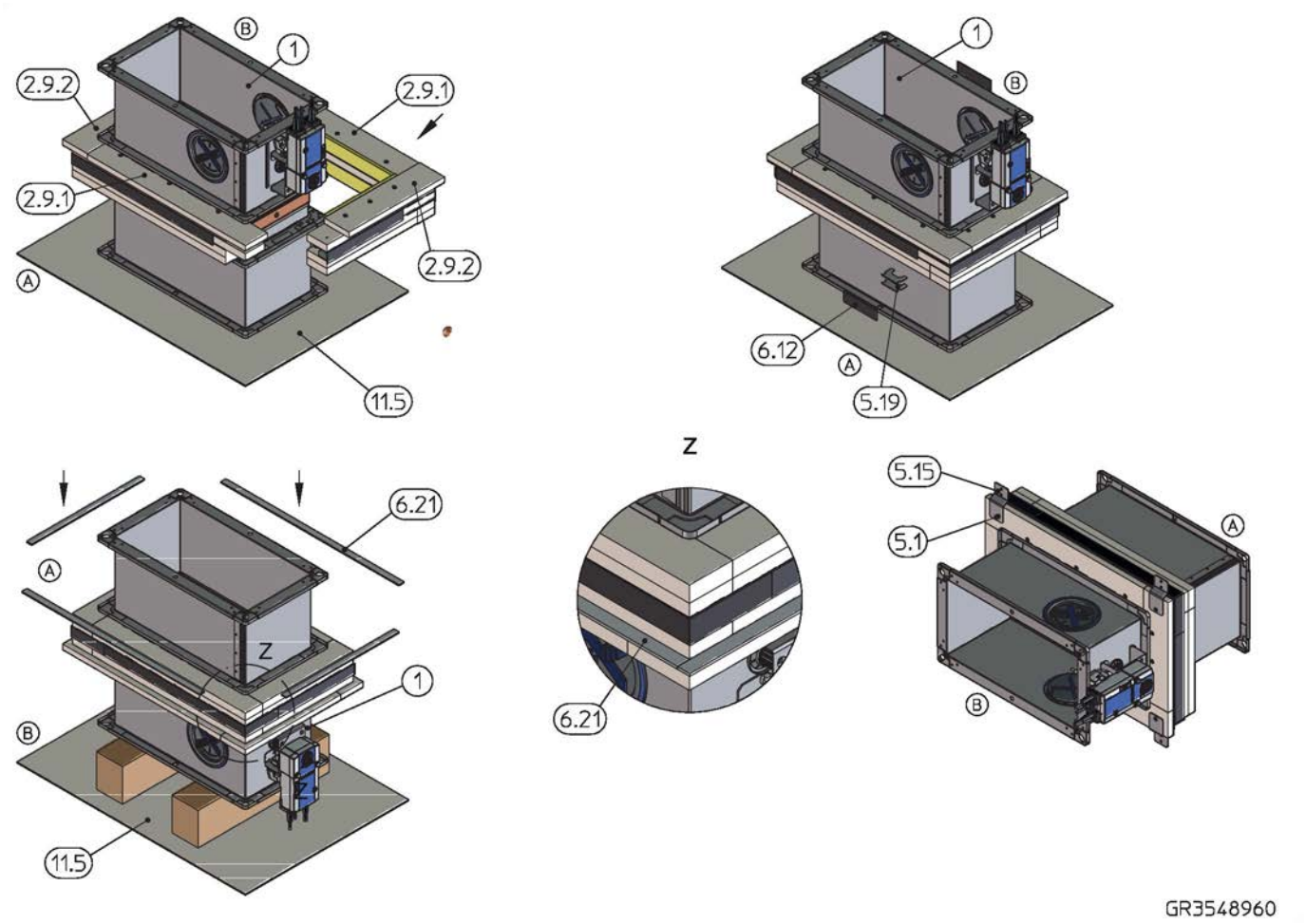


Fig. 25: Assembly of installation kit ES for dry mortarless installation

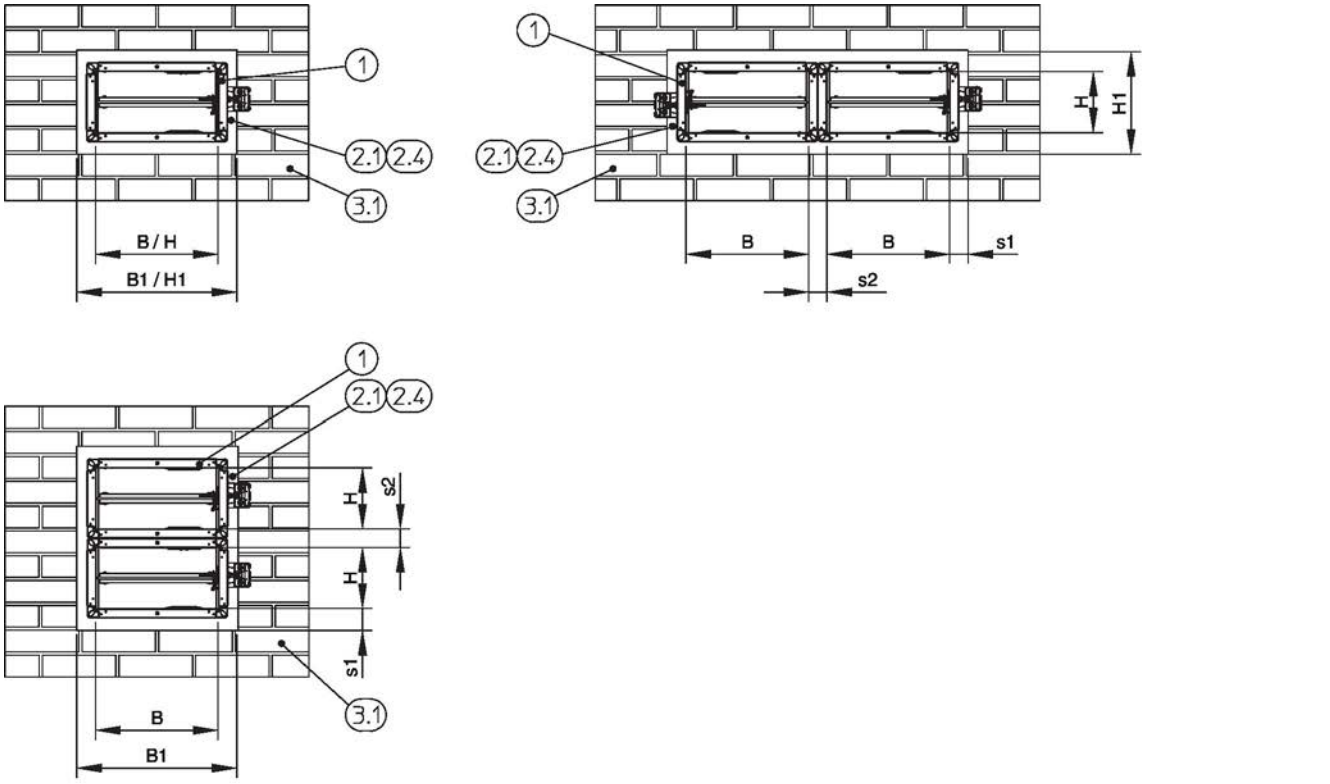
1	FK2-EU	5.19	Connecting clip
2.9	Installation kit ES	6.12	Intumescent seal
2.9.1	B part (2 ×)	6.21	Kerafix 2000 sealing tape
2.9.2	H part (2 ×)	11.5	Base
5.1	Dry wall screw 5 × 50 mm	A	Installation side
5.15	Bracket	B	Operating side

1. In each case, join one B part (2.9.1) and one H part (2.9.2) and fix with two connecting clips (5.19), then apply intumescent seal (6.12), Fig. 23.
2. Place the fire damper (1) with the flange on the installation side A on a base (11.5) made of cardboard or wood.
3. Place the two installation kit parts that were joined together beforehand around the fire damper, join them together also and fix with connecting clips (5.19), then apply intumescent seal (6.12).
4. Turn the fire damper (1) with the flange towards operating side B and apply the Kerafix 2000 sealing tape (6.21) along the perimeter.
5. Screw in the brackets (5.15) for fastening to the wall on the installation kit with dry wall screw (5.1). The number and position of the brackets are dependent on the size and correspond with the drilled holes made in the factory.
6. For subsequent assembly and installation steps see the installation details.

Installation kit remote from walls

- For installation remote from walls and ceilings, the intumescent seal (6.12) on the installation kit ES must be removed from the perimeter by others.
- The sealing tape (6.21) may not be affixed.

5.4 Solid walls



GR3548012

Fig. 26: Solid walls – arrangement / distances

1 FK2-EU
2.1 Mortar
2.4 Fire batt with ablative coating
3.1 Solid wall

Additional requirements: solid walls

- Solid wall *24*
- Distances and installation orientations, see *20*

Installation type	Installation opening [mm]		Distance [mm]	
	B1	H1	s1	s2
Mortar-based installation	B + 450 max.	H + 450 max.	≤ 225	60 – 225
Dry mortarless installation with fire batt [1]	H + 1200 max.	H + 1200 max.	≤ 600	-

[1)] Observe maximum permitted size of the fire batt!

5.4.1 Mortar-based installation

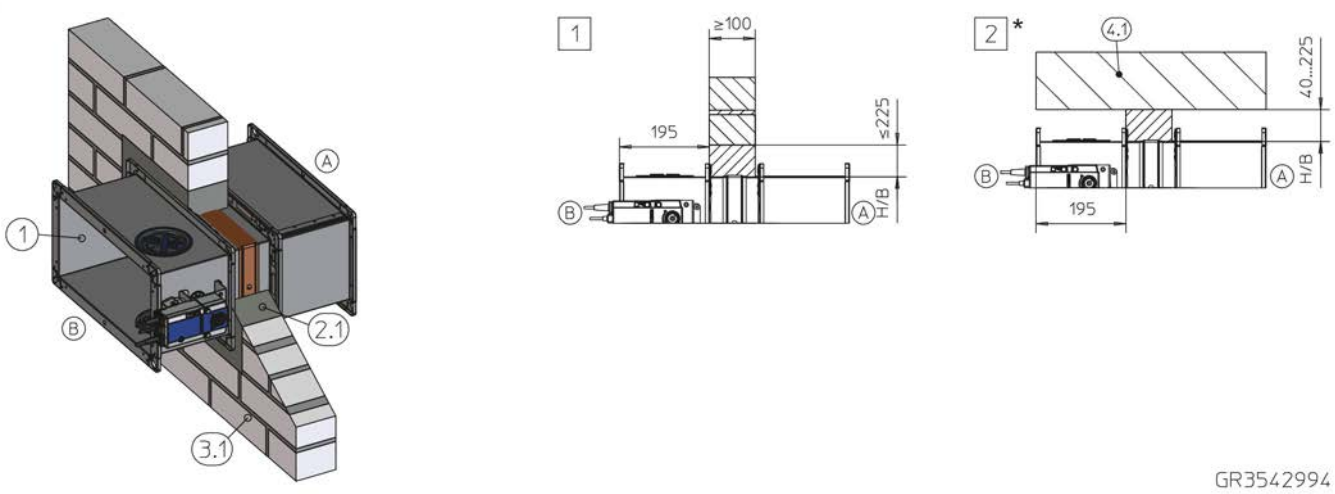


Fig. 27: Mortar-based installation into a solid wall

1	FK2-EU	*	Installation near the floor analogous to 2
2.1	Mortar	1 2	Up to EI 120 S
3.1	Solid wall	A	Installation side
4.1	Solid ceiling slab	B	Operating side

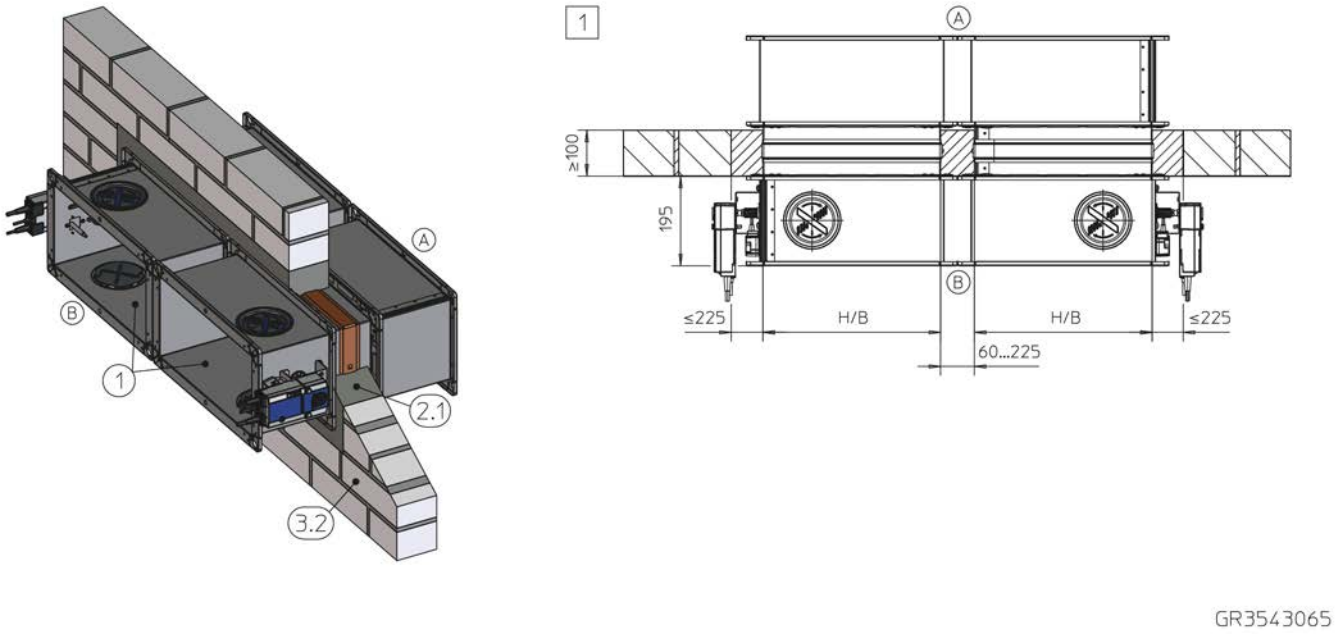


Fig. 28: Mortar-based installation into a solid wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FK2-EU	1	Up to EI 120 S
2.1	Mortar	A	Installation side
3.1	Solid wall	B	Operating side

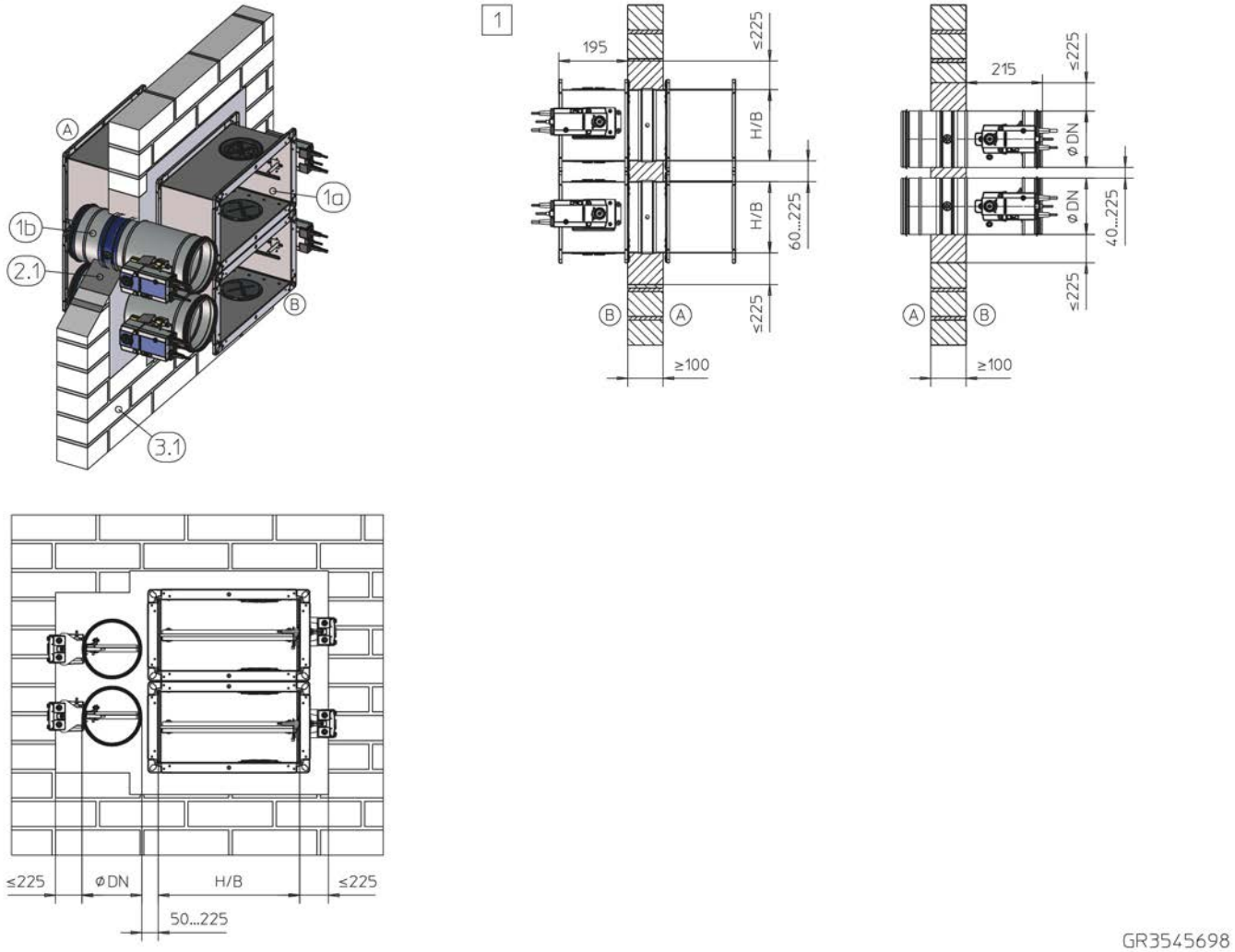


Fig. 29: Mortar-based installation into a solid wall, combined, FK2-EU und FKRS-EU

1a	FK2-EU
1b	FKRS-EU
2.1	Mortar
3.1	Solid wall
1	Up to EI 90 S
A	Installation side
B	Operating side

Note: Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.

Additional requirements: mortar-based installation in solid walls

- Solid wall *24*
- Casing length L = 305 or 500 mm

5.4.2 Mortar-based installation with partial mortaring

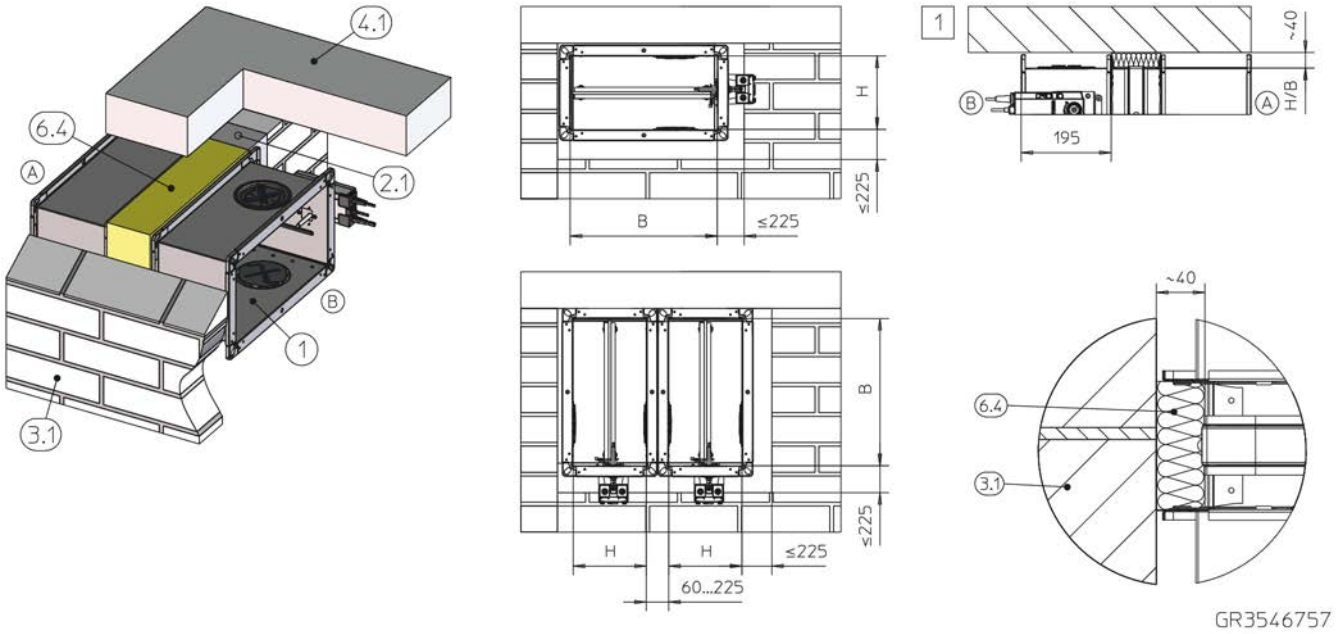


Fig. 30: Mortar-based installation into a solid wall, with partial mortaring

1	FK2-EU	6.4	Mineral wool, ≥ 1000 °C, ≥ 140 kg/m³
2.1	Mortar	1	Up to EI 90 S
3.1	Solid wall	A	Installation side
4.1	Solid ceiling slab	B	Operating side

Additional requirements: mortar-based installation in solid walls with partial mortaring

- Solid wall *24*
- Casing length L = 305 or 500 mm
- Distance between two FK2-EU in one installation opening 60 – 225 mm

1. The difficult-to-access installation gap between the FK2-EU and the wall / ceiling must be completely filled with mineral wool between the wall flanges.
2. Completely close off the remaining gaps (on 2 or 3 sides) with mortar.

5.4.3 Mortar-based installation with flexible ceiling joint

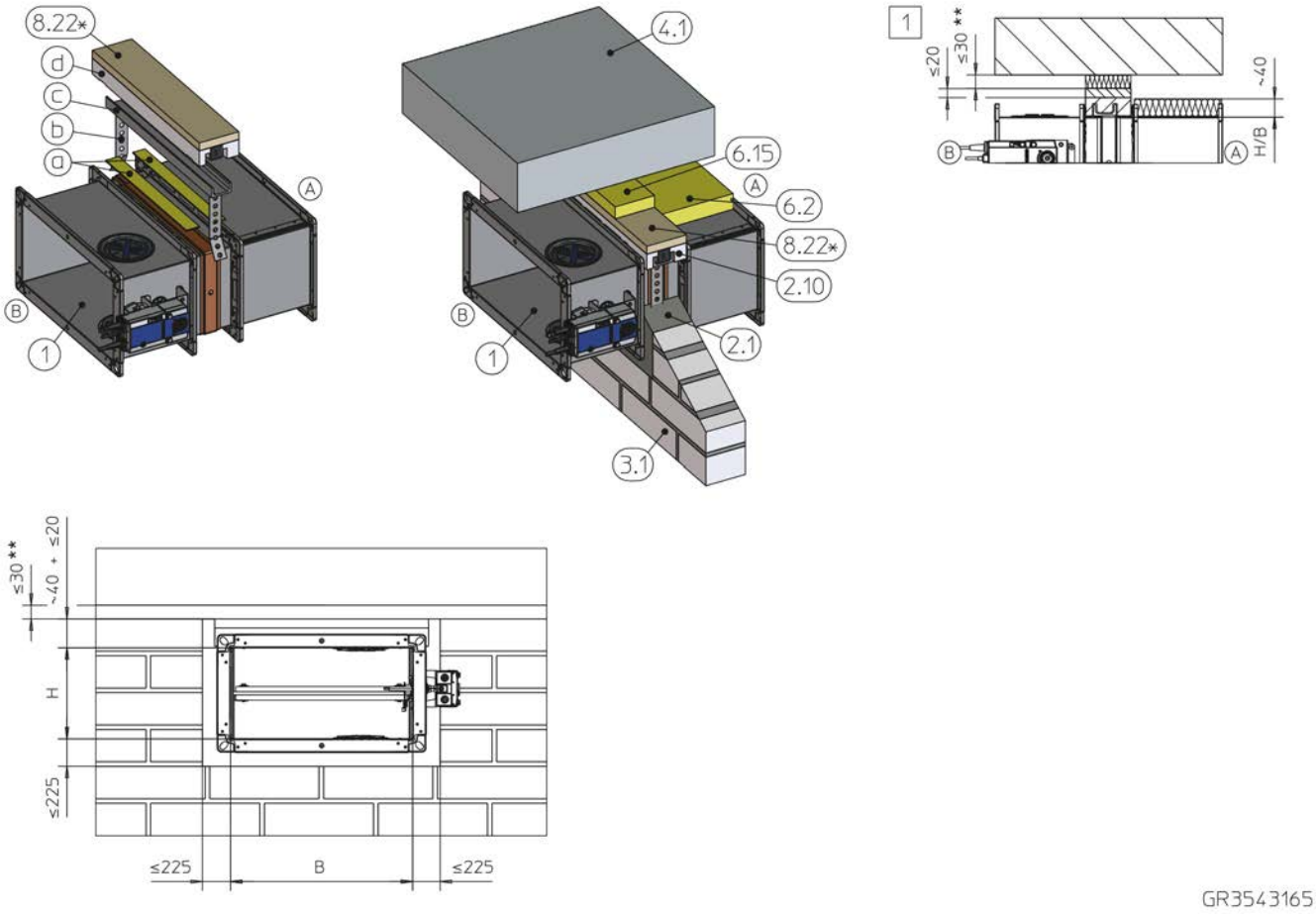


Fig. 31: Mortar-based installation into a solid wall with flexible ceiling joint, with installation kit GM

1	FK2-EU
2.1	Mortar
2.10	Installation kit GM, consisting of:
a	Mineral wool (B = 70 mm, distributed by others 2 × 35 mm)
b	Fixing tab
c	Steel channel
d	Calcium silicate board
3.1	Solid wall
4.1	Solid ceiling slab
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
6.15	Mineral wool, depending on the flexible ceiling joint**
8.22	Calcium silicate board, or alternatively mineral wool ≥ 1000 °C, ≥ 140 kg/m³
1	Up to EI 90 S
A	Installation side
B	Operating side

(1) and (2.10) are part of the supply package.

* If there is a difference of up to 20 mm between a calcium silicate board (d) and the upper edge of a wall, a calcium silicate reinforcing board or mineral wool (8.22) can be used to compensate for the difference.

**The gap between the ceiling and installation kit GM may be up to 30 mm after the ceiling has subsided. In case of a larger gap the fire damper has to be installed below a lintel.

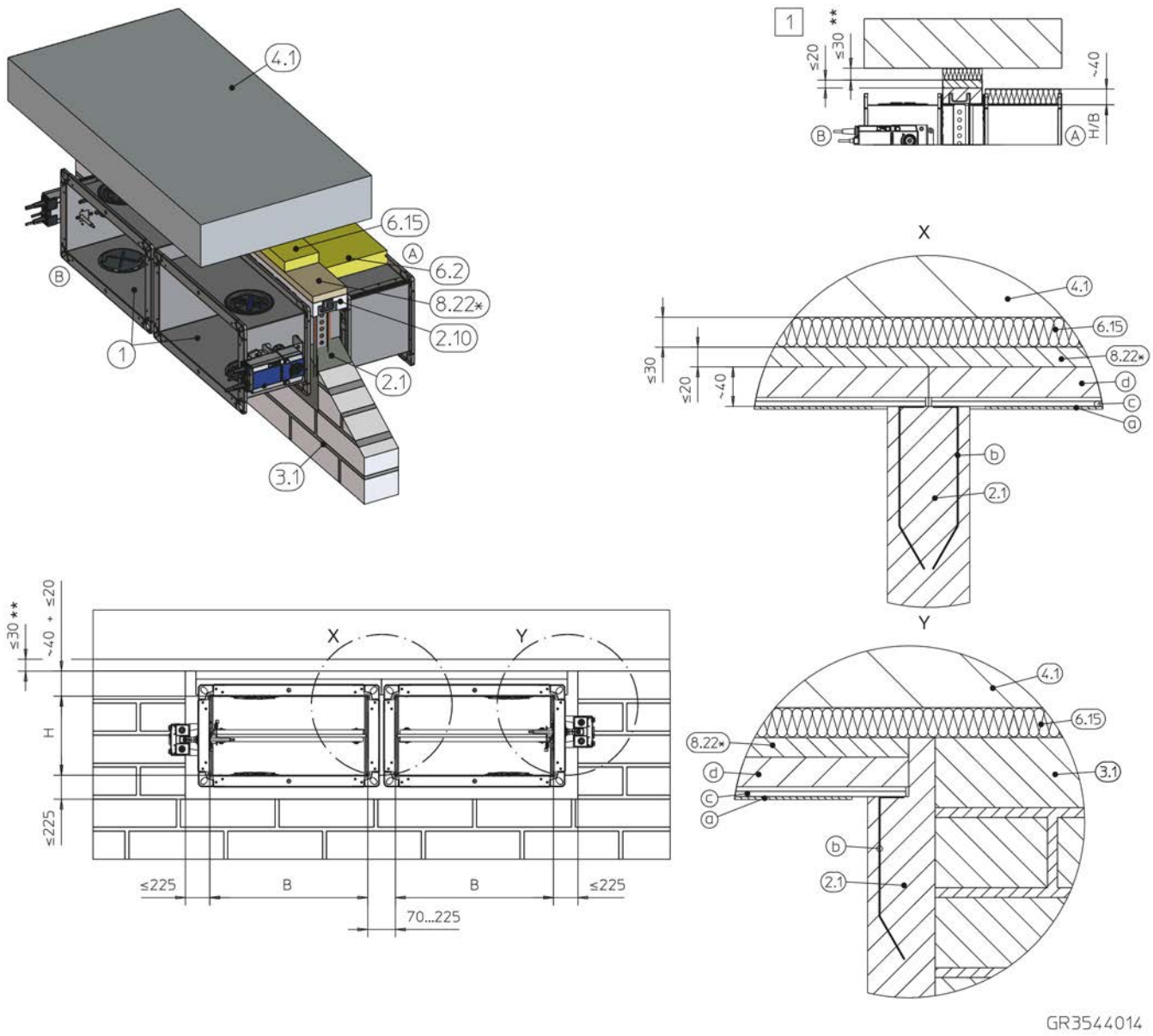


Fig. 32: Mortar-based installation into a solid wall with flexible ceiling joint (with installation kit GM), side-by-side installation

1	FK2-EU
2.1	Mortar
2.10	Installation kit GM, consisting of:
a	Mineral wool
b	Fixing tab
c	Steel channel
d	Calcium silicate board
3.1	Solid wall
4.1	Solid ceiling slab
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
6.15	Mineral wool, depending on the flexible ceiling joint**
8.22	Calcium silicate board, or alternatively mineral wool ≥ 1000 °C, ≥ 140 kg/m³
1	Up to EI 90 S
A	Installation side
B	Operating side

(1) and (2.10) are part of the supply package.

* If there is a difference of up to 20 mm between a calcium silicate board (d) and the upper edge of a wall, a calcium silicate reinforcing board or mineral wool (8.22) can be used to compensate for the difference.

**The gap between the ceiling and installation kit GM may be up to 30 mm after the ceiling has subsided. In case of a larger gap the fire damper has to be installed below a lintel.

Additional requirements: mortar-based installation in solid walls with flexible ceiling joint

- Solid wall *24*
- Horizontal installation (shaft)
- Casing length L = 500 mm
- Distance between two FK2-EU in one installation opening 60 – 225 mm
- 40 – 60 mm distance between the fire damper and the upper edge of a solid wall

1. Assembling the installation kit:
   - Place mineral wool (a) in the upper groove of the fire damper casing.
   - Bend the fixing tabs (b) on the steel channel (c) and place them on the mineral wool.
   - Place the calcium silicate board (d) on the steel channel. Ensure that the entire wide side is in contact with the flange and that the upper edge is flush with the upper edge of the wall.
   - If necessary, lay the reinforcing board made from calcium silicate or mineral wool (8.22) and secure it in position.
2. Fill the area above the fire damper up to the flange on the installation side with mineral wool (6.2) to a thickness of 40 mm.
3. Use mineral wool (depending on the flexible ceiling joint) above the installation kit.

5.4.4 Dry mortarless installation with installation kit ES

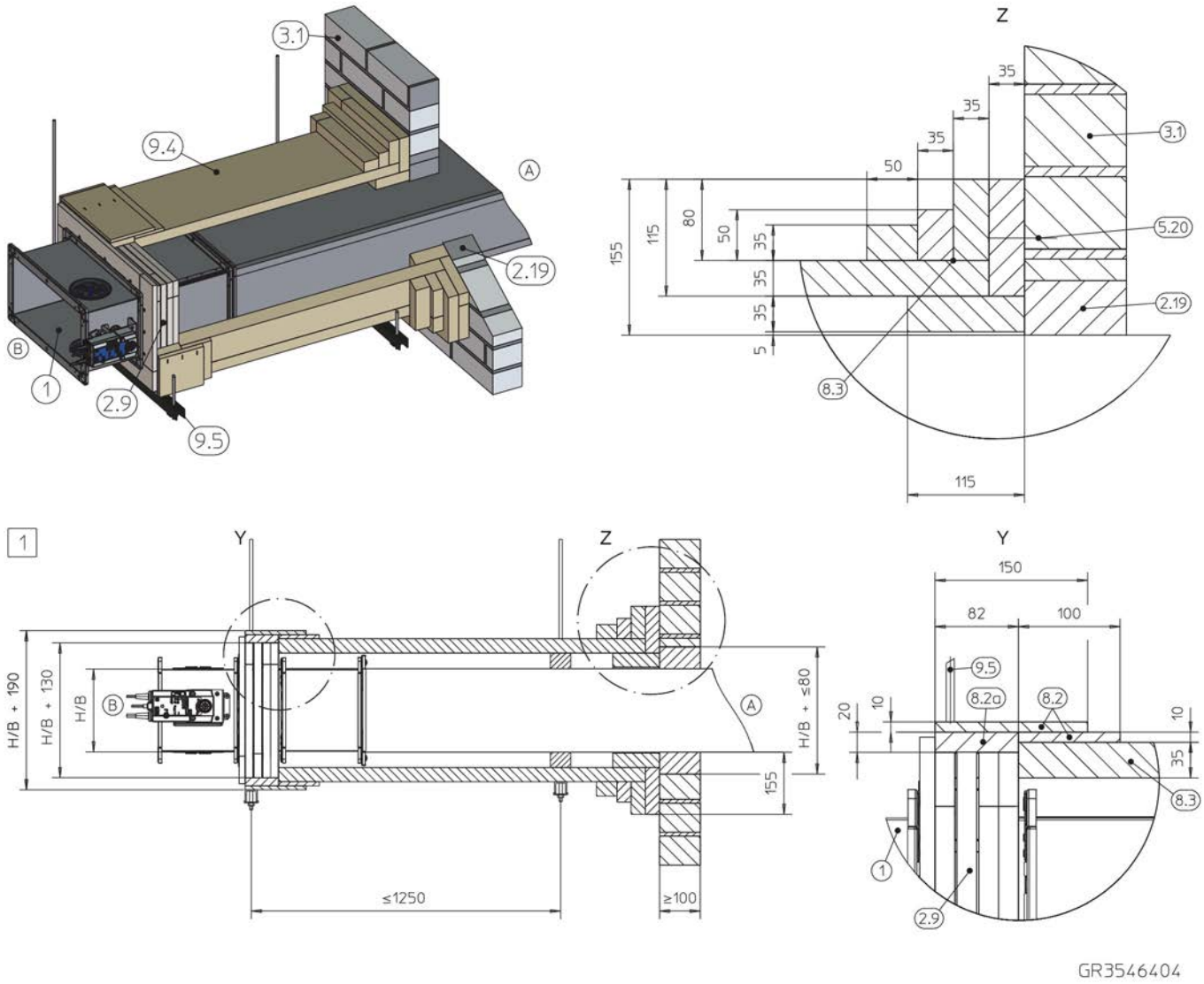


Fig. 33: Dry mortarless installation with installation kit ES, remote from a solid wall (wall-mounting type)

1 FK2-EU
2.9 Installation kit ES *
2.19 Joint filler (Promat® filler, Promat® ready-to-use putty, mineral wool ≥ 1000 °C, ≥ 80 kg/m³ or mortar)
3.1 Solid wall, wall connector according to Promat® manual, construction 478, latest edition
5.20 Screw, Fischer FFS 7.5 × 82 mm or equivalent
8.2 PROMATECT®-H, d = 10 mm
8.2a PROMATECT®-H, d = 20 mm
8.3 PROMATECT®-LS, d = 35 mm, alternative materials *22*
9.4 Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5 Suspension system (by others) consisting of:
a Threaded rod M10 – M12
b Hilti mounting rail MQ 41 × 3 mm or equivalent
c Hilti drilled plate MQZ L13 or equivalent
d Hexagon nut M10 – M12 with washer
[1] Up to EI 90 S
A Installation side
B Operating side

Note: * Remove intumescent seal (6.12) and seal (6.21) or do not affix, see *27*. Further installation details and components to be provided by the customer on request.

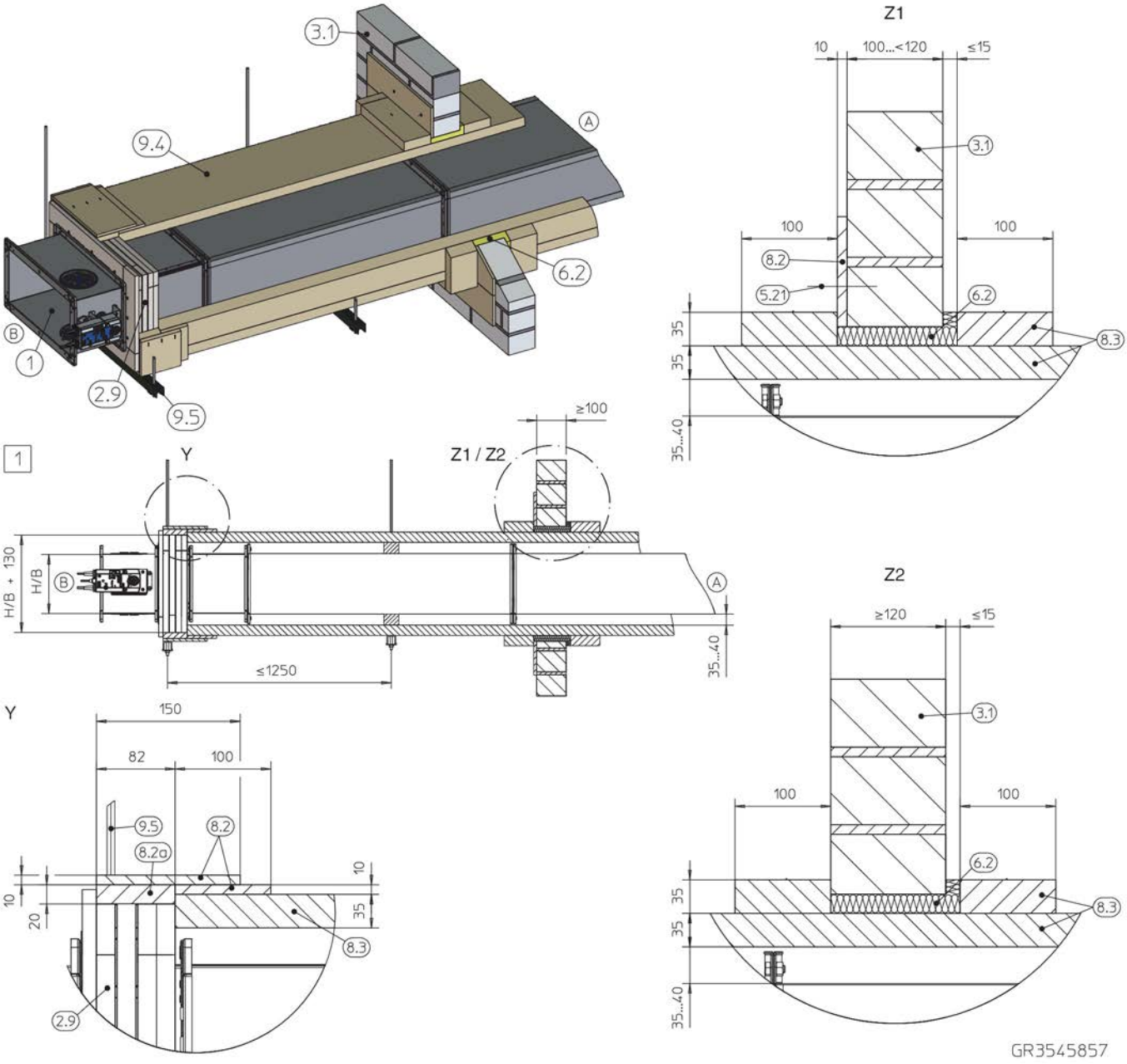


Fig. 34: Dry mortarless installation with installation kit ES, remote from a solid wall (wall penetration)

1	FK2-EU
2.9	Installation kit ES *
3.1	Solid wall, wall penetration according to Promat® manual, construction 478, latest edition
5.21	Screw / wallplug
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
8.2	PROMATECT®-H, d = 10 mm
8.2a	PROMATECT®-H, d = 20 mm
8.3	PROMATECT®-LS, d = 35 mm, alternative materials *22*
9.4	Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5	FK2-EU suspension system (by others), consisting of:
a	Threaded rod M10 – M12
b	Hilti mounting rail MQ 41 × 3 mm or equivalent
c	Hilti drilled plate MQZ L13 or equivalent
d	Hexagon nut M10 – M12 with washer
1	Up to EI 90 S
A	Installation side
B	Operating side

Note: * Remove intumescent seal (6.12) and seal (6.21) or do not affix, see *27*. Further installation details and components to be provided by the customer on request.

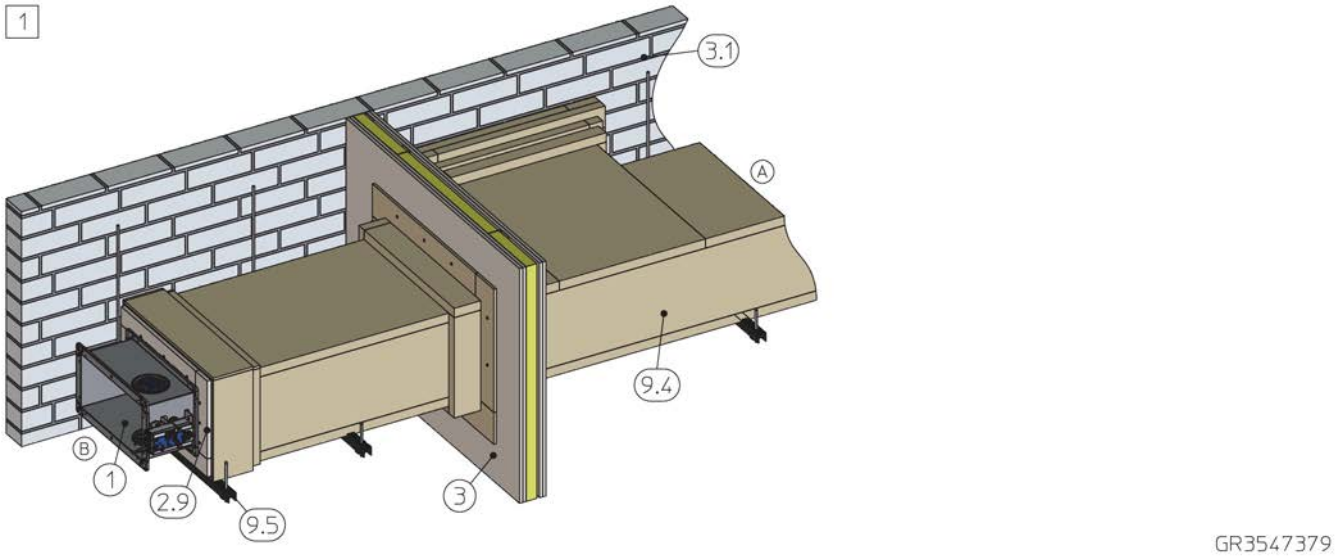


Fig. 35: Dry mortarless installation with installation kit ES, remote from a solid wall (installation variant)

1 FK2-EU
2.9 Installation kit ES *
3 Lightweight partition wall / solid wall (if any), wall penetration and wall connector according to Promat® manual, construction 478, latest edition
3.1 Solid wall, wall penetration and wall connector according to Promat® manual, construction 478, latest edition
9.4 Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5 FK2-EU suspension system (by others), consisting of:
a Threaded rod M10 – M12
b Hilti mounting rail MQ 41 × 3 mm or equivalent
c Hilti drilled plate MQZ L13 or equivalent
d Hexagon nut M10 – M12 with washer
Damper sizes > 1000 × 600 mm require two suspension points underneath the damper at a distance of 150 mm
[1] Up to EI 90 S
A Installation side
B Operating side

Note: * Remove intumescent seal (6.12) and seal (6.21) or do not affix, see *27*. Further installation details and components to be provided by the customer on request.

Additional requirements: dry mortarless installation with installation kit ES remote from solid walls

- Solid wall *24*
- Horizontal installation position
- Sheet steel ducts without any openings, with fire-resistant cladding (fittings with cladding according to instructions from Promat®)
- Casing length L = 500 mm
- Distance from the fire damper to the wall or ceiling slab ≥ 155 mm
- ≥ 310 mm distance between two fire dampers
- Enough clear space is required to attach the installation kit to the fire damper.

Note: Fire damper and duct must be suspended *88*.

5.4.5 Dry mortarless installation with fire batt

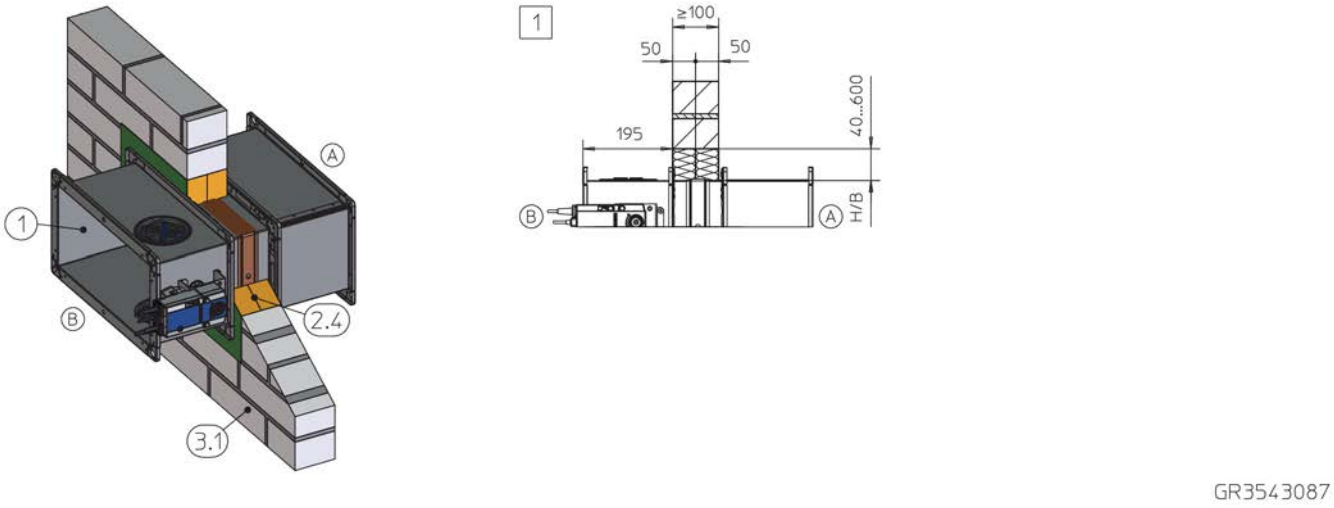


Fig. 36: Dry mortarless installation with fire batt into a solid wall

1	FK2-EU	1	Up to EI 120 S
2.4	Fire batt with ablative coating	A	Installation side
3.1	Solid wall	B	Operating side

Additional requirements: dry mortarless installation with fire batt in solid walls

- Solid wall *24*
- Fire batt distances / dimensions, see *23* f
- Suspension *89*
- Casing length L = 305 or 500 mm

5.5 Solid ceiling slabs

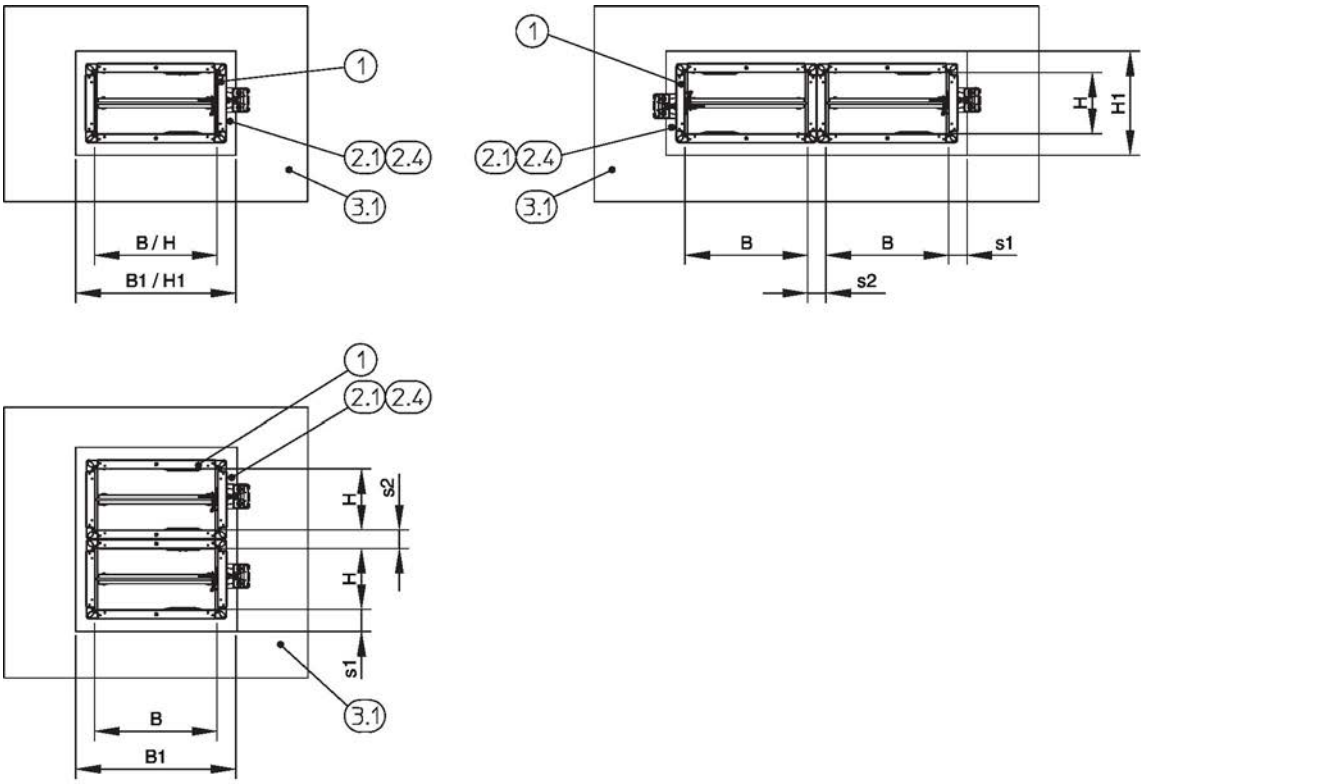


Fig. 37: Solid ceiling slabs – arrangement / distances

1 FK2-EU
2.1 Mortar
4.1 Solid ceiling slab
* Installation opening for mortar-based installation

Additional requirements: solid ceiling slabs

- Solid wall *25*
- Distances and installation orientations, see *20*

Installation type	Installation opening [mm]		Distance [mm]	
	B1	H1	s1	s2
Mortar-based installation	B + 450 max.	H + 450 max.	≤ 225	60 – 225

5.5.1 Mortar-based installation into solid ceiling slabs

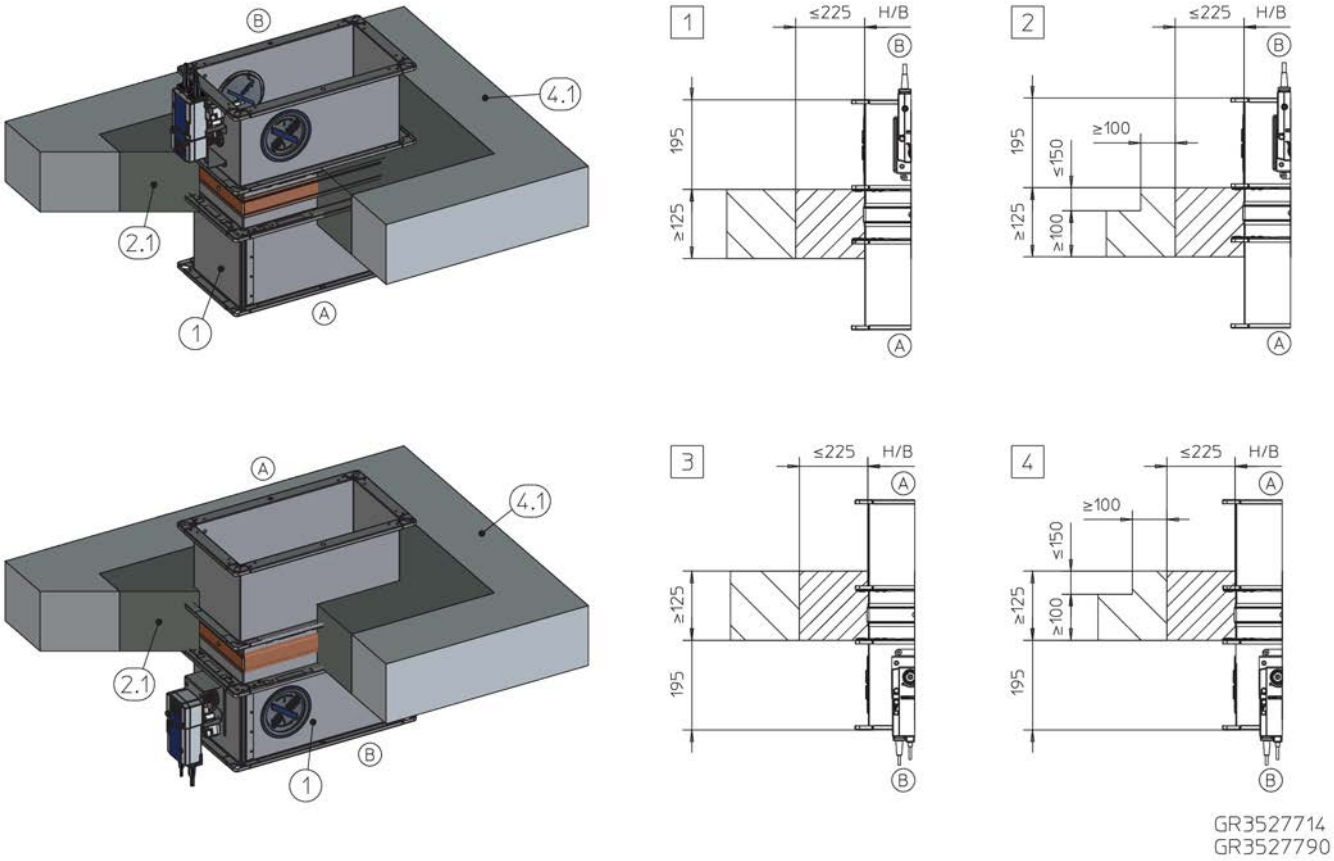


Fig. 38: Mortar-based installation into a solid ceiling slab, suspended or upright

1	FK2-EU	1 – 4	Up to EI 120 S
2.1	Mortar	A	Installation side
4.1	Solid ceiling slab	B	Operating side

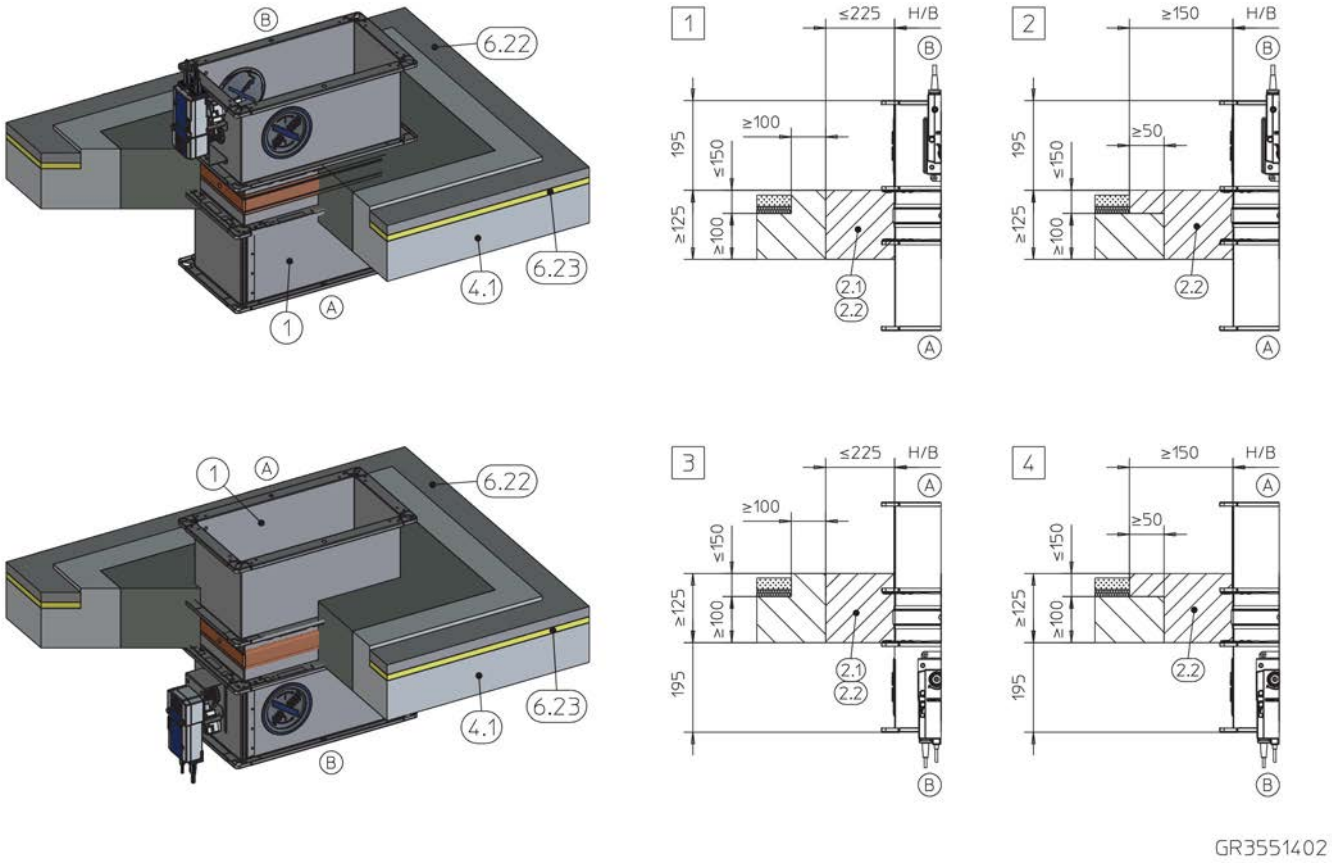


Fig. 39: Mortar-based installation into a solid ceiling slab with screed and footfall sound insulation, suspended or upright

1	FK2-EU
2.1	Mortar
2.2	Reinforced concrete
4.1	Solid ceiling slab
6.22	Screed
6.23	Football sound insulation
1 – 4	Up to EI 120 S
A	Installation side
B	Operating side

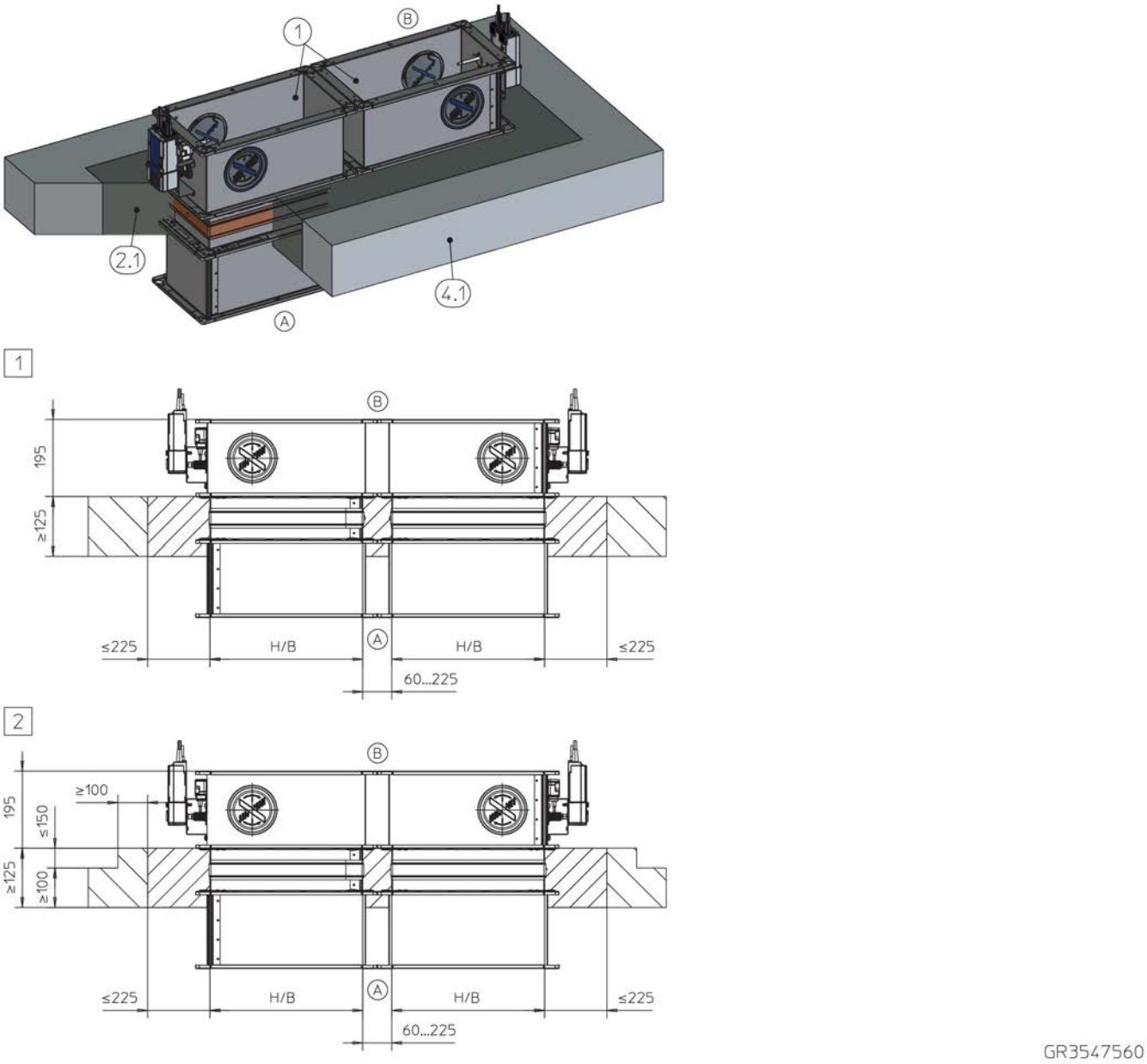


Fig. 40: Mortar-based installation in solid ceiling slab, "flange to flange", shown upright (also applicable for suspended arrangement)

1	FK2-EU	1 2	Up to EI 120 S
2.1	Mortar	A	Installation side
4.1	Solid ceiling slab	B	Operating side

Additional requirements: mortar-based installation in solid ceiling slabs

- Solid wall *25*
- Casing length L = 305 or 500 mm

5.5.2 Mortar-based installation into a concrete base

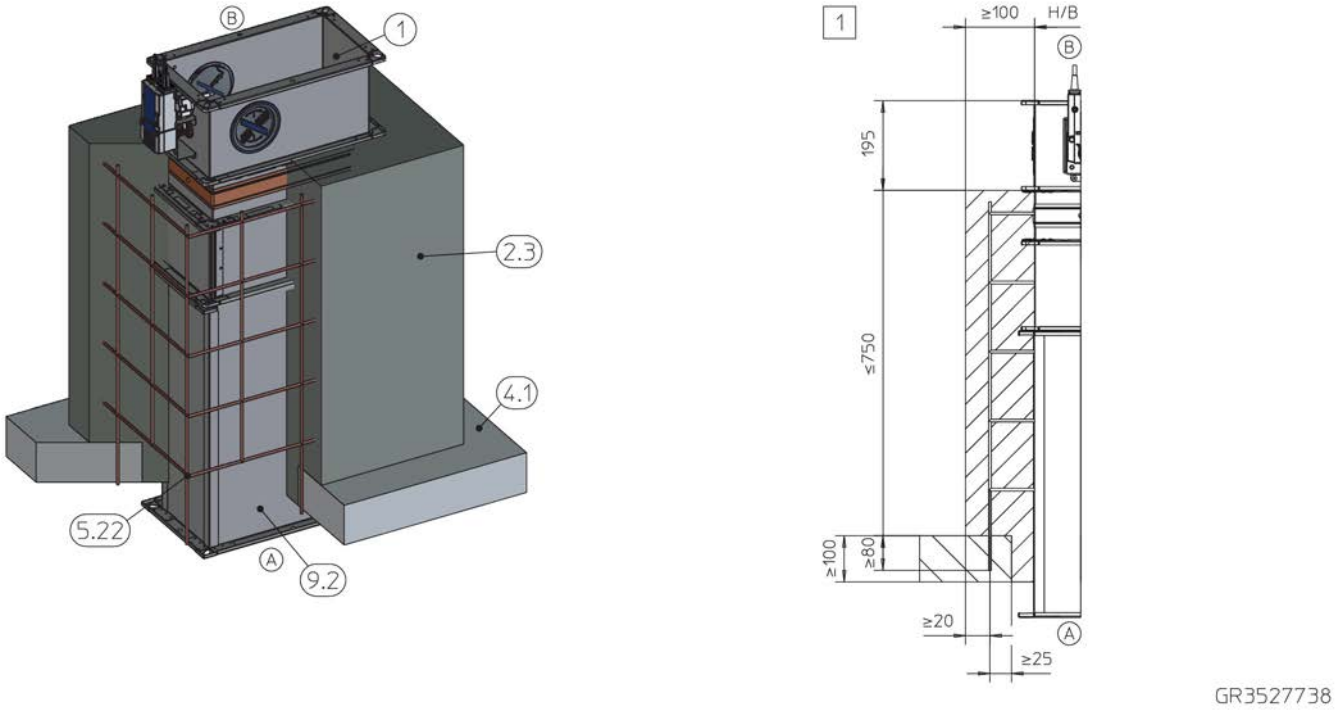


Fig. 41: Mortar-based installation with concrete base into a solid ceiling slab, upright

1	FK2-EU	9.2	Extension piece or duct
2.3	Concrete base	1	Up to EI 120 S
4.1	Solid ceiling slab	A	Installation side
5.22	Steel fabric, ∅ ≥ 8 mm, mesh aperture 150 mm, or equivalent, for number of fixing points see table	B	Operating side

Minimum number of fixing points in the bare ceiling

H [mm]	B [mm]		
	≥ 200	≥ 500	800
100 – 200	4	6	8

Additional requirements: mortar-based installation in solid ceiling slab with concrete base

- Solid wall 🡆 *25*
- Casing length L = 305 or 500 mm
- ≥ 60 mm distance between two fire dampers

1. ▸ Screw the fire damper to the existing, dysfunctional fire damper or to the ducting

   Note: If the fire damper is to be attached to an existing but dysfunctional fire damper, all interior parts of the dysfunctional fire damper, e.g. damper blade, travel stop and control elements, have to be removed. Tightly seal any openings in the old fire damper casing with a sheet metal plate.

2. ▸ Create a concrete base according to Fig. 41 or equivalent.

5.5.3 Mortar-based installation in conjunction with wooden beam ceilings

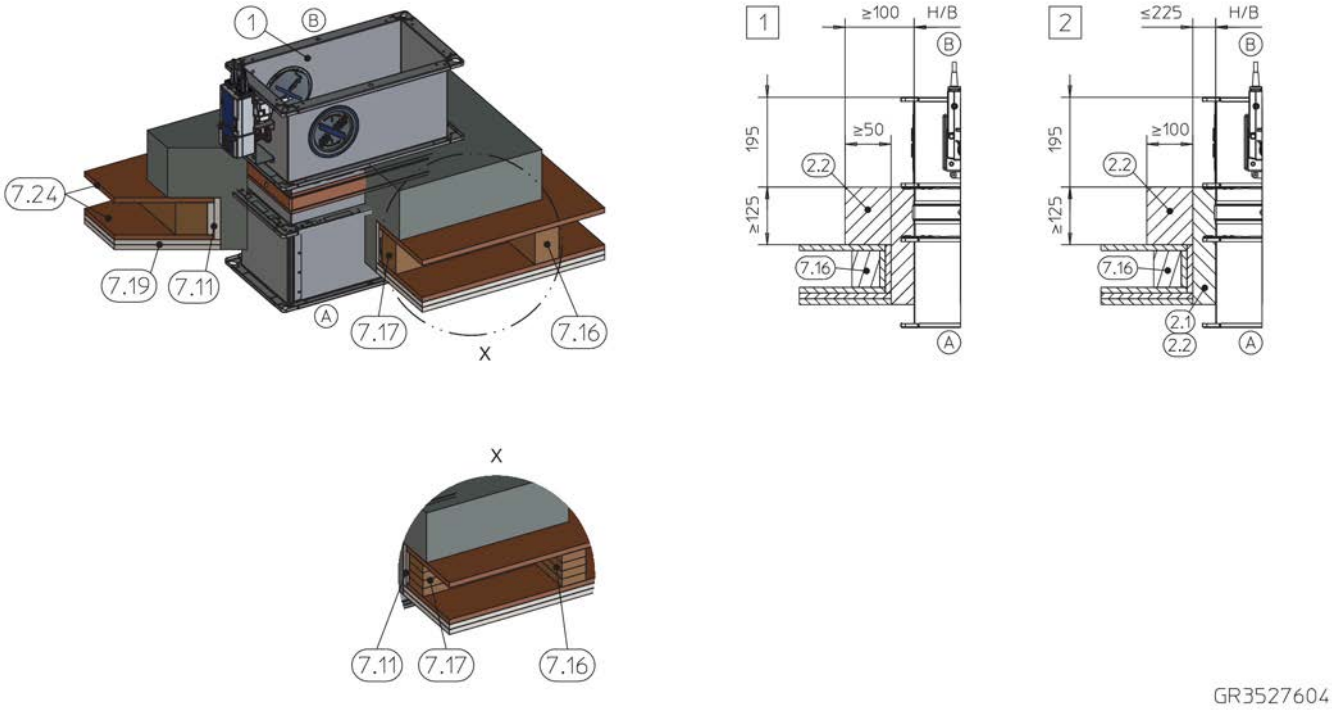


Fig. 42: Mortar-based installation in solid ceiling slab in conjunction with wooden beam / laminated beam ceilings, upright (illustration as an example, can be used for other ceiling designs with wooden beams)

1	FK2-EU	7.19	Fire-resistant cladding (ceiling-dependent)
2.1	Mortar	7.24	Ceiling design
2.2	Reinforced concrete	1 2	Up to EI 90 S
7.11	Trim panel, same construction as 7.19	A	Installation side
7.16	Wooden beam / gluelam (reduce distances between wooden beams to the size of the installation opening)	B	Operating side
7.17	Trimmers, wooden beam / gluelam		

Additional requirements: mortar-based installation in solid ceiling slabs in conjunction with wooden beam / laminated beam ceilings

- Wooden beam ceiling with fire resistance, see *25*
- Casing length L = 305 or 500 mm
- ≥ 60 mm distance between two fire dampers. When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured. Professionally connect the trimmers.
2. Create a partial concrete ceiling around the fire damper, ≥ 100 mm, ≥ 125 mm thick.
3. Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete, have to be evaluated and ensured by others.

5.5.4 Mortar-based installation in conjunction with solid wood ceilings

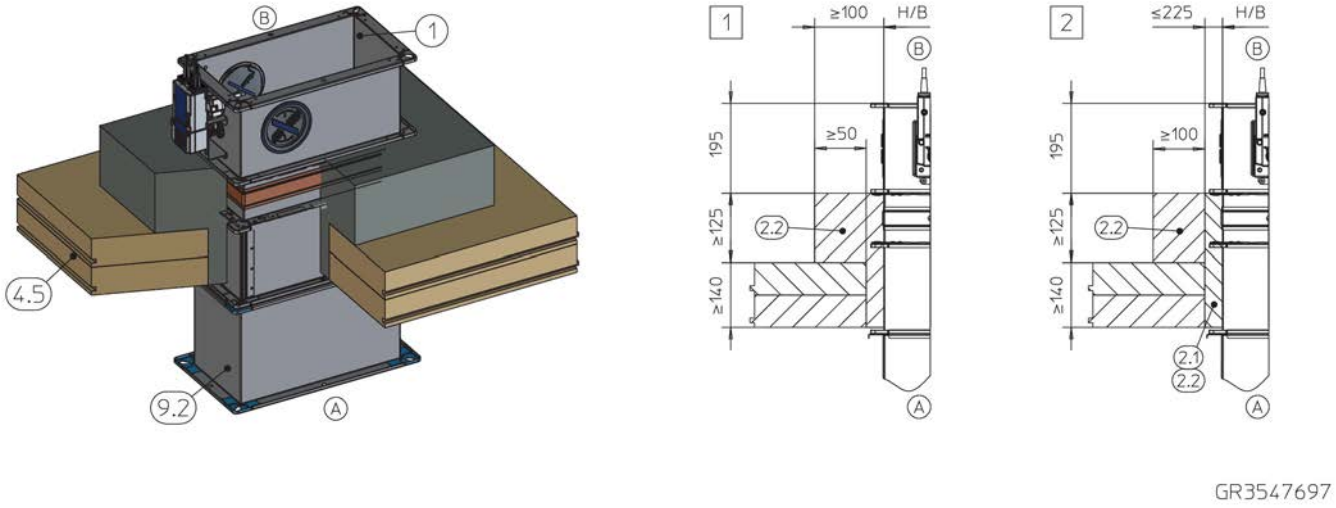


Fig. 43: Mortar-based installation into a solid ceiling slab with solid wood ceiling, upright (illustration is an example; installation into other types of solid wood ceiling systems may be possible depending on local conditions)

1	FK2-EU	9.2	Extension piece or duct
2.1	Mortar	1 2	Up to EI 90 S
2.2	Reinforced concrete	A	Installation side
4.5	Solid wood ceiling	B	Operating side

Additional requirements: mortar-based installation in solid ceiling slabs in conjunction with solid wood ceilings

- Solid wood ceiling *25*
- Casing length L = 305 or 500 mm
- ≥ 60 mm distance between two fire dampers. When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured.
2. Create a partial concrete ceiling around the fire damper, ≥ 100 mm, ≥ 125 mm thick.
3. Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete, have to be evaluated and ensured by others.

5.5.5 Mortar-based installation in conjunction with lightweight ceilings

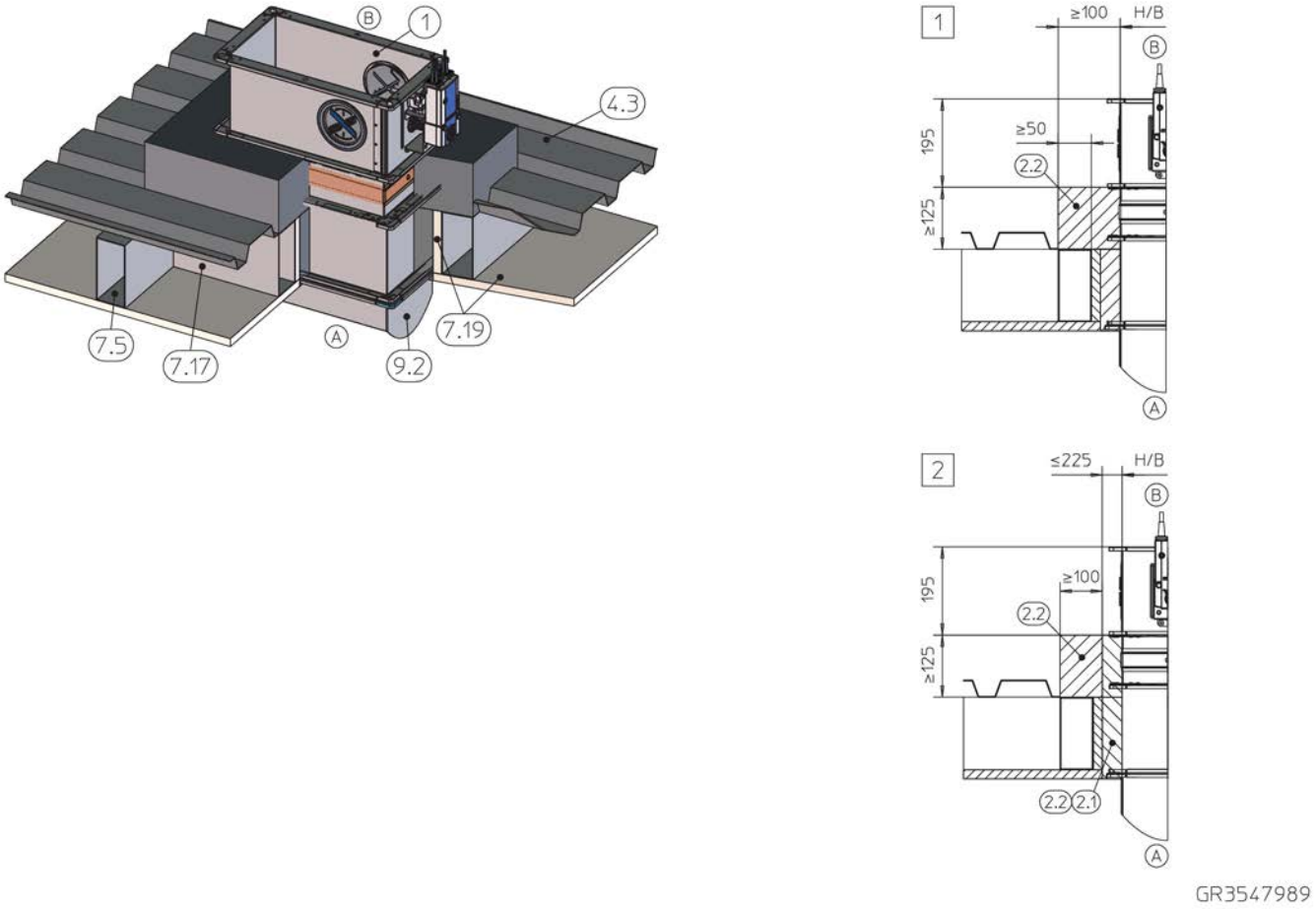


Fig. 44: Mortar-based installation into a solid ceiling slab in conjunction with a lightweight ceiling (Cadolto system), upright

1	FK2-EU	7.19	Fire-resistant cladding
2.1	Mortar	9.2	Extension piece or duct
2.2	Reinforced concrete	#	optional
4.3	Modular ceiling (Cadolto system), installation according to manufacturer's instructions and general appraisal certificate	1 2	Up to EI 90 S
		A	Installation side
		B	Operating side
7.5	Steel support structure		
7.17	Trimmers, steel support structure		

Additional requirements: mortar-based installation in solid ceiling slabs in conjunction with lightweight ceilings

- Modular ceiling (Cadolto) *25*
- Casing length L = 305 or 500 mm
- ≥ 60 mm distance between two fire dampers. When you install two fire dampers next to each other into the same opening, the concrete bed between the two fire dampers must not exceed 225 mm.

1. Create the installation opening so that a surrounding concrete cover of at least 50 mm is ensured.
2. Create a partial concrete ceiling around the fire damper, ≥ 100 mm, ≥ 125 mm thick.
3. Structural and fire resistance properties of the ceiling construction, including the attachment to the concrete, have to be evaluated and ensured by others.

5.5.6 Dry mortarless installation with installation kit ES

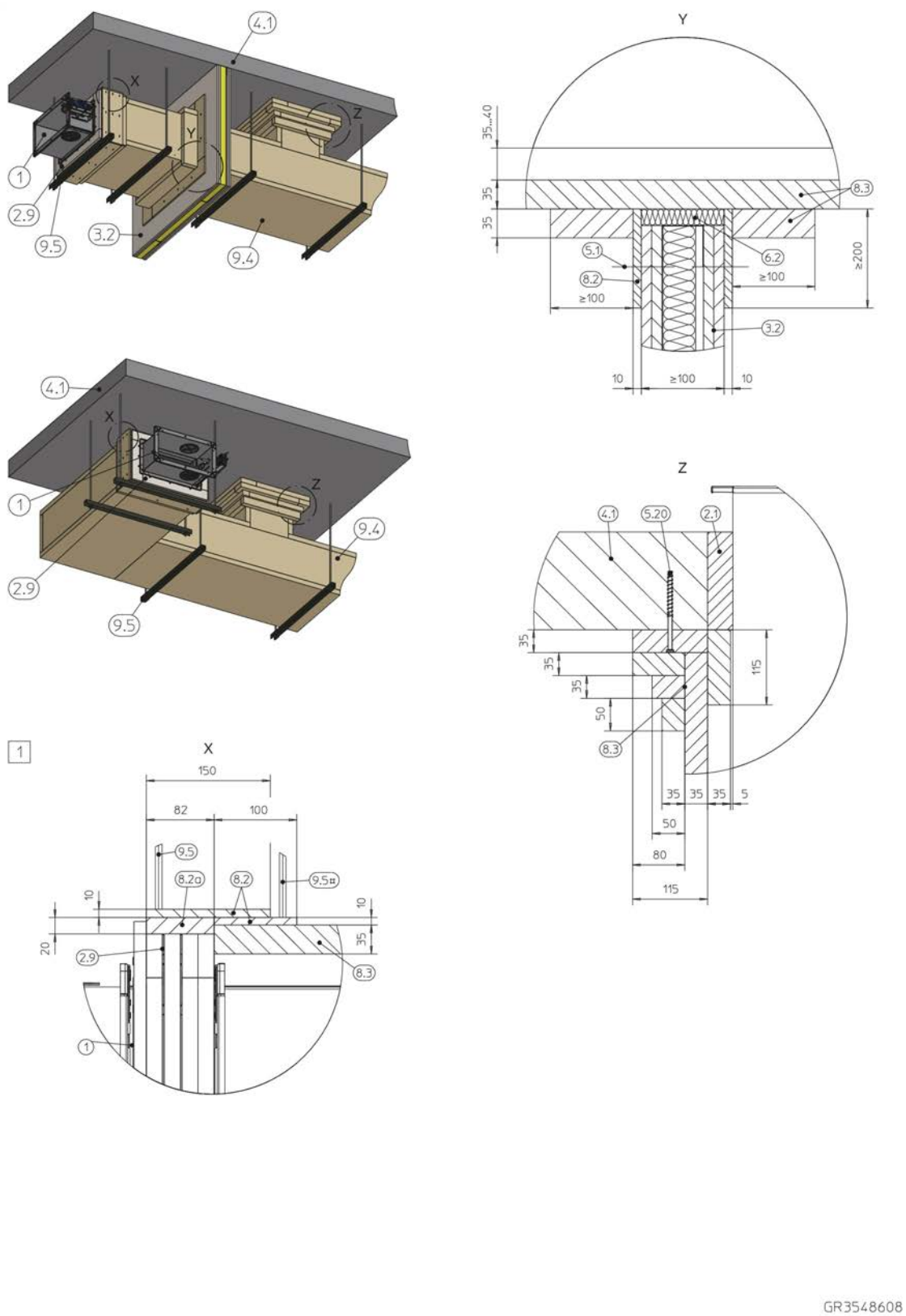


Fig. 45: Dry mortarless installation remote from solid ceiling slabs

1	FK2-EU
2.1	Mortar
2.9	Installation kit ES *
3.2	Lightweight partition wall or solid wall (if any), wall penetration and ceiling connector according to Promat® manual, construction 478, latest version
4.1	Solid ceiling slab
5.1	Dry wall screw
5.20	Screw Fischer® FFS 7.5 × 82 mm or equivalent
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
8.2	PROMATECT®-H, d = 10 mm
8.2a	PROMATECT®-H, d = 20 mm
8.3	PROMATECT®-LS, d = 35 mm, alternative materials *22*
9.4	Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5	Suspension system (by others) consisting of:
a	Threaded rod M10 – M12
b	Hilti® mounting rail MQ 41 × 3 mm or equivalent
c	Hilti® drilled plate MQZ L13 or equivalent
d	Hexagon nut M10 – M12 with washer
1	Up to EI 90 S
A	Installation side
B	Operating side

Note: * Remove intumescent seal (6.12) and seal (6.21) or do not affix, see *27*. Further installation details and components to be provided by the customer on request.

Additional requirements: dry mortarless installation with installation kit ES remote from solid ceiling slabs

- Solid wall *25*
- Horizontal installation position
- ≥ 310 mm distance between two fire dampers
- Casing length L = 500 mm
- Sheet steel duct with fire-resistant cladding made from panel materials *22*

1. Mount the installation kit onto the fire damper, see Fig. 23 and Fig. 25
2. Connect the fire damper and installation kit to the duct, detail X Fig. 45, then attach fire-resistant cladding to the ducting according to the manufacturer's instructions (Promat® manual).
3. Attach the suspensions according to the manufacturer's instructions (Promat® manual) *88*.
4. Attachment to the ceiling, detail Z Fig. 45.
5. Seal the perimeter gap between the duct and the ceiling with mortar.

5.6 Lightweight partition walls and compartment walls with metal support structure

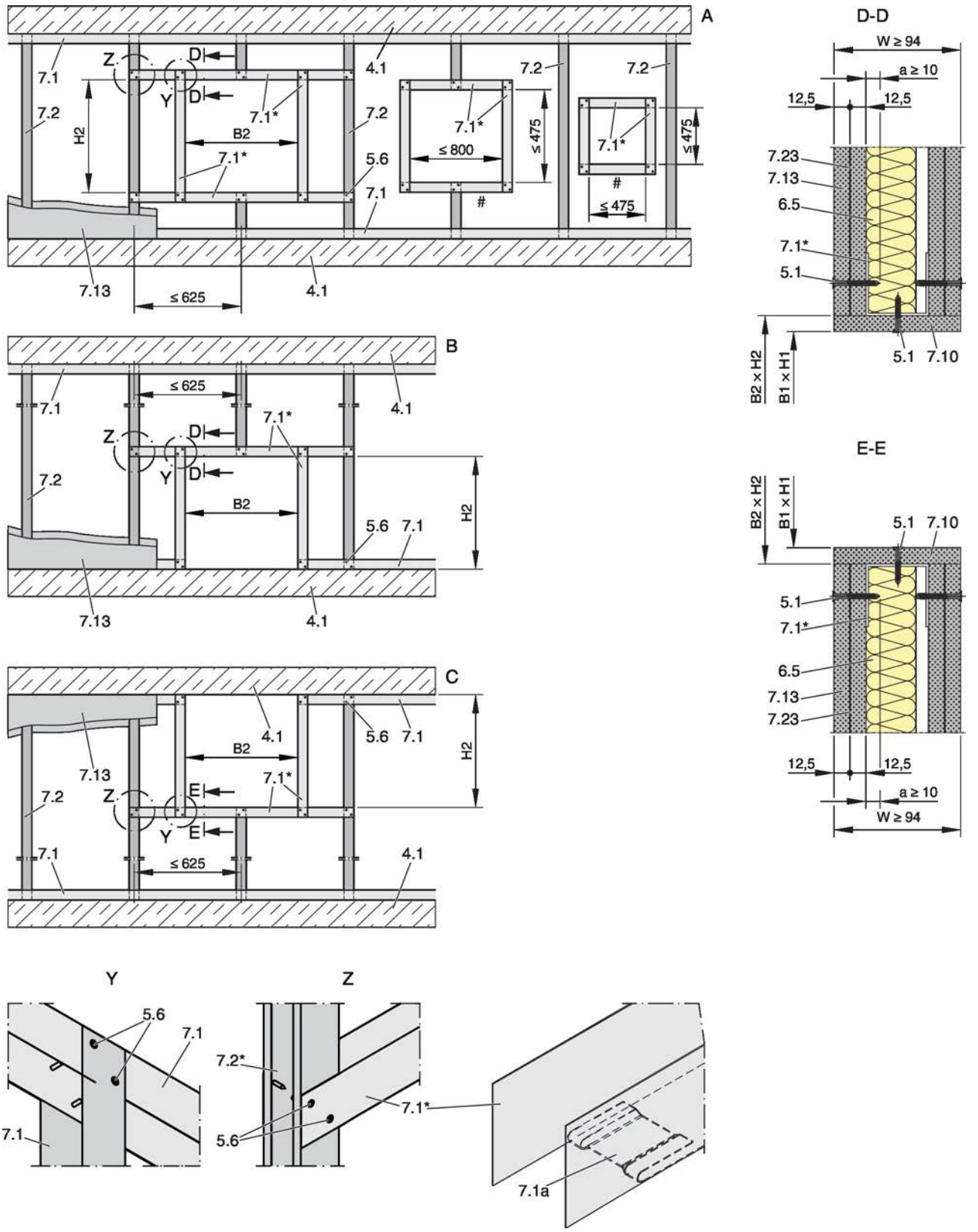


Fig. 46: Lightweight partition wall with metal support structure and cladding on both sides

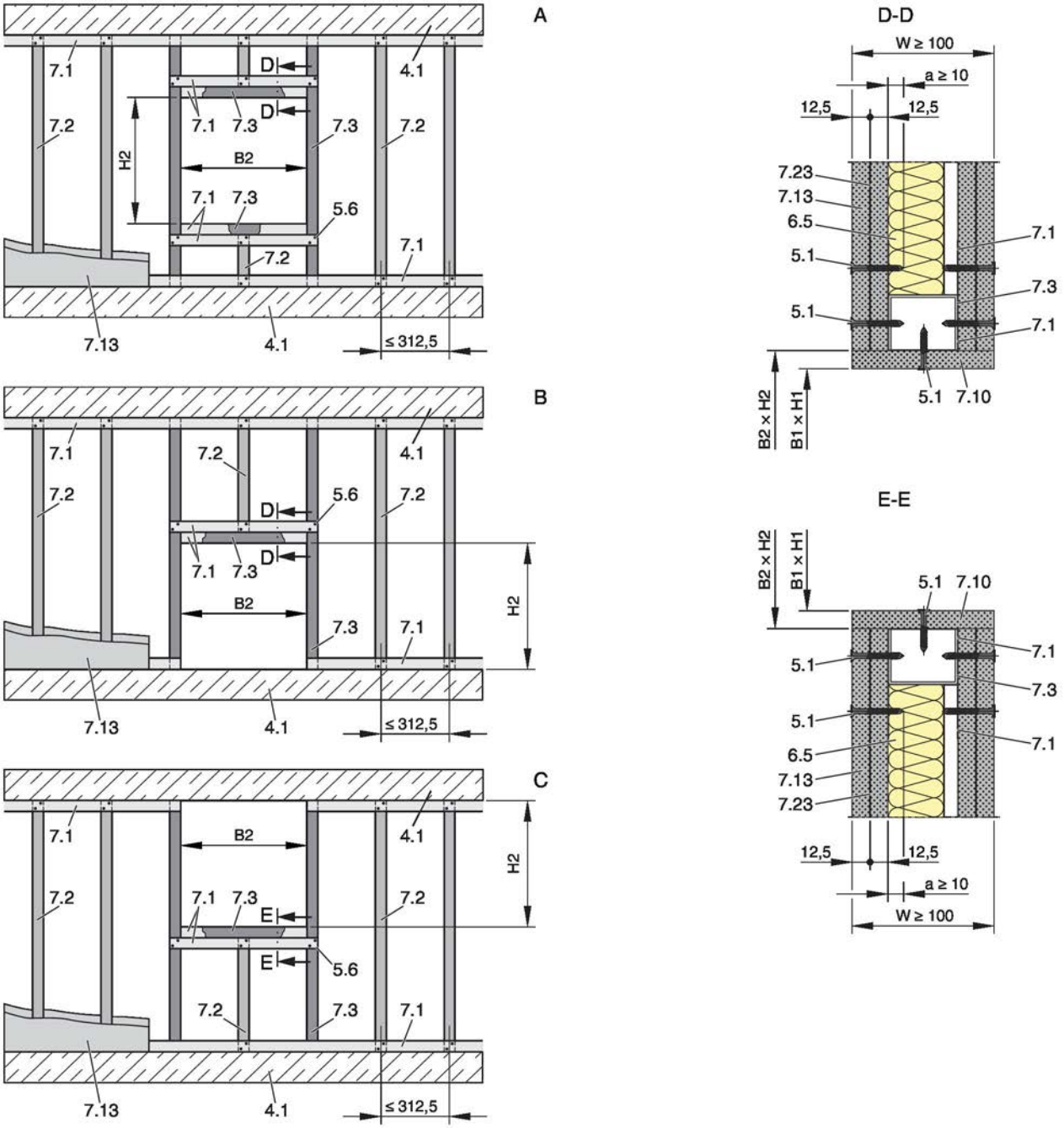


Fig. 47: Compartment wall with metal support structure and cladding on both sides

A	Lightweight partition wall / compartment wall / safety partition wall
B	Lightweight partition wall / compartment wall / safety partition wall, installation near the floor
C	Lightweight partition wall / compartment wall / safety partition wall, installation near the ceiling
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw
5.6	Screw or steel rivet
6.5	Mineral wool, depending on wall construction
7.1	UW section
7.1a	UW section, cut in and bent or cut off
7.2	CW section
7.3	UA section
7.10	Optional trim panels, according to installation details
7.13	Cladding
7.23	Sheet steel insert depending on wall manufacturer
B1 × H1	Installation opening
B2 × H2	Opening in the metal support structure (without trim panels: B2 = B1, H2 = H1)
*	Closed side of metal section must face the installation opening
#	Arrangement variable

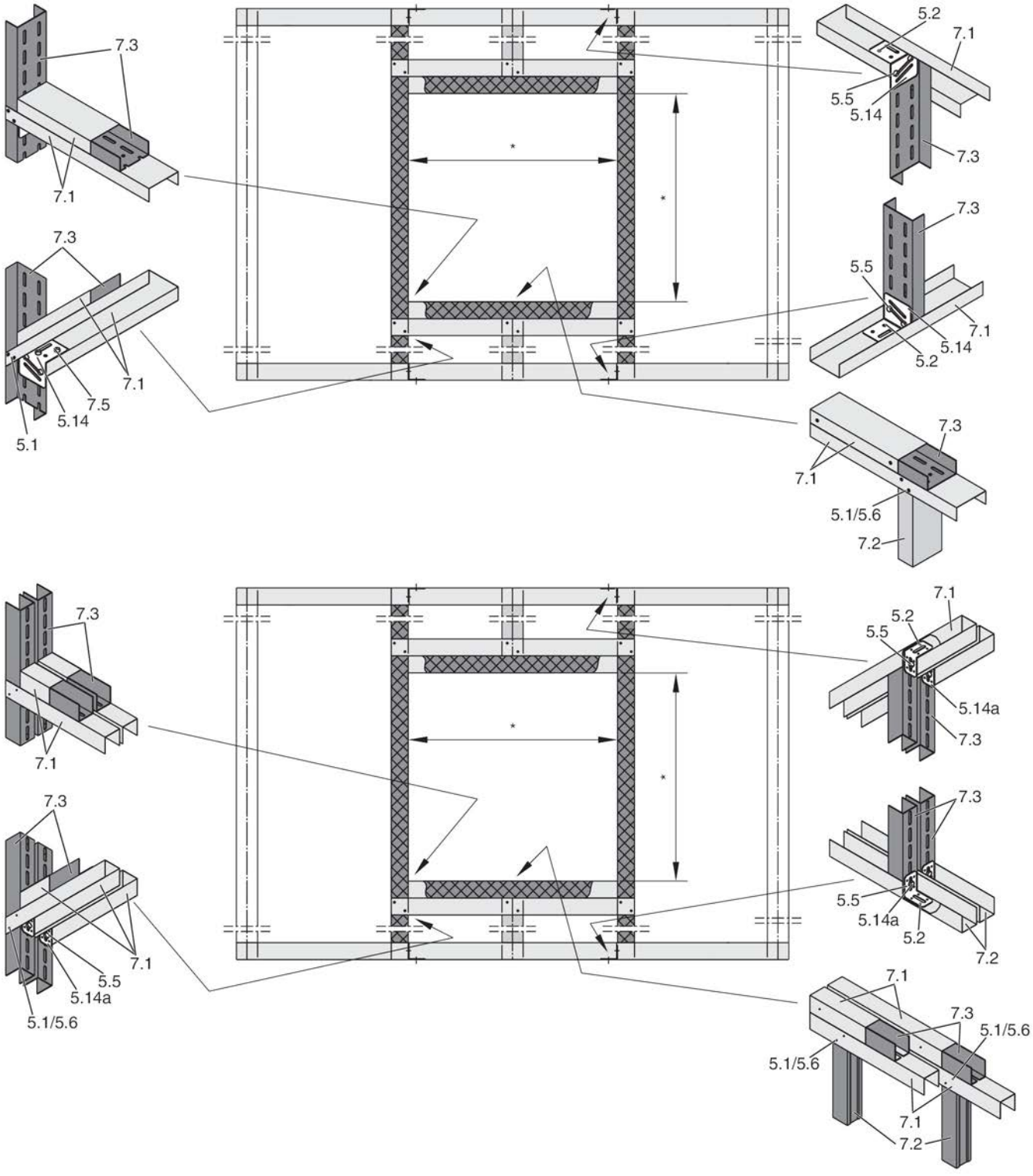


Fig. 48: Metal support structure of compartment wall, single and double stud system

5.1	Dry wall screw	7.1	UW section
5.2	Hexagon head screw M6	7.2	CW section
5.5	Carriage bolt, L ≤ 50 mm, with nut and washer	7.3	UA section
5.6	Steel rivet	*	Installation opening depending on installation type
5.14	Angle bracket		*on page 50*

Additional requirements: lightweight and compartment walls with metal support structure

- Lightweight partition wall or compartment wall, see *25*

Installation type	Installation opening [mm]			
	B1	H1	B2	H2
Mortar-based installation [1]	B + 450 max.	H + 450 max.	B1 + (2 × trim panels)	H1 + (2 × trim panels)
Dry mortarless installation with installation kit ES [1, 2]	B + 140	H + 140		
Dry mortarless installation with fire batt [3]	B + 80 to 1200	H + 80 to 1200		

[1)] Optional trim panels (single layer)

[2)] Installation opening tolerance ± 2 mm

[3)] Trim panels are required

Subsequent installation

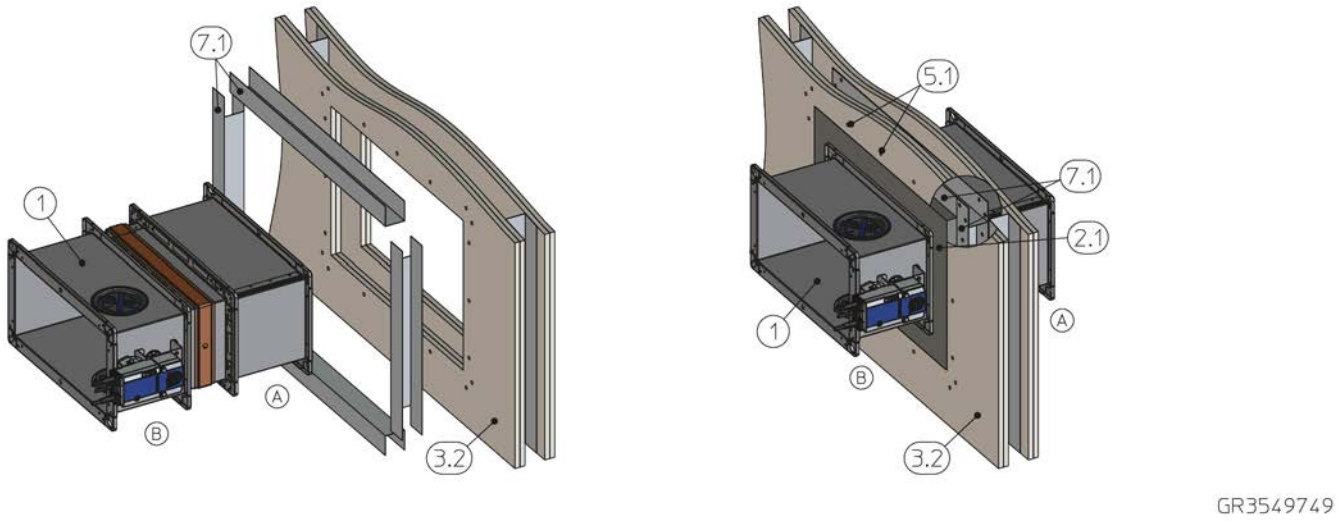


Fig. 49: Subsequent installation in lightweight partition wall for clear opening ≤ 475 mm between two shelves, mortar-based installation shown (also applicable for dry mortarless installation)

1 FK2-EU
2.1 Mortar
3.2 Lightweight partition wall with metal support structure or steel support structure, cladding on both sides
5.1 Dry wall screw, with a distance of approx. 100 mm
7.1 UW sections, cut to size by others, overlapping
A Installation side
B Operating side

5.6.1 Mortar-based installation

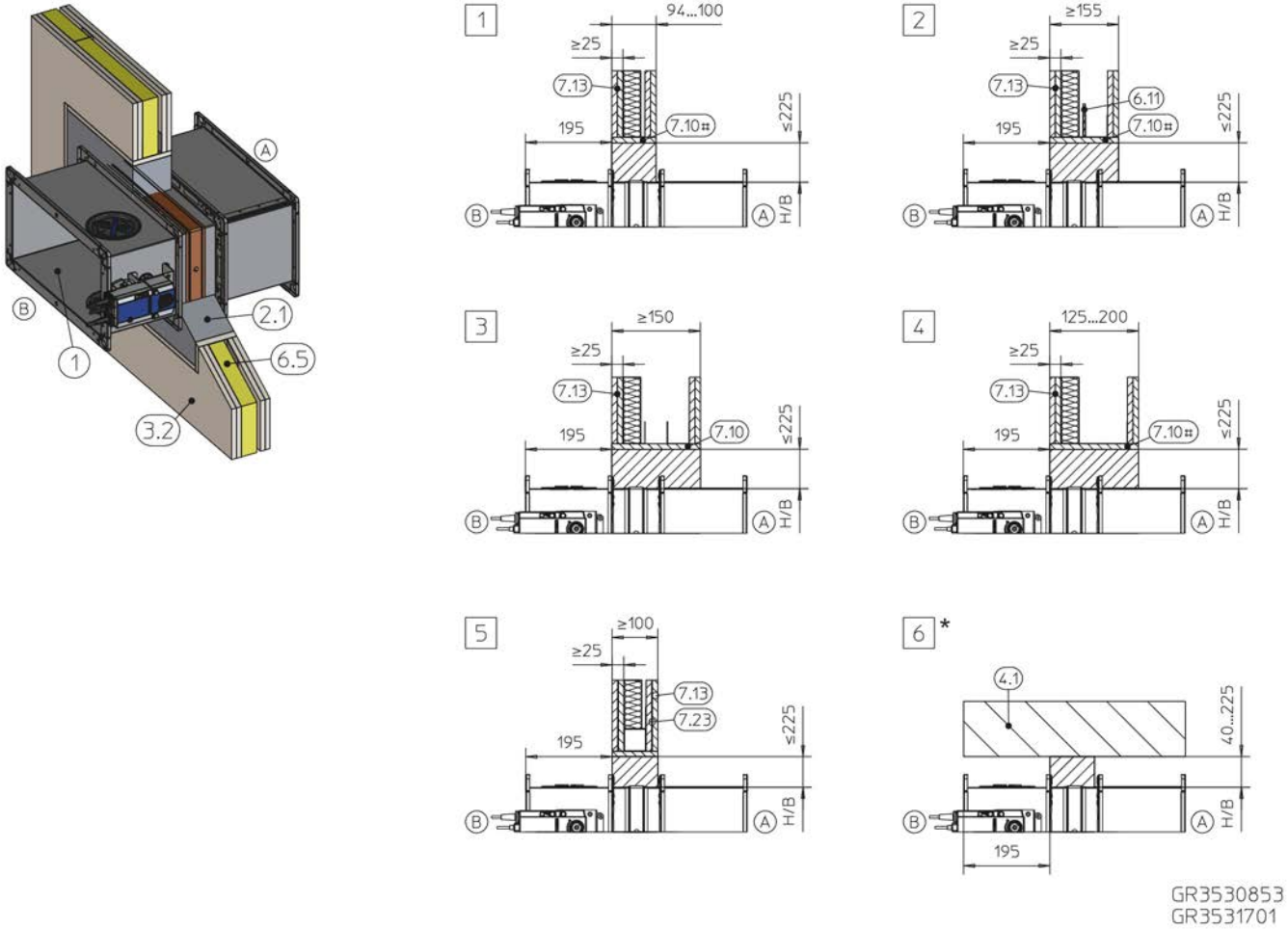


Fig. 50: Mortar-based installation into a lightweight partition wall, compartment wall or safety partition wall

1	FK2-EU	7.23	Sheet steel insert depending on wall manufacturer
2.1	Mortar	#	optional
3.2	Lightweight partition wall with metal support structure, cladding on both sides	*	Installation near the floor analogous to 6
4.1	Solid ceiling slab / solid floor	1 – 4	Up to EI 120 S
6.5	Mineral wool, depending on wall construction	5	Up to EI 120 S
6.11	Insulating strip (depending on wall construction)	6	EI 30 S to EI 120 S
7.10	Trim panels	A	Installation side
7.13	Cladding	B	Operating side

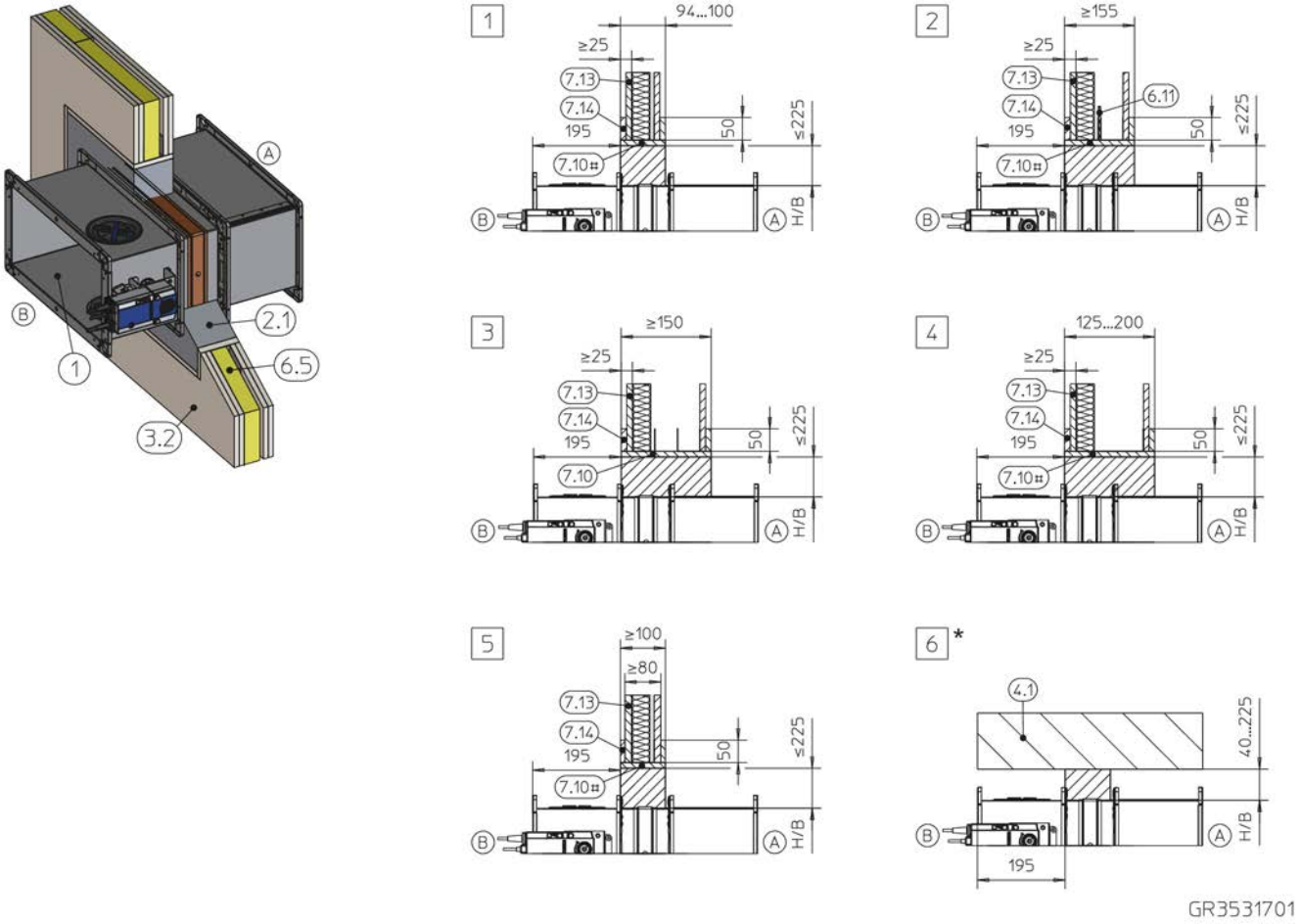


Fig. 51: Mortar-based installation into a lightweight partition wall

1	FK2-EU
2.1	Mortar
3.2	Lightweight partition wall with metal support structure, cladding on both sides
6.5	Mineral wool, depending on wall construction
6.11	Insulating strip (depending on wall construction)
7.10	Trim panels
7.13	Cladding
7.14	Reinforcing board of the same material as the wall

#	optional
*	Installation near the floor analogous to 6
1 – 4	EI 30 S
5	Up to EI 60 S
6	EI 30 S to EI 120 S
A	Installation side
B	Operating side

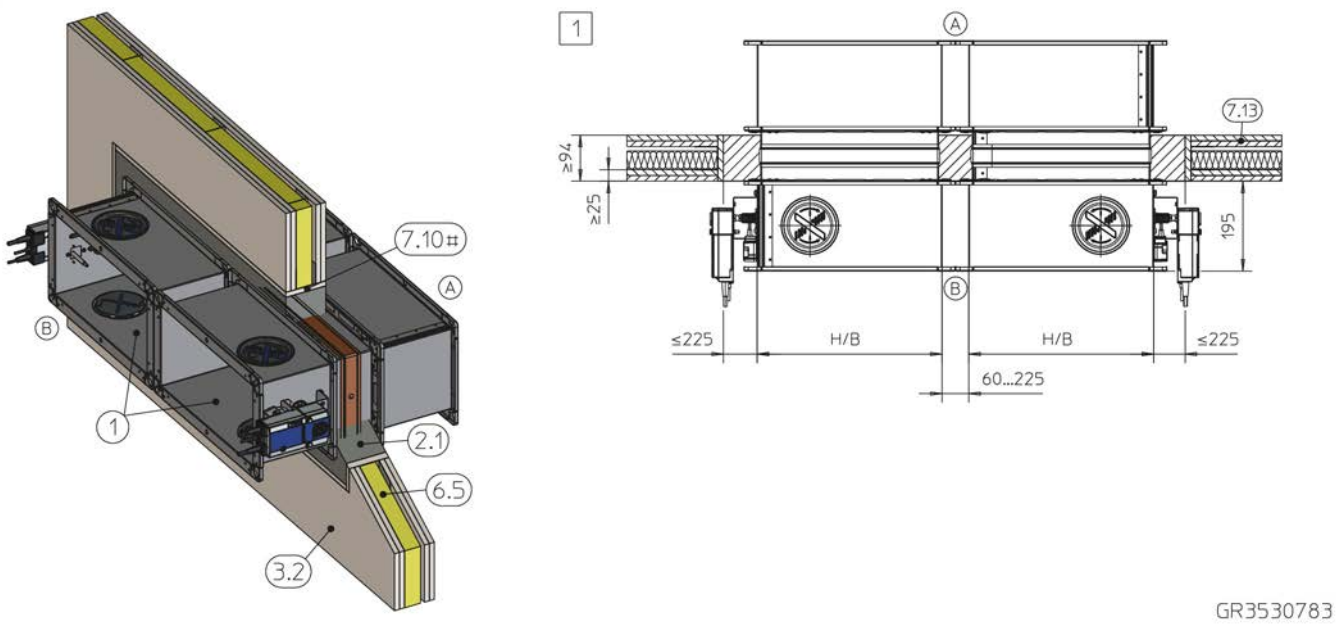


Fig. 52: Mortar-based installation into a lightweight partition wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FK2-EU	7.13	Cladding
2.1	Mortar	#	optional
3.2	Lightweight partition wall with metal support structure, cladding on both sides	1	Up to EI 120 S
		A	Installation side
6.5	Mineral wool, depending on wall construction	B	Operating side
7.10	Trim panels		

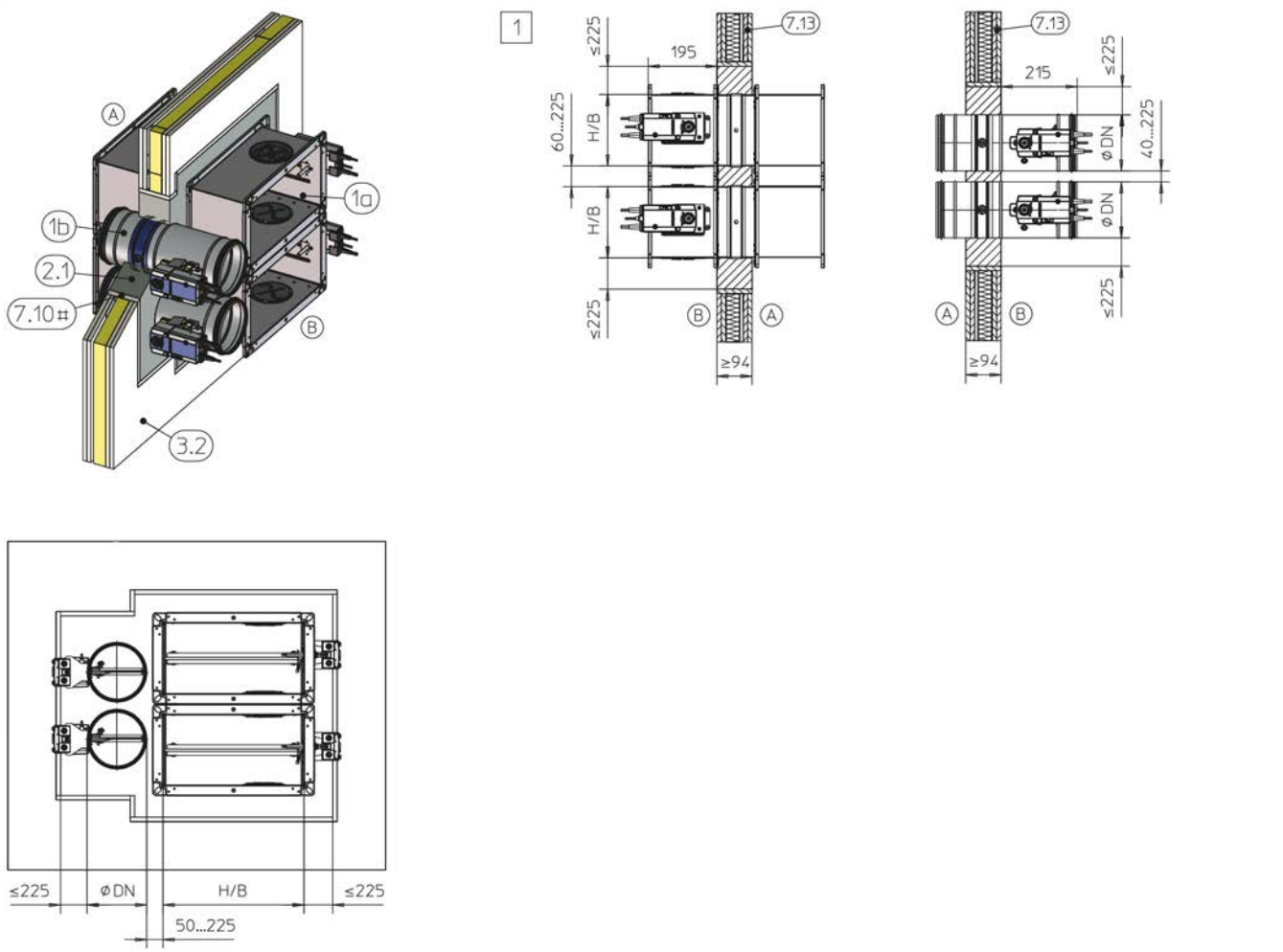


Fig. 53: Mortar-based installation into a lightweight partition wall, FK2-EU and FKRS-EU combined

1a	FK2-EU	7.13	Cladding
1b	FKRS-EU	#	optional
2.1	Mortar	[1]	Up to EI 90 S
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	A	Installation side
		B	Operating side
6.5	Mineral wool, depending on wall construction		
7.10	Trim panels		

Note: Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.

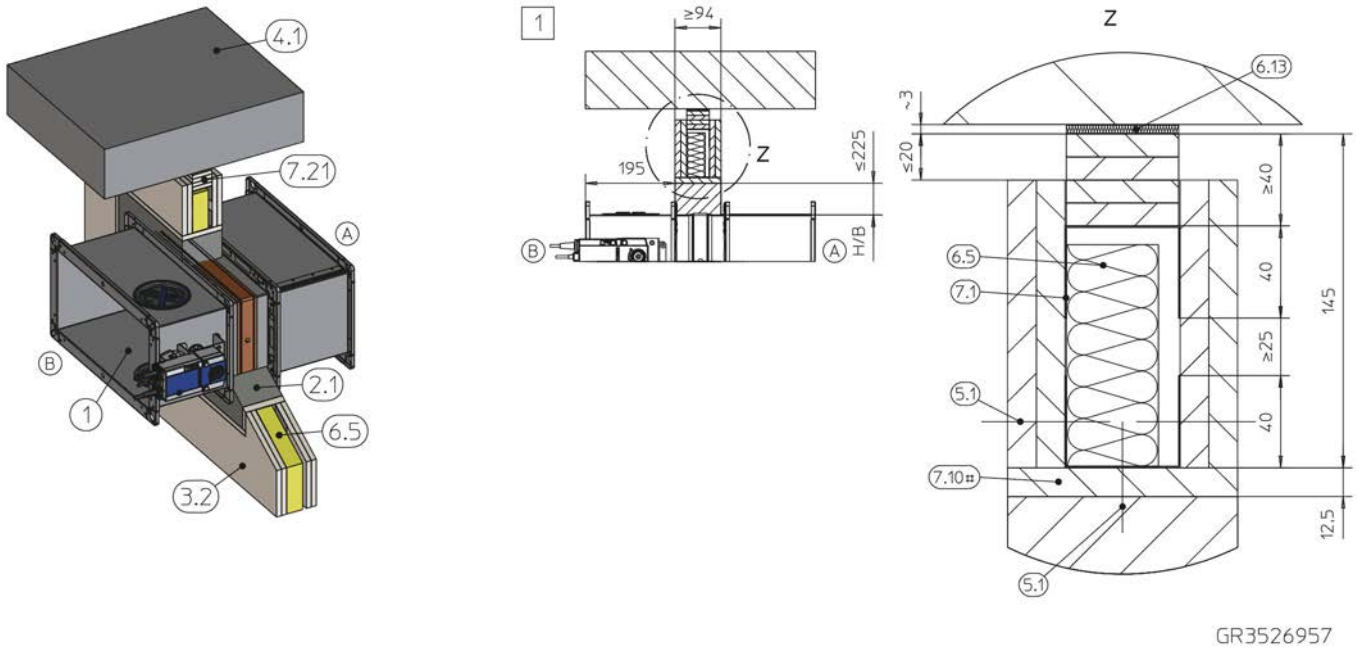


Fig. 54: Mortar-based installation into a lightweight partition wall, below a flexible ceiling joint

1	FK2-EU	7.10	Trim panels
2.1	Mortar	7.21	Ceiling joint strips (e.g. 4 × ≥10 mm)
3.2	Lightweight partition wall with metal support structure, cladding on both sides	*	Can be increased to account for the thickness of the trim panels
4.1	Solid ceiling slab	#	Optional, depending on wall construction
5.1	Dry wall screw	1	Up to EI 120 S
6.5	Mineral wool, depending on wall construction	A	Installation side
6.13	Mineral wool strips A1, filler as an alternative (if required to even out an uneven wall)	B	Operating side
7.1	UW section		

Additional requirements: mortar-based installation in lightweight partition and compartment walls

- Lightweight partition wall or compartment wall, see *25*
- Casing lengths L = 305 and 500 mm (flange to flange only L = 500 mm)
- EI 120 S: 60 – 225 mm distance between two FK2-EU fire dampers of the same size in one installation opening

5.6.2 Dry mortarless installation with installation kit ES

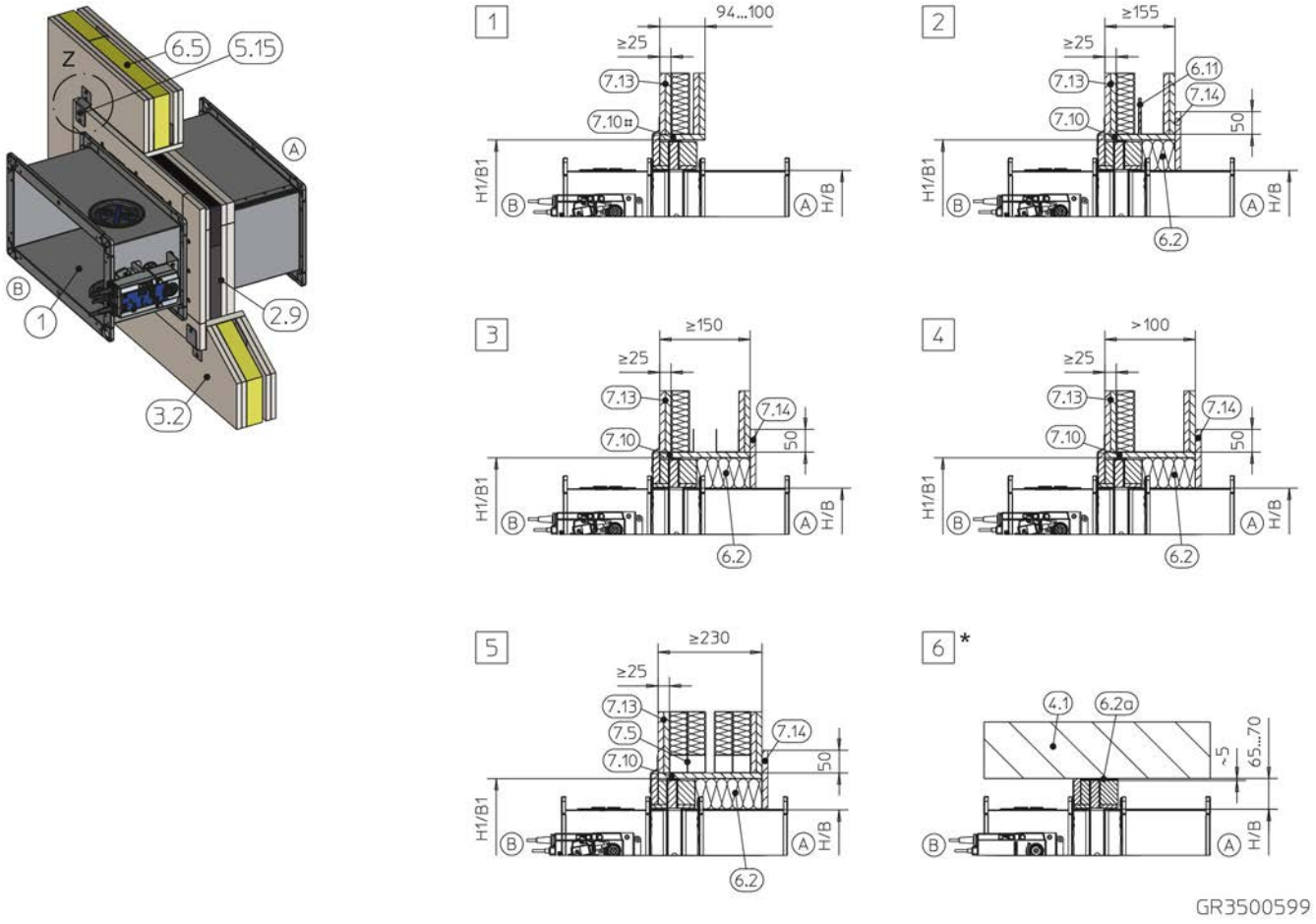


Fig. 55: Dry mortarless installation into a lightweight partition wall, with installation kit ES

1	FK2-EU	7.13	Cladding
2.9	Installation kit ES	7.14	Reinforcing board of the same material (required for wall thicknesses > 100 mm)
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	9.2	Extension piece or duct
4.1	Solid ceiling slab / solid floor	*	Installation near the floor analogous to 6
5.15	Bracket	#	optional
6.2a	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³, alternatively gypsum mortar (to even out an uneven ceiling or floor)	Z	For fixing, see Fig. 19
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³	1 – 5	Up to EI 90 S
6.5	Mineral wool, depending on wall construction	6	EI 30 S to EI 90 S
6.11	Insulating strip	A	Installation side
7.10	Trim panels	B	Operating side

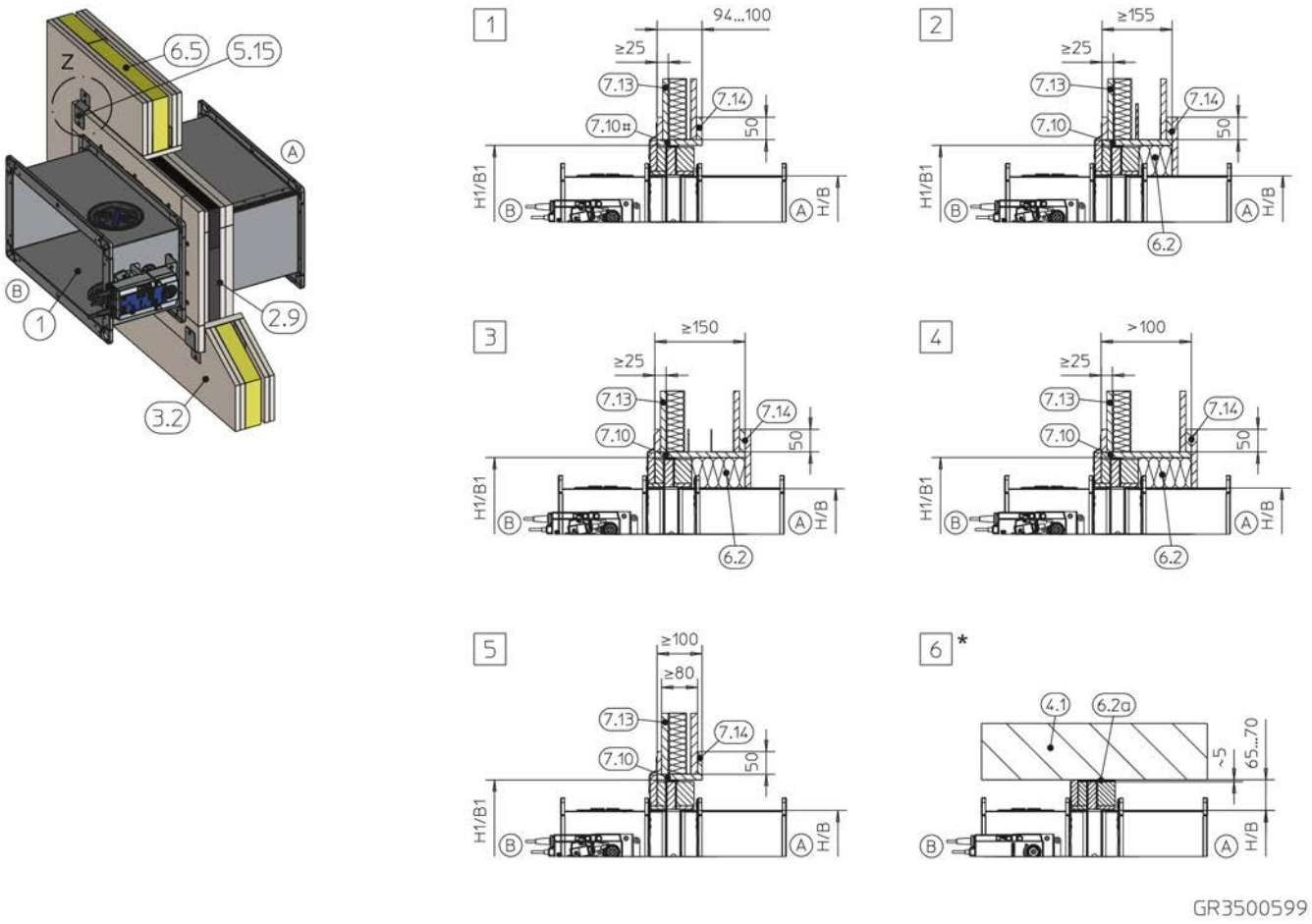


Fig. 56: Dry mortarless installation into a lightweight partition wall, with installation kit ES

1	FK2-EU
2.9	Installation kit ES
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides
5.15	Bracket
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
6.5	Mineral wool, depending on wall construction
6.11	Insulating strip
7.10	Trim panels
7.13	Cladding
7.14	Reinforcing board of the same material (required for wall thicknesses > 100 mm)
*	Installation near the floor analogous to 6
#	optional
Z	For fixing, see Fig. 19
1 – 4	EI 30 S
5	Up to EI 60 S
6	EI 30 S to EI 90 S
A	Installation side
B	Operating side

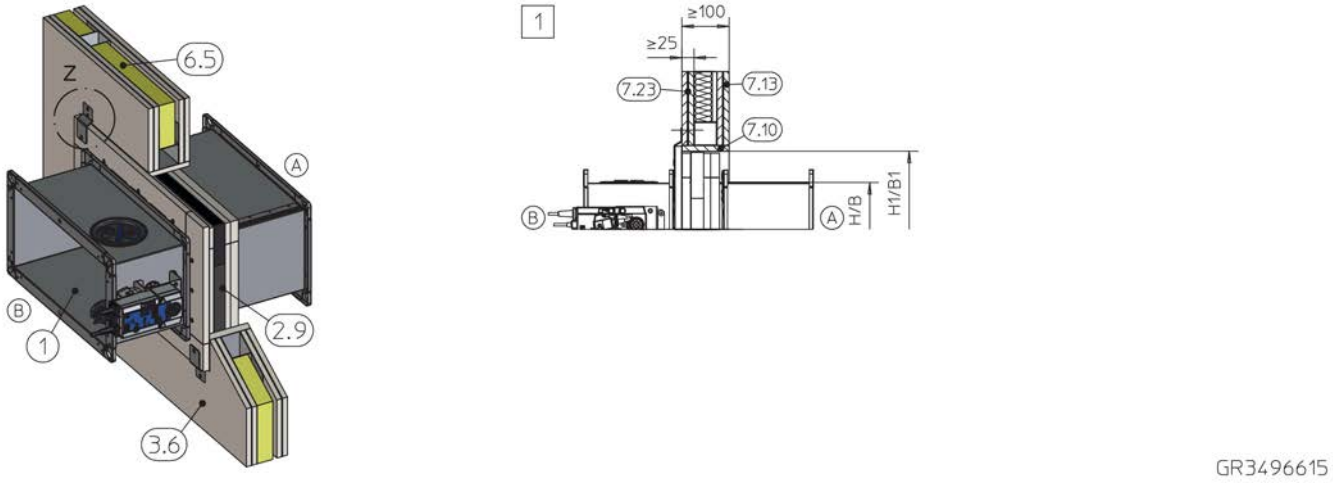


Fig. 57: Dry mortarless installation into a compartment wall or safety partition wall, with installation kit ES

1	FK2-EU	7.13	Cladding
2.9	Installation kit ES	7.23	Sheet steel insert depending on wall manufacturer
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	Z	For fixing, see Fig. 19
5.15	Bracket	1	Up to EI 90 S
6.5	Mineral wool, depending on wall construction	A	Installation side
7.10	Trim panels	B	Operating side

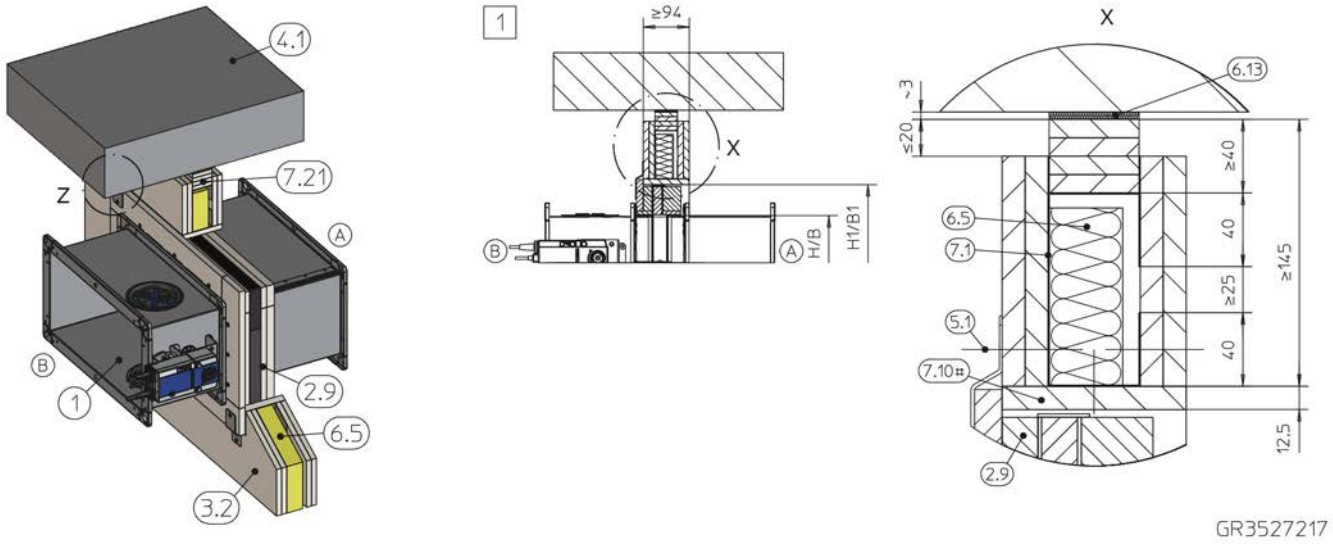


Fig. 58: Dry mortarless installation into a lightweight partition wall, below a flexible ceiling joint

1	FK2-EU	7.1	UW section
2.9	Installation kit ES	7.10	Trim panels
3.2	Lightweight partition wall with metal support structure, cladding on both sides	7.21	Ceiling joint strips (e.g. 4 × ≥10 mm)
4.1	Solid ceiling slab	Z	For fixing, see Fig. 19
5.1	Dry wall screw	#	Optional (94 – 100 mm wall thickness)
5.15	Bracket	1	Up to EI 90 S
6.5	Mineral wool, depending on wall construction	A	Installation side
6.13	Mineral wool strips A1, filler as an alternative (if required to even out an uneven wall)	B	Operating side

Additional requirements: dry mortarless installation with installation kit ES in lightweight partition walls

- Lightweight partition wall or compartment wall, see *25*
- Casing length L = 500 mm
- Distance from the fire damper to the adjacent parts approx. 80 / 120 mm (depending on the arrangement of brackets)
- 65 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements, see , detail 6
- ≥ 200 mm distance between two fire dampers in separate installation openings
- Ensure accessibility from the rear.

1. Mount the installation kit onto the fire damper, see *27*.
2. Attach the fire damper with brackets and dry wall screws to the metal support structure, see 59 and *27*.

5.6.3 Dry mortarless installation with installation kit ES remote from a lightweight partition wall

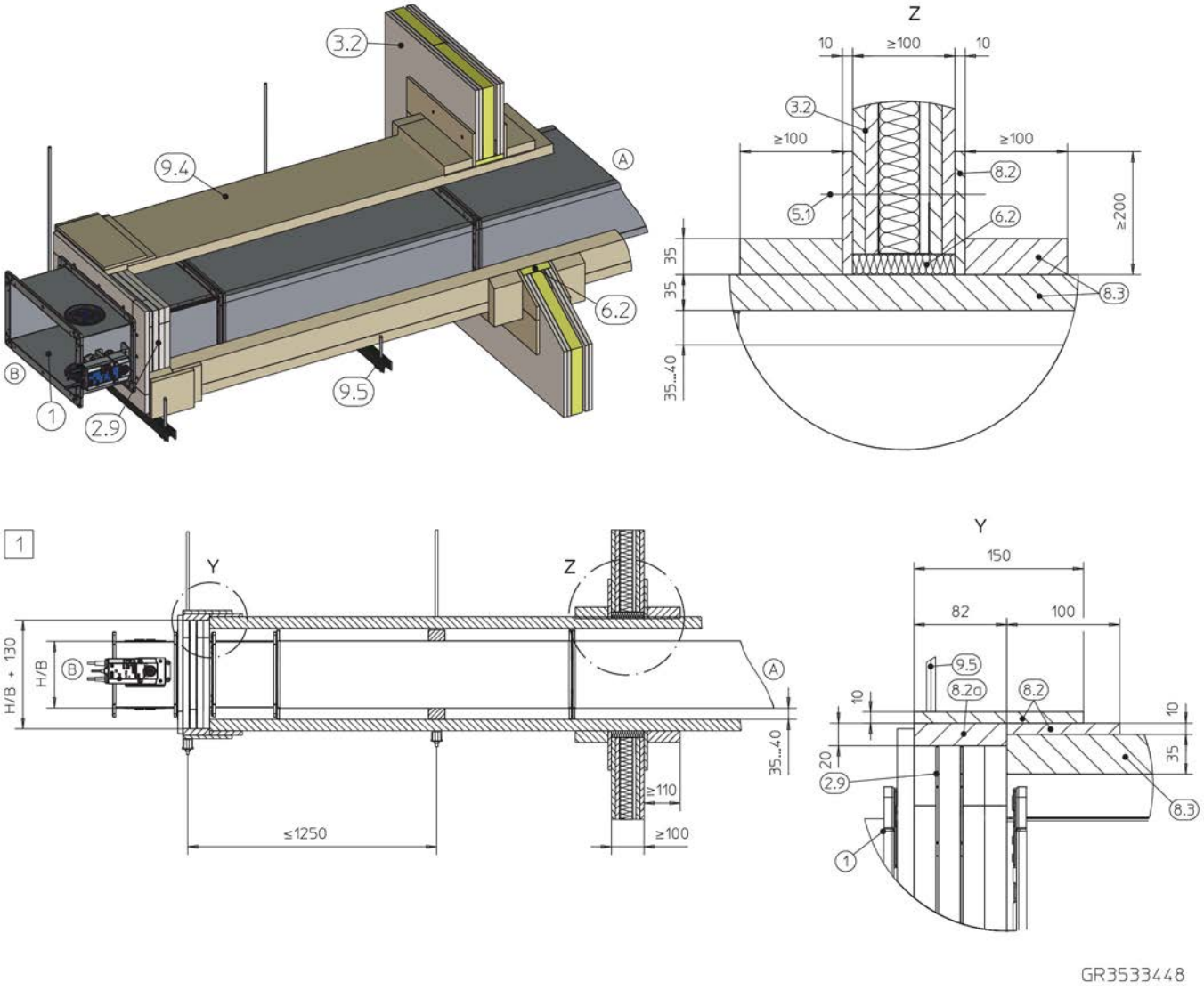


Fig. 59: Dry mortarless installation with installation kit ES remote from a lightweight partition wall

1	FK2-EU
2.9	Installation kit ES *
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides
5.1	Dry wall screw
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
8.2	PROMATECT®-H, d = 10 mm
8.2a	PROMATECT®-H, d = 20 mm
8.3	PROMATECT®-LS, d = 35 mm
9.4	Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5	FK2-EU suspension system (by others), consisting of:
a	Threaded rod M12
b	Hilti mounting rail MQ 41 × 3 mm or equivalent
c	Hilti drilled plate MQZ L13 or equivalent
d	Hexagon nut M10 – M12 with washer
1	Up to EI 90 S
A	Installation side
B	Operating side

Note: * Remove intumescent seal (6.12) and seal (6.21) or do not affix, see ↳ *27*. Further installation details and components to be provided by the customer on request.

Additional requirements: dry mortarless installation with installation kit ES remote from lightweight partition walls

- Lightweight partition wall *25*
- Horizontal installation position
- Sheet steel ducts without any openings, with fire-resistant cladding (fittings with cladding according to instructions from Promat®)
- Casing length L = 500 mm
- Enough clear space is required to attach the installation kit to the fire damper.

Note: Fire damper and duct must be suspended *88*.

5.6.4 Dry mortarless installation with fire batt

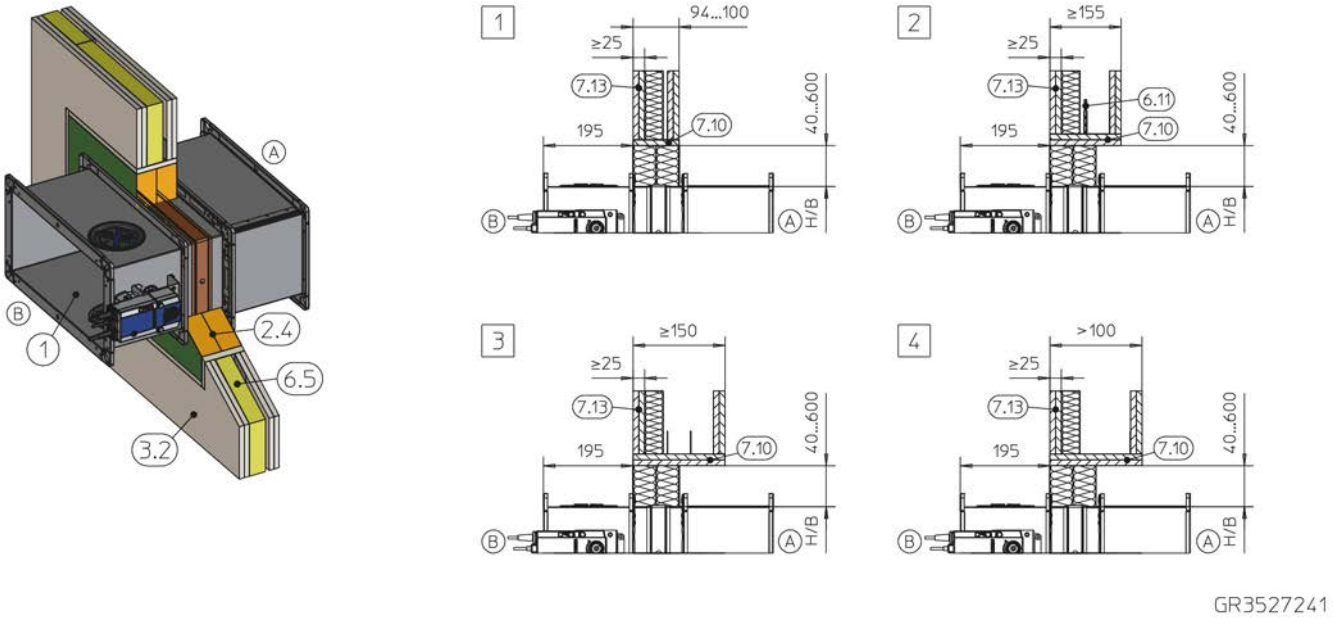


Fig. 60: Dry mortarless installation into a lightweight partition wall, with a fire batt

1	FK2-EU
2.4	Fire batt with ablative coating
3.2	Lightweight partition wall with metal support structure, cladding on both sides
6.5	Mineral wool, depending on wall construction
6.11	Insulating strip
7.10	Trim panels, dual-layer with W > 100 mm
7.13	Cladding
1 – 4	Up to EI 120 S Up to EI 90 S
A	Installation side
B	Operating side

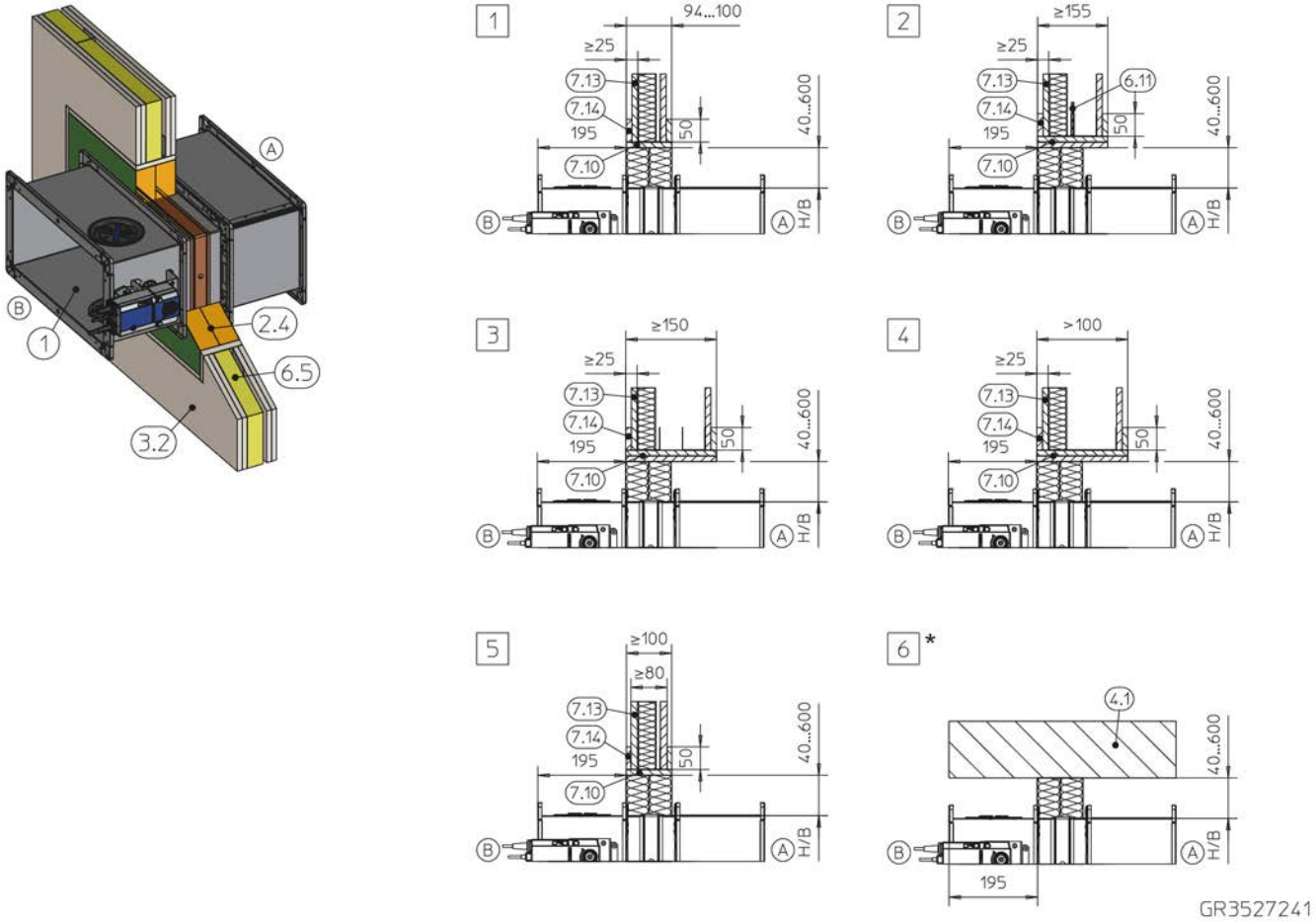


Fig. 61: Dry mortarless installation into a lightweight partition wall, with a fire batt

1	FK2-EU
2.4	Fire batt with ablative coating
3.2	Lightweight partition wall with metal support structure, cladding on both sides
4.1	Solid ceiling slab
6.5	Mineral wool, depending on wall construction
6.11	Insulating strip
7.10	Trim panels, dual-layer with W > 100 mm
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
*	Installation near the floor analogous to 6
1 – 4	EI 30 S
5	Up to EI 60 S
6	EI 30 S to EI 120 S
A	Installation side
B	Operating side

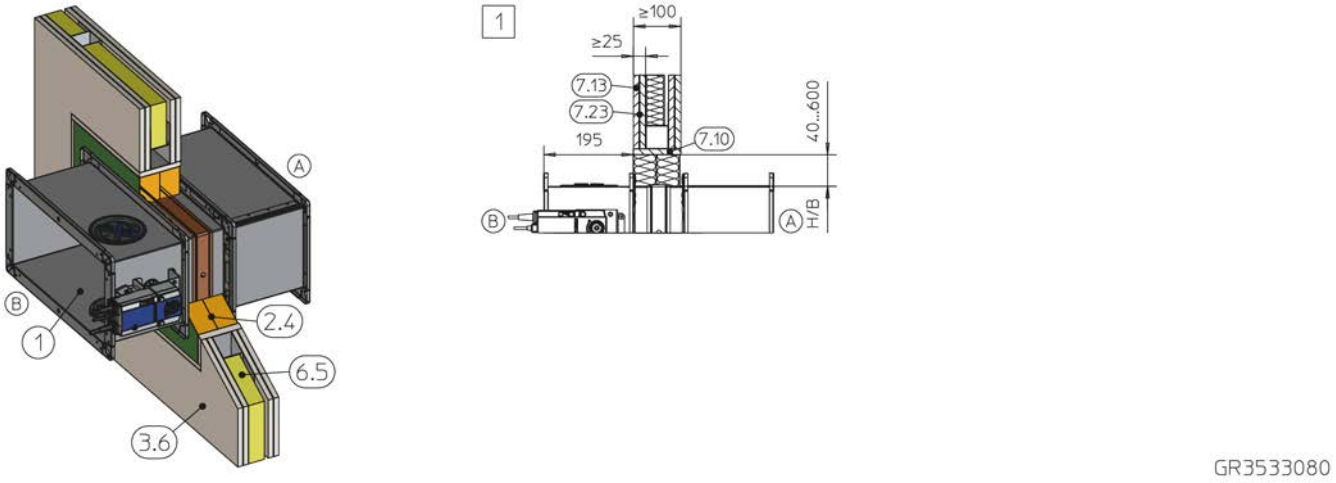


Fig. 62: Dry mortarless installation with fire batt into a compartment wall or safety partition wall

1	FK2-EU	7.13	Cladding
2.4	Fire batt with ablative coating	7.23	Sheet steel insert depending on wall manufacturer
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	1	Up to EI 120 S
6.5	Mineral wool, depending on wall construction	A	Installation side
7.10	Trim panels, dual-layer with W > 100 mm	B	Operating side

Additional requirements: dry mortarless installation with fire batt in lightweight partition and compartment walls with metal support structure

- Lightweight partition wall or compartment wall, see *25*
- Fire batt distances / dimensions, see *23* f
- Suspension *89*
- Casing lengths L = 305 and 500 mm
- 60 – 600 mm distance between two fire dampers in one installation opening

5.7 Lightweight partition walls with timber support structure

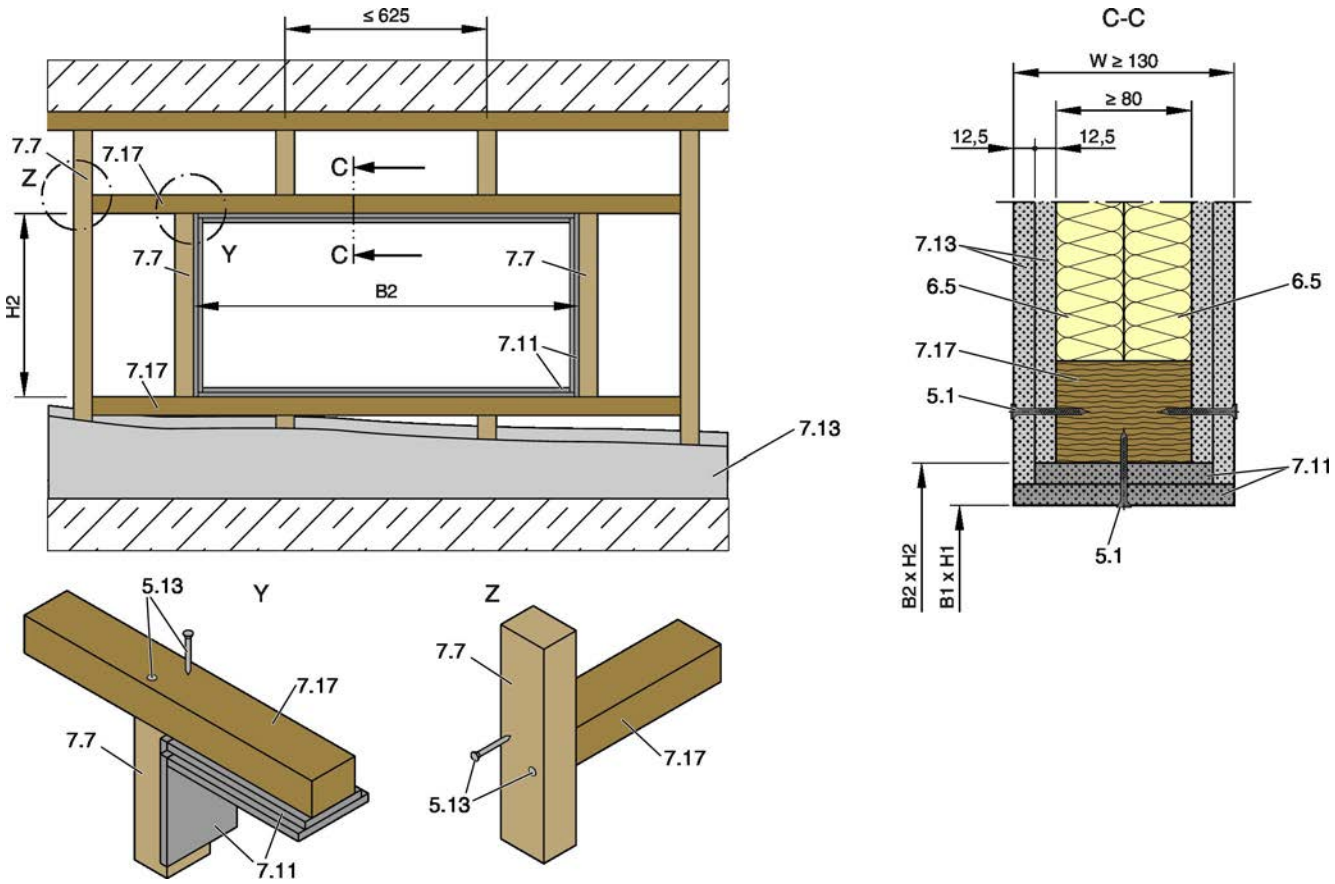


Fig. 63: Lightweight partition wall with timber support structure and cladding on both sides

5.1	Dry wall screw	7.13	Cladding
5.13	Wood screw or pin	7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm
6.5	Mineral wool, depending on wall construction		
7.7	Timber stud, at least 60 × 80 mm	B1 × H1	Clear installation opening
7.11	Trim panels, double layer, staggered joints	B2 × H2	Opening in the half-timbered construction

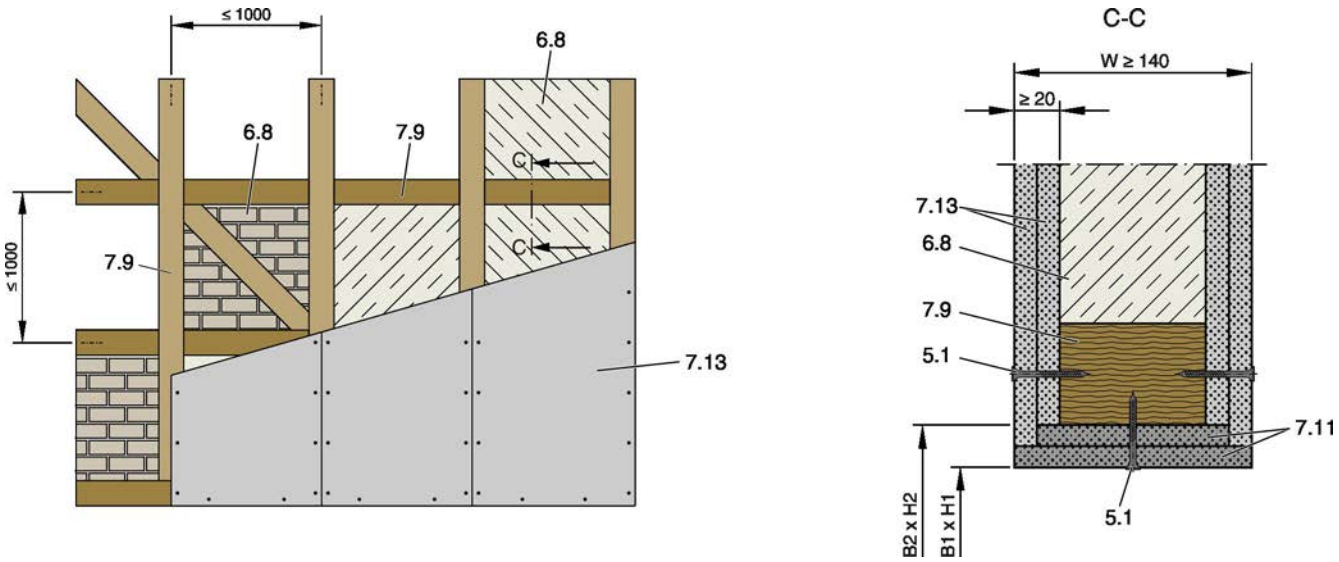


Fig. 64: Lightweight partition wall, half-timbered construction with cladding on both sides

5.1	Dry wall screw
6.8	Infill*
7.9	Half-timbered construction
7.11	Trim panels, double layer, staggered joints
7.13	Cladding
*	Cavities completely filled with mineral wool ≥ 50 kg/m³, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay
B1 × H1	Clear installation opening
B2 × H2	Opening in the half-timbered construction

Additional requirements: lightweight partition walls with timber studs

- Timber stud wall or half-timbered construction, *26*

Installation type	Installation opening [mm]			
	B1	H1	B2	H2
Mortar-based installation	B + 450 max.	H + 450 max.	B1 + (4 × trim panels)	H1 + (4 × trim panels)
Dry mortarless installation with installation kit ES [1]	B + 140	H + 140		
Dry mortarless installation with fire batt	B + 80 to 1200	H + 80 to 1200		

[1] Installation opening tolerance ± 2 mm

5.7.1 Mortar-based installation

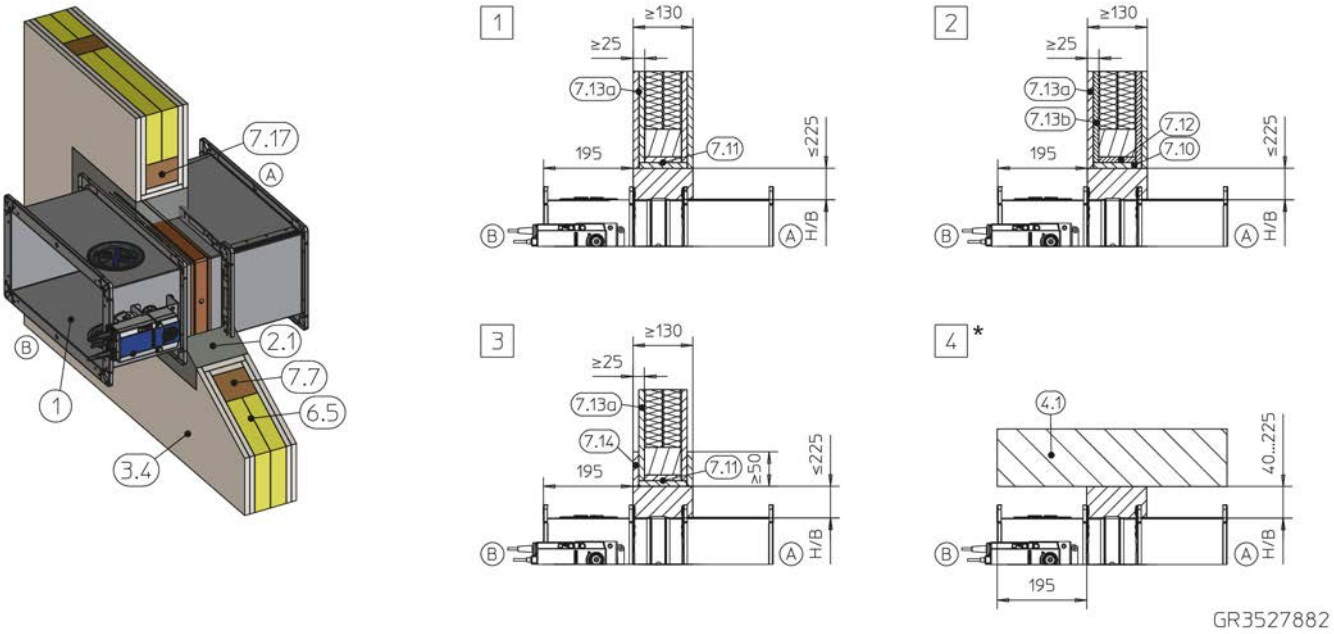


Fig. 65: Mortar-based installation into a lightweight partition wall with timber support structure

1	FK2-EU
2.1	Mortar
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
6.5	Mineral wool, depending on wall construction
7.7	Timber stud, at least 60 × 80 mm
7.10	Trim panels (fire-resistant)
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmer, wooden beam,min. 60 × 80 mm
*	Installation near the floor analogous to 4
1	Up to EI 120 S
2 3	EI 30 S
4	EI 30 S to EI 120 S
A	Installation side
B	Operating side

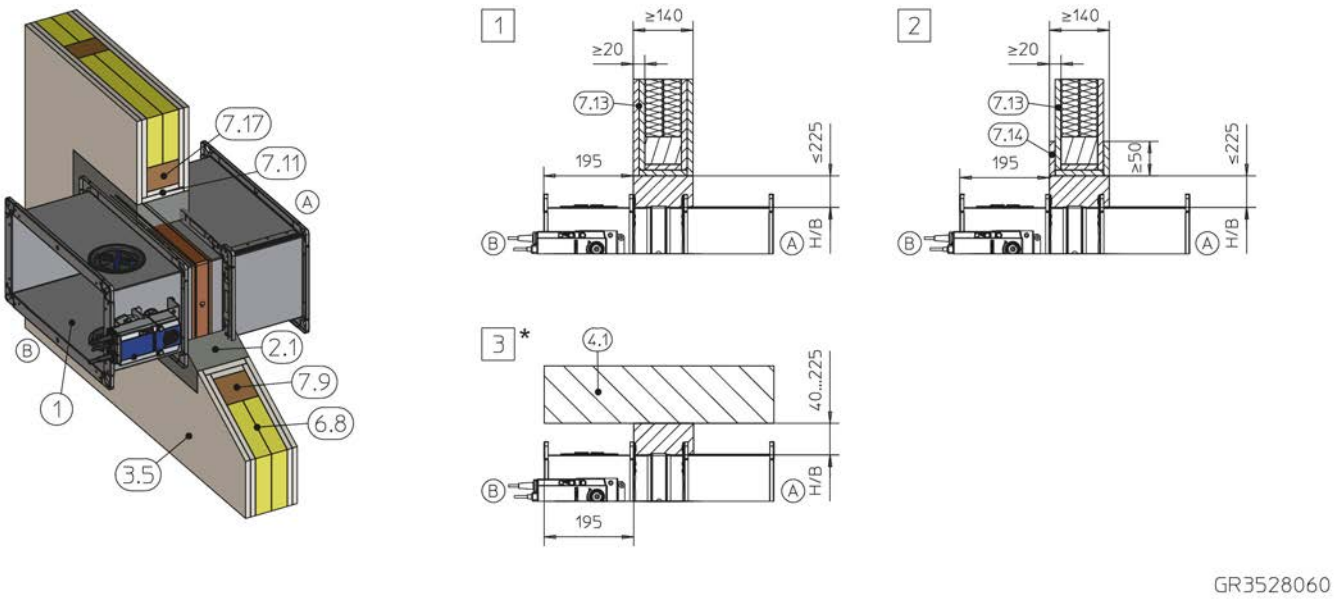


Fig. 66: Mortar-based installation into a lightweight partition wall, half-timbered construction

1	FK2-EU
2.1	Mortar
3.5	Half-timbered construction, cladding on both sides
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9	Half-timbered construction
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
7.17	Trimmer, wooden beam,min. 60 × 80 mm
*	Installation near the floor analogous to 3
1	Up to EI 90 S
2	EI 30 S
3	EI 30 S to EI 90 S
A	Installation side
B	Operating side

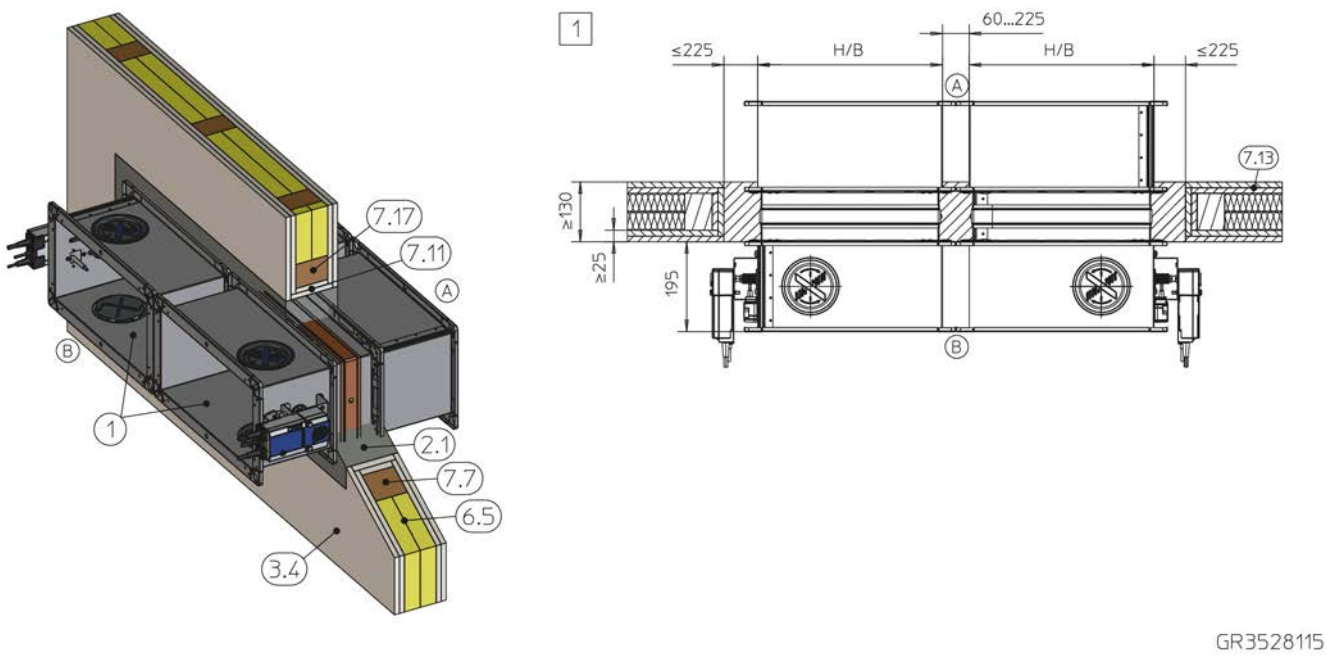


Fig. 67: Mortar-based installation into a lightweight partition wall with timber studs, "flange to flange", illustration shows side by side installation (applies also to installation of dampers on top of each other and for half-timbered construction)

1	FK2-EU
2.1	Mortar
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
6.5	Mineral wool, depending on wall construction
7.7	Timber stud, at least 60 × 80 mm
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.13	Cladding
7.17	Trimmer, wooden beam,min. 60 × 80 mm
[1]	To EI 120 S / half-timbered construction to EI 90 S
A	Installation side
B	Operating side

Additional requirements: mortar-based installation in lightweight partition walls with timber studs

- Timber stud wall or half-timbered construction, *26*
- Casing lengths L = 305 and 500 mm

5.7.2 Dry mortarless installation with installation kit ES

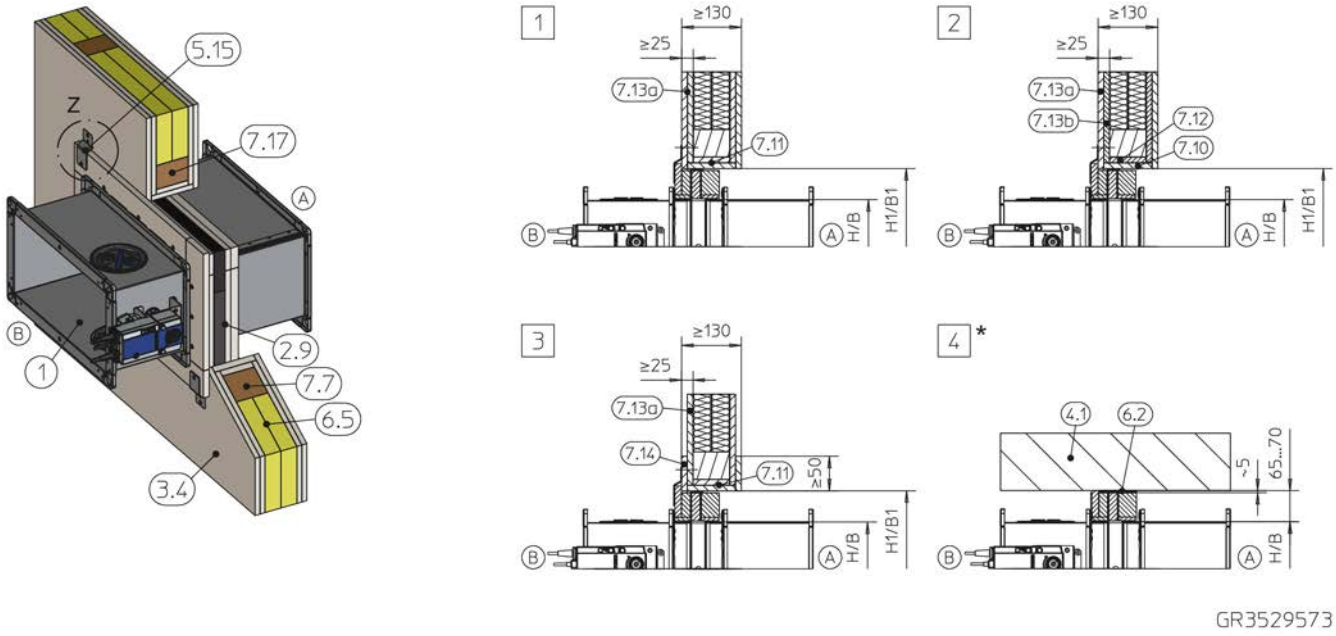


Fig. 68: Dry mortarless installation into a lightweight partition wall with timber support structure, with installation kit ES

1	FK2-EU
2.9	Installation kit ES
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
4.1	Solid ceiling slab / solid floor
5.15	Bracket
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³
6.5	Mineral wool, depending on wall construction
7.7	Timber stud / nogging, at least 60 × 80 mm
7.10	Trim panels (fire-resistant)
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmer, wooden beam min. 60 x 80 mm
*	Installation near the floor analogous to 4
Z	For fixing, see Fig. 19
1	Up to EI 90 S
2 3	EI 30 S
4	Up to EI 90 S
A	Installation side
B	Operating side

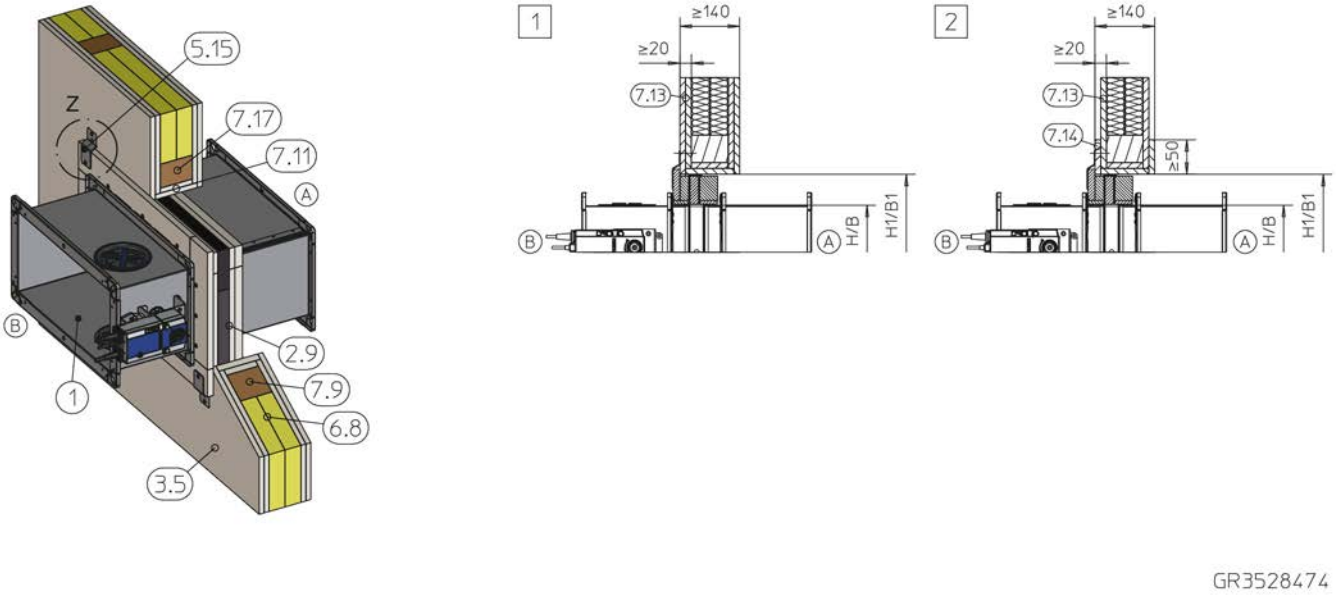


Fig. 69: Dry mortarless installation into a half-timbered construction, with installation kit ES

1	FK2-EU
2.9	Installation kit ES
3.5	Half-timbered construction, cladding on both sides
5.15	Bracket
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9	Half-timbered construction
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
7.17	Trimmers, timber (in a half-timbered construction)
Z	For fixing, see Fig. 19
1	Up to EI 90 S
2	EI 30 S
A	Installation side
B	Operating side

Additional requirements: dry mortarless installation with installation kit ES in lightweight partition walls with timber studs

- Timber stud wall or half-timbered construction, *26*
- Casing length L = 500 mm
- Distance from the fire damper to the adjacent parts approx. 80 / 120 mm (depending on the arrangement of brackets)
- 65 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements
- ≥ 200 mm distance between two fire dampers in separate installation openings

1. Mount the installation kit onto the fire damper, see *27*.
2. Fix the fire damper with brackets and dry wall screws to the timber stud wall or half-timbered construction, see Fig. 68 and *27*.

5.7.3 Dry mortarless installation with fire batt

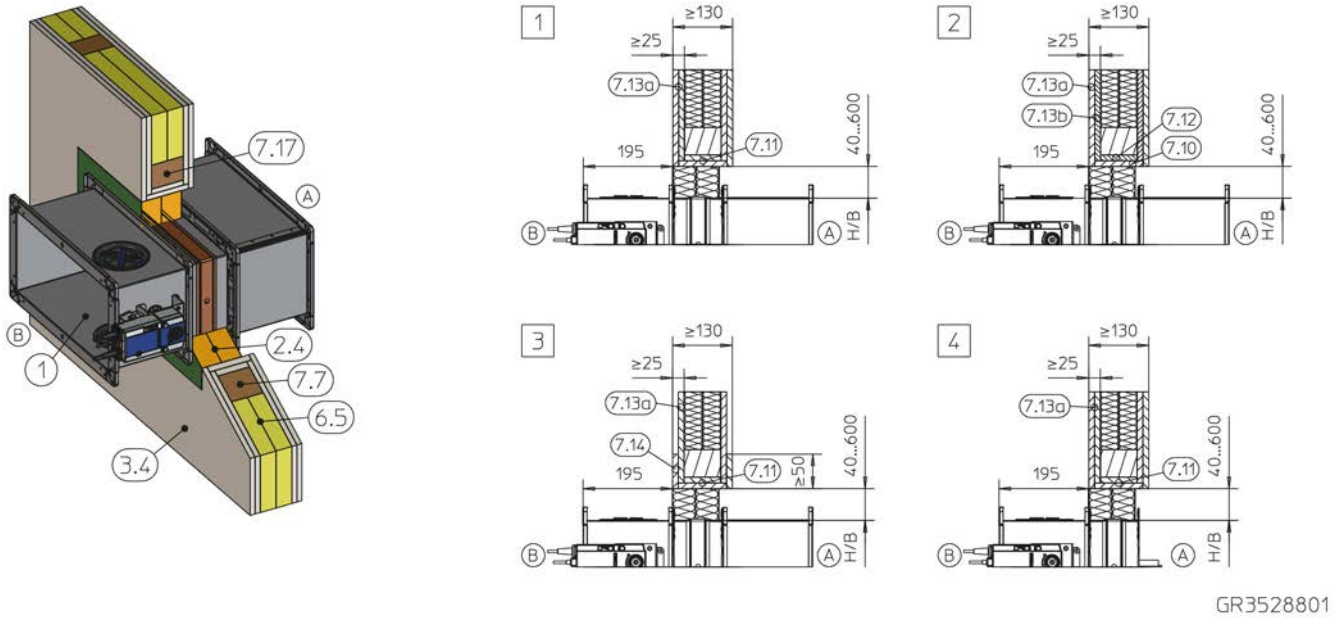


Fig. 70: Dry mortarless installation with fire batt into a lightweight partition wall with timber studs

1	FK2-EU
2.4	Fire batt with ablative coating
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
6.5	Mineral wool, depending on wall construction
7.7	Timber stud, at least 60 × 80 mm
7.10	Trim panels (fire-resistant)
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.12	Trim panels, wood sheet, at least 600 kg/³
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board of the same material as the wall
7.17	Trimmer, wooden beam min. 60 x 80 mm
1 4	Up to EI 120 S
2 3	EI 30 S
A	Installation side
B	Operating side

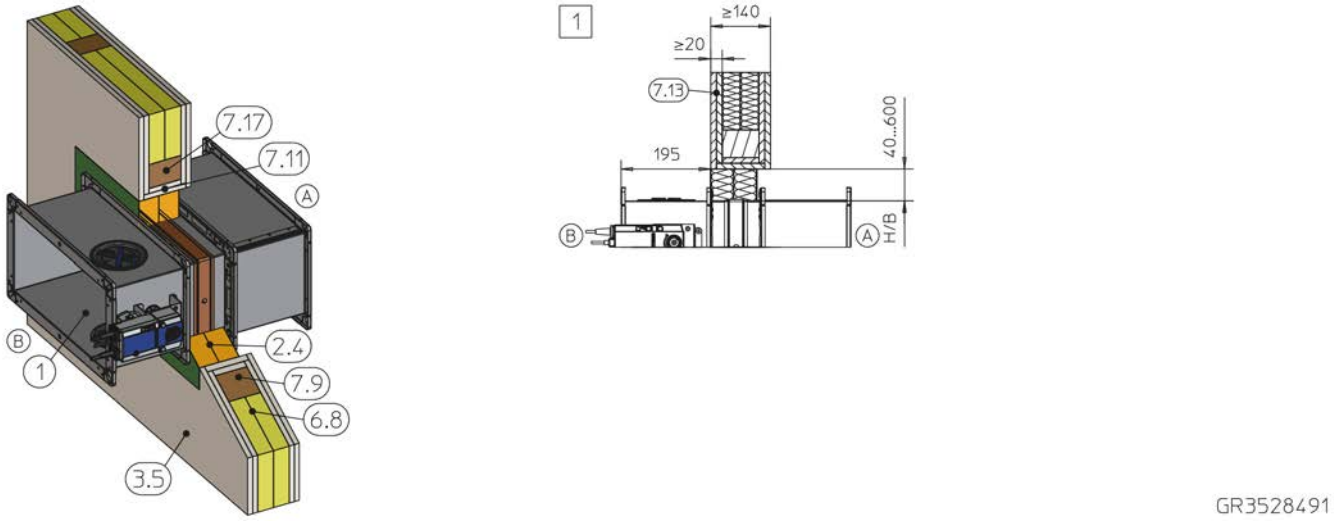


Fig. 71: Dry mortarless installation with fire batt into a half-timbered construction

1	FK2-EU
2.4	Fire batt with ablative coating
3.5	Half-timbered construction, cladding on both sides
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
7.9	Half-timbered construction
7.11	Trim panels, fire-resistant, double layer, staggered joints
7.13	Cladding
7.17	Trimmer, wooden beam min. 60 x 80 mm
1	Up to EI 90 S
A	Installation side
B	Operating side

Additional requirements: dry mortarless installation with fire batt in lightweight partition walls with timber studs

- Timber stud wall or half-timbered construction, *26*
- Fire batt distances / dimensions, see *23* f
- Casing lengths L = 305 and 500 mm
- 60 – 600 mm distance between two fire dampers of the same size in one installation opening

5.8 Solid wood walls

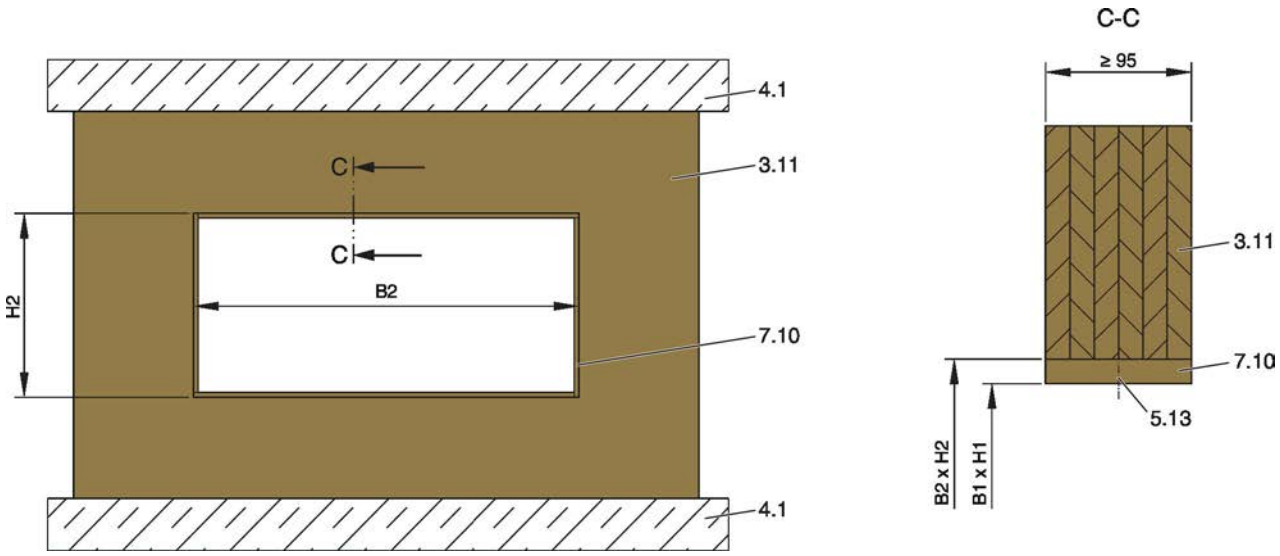


Fig. 72: Solid wood wall

3.11 Solid wood wall / CLT wall
4.1 Solid ceiling slab / solid floor
5.13 Wood screw or pin
7.10 Trim panels (optional)
B1 × H1 Clear installation opening
B2 × H2 Opening in a solid wood wall / CLT wall (without trim panels: B2 = B1, H2 = H1)

Additional requirements: solid wood walls

- Solid wood wall or CLT wall *26*

Installation type	Installation opening [mm]			
	B1	H1	B2	H2
Mortar-based installation	B + 450 max.	H + 450 max.	B1 + (2 × trim panels)	H1 + (2 × trim panels)
Dry mortarless installation with installation kit ES [1]	B + 140	H + 140		
Dry mortarless installation with fire batt	B + 80 to 1200	H + 80 to 1200		

[1] Installation opening tolerance ± 2 mm

5.8.1 Mortar-based installation

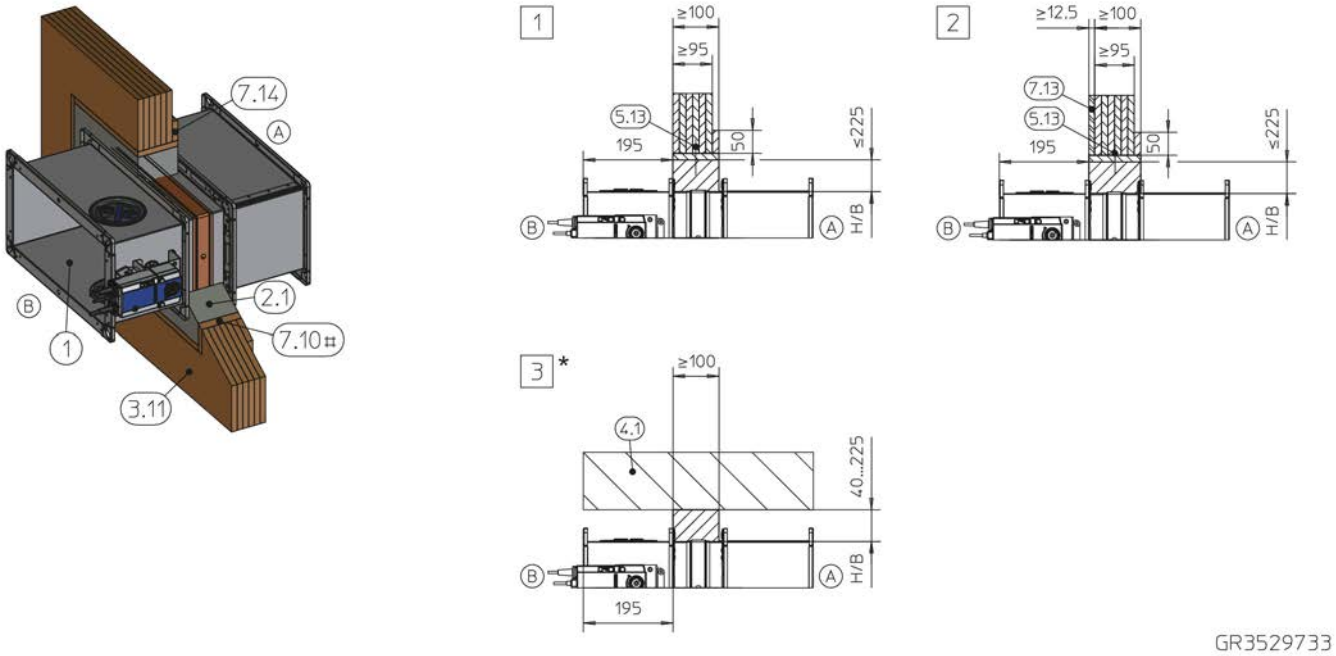


Fig. 73: Mortar-based installation into a solid wood wall or CLT wall

1	FK2-EU	7.14	Reinforcing board of the same material (required if W < 100 mm)
2.1	Mortar		
3.11	Solid wood wall / CLT wall	#	optional
4.1	Solid ceiling slab	*	Installation near the floor analogous to 3
5.13	Wood screw or pin	1 – 3	Up to EI 90 S
7.10	Trim panels	A	Installation side
7.13	Cladding, fire-resistant	B	Operating side

Additional requirements: mortar-based installation in solid wood walls

- Solid wood wall or CLT wall *26*
- Casing lengths L = 305 and 500 mm
- ≥ 200 mm distance between two fire dampers in separate installation openings

5.8.2 Dry mortarless installation with installation kit ES

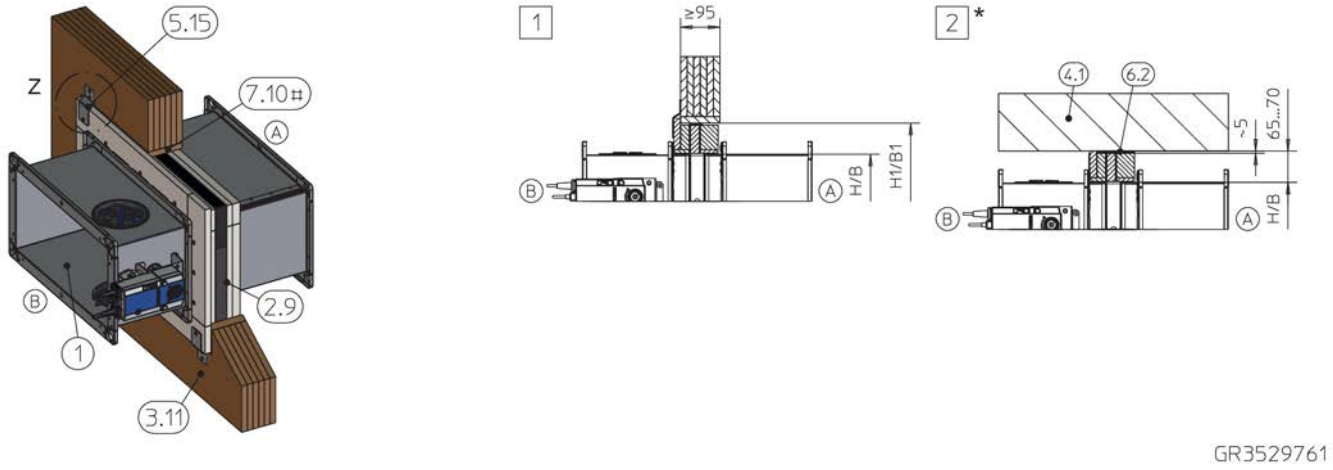


Fig. 74: Dry mortarless installation into a solid wood wall or CLT wall, with installation kit ES

1	FK2-EU	#	optional
2.9	Installation kit ES	*	Installation near the floor analogous to 2
3.11	Solid wood wall / CLT wall	Z	For fixing, see Fig. 19
4.1	Solid ceiling slab	1 2	Up to EI 90 S
5.15	Bracket	A	Installation side
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³, or gypsum mortar (to even out an uneven ceiling)	B	Operating side
7.10	Trim panels		

Additional requirements: dry mortarless installation with installation kit ES in solid wood walls

- Solid wood wall or CLT wall *26*
- Casing length L = 500 mm
- Distance from the fire damper to the adjacent parts approx. 80 / 120 mm (depending on the arrangement of brackets)
- 65 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements, see , detail 2
- ≥ 200 mm distance between two fire dampers in separate installation openings

1. Mount the installation kit onto the fire damper, see *27*.
2. Fix the fire damper with brackets and dry wall screws to the solid wood wall, see Fig. 74 and *27*.

5.8.3 Dry mortarless installation with fire batt

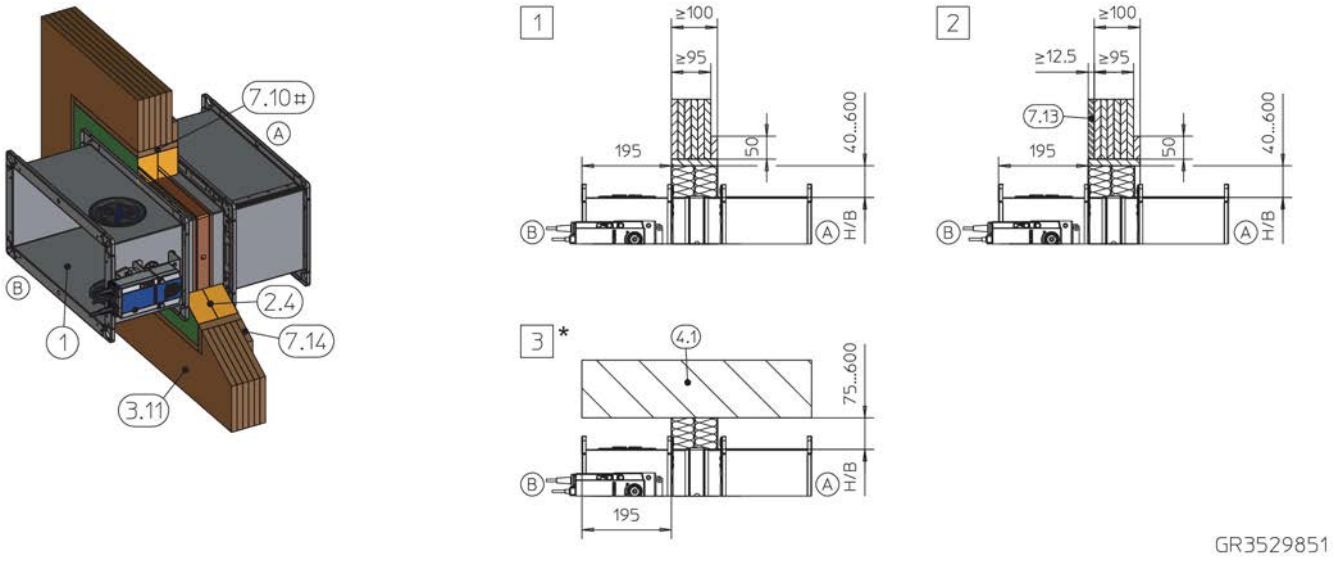


Fig. 75: Dry mortarless installation into a timber wall or CLT wall, with a fire batt

1	FK2-EU
2.4	Fire batt with ablative coating
3.11	Solid wood wall / CLT wall
4.1	Solid ceiling slab / solid floor
7.10	Trim panels
7.13	Cladding, fire-resistant
7.14	Reinforcing board of the same material as the wall
#	optional
*	Installation near the floor analogous to 3
1 – 3	Up to EI 90 S
A	Installation side
B	Operating side

Additional requirements: dry mortarless installation with fire batt in solid wood walls

- Solid wood wall or CLT wall *26*
- Fire batt distances / dimensions, see *23* f
- Casing length L = 305 or 500 mm
- ≥ 200 mm distance between two fire dampers in separate installation openings

5.9 Shaft walls with metal support structure

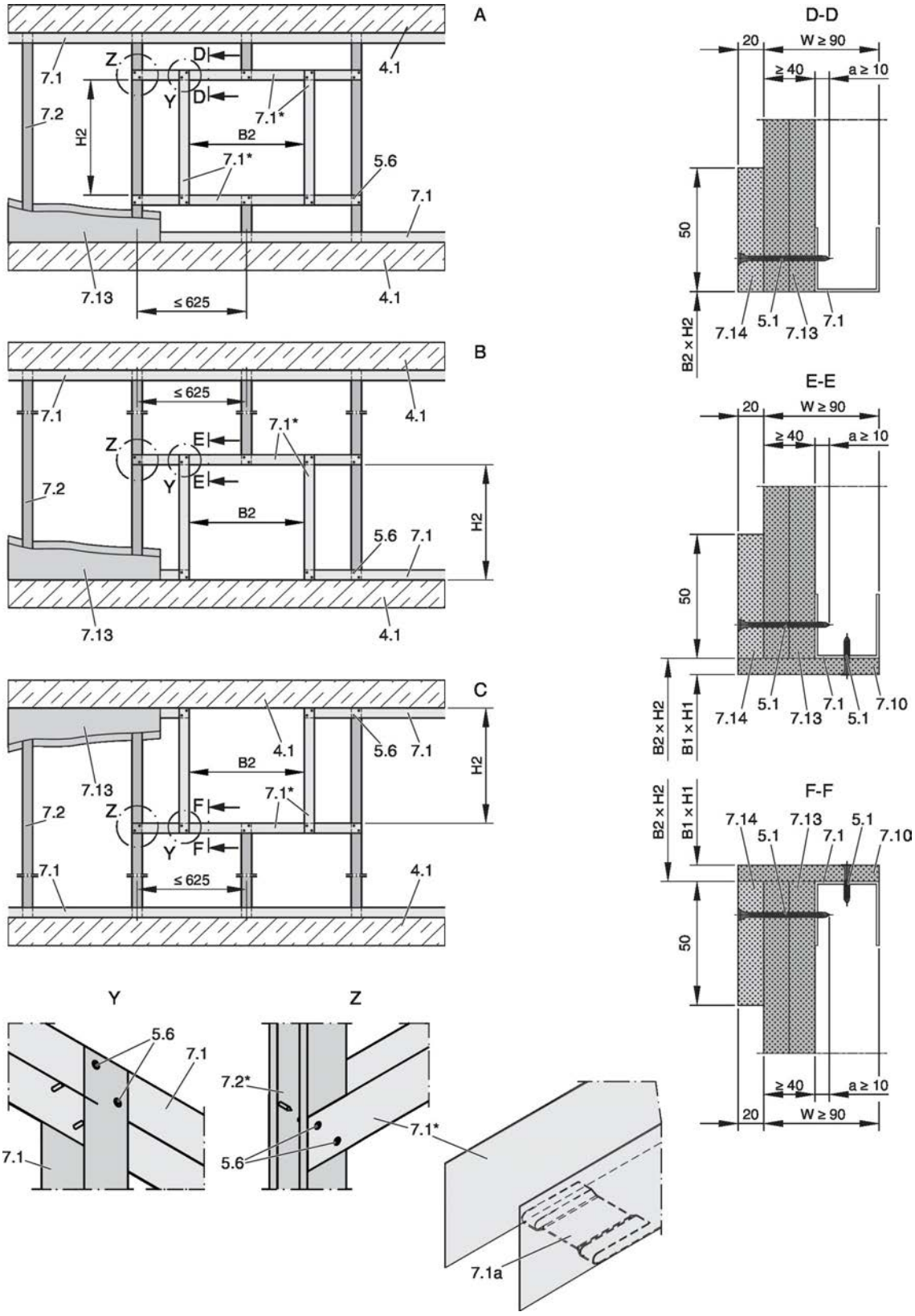


Fig. 76: Shaft walls with metal support structure and cladding on one side

A	Shaft wall
B	Shaft wall, installation near the floor
C	Shaft wall, installation near the ceiling
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw
5.6	Screw or steel rivet
7.1	UW section
7.1a	UW section, cut in and bent or cut off
7.2	CW section
7.10	Optional trim panels, according to installation details
7.13	Cladding
7.14	Reinforcing board of the same material as the wall
B1 × H1	Installation opening
B2 × H2	Opening in the metal support structure (without trim panels: B2 = B1, H2 = H1)
*	Closed side of metal section must face the installation opening

Additional requirements: shaft walls with metal support structure

- Shaft wall *26*

Installation type	Installation opening [mm]			
	B1	H1	B2	H2
Mortar-based installation	B + 450 max.	H + 450 max.	B1 + (2 × trim panels)	H1 + (2 × trim panels)
Dry mortarless installation with installation kit ES[1, 2]	B + 140	H + 140		

[1)] Optional trim panels (single layer)

[2)] Installation opening tolerance ± 2 mm

5.9.1 Mortar-based installation

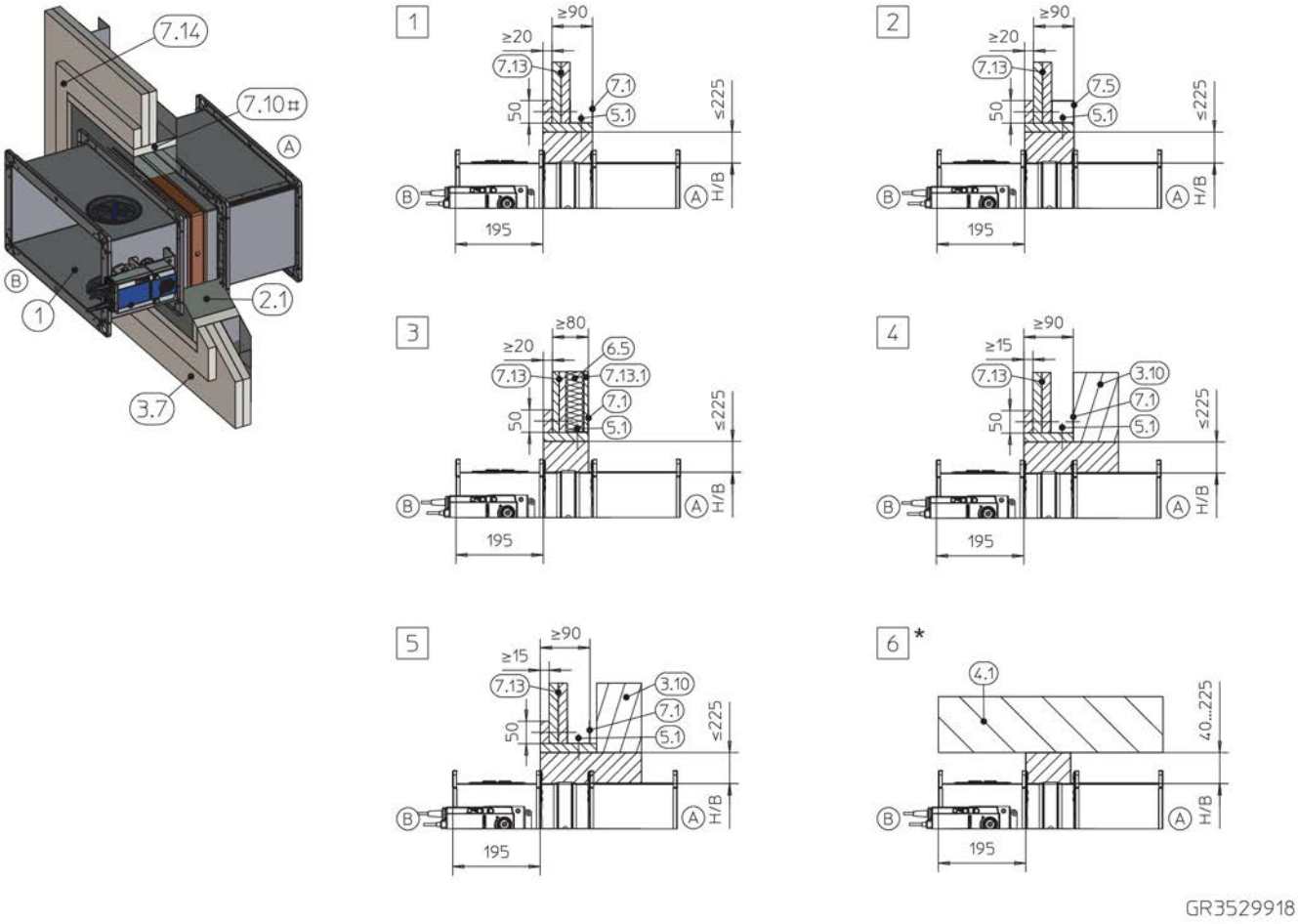


Fig. 77: Mortar-based installation into shaft wall with metal support structure

1	FK2-EU (actuator on outside of shaft)	7.13	Cladding, two layers
2.1	Mortar	7.13.1	Cladding, single-layer, adjusted
3.7	Shaft wall with metal support structure, cladding on one side	7.14	Reinforcing board of the same material as the wall
3.10	Wall without adequate fire resistance rating	#	optional
4.1	Solid ceiling slab / solid floor	*	Installation near the floor analogous to 6
5.1	Dry wall screw	1 – 3	Up to EI 90 S
6.5	Mineral wool, depending on wall construction	4 5	EI 30 S
7.1	UW section	6	EI 30 S – EI 90 S
7.5	Steel support structure (box section)	A	Installation side
7.10	Trim panels	B	Operating side

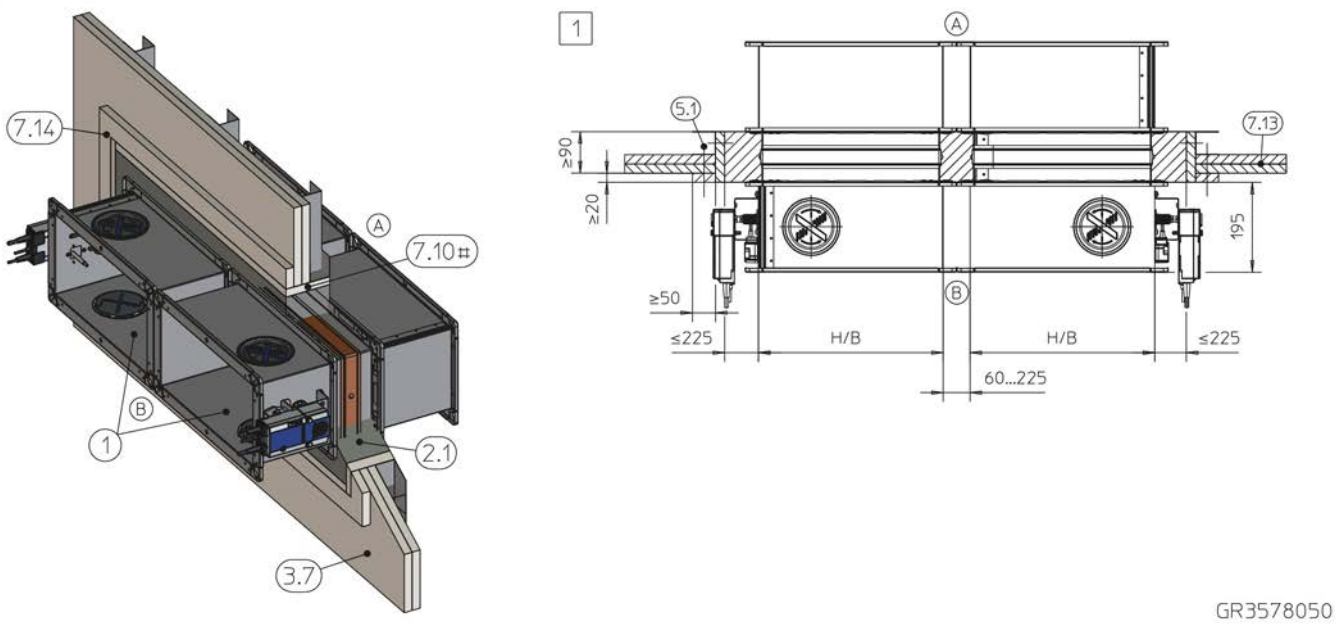


Fig. 78: Mortar-based installation into a shaft wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

1	FK2-EU	7.13	Cladding
2.1	Mortar	7.14	Reinforcing board of the same material as the wall
3.2	Shaft wall with metal support structure, cladding on one side	#	optional
5.1	Dry wall screw	1	Up to EI 90 S
6.5	Mineral wool, depending on wall construction	A	Installation side
7.10	Trim panels	B	Operating side

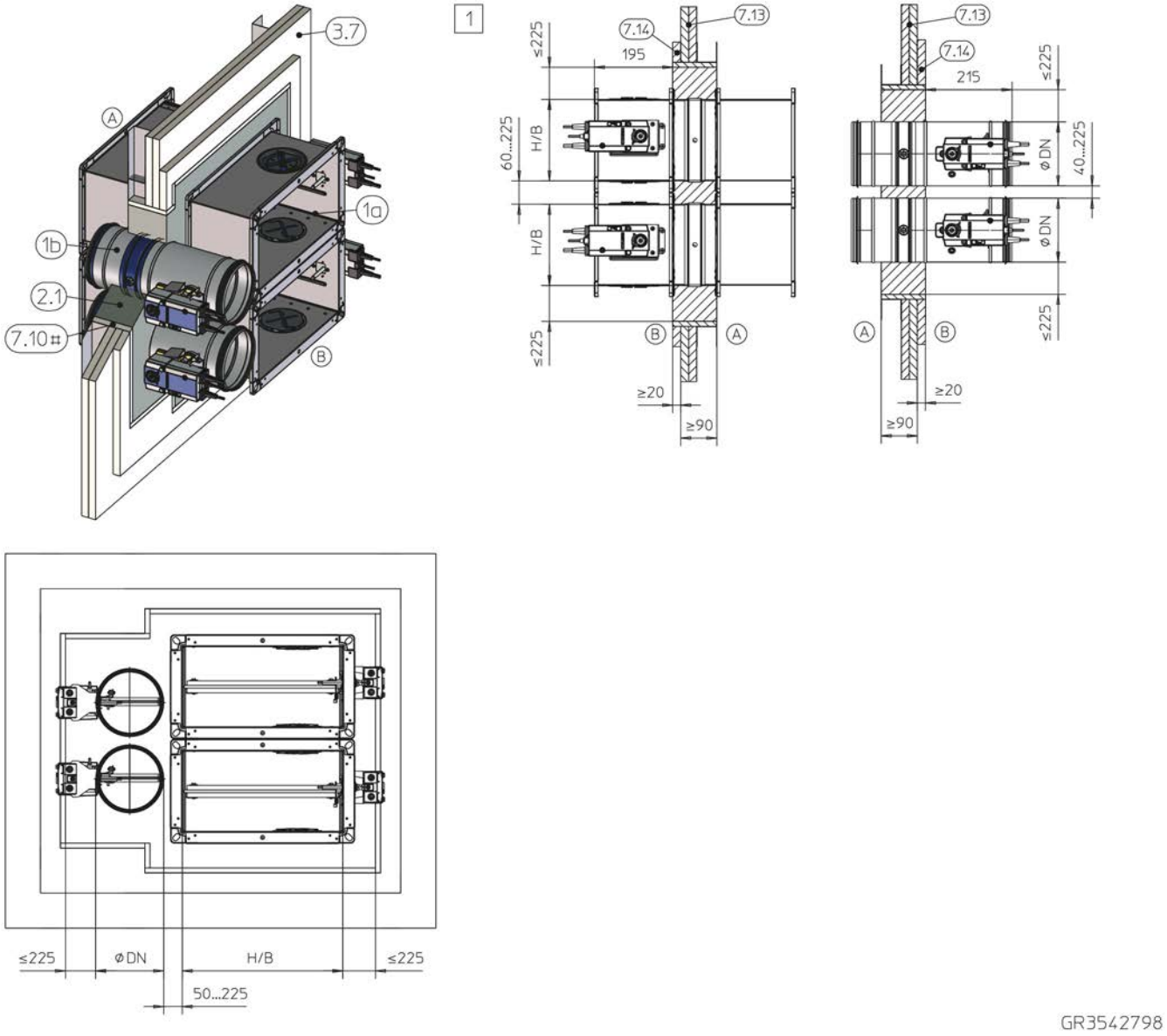


Fig. 79: Mortar-based installation into a shaft wall, FK2-EU and FKRS-EU combined

1a	FK2-EU	7.14	Reinforcing board of the same material as the wall
1b	FKRS-EU		
2.1	Mortar	#	optional
3.7	Shaft wall with metal support structure, cladding on one side	1	Up to EI 90 S
		A	Installation side
7.13	Cladding, two layers	B	Operating side

Note: Alternative installation orientations of side-by-side, under or on top of one another possible. Details are available upon request.

Additional requirements: mortar-based installation in shaft walls with metal support structure

- Shaft wall *26*
- Casing length L = 305 or 500 mm

5.9.2 Dry mortarless installation with installation kit ES

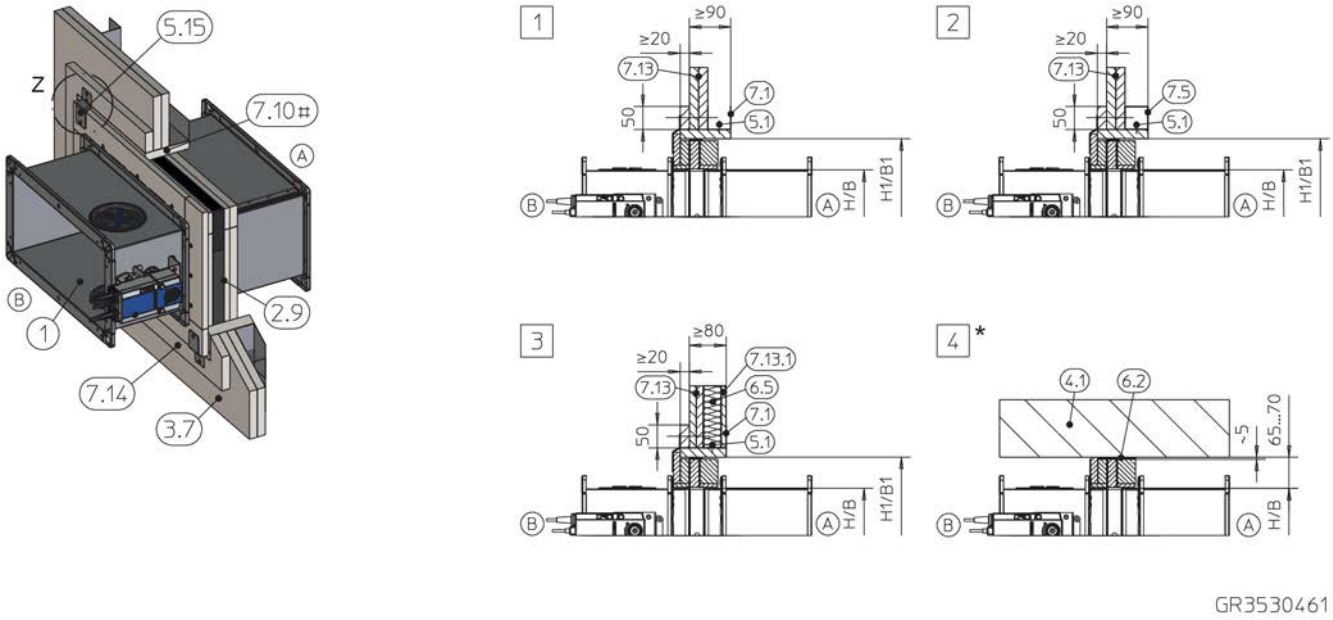


Fig. 80: Dry mortarless installation with installation kit ES into a shaft wall with metal support structure

1	FK2-EU
2.9	Installation kit ES
3.7	Shaft wall with metal support structure, cladding on one side
4.1	Solid ceiling slab / solid floor
5.1	Dry wall screw, to be provided by others
5.15	Bracket
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³, or gypsum mortar (to even out an uneven ceiling or floor)
6.5	Mineral wool, depending on wall construction
7.1	UW section
7.5	Steel support structure (box section)
7.10	Trim panels
7.13	Cladding, fire-resistant
7.13.1	Cladding, single-layer, adjusted
7.14	Reinforcing board of the same material as the wall
#	optional
*	Installation near the floor analogous to 4
Z	For fixing, see Fig. 19
1 – 4	Up to EI 90 S
A	Installation side
B	Operating side

Additional requirements: dry mortarless installation with installation kit ES in shaft walls with metal support structure

- Shaft wall *26*
- Casing length L = 500 mm
- Distance from the fire damper to the adjacent parts approx. 80 / 120 mm (depending on the arrangement of brackets)
- 65 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements, see , detail 4
- ≥ 200 mm distance between two fire dampers in separate installation openings

1. ▸ Mount the installation kit onto the fire damper, see *27*.
2. ▸ Attach the fire damper with brackets and dry wall screws to the metal support structure, see Fig. 80 and *27*.

5.10 Fixing the fire damper

5.10.1 General

For installation remote from walls and ceilings and installation with fire batt, the fire dampers must be suspended with steel threaded rods (M10 – M12). The rods have to be fixed to the ceiling slab; the required fire resistance must not be compromised. Use only fire-rated steel anchors with suitability certificate. Instead of anchors, you can use threaded rods and secure them using nuts and washers. Secure the threaded rods above the ceiling using steel nuts and washers. Threaded rods up to 150 m long do not require any insulation; longer rods do require insulation (according to Promat® work sheet 478, for example). Load the suspension system only with the weight of the fire damper, ducting must be suspended separately. For weights [kg] of FK2-EU fire dampers see *8*.

In addition to the fixing systems described in this manual, you may also use fixing systems that have been approved by accredited testing institutes. This applies in particular to the fire damper installation near a wall or in a corner (when angle sections or mounting plates are used).

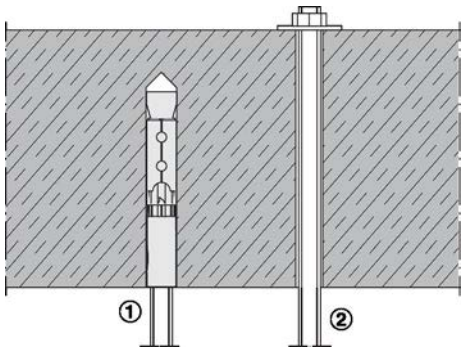


Fig. 81: Fixing to the ceiling slab

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

5.10.2 Suspending fire dampers installed remote from solid walls and ceiling slabs

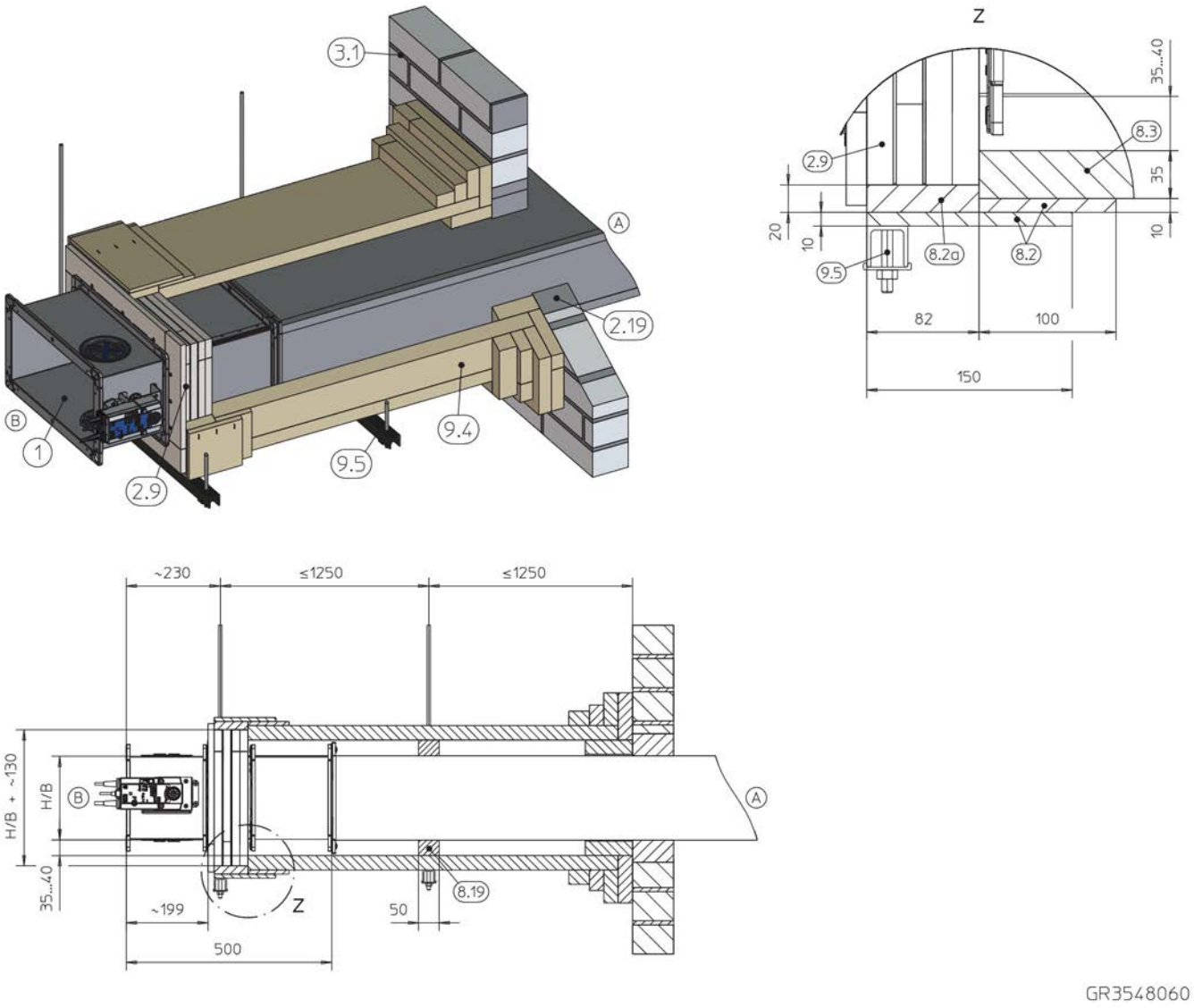


Fig. 82: Dry mortarless installation into a solid wall, with installation kit WE

1	FK2-EU
2.9	Installation kit ES (intumescent seal removed by others)
2.19	Joint filler (Promat® filler, Promat® ready-to-use putty, mineral wool ≥ 1000 °C, ≥ 80 kg/m³ or mortar)
3.1	Solid wall
8.2	PROMATECT®-H, d = 10 mm
8.2a	PROMATECT®-H, d = 20 mm
8.3	PROMATECT®-LS, d = 35 mm, alternative materials *22*
8.19	Support, made from 8.3
9.4	Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5	FK2-EU suspension system (by others), consisting of:
a	Threaded rod M10 – M12
b	Hilti mounting rail MQ 41 × 3 mm or equivalent
c	Hilti drilled plate MQZ L13 or equivalent
d	Hexagon nut M10 – M12 with washer
A	Installation side
B	Operating side

5.10.3 Fixing the damper when a fire batt is used

Horizontal duct

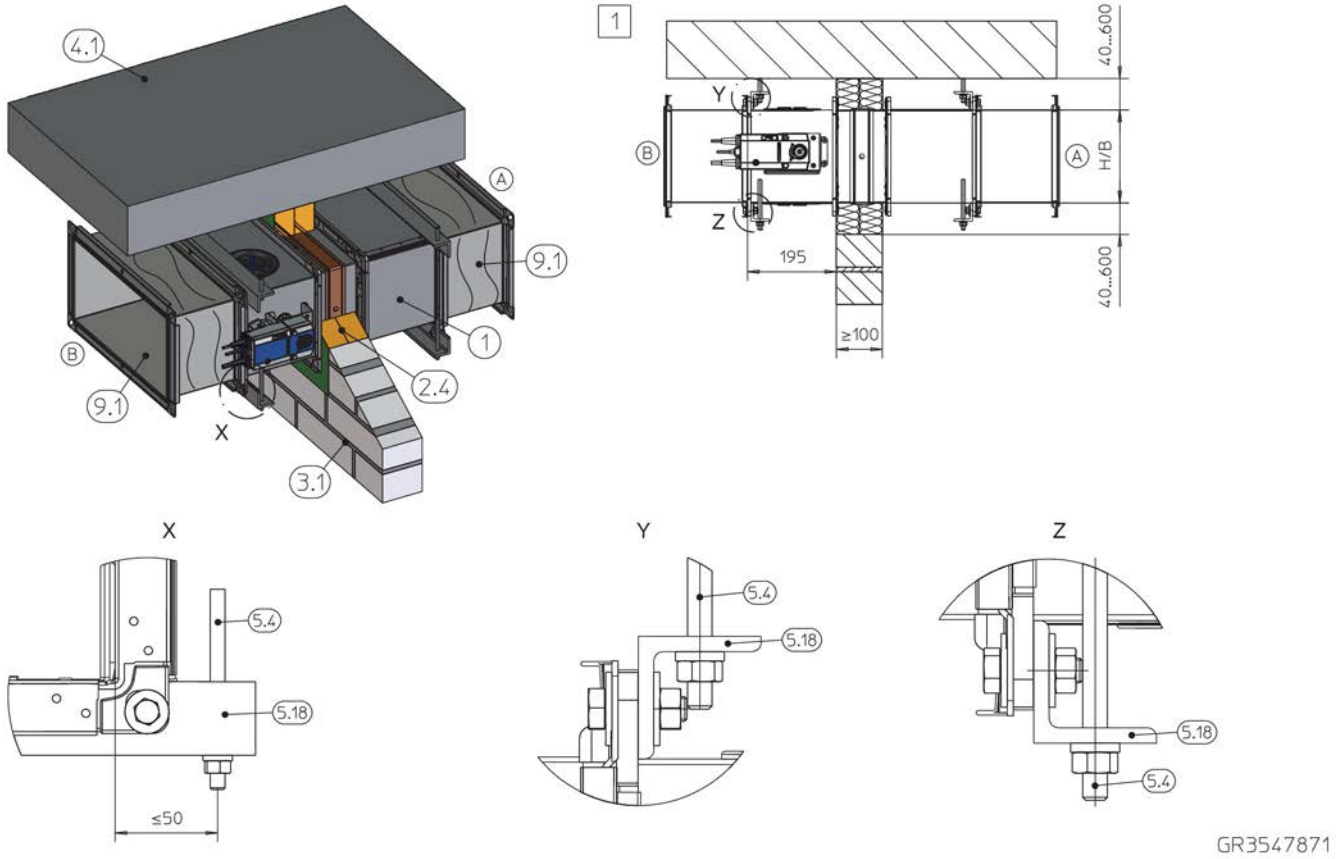


Fig. 83: Dry mortarless installation with a fire batt, illustration shows installation into a solid wall (applies also to installation into a lightweight partition wall)

1	FK2-EU
2.4	Fire batt with ablative coating
3.1	Solid wall
4.1	Solid ceiling slab
5.4	Threaded rod M10 – M12 with washer and nut
5.18	Steel angle section to EN 10056-1, L ≥ 40 mm × 40 mm × 5 mm, galvanised or painted, or equivalent
9.1	Flexible connector (recommended)
1	Up to EI 120 S
A	Installation side
B	Operating side

Note: Each fire damper has to be suspended both on the operating side and on the installation side. The suspension is carried out in each case above **or** below the flange.

6 Accessories

Extension pieces

When there are cover grilles, circular spigots, flexible connectors, circular duct bends, etc., you may have to use an extension piece for certain heights. See the table for the required lengths.

Extension pieces [mm]			
L	**H**	**Operating side**	**Installation side**
305	100 – 200	–	195
500	100 – 200	–	–

Open blade protrusion [mm]			
H	**100**	**150**	**200**
x	-204	-179	-154
y			
L = 305	-8*	17*	42*
L = 500	-204	-179	-154

*Extension piece required

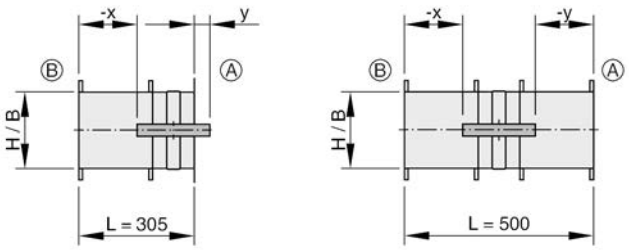


Fig. 84: Open blade protrusion

A Installation side
B Operating side

> ***Note***
>
> *The movement of the damper blade must not be obstructed by any accessory. The distance between the tip of the open damper blade and any accessory must be at least 50 mm.*

Flexible connectors

Flexible connectors are used to avoid both tension and compression.

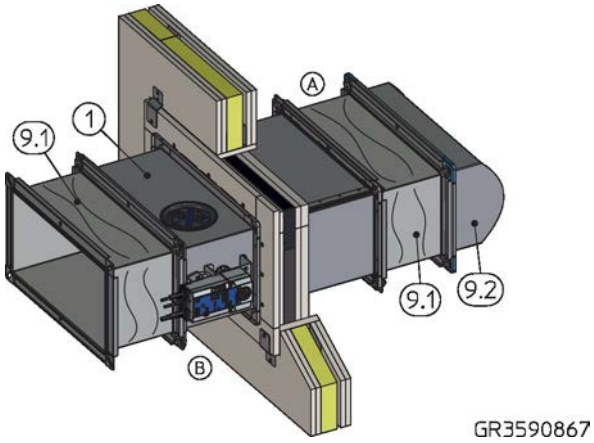


Fig. 85: Fire damper with flexible connectors

1 FK2-EU
9.1 Flexible connector
9.2 Duct
A Installation side
B Operating side

Circular spigot

Circular spigots can be used on request to connect the fire damper to circular ducts.

Cover grilles

Cover grilles are used on non-ducted ends of fire dampers.

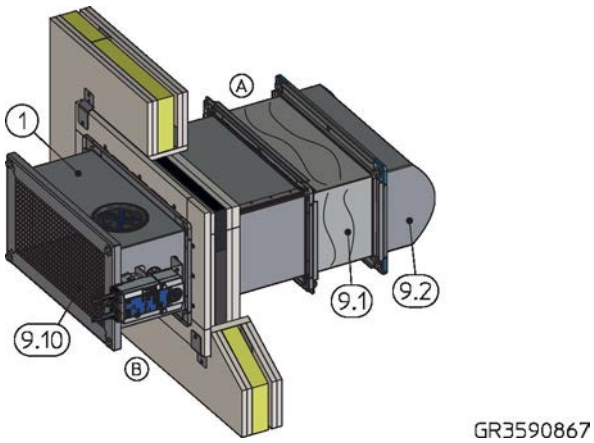


Fig. 86: Fire damper with cover grille

1 FK2-EU
9.1 Flexible connector
9.2 Extension piece or duct
9.10 Cover grille, galvanised steel, mesh aperture ≤ 20 mm
A Installation side
B Operating side

Profile connecting frame

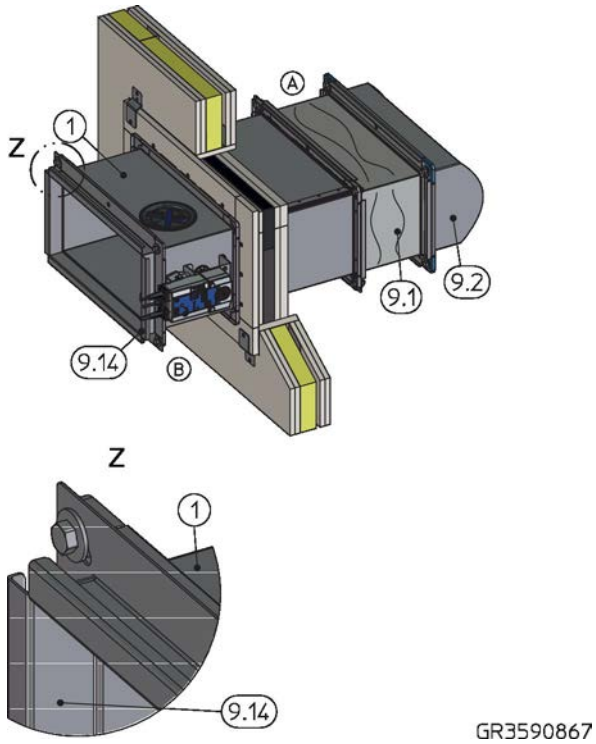


Fig. 87: Fire damper with profile connecting frame

1 FK2-EU
9.1 Flexible connector
9.2 Extension piece or duct
9.14 Profile connecting frame
A Installation side
B Operating side

7 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.

7.1 Limit switches (fire dampers with fusible link)

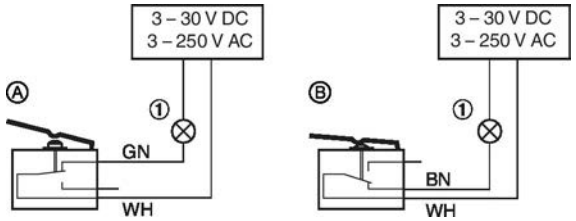


Fig. 88: Wiring of limit switches, example

1 Indicator light or relay, to be provided by others
A Type of connection normally closed
B Type of connection normally open

- The limit switches must be connected according to the wiring example Fig. 88
- Indicator lights or relays may be connected as long as the performance specifications are taken into consideration.
- Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

Type of connection	Limit switch	Damper blade	Electric circuit
A	Not actuated	CLOSED or OPEN position is not reached	Closed
B	actuated	CLOSED or OPEN position is reached	Closed

7.2 Spring return actuator

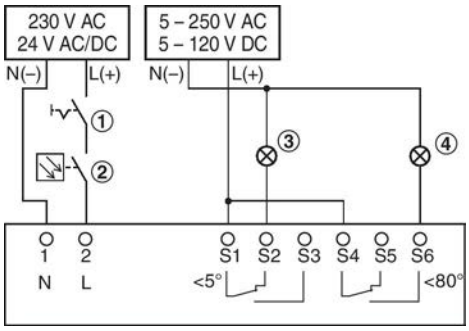


Fig. 89: Actuator connection, example

1 Switch for opening and closing, to be provided by others
2 Optional release mechanism, e.g. TROX duct smoke detector Type RM-O-3-D or RM-O-VS-D
3 Indicator light for CLOSED position, to be provided by others
4 Indicator light for OPEN position, to be provided by others

- The fire damper may be equipped with a spring return actuator for a supply voltage of 230 V AC or 24 V AC/DC. See the performance data on the actuator rating plate.
- The spring return actuator must be connected according to the wiring example shown. Several actuators can be connected in parallel as long as the performance specifications are taken into consideration.
- Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

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.

7.3 Spring return actuator and duct smoke detector RM-O-3-D

Note: For connection examples and further details see the RM-O-3-D operating and installation manual

8 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.

⚠ CAUTION!

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

8.1 Fire damper with fusible link

Damper blade position indicator

The position of the damper blade (1.2) is indicated by the position of the handle (1.6).

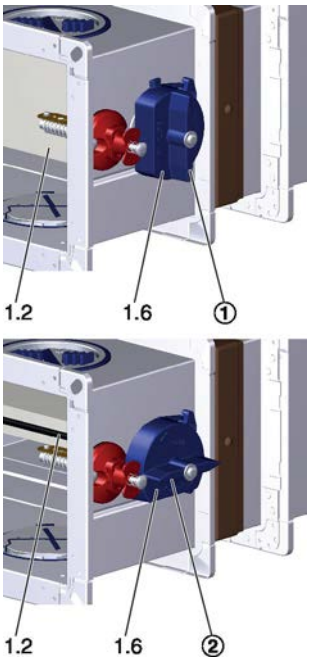


Fig. 90: Damper blade position indicator

1. ▸ Damper blade (1.2) is closed
2. ▸ Damper blade (1.2) is open

Close the damper blade

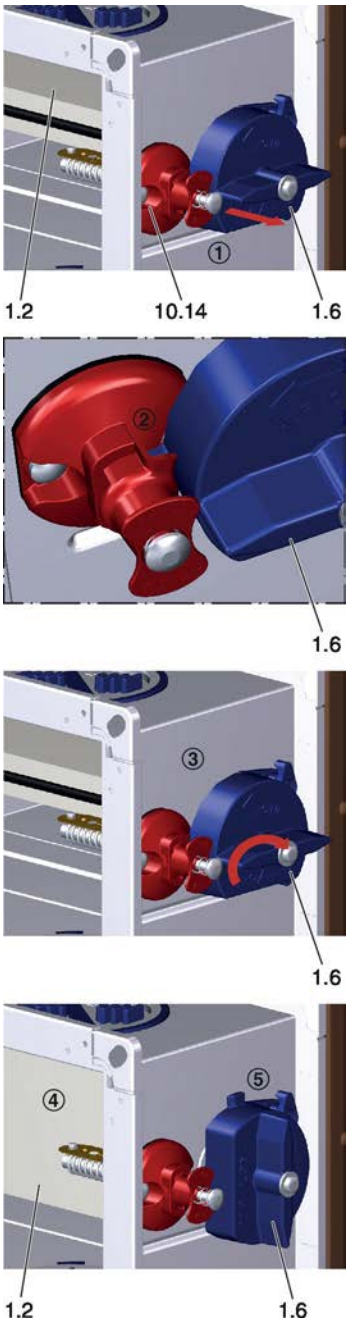


Fig. 91: Close the damper blade

Requirement

- The damper blade is open.

1. ▸ Pull the knob of the thermal release mechanism (10.14) forwards in the direction of the arrow to release
2. ▸ the handle (1.6).
3. ▸ The handle (1.6) swivels automatically in the direction of the arrow.
4. ▸ The damper blade (1.2) is closed and
5. ▸ the handle (1.6) shows that the damper blade (1.2) is closed.

Opening the damper blade

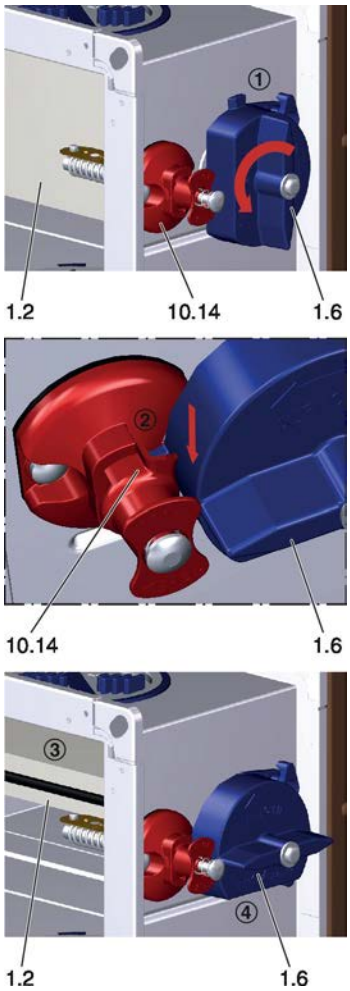


Fig. 92: Opening the damper blade

Requirement

- The damper blade is closed.

1. ▸ Turn the handle (1.6) in the direction of the arrow (counter-clockwise) until
2. ▸ the handle (1.6) engages behind the knob of the thermal release mechanism (10.14).
3. ▸ The damper blade (1.2) is open and
4. ▸ the handle (1.6) indicates that the damper blade (1.2) is open.

8.2 Fire damper with spring return actuator BFL...

Status indicator

Fig. 93: Thermoelectric release mechanism BAT

1 Push button for functional test
2 Indicator light

The indicator light (2) for the thermoelectric release mechanism is illuminated when all of the following conditions apply:

- Power is being supplied.
- The thermal fuses are intact.
- The push button is not being pushed.

Damper blade position indicator

The position of the damper blade is indicated by the pointer on the actuator.

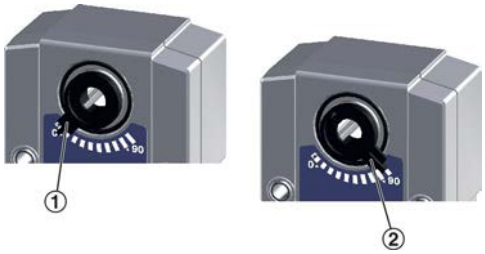


Fig. 94: Damper blade position indicator

1 Damper blade is closed
2 Damper blade is open

Closing/opening the damper blade with spring return actuator

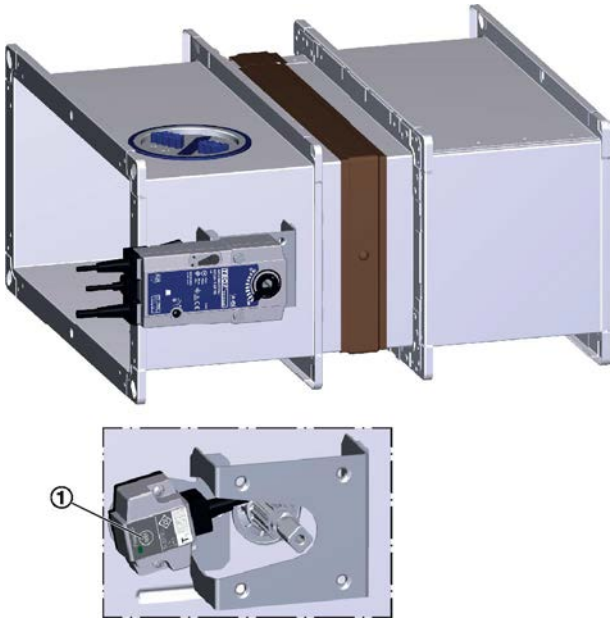


Fig. 95: Functional test (FK2-EU shown in OPEN position)

⚠ CAUTION!

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

Requirement

- Power is being supplied

1. Push the push button (1) and keep it pushed.
   ⇨ This interrupts the power supply, and the damper blade closes.
2. Check if the damper blade is CLOSED, check running time.
3. Release the push button (1).
   ⇨ Power is supplied again, and the damper blade opens.
4. Check if the damper blade is OPEN, check running time.

Opening the damper blade using the crank handle

Fig. 96: Functional test (without power supply)

⚠ DANGER!

Danger due to malfunction of the fire damper.

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

To re-establish its function, connect the power supply.

Requirement

- The damper blade is CLOSED

1. Insert the crank handle (1) into the opening for the spring winding mechanism.
2. Turn the crank handle in the direction of the arrow (2) to just short of the travel stop and hold it.
3. Set the interlock (3) to "Lock 🔒"
   ⇨ The damper blade remains in the OPEN position.
4. Remove the crank handle.

Close the damper blade

Fig. 97: Functional test (without power supply)

CAUTION!

Danger of injury when reaching into the fire damper while the damper blade is moving. Do not reach into the fire damper while actuating the release mechanism.

Requirement

- The damper blade is OPEN

▸ Set the interlock (3) to "Lock opened"

⇨ The damper blade is released and closes.

8.3 Functional test with automatic control unit

Functional test with automatic control unit

The function of fire dampers with a spring return actuator can also be tested with an automatic control unit. The control unit should have the following functions:

- Opening and closing fire dampers in regular intervals (intervals to be set by the system owner)
- Monitoring of the actuator running times
- Issuing an alarm when the running times are exceeded and when fire dampers close
- Recording the test results

TROXNETCOM systems such as TNC-EASYCONTROL or AS-interface meet all these requirements. For more informationen see *www.troxtechnik.com*.

TROXNETCOM systems allow for automatic functional tests; they do not replace maintenance and cleaning, which have to be carried out in regular intervals or depending on the condition of the product. The documentation of test results makes trends visible, e.g. the running time of actuators. They may also indicate the need for additional measures which help to maintain the system's function, e.g. removing heavy contamination (dust in extract air systems).

9 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 ↳ *on page 100*.

Operation

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

If the temperature in the duct (≥ 72 °C / ≥ 95 °C in warm air ventilation systems) or the ambient temperature (≥ 72 °C) rises in the event of a fire, the thermal release mechanism is triggered and closes the damper blade.

CLOSED fire dampers

Fire dampers which close while the ventilation and air conditioning system is running must be inspected before they are opened again in order to ensure their correct function ↳ *'Inspection' on page 98.*

10 Maintenance

10.1 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 system owner is responsible for the maintenance of the fire 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 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
- EN 15423

The function of fire dampers with a spring return actuator can also be tested with an automatic control unit *'Functional test with automatic control unit' on page 96*.

Maintenance

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

Cleaning

The fire damper may be cleaned with a dry or damp cloth. Sticky dirt or contamination may be removed with a commercial, non-aggressive cleaning agent. Do not use abrasive cleaners or tools (e.g. brushes). For disinfection you may use commercially available disinfectants or disinfecting procedures.

Hygiene

Hygienic requirements are fulfilled in accordance with VDI 6022-1, VDI 3803-1, DIN 1946-4, DIN EN 13779 as well as the Önorm H 6020 and H 6021 and SWKI. The fire damper building materials were tested for resistance to fungi and bacteria in a test of their microbial metabolic potential in accordance with DIN EN ISO 846. The building materials do not promote the growth of microorganisms (fungi, bacteria), thus reducing the risks of infection for people. The fire dampers are resistant to disinfectants[1] and are thus suitable for hospitals and comparable institutions. Disinfection and cleaning is very straightforward. Verification of corrosion resistance was provided in accordance with EN 15650.

[1] Resistance to disinfectants was tested with the disinfectant groups of active substances alcohol and quaternary compounds. These disinfectants correspond with the list from the Robert Koch Institute and were used in accordance with the specifications of the Disinfectant List of the Disinfectant Commission in the Association for Applied Hygiene (VAH).

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 in *on page 100*. 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 *93*.

10.2 Replacing the fusible link

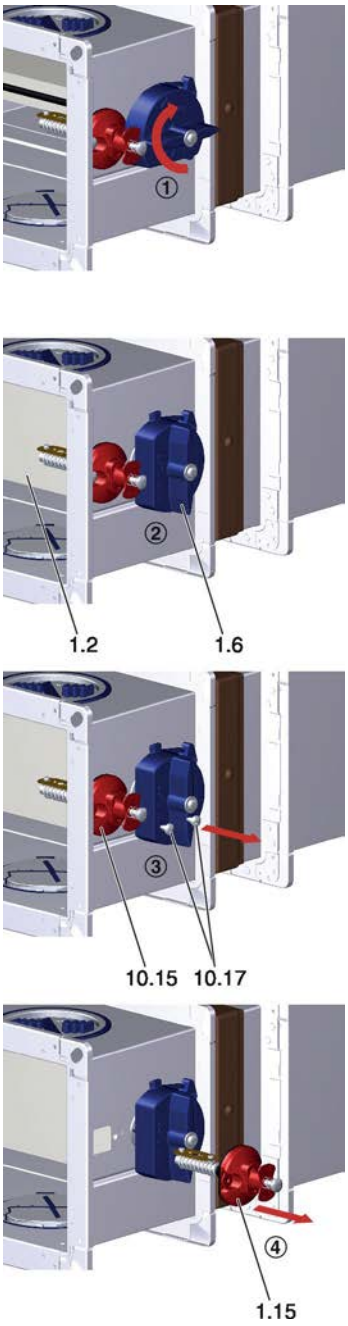


Fig. 98: Removing the fusible link holder

1. Close the damper blade.
2. The handle (1.6) shows that the damper blade (1.2) is closed.
3. Loosen the screws (10.17) on the fusible link holder (10.15).
4. Remove the fusible link holder (10.15) from the fire damper.

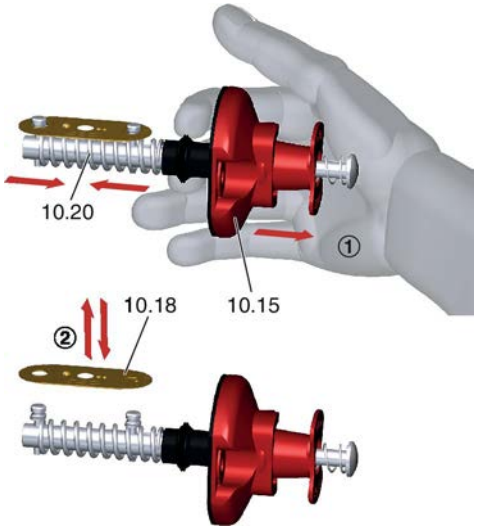


Fig. 99: Replacing the fusible link

1. Cover fusible link holder (10.15) as shown and press together in the direction of the arrow to tension the spring (10.20).
2. Remove old fusible link (10.18), hook in new fusible link (10.18).

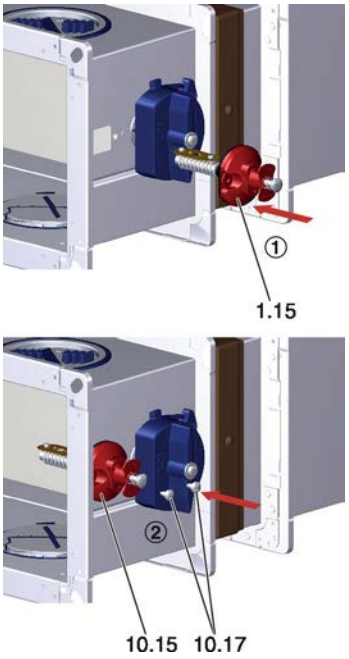


Fig. 100: Install the fusible link holder

1. Insert the fusible link holder (10.15) into the fire damper and
2. fasten with screws (10.17).

   ⇨ Carry out functional test.

10.3 Inspection, maintenance and repair measures

Interval	Measure	Staff
A	Access to the fire damper ■ Internal and external accessibility – Provide access	Specialist personnel
	Installation of the fire damper ■ Installation according to the operating manual – Install the fire damper correctly.	Specialist personnel
	Transport and installation protection, if any ■ Transport/installation protection has been removed – Remove transport/installation protection	Specialist personnel
	Connection of ductwork/cover grille/flexible connector *90* ■ Connection according to this manual – Establish correct connection	Specialist personnel
	Power supply to the spring return actuator ■ Power supply according to spring return actuator rating plate – Provide correct voltage	Skilled qualified electrician
A / B	Check fire damper for damage ■ Fire damper, damper blade and seal must be intact – Replace the damper blade – Repair or replace the fire damper.	Specialist personnel
	Function of the release mechanism ■ Function OK ■ Fusible link intact/no corrosion – Replace the fusible link – Replace the release mechanism	Specialist personnel
	Functional test of the fire damper with fusible link *93* ■ Fire damper can be opened manually ■ Handle can be locked in the OPEN position ■ Damper blade closes when triggered manually – Determine and eliminate the cause of the fault – Repair or replace the fire damper. – Replace the release mechanism	Specialist personnel
	Functional test of the fire damper with spring return actuator *94* ■ Actuator function OK ■ Damper blade closes ■ Damper blade opens – Determine and eliminate the cause of the fault – Replace the spring return actuator – Repair or replace the fire damper.	Specialist personnel
	Function of external duct smoke detector ■ Function OK ■ Fire damper closes when triggered manually or when smoke is detected ■ Fire damper opens after reset – Determine and eliminate the cause of the fault – Repair or replace duct smoke detector	Specialist personnel

Interval	Measure	Staff
C	Cleaning the fire damper ■ No contamination in the interior or on the exterior of the fire damper ■ No corrosion – Remove contamination with a damp cloth – Remove corrosion or replace part	Specialist personnel
	Function of limit switches ■ Function OK – Replace the limit switches	Specialist personnel
	Function of the external signalling (damper blade position indicator) ■ Function OK – Determine and eliminate the cause of the fault	Specialist personnel

Interval

A = Commissioning

B = Regularly

The functional reliability of fire dampers must be tested at least every six months. If two consecutive tests are successful, the next test can be conducted one year later. The function of fire dampers with a spring return actuator can also be tested with an automatic control unit (remote controlled). The system owner can then set the intervals for local tests.

C = as required

Item to be checked

- Required condition
  - Remedial action if necessary

11 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.

12 Legend

For various installation situations described in this manual you have some choice, e.g. 6.2 6.16 , either (6.2) or (6.16).

Item no.	Description
1	**Fire damper**
1.1	Casing
1.2	Damper blade (with or without lip seal)
1.3	Travel stop for OPEN position
1.4	Travel stop for CLOSED position
1.5	Inspection access
1.6	Handle/damper blade position indicator
1.7	Interlock
1.8	Lip seal

Item no.	Description
2	**Materials for fire damper installation**
2.1	Mortar or gypsum mortar
2.2	Reinforced concrete / Non-reinforced concrete
2.3	Reinforced concrete base
2.4	Fire batt with ablative coating
2.5	Installation kit WA
2.6	Installation kit WE
2.7	Installation kit WV
2.8	Installation kit E1, E2
2.9	Installation kit ES
2.10	Installation kit GM
2.11	Installation kit TQ
2.12	Installation kit GL
2.13	Installation kit GL100
2.14	Lintel
2.15	Steel bracket, galvanised
2.16	Installation subframe
2.17	Hilti CFS-BL fire stop block
2.18	Installation block ER with cover plate
2.19	Joint filler (Promat® filler, Promat® ready-to-use putty; mineral wool > 80 kg / m³, > 1000 °C or mortar)

Item no.	Description
3	**Walls**
3.1	Solid wall
3.2	Lightweight partition wall with metal support structure, cladding on both sides
3.3	Lightweight partition wall with steel support structure, cladding on both sides
3.4	Timber stud wall (also timber panel constructions), cladding on both sides
3.5	Half-timbered construction, cladding on both sides
3.6	Compartment wall with metal support structure, cladding on both sides
3.7	Shaft wall with metal support structure, cladding on one side
3.8	Shaft wall with steel support structure, cladding on one side
3.9	Shaft wall without metal support structure, cladding on one side
3.10	Wall without adequate fire resistance rating
3.11	Solid wood wall / CLT wall

Item no.	Description
4	**Ceilings**
4.1	Solid ceiling slab / solid floor
4.2	Wooden beam ceiling
4.3	Modular ceiling, Cadolto system
4.4	Partial concrete ceiling with reinforcement
4.5	Solid wood ceiling
4.6	False ceiling
4.7	Reinforced hollow chamber ceiling
4.8	Hollow stone ceiling
4.9	Ribbed ceiling
4.10	Composite ceiling

Item no.	Description
5	**Fixing material**
5.1	Dry wall screw
5.2	Hexagon head screws, washers, nuts (see installation details)
5.3	Chipboard screw

Item no.	Description
5	**Fixing material**
5.4	Threaded rod, galvanised steel (see installation details)
5.5	Carriage bolt, L ≤ 50 mm, with washer and nut
5.6	Screw or rivet, galvanised steel (see installation details)
5.7	Fire-rated anchor (with suitability certificate)
5.8	Anchor M8 – M12
5.9	Steel angle section
5.10	Fixing tab
5.11	Floor mounting plate
5.12	Cover plate
5.13	Wood screw or pin
5.14	Angle bracket
5.15	Bracket
5.16	Wall connection frame
5.17	Anchor bolt
5.18	Steel angle section to EN 10056-1, 40 × 40 × 5 mm, galvanised, painted, or equivalent
5.19	Connecting clip
5.20	Fire safety dowel Fischer® FFS 7.5 × 82 mm
5.21	Screw / wallplug
5.22	Steel fabric, ∅ ≥ 6 mm, mesh aperture 150 mm or equivalent

Item no.	Description
6	**Filling and coating material**
6.1	Mineral wool ≥ 1000 °C, ≥ 40 kg/m³
6.2	Mineral wool ≥ 1000 °C, ≥ 80 kg/m³
6.3	Mineral wool ≥ 1000 °C, ≥ 100 kg/m³
6.4	Mineral wool ≥ 1000 °C, ≥ 140 kg/m³
6.5	Mineral wool (depending on wall construction) / ceiling construction, mineral wool filling on request
6.6	Fire batt with ablative coating
6.7	Fire batt
6.8	Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m³, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)

Item no.	Description
6	**Filling and coating material**
6.9	Fire-resistant sealant suitable for the fire batt system used
6.10	Ablative coating around the perimeter, d = 2.5 mm
6.11	Insulating strip (depending on wall construction)
6.12	Intumescent seal
6.13	Mineral wool strips A1, if required
6.14	Armaflex
6.15	Mineral wool (depending on the flexible ceiling joint)
6.16	Armaflex AF / Armaflex Ultima
6.17	Fire batt (Hensel)
6.18	Filler
6.19	Mineral wool > 1000 °C, > 80 kg/m³, panel material around the perimeter, leave out the actuator and release mechanism; inspection openings must remain accessible
6.20	Sleeve
6.21	Kerafix 2000 sealing tape
6.22	Screed
6.23	Football sound insulation
6.24	Elastomer foam (synthetic rubber) of fire rating class B-S3, D0
6.25	Glass wool > 1000 °C, > 80 kg/m³
6.26	Plaster

Item no.	Description
7	**Supporting construction**
7.1	UW section
7.1a	UW section, cut and bent
7.2	CW section (metal support structure)
7.3	UA section
7.4	U50 channel
7.5	Steel support structure
7.6	Perimeter metal section
7.7	Timber stud, at least 60 × 80 mm
7.9	Half-timbered construction
7.10	Trim panels (optional)
7.11	Trim panels, double layer, staggered joints

Item no.	Description
7	**Supporting construction**
7.12	Trim panels, wood sheet
7.13	Cladding made from material x, one, two or three layers
7.13a	Cladding, fire-resistant
7.13b	Cladding, wood sheet, at least 600 kg/³
7.14	Reinforcing board made from material x, one, two or three layers
7.15	Wooden floorboard / floor tile / wood sheet min . 600 kg/m³
7.16	Wooden beam / gluelam (reduce distances between wooden beams to the size of the installation opening)
7.17	Trimmers, wooden beam / gluelam, metal support structure or steel support structure (see installation details)
7.18	Formwork
7.19	Fire-resistant cladding
7.20	Fixing kit GL
7.21	Ceiling joint strips
7.22	Ceiling joint section
7.23	Sheet steel insert depending on wall manufacturer
7.24	Ceiling design
7.25	Reinforced concrete support
7.26	Hollow stone

Item no.	Description
8	**Material for extended applications**
8.1	PROMATECT®-H strip b ≥ 100 mm, d = 10 mm
8.2	PROMATECT®-H strip b ≥ 200 mm, d = 10 mm
8.3	PROMATECT®-LS board d = 35 mm
8.4	Hilti mounting rail MQ 41 × 3 or equivalent
8.5	Hilti drilled plate MQZ L13 or equivalent
8.6	Hilti fixing band LB26 or equivalent
8.7	Mounting rail, Würth Varifix 36 × 36 × 2,5, or Müpro MPC 38/40 or equivalent
8.8	Fixing bracket, Varifix or Müpro MPC or equivalent

Item no.	Description
8	**Material for extended applications**
8.9	Bracket, Varifix ANSHWNKL-PRFL36-90GRAD or Müpro mounting bracket 90°, galvanised, or equivalent
8.10	Large gears
8.11	Actuator
8.12	Actuator mounting plate
8.13	Small gears
8.14	Connecting cable
8.15	Adjustment screws
8.16	Actuator mounting plate
8.17	Cover
8.18	Junction box
8.19	Support, made from 8.3
8.20	Promaseal®-Mastic intumescent sealant
8.21	Fire-resistant sealant CFS-S ACR CW
8.22	Calcium silicate board
8.23	Foam rubber seal
8.24	Retaining plate on both sides, sheet steel ≥ 1 mm thick

Item no.	Description
9	**Accessories**
9.1	Flexible connector
9.2	Extension piece or duct
9.3	Prop
9.4	Sheet steel duct with L90 cladding and suspension system according to Promat® manual, construction 478, latest edition
9.5	Suspension system
9.6	Damper blade used for repair
9.7	Blade
9.8	Rivet axis
9.9	Plate
9.10	Cover grilles
9.11	Circular spigot
9.12	Clamping ring
9.13	Prop
9.14	Profile connecting frame

Item no.	Description
10	**Release mechanisms**
10.1	Spring return actuator
10.2	Spring return actuator Belimo BLF
10.3	Spring return actuator Belimo BF
10.4	Spring return actuator Belimo BFN
10.5	Spring return actuator Belimo BFL
10.6	Spring return actuator Schischek ExMax (yellow)
10.7	Spring return actuator Schischek RedMax (magenta)
10.8	Spring return actuator Siemens GGA
10.9	Spring return actuator Siemens GRA
10.10	Spring return actuator Siemens GNA
10.11	Spring return actuator Joventa SFR
10.12	Duct smoke detector RM-O-3-D (fixed with adapter metal sheet)
10.13	Thermoelectric release mechanism with temperature sensor
10.14	Thermal release mechanism with fusible link, 72 °C / 95 °C
10.15	Fusible link holder
10.16	Fusible link holder rocker
10.17	Screw
10.18	Fusible link
10.19	Cover
10.20	Spring

Item no.	Description
11	**Additions**
11.1	Cable tray
11.2	Cable set
11.3	Pipe collar
11.4	Underlay material, non-combustible, to be provided by others
11.5	Base, to be provided by others

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