



Fire damper

Type FK-EU

according to Declaration of Performance
DoP / FK-EU / DE / 003



Read the instructions prior to performing any task!

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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.

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- Copying content
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TROX Technical Service

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

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

Online	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:

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	Warning – danger zone.

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1 Safety

1.1 General safety notes

Sharp edges, sharp corners and thin sheet metal parts



CAUTION!

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

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

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

Electrical voltage



DANGER!

Danger of electric shock! Do not touch any live components! Electrical equipment carries a dangerous electrical voltage.

- Only skilled qualified electricians are allowed to work on the electrical system.
- Switch off the power supply before working on any electrical equipment.

1.2 Correct use

- 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.
- The fire damper may be used in potentially explosive atmospheres if appropriate special accessories are used with it and if the product bears the CE conformity marking according to Directive 94/9/EC. Fire dampers for use in potentially explosive atmospheres are marked for the zones for which they have been approved.
- 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:

- Use as an air transfer damper only with general building inspectorate licence Z-6.50-2031. The connection of additional ventilation components may be possible (upon request).
- Do not use it in extract air systems in commercial kitchens.

Incorrect use



WARNING!

Danger due to incorrect use!

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

Never use the fire damper

- without specially approved attachments 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 × 200 – 1500 × 800 mm *
Casing lengths L	375 and 500 mm
Volume flow rate range	Up to 14400 l/s or 51840 m³/h
Differential pressure range	Up to 2000 Pa
Temperature range ^{1, 3, 4}	-20 °C to 50 °C
Release temperature	72 °C or 95 °C (for warm air ventilation systems)
Upstream velocity ^{2, 3}	≤ 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 ³	<ul style="list-style-type: none"> Construction Products Regulation (EU) no. 305/2011 EN 15650 – Ventilation for buildings – Fire dampers EN 13501-3 – Classification – Part 3: Fire resisting ducts and fire dampers EN 1366-2 – Fire resistance tests for service installations – Part 2: Fire dampers EN 1751 Ventilation for buildings – Air terminal devices
Declaration of performance	DoP / FK-EU / DE / 003

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⁾ For explosion-proof constructions of the FK-EU see the corresponding operating manual.

⁴⁾ Condensation and the intake of humid fresh air have to be avoided as otherwise operation will be impaired or not possible.

* Damper blade with lip seal; size B × H > 600 × 400 mm with travel stop seal.

Rating plate



Fig. 1: Rating plate (example)

- | | |
|---|---|
| <p>1 CE mark</p> <p>2 Manufacturer's address</p> <p>3 Number of the European standard and year of its publication</p> <p>4 Notified body</p> <p>5 The last two digits of the year in which the CE marking was affixed</p> | <p>6 Year of manufacture</p> <p>7 No. of the declaration of performance</p> <p>8 Website from which the DoP can be downloaded</p> <p>9 Regulated characteristics; the fire resistance class depends on the application and may vary ↗ Chapter 5.1 'Installation situations' on page 23</p> <p>10 Type</p> |
|---|---|

2.2 FK-EU with fusible link

Dimensions and weight

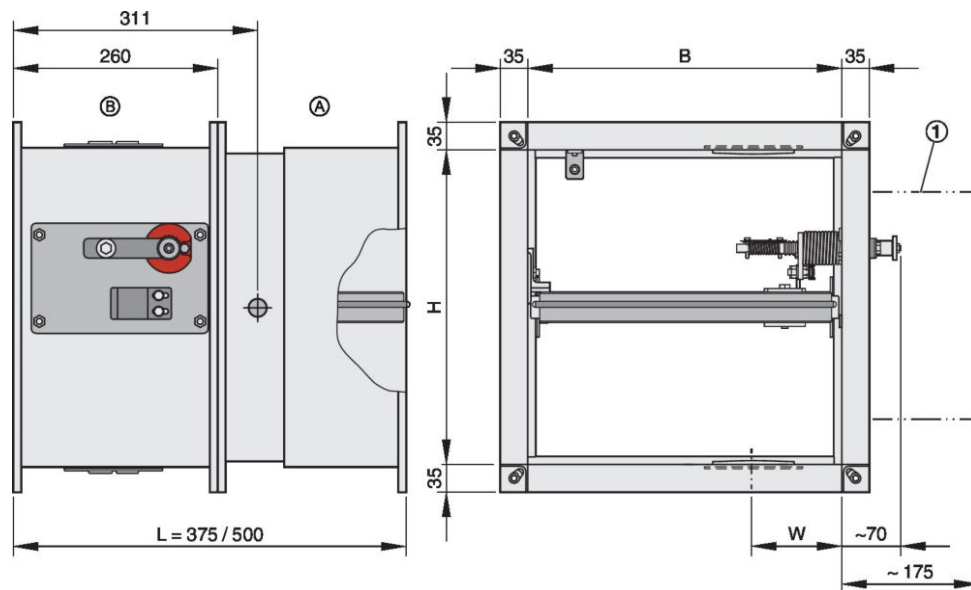


Fig. 2: FK-EU with fusible link

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

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

■ Weight of FK-EU with fusible link, see table 10.

Limit switches	
Connecting cable length / cross section	1 m / 3 × 0.34 mm ²
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]*													
B [mm]	H [mm]												
	200	250	300	350	400	450	500	550	600	650	700	750	800
200	10	11	12	13	15	16	17						
250	11	12	13	15	16	17	18						
300	12	13	14	16	17	18	19	21	23	24	25	26	27
350	13	15	16	17	18	20	22	23	25	26	27	28	29
400	15	16	17	18	20	22	24	26	27	28	28	30	32
450	16	17	18	20	22	22	26	28	29	29	31	32	34
500	17	18	19	22	24	26	28	29	30	31	33	34	36
550	18	19	21	23	26	28	29	30	31	33	35	37	38
600	19	21	23	25	27	29	30	32	34	35	37	39	42
650	20	22	24	26	28	29	31	34	36	37	40	42	45
700	22	24	25	27	30	31	33	35	37	40	43	45	47
750	23	25	26	29	31	32	34	37	39	42	45	48	50
800	24	26	28	30	32	34	36	38	42	45	48	50	52
900	26	28	30	32	35	37	39	43	45	49	52	55	57
1000	28	30	31	34	38	40	45	47	50	53	56	59	62
1100	30	32	34	37	40	44	47	50	54	57	60	63	65
1200	31	34	36	39	43	47	50	54	57	61	64	66	68
1300	33	36	38	41	46	49	53	57	61	64	67	69	71
1400	35	38	40	44	48	52	56	60	64	68	71	73	75
1500	38	41	44	48	52	57	62	67	71	75	78	81	84

* Weights apply to casing length L = 500 mm

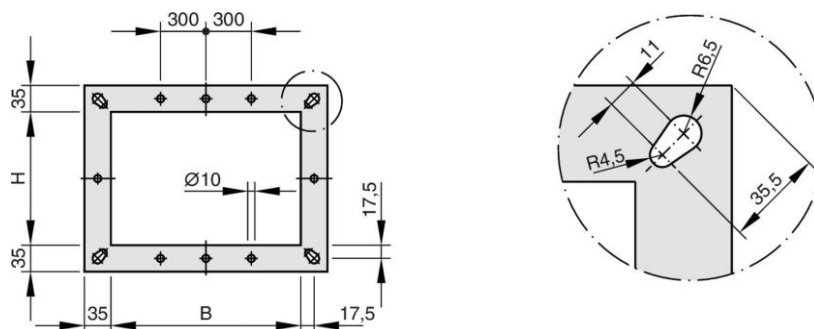
Flange holes


Fig. 3: Flange holes – uneven number of holes

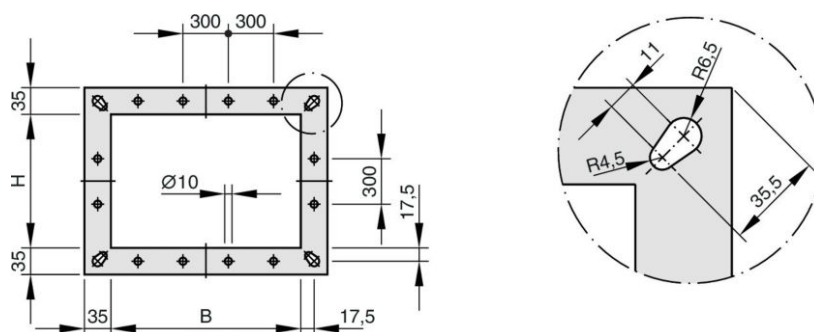


Fig. 4: Flange holes – even number of holes

B or H [mm]	200	300	400	500	600	650	750	900	1100	1300	1500
	250	350	450	550		700	800	1000	1200	140	700
No. of holes, side B*			1	1	1	2	2	3	3	4	4
No. of holes, side H*			1	1	1	2	2				

* excluding corner holes

2.3 FK-EU with spring return actuator

Dimensions and weight

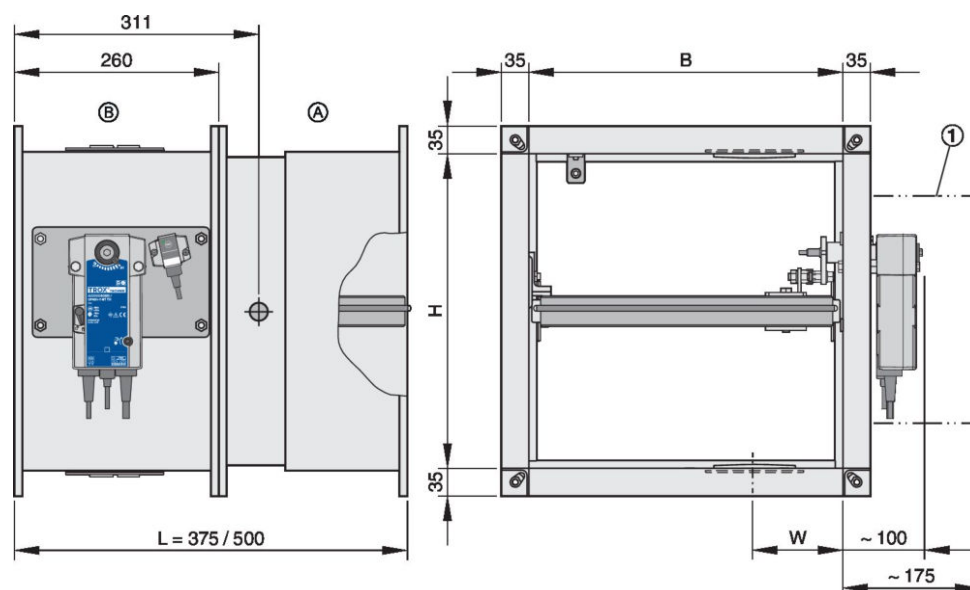


Fig. 5: FK-EU with Belimo spring return actuator

- | | | | |
|----|---|---|--|
| B | Width of the fire damper (side B) | 1 | Keep clear to provide access for operation |
| H | Height of the fire damper (side H) | Ⓐ | Installation side |
| L | Length of the fire damper (casing length) | Ⓑ | Operating side |
| W: | 115 mm | | |
- Weight of FK-EU with fusible link + approx. 1.5 kg (BFL... and BFN...) or 3 kg (BF...), see table 10.

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 to 55 °C / -30 to 55 °C ¹	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm ² / 1 m, 6 × 0.75 mm ² (free of halogens)	

Spring return actuator BFL... for sizes B × H = 200 × 200 – 400 × 300 mm.

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

Spring return actuator BFN...			
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	5 W / 2.1 W	4 W / 1.4 W
	Rating	10 VA (I _{max} 4 A @ 5 ms)	6 VA (I _{max} 8.3 A @ 5 ms)
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 to 55 °C / -30 to 55 °C ¹	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm ² / 1 m, 6 × 0.75 mm ² (free of halogens)	

Spring return actuator BFN... for sizes B × H = 401 × 301 – 1200 × 600 mm.

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

Spring return actuator BF...			
Construction		230-T(N) TR	24-T(N)-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	8.5 W / 3 W	7 W / 2 W
	Rating	11 VA	10 VA
Running time	Actuator / spring return	< 120 s / approx. 16 s	
Limit switch	Type of contact	2 changeover contacts	
	Switching voltage	5 – 120 V DC / 5 – 250 V AC	
	Switching current	1 mA ... 6 A	
	Contact resistance	< 100 mΩ	
IEC protection class / IP protection		II / IP 54	III / IP 54
Storage temperature / ambient temperature		-40 to 50 °C / -30 to 50 °C ¹	
Ambient humidity		≤ 95% rh, no condensation	
Connecting cable	Actuator / limit switch	1 m, 2 × 0.75 mm ² / 1 m, 6 × 0.75 mm ² (free of halogens)	

Spring return actuator BF... for sizes B × H = 1201 × 601 – 1500 × 800 mm.

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

Dimensions and weight

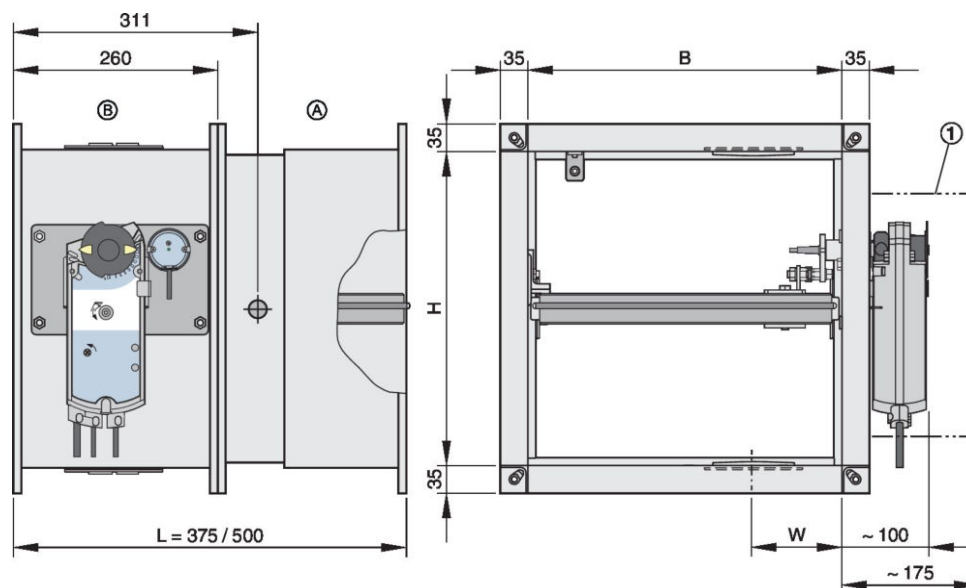


Fig. 6: FK-EU with Siemens spring return actuator

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

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

- Weight of FK-EU with fusible link + approx. 1.4 kg (GRA... and GNA...) or 2.5 kg (GGA...), see table 10.

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 54	III / 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 mm ² (free of halogens)	

Spring return actuator GRA... for sizes B × H = 200 × 200 – 400 × 300 mm.

*Connecting cable at the bottom

Spring return actuator GNA...			
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 54	III / 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 mm ² (free of halogens)	

Spring return actuator GNA... for sizes B × H = 401 × 301 – 1200 × 600 mm.

*Connecting cable at the bottom

Spring return actuator GGA...			
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	8 VA / 6 W	7 VA / 5 W
	Hold position	4 W	3 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 54	III / 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 mm ² (free of halogens)	

Spring return actuator GGA... for sizes B × H = 1201 × 601 – 1500 × 800 mm.

*Connecting cable at the bottom

Dimensions and weight

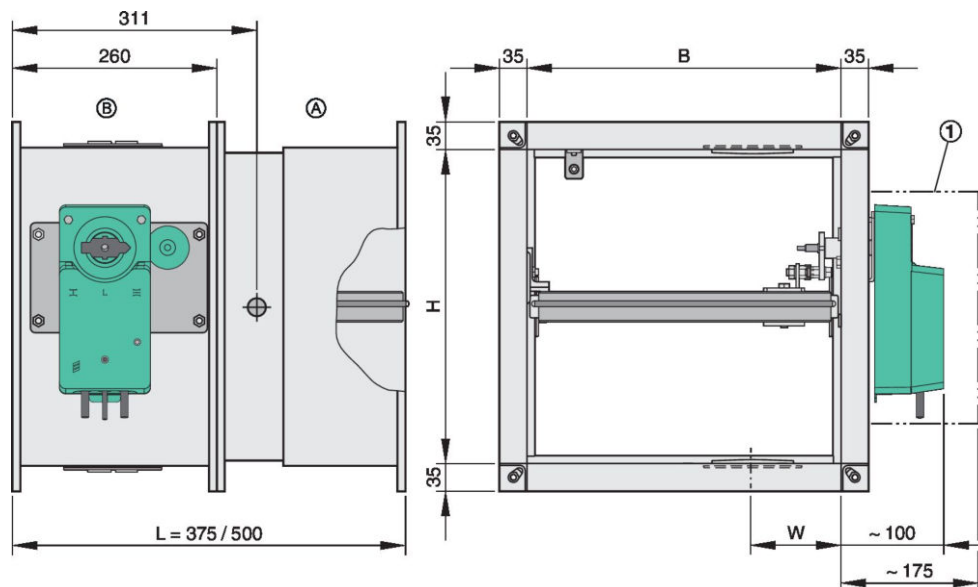


Fig. 7: FK-EU with Joventa spring return actuator SFR...

- | | | | |
|----|---|---|--|
| B | Width of the fire damper (side B) | 1 | 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 FK-EU with fusible link + 2.9 kg (SFR 2.90 T) or 2.7 kg (SFR 1.90 T SLC), see table 10.

Spring return actuator SFR...				
Construction		2.90 T	1.90 T	1.90 T SLC ¹
Supply voltage		230 V AC, 50/60 Hz	24 V AC/DC, 50/60 Hz	24 V from control module BSLC 24..., 50 Hz
Power rating	Spring winding mechanism	8 W	10 W	6.2 W
	Hold position	4.5 W	4 W	1.3 W
	Rating	13 VA (I _{max} 0.3 A @ 2 ms)	18 VA (I _{max} 4 A @ 2 ms)	10.5 VA (I _{max} 1.3 A @ 2 ms)
Running time	Actuator / spring return	90 – 120 s / 10 s		
Limit switch	Type of contact	2 changeover contacts		From control module BSLC 24...
	Switching voltage	230 V AC		
	Switching current	3 A (inductive 1.5 A)		
IEC protection class / IP protection		II / IP 54		
Storage temperature / ambient temperature		-30 to 60 °C / -20 to 50 °C		
Ambient humidity		≤ 95% rh, no condensation		
Connecting cable	Actuator / limit switch	– (terminals)		

¹Only when combined with JSLC-B control and monitoring module (by others)

2.4 FK-EU with spring return actuator and duct smoke detector or used as an air transfer damper

Dimensions and weight

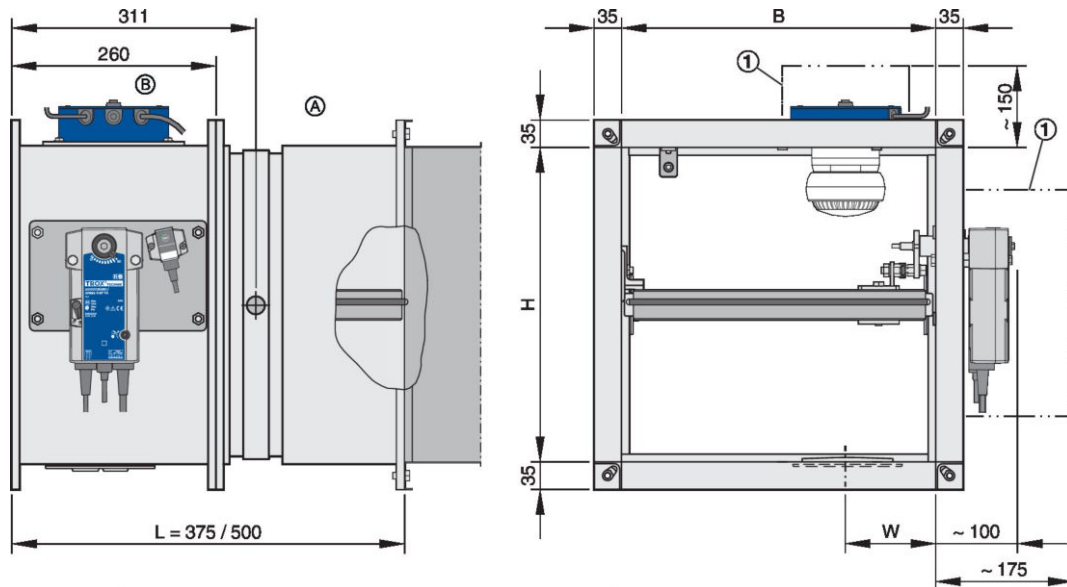


Fig. 8: FK-EU with Belimo spring return actuator and duct smoke detector

- | | | | |
|---|---|---|--|
| B | Width of the fire damper (side B) | 1 | Keep clear to provide access for operation |
| H | Height of the fire damper (side H) | Ⓐ | Installation side |
| L | Length of the fire damper (casing length) | Ⓑ | Operating side |

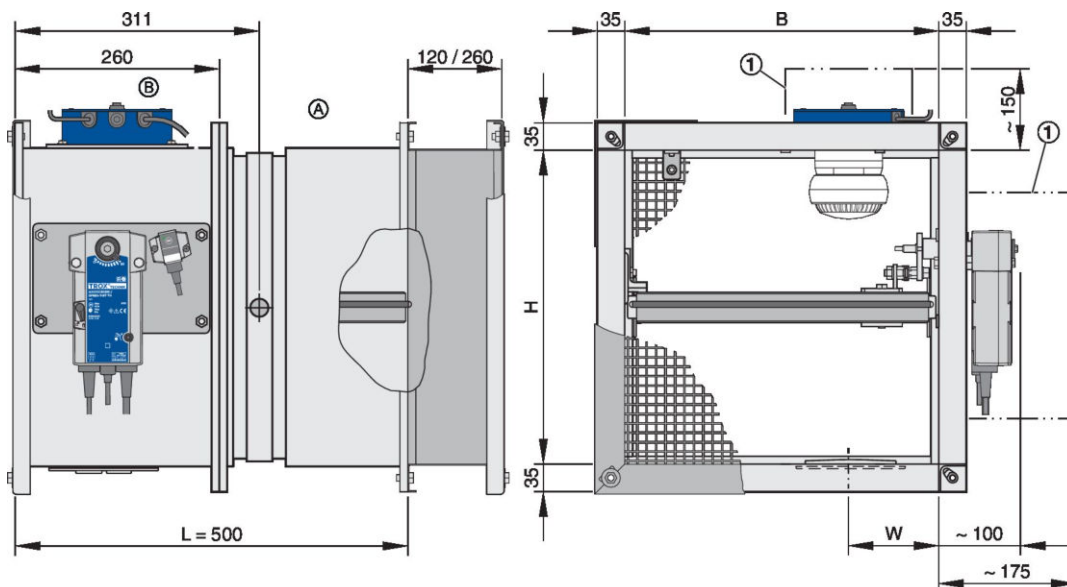


Fig. 9: FK-EU as air transfer damper

- | | | | |
|---|---|---|--|
| B | Width of the fire damper (side B) | 1 | Keep clear to provide access for operation |
| H | Height of the fire damper (side H) | Ⓐ | Installation side |
| L | Length of the fire damper (casing length) | Ⓑ | Operating side |

- Weight of FK-EU with fusible link + approx. 2.5 kg (BFL... and BFN...) or 4 kg (BF...), without extension pieces and cover grilles on air transfer dampers, see table 10.
- Technical data for spring return actuator, see table 12 and 14
- Duct smoke detector RM-O-3-D is fitted in the upper inspection access opening of the FK-EU and hence, just as the spring return actuator, an integral part of the fire damper. For technical details on the duct smoke detector see the operating and installation manual for RM-O-3-D.

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.

To ensure proper functioning of the fire damper, a test can be carried out. ↗ 134

4.1 FK-EU with fusible link

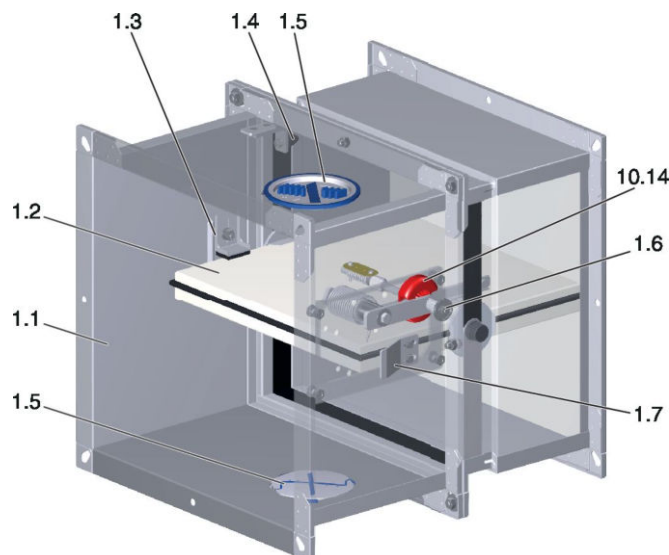


Fig. 10: FK-EU with fusible link

- 1.1 Casing (galvanised, powder-coated or stainless steel)
- 1.2 Damper blade with 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
- 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 FK-EU with spring return actuator

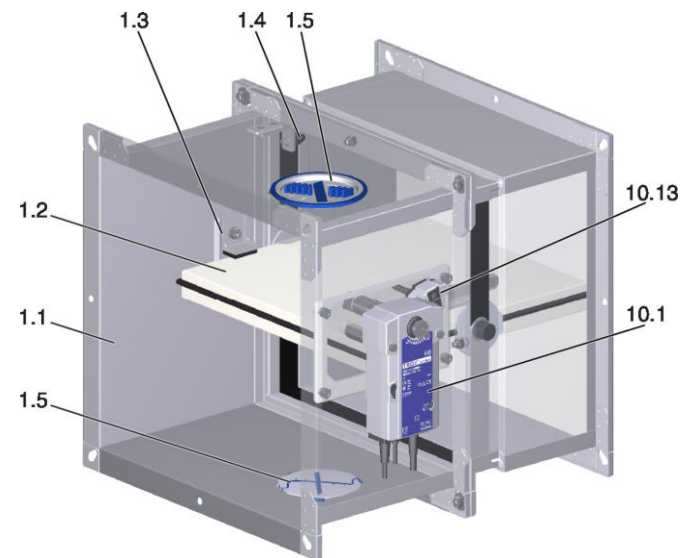


Fig. 11: FK-EU with spring return actuator

- 1.1 Casing (galvanised, powder-coated or stainless steel)
- 1.2 Damper blade with lip seal
- 1.3 Travel stop for OPEN position
- 1.4 Travel stop for CLOSED position
- 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. As long as power is supplied to the actuator, the damper blade remains open. In the event of a fire, the internal thermoelectric release mechanism closes the damper blade when at least one of the following is true:

- 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 FK-EU with spring return actuator and duct smoke detector

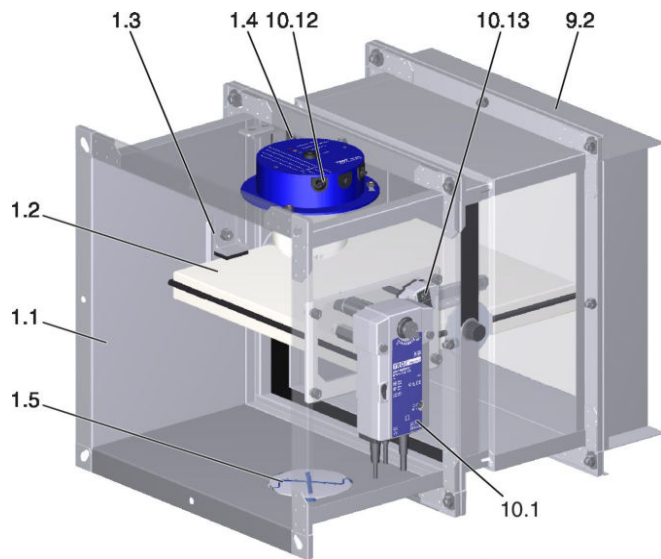


Fig. 12: FK-EU with spring return actuator and duct smoke detector

- 1.1 Casing (galvanised, powder-coated or stainless steel)
- 1.2 Damper blade with lip seal
- 1.3 Travel stop for OPEN position
- 1.4 Travel stop for CLOSED position
- 1.5 Inspection access
- 9.2 Continuing duct
- 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. In the event of a fire, the damper closes when at least one of the following occurs:

- 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)

4.4 FK-EU as air transfer damper

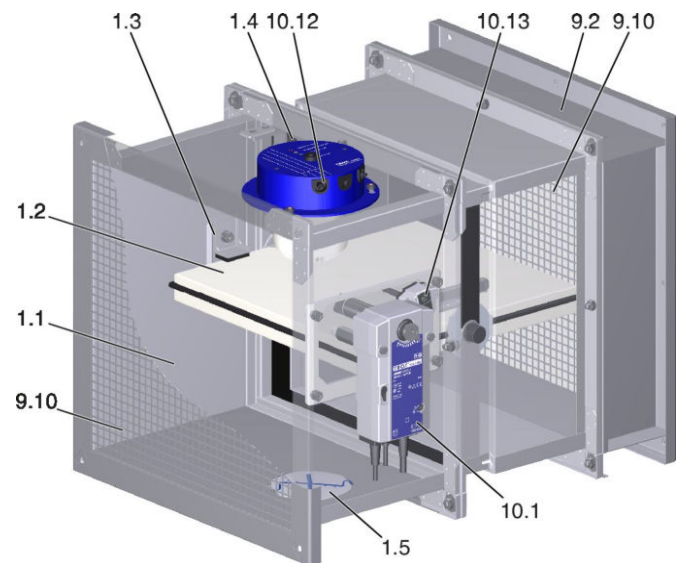


Fig. 13: FK-EU with spring return actuator and duct smoke detector used as an air transfer damper

- 1.1 Casing (galvanised, powder-coated or stainless steel)
- 1.2 Damper blade with lip seal
- 1.3 Travel stop for OPEN position
- 1.4 Travel stop for CLOSED position
- 1.5 Inspection access
- 9.2 Extension piece
- 9.10 Cover grille
- 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

For more information on the installation and use of the fire damper as an air transfer damper in Germany see general building inspectorate licence Z-6.50-2031.

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
				375 ⁶	500	
Solid walls	in	100	EI 120 S	–	W	↪ 42
		100	EI 90 S	W	W	↪ 42
		100	EI 120 S	–	N	↪ 35
		100	EI 90 S	N	N	↪ 35
		100	EI 90 S	–	E	↪ 41
	in, partially with mineral wool	100	EI 90 S	–	N	↪ 38
	in, with flexible ceiling joint	100	EI 90 S	–	E	↪ 39
	on the face of	100	EI 90 S	E	E	↪ 44
	adjacent to	100	EI 90 S	–	E	↪ 46
	remote from	100	EI 90 S	–	E	↪ 48
Solid ceiling slabs ¹	in	150	EI 180 S	–	W	↪ 58
		100	EI 90 S	W	W	↪ 58
		100 (150) ⁴	EI 120 S	–	W	↪ 58
		100 (125) ⁴	EI 90 S	N	N	↪ 51
	in, with concrete base	100	EI 90 S	N	N	↪ 53
	below (in horizontal ducts)	125	EI 90 S	–	E	↪ 61
	in conjunction with wooden beam ceilings	125	EI 90 S	N	N	↪ 55
	in conjunction with solid wood ceilings	125	EI 90 S	N	N	↪ 56

¹⁾ For FK-EU as air transfer damper only up to B × H = 500 × 500 mm

²⁾ For lightweight partition walls ≥ EI 120

³⁾ Wall thickness ≤ 225 mm, width of support structure ≤ 175 mm

⁴⁾ Thickness increased near the installation opening

⁵⁾ Cadolto system

⁶⁾ An extension piece may be required

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
				375 ⁶	500	
	in conjunction with modular ceilings ⁵	125	EI 90 S	N	N	↙ 57
Lightweight partition walls	in, with metal support structure, also steel support structure, cladding on both sides	98	EI 120 S	–	N	↙ 65
		98	EI 90 S	N	N	↙ 65
		98	EI 90 S	–	E	↙ 71
		98	EI 90 S	W	W	↙ 76
		98	EI 120 S ²	–	W	↙ 76
	in, with metal support structure, cladding on both sides, flexible ceiling joint	100 ³	EI 90 S	–	E	↙ 80
	in, with timber stud wall (also timber panel construction), cladding on both sides	130	EI 90 S	N	N	↙ 89
		130	EI 120 S	–	E	↙ 92
		130	EI 120 S	W	W	↙ 95
		105	EI 30 S	N	N	↙ 89
		105	EI 30 S	–	E	↙ 92
		105	EI 30 S	W	W	↙ 95
	in, half-timbered constructions, cladding on both sides	140	EI 90 S	N	N	↙ 89
		140	EI 90 S	–	E	↙ 92
		140	EI 90 S	W	W	↙ 95
	in solid wood / CLT	95	EI 90 S	N	N	↙ 101
		95	EI 90 S	–	E	↙ 102
		95	EI 90 S	W	W	↙ 104
Compartment walls	in, with metal support structure, cladding on both sides	100	EI 90 S	N	N	↙ 109
		100	EI 90 S	–	E	↙ 110
Shaft walls	in, with metal support structure, also steel support structure, cladding on one side	90	EI 90 S	–	E	↙ 117
		90	EI 90 S	N	N	↙ 114
	in, without metal support structure, cladding on one side	40	EI 90 S	–	E	↙ 122
		40	EI 90 S	N	N	↙ 121

¹⁾ For FK-EU as air transfer damper only up to B × H = 500 × 500 mm

²⁾ For lightweight partition walls ≥ EI 120

³⁾ Wall thickness ≤ 225 mm, width of support structure ≤ 175 mm

⁴⁾ Thickness increased near the installation opening

⁵⁾ Cadolto system

⁶⁾ An extension piece may be required

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. ↪ 134
 - Protect the fire damper from humidity and condensation as they will damage the fire damper.
 - The construction variants with stainless steel or powder-coated casing and additionally with an impregnated damper blade meet more critical requirements for corrosion protection.
 - 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.
 - You may install two FK-EU fire dampers into the same opening unless stated otherwise for a particular installation situation.
 - 'Flange-to-flange' installation of two FK-EU fire dampers into one installation opening is only possible if both dampers are of the same size (details for other installations are available upon request)
 - 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 actuators with limit switches that ensure that not too many dampers close 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. If equipotential bonding is a requirement, there must be an electrical earth connection from the fire damper to the duct.

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, FK-EU fire dampers have two inspection panels ↪ Chapter 4 'Parts and function' on page 21. Depending on the installation configuration it may be necessary to provide additional inspection access points in the connecting ducts.

Equipotential bonding

In the event of a fire, mechanical loads from the equipotential bonding must not affect the fire damper. The flange of the fire damper can be used for equipotential bonding; no holes must be drilled into the damper casing.

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. 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 remain accessible.
- The insulation does not penetrate walls or ceilings.

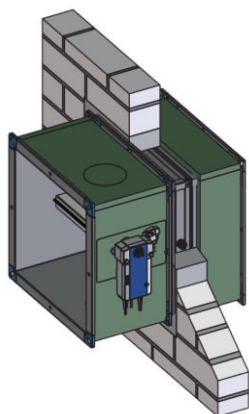


Fig. 14: Thermal insulation

Extension pieces

To ensure that the fire damper can be connected to the ductwork after installation even if the wall or ceiling is fairly thick, you should extend the fire damper with a suitable extension piece (attachment or by others) on the installation side (see table).

FK-EU casing length L	Wall or ceiling thickness		
	≤ 115	> 115	≥ 240
375	—	•	•
500	—	—	•

- Extension piece required

Installation positions

The fire damper may be installed such 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).

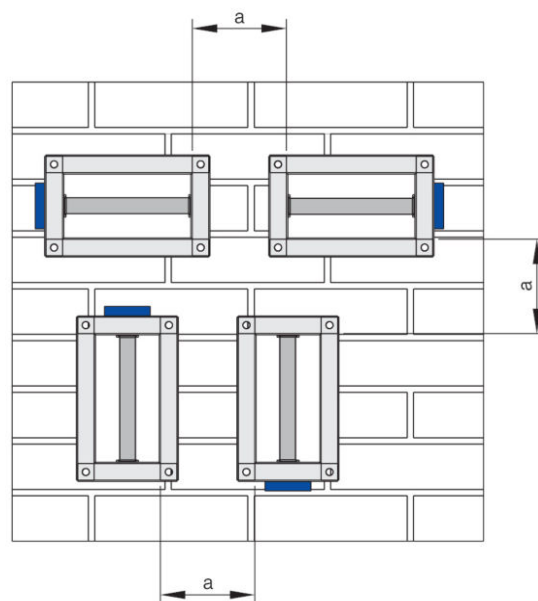


Fig. 15: Blade shaft horizontal or vertical

- a Minimum distance between two fire dampers.
 ≥ 200 mm distance between two fire dampers unless stated otherwise for a particular installation situation.

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 such 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. The gap must be large enough such that mortar can be filled in. We recommend a gap of at least 20 mm (note the minimum installation opening size). If the fire damper is installed as the ceiling slab is being completed, the perimeter gap »s« is not required. Reinforcement should meet structural requirements.

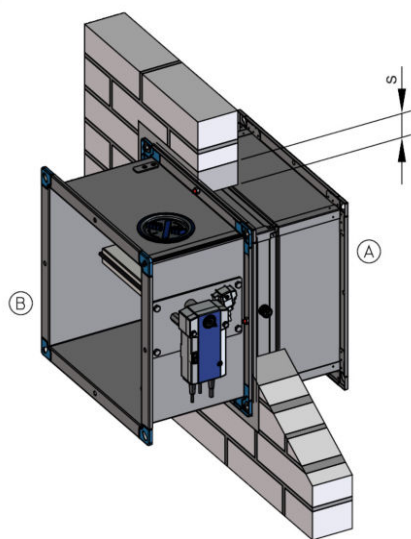


Fig. 16: Perimeter gap

s Perimeter gap »s«

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 such that the distance between the operating side flange and the wall is 260 mm; secure the fire damper in this position.

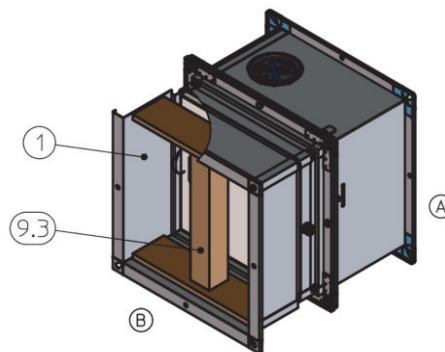


Fig. 17: FK-EU with prop

1 FK-EU
9.3 Prop

- 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 $\geq 80 \text{ kg/m}^3$ and a melting point of $\geq 1000^\circ\text{C}$ must be used.

Fire-resistant cladding

When you use installation kit WE, the following materials are acceptable for the cladding of fire dampers and ducts:

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

General installation information

Stainless steel constructions

If the FK-EU is a stainless steel construction, a mineral wool layer is required on top of the casing on the installation side.

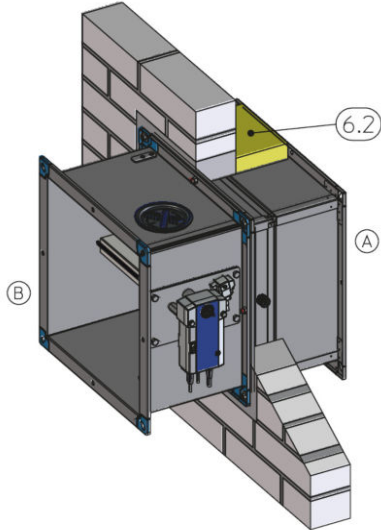


Fig. 18: Stainless steel construction

6.2 Mineral wool, $\geq 1000\text{ °C}$, $\geq 80\text{ kg/m}^3$

(A) Installation side

(B) Operating side

Installation with installation kit

- Position the fire damper in the centre of the installation opening and push it in far enough such that the installation kit rests on the face of the wall.
- Enough clear space is required to attach the installation kit to the wall, at least 90 mm around the perimeter
- Fix the installation kit ES with dry wall screws $\geq \text{Ø } 5.5\text{ mm}$ and brackets to the support structure. The dry wall screws must be long enough such that the damper can be firmly fastened. There should be equal spaces between the fastening points on side B; pre-drill holes $\text{Ø } 4\text{ mm}$.
- For installation near the floor or ceiling, professionally shorten the installation kit on one side or cut it such that no part protrudes. Then use the brackets that were previously on sides B and fix them in the upper parts of sides H (see installation details).
- Installation kit E1/E2: Use hexagon head screws $\text{M8} \times 35\text{ mm}$ to fasten the brackets to the installation subframe.

Installation with fire batt

- The distance from the operating side flange to the wall or ceiling has to be between 260 mm and 270 mm.
- Fire batt systems consist of two layers of mineral wool slabs, gross density $\geq 140\text{ kg/m}^3$.
- 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 $\geq 2.5\text{ mm}$. The actuator and release unit must not be coated.
- Ceiling installation: Gap of up to 50 mm between mineral wool slabs.
- Fix fire dampers on both sides of the wall or ceiling
↳ 126.
- If the ceiling is fairly thick, you may use additional layers of mineral wool slabs on side A.

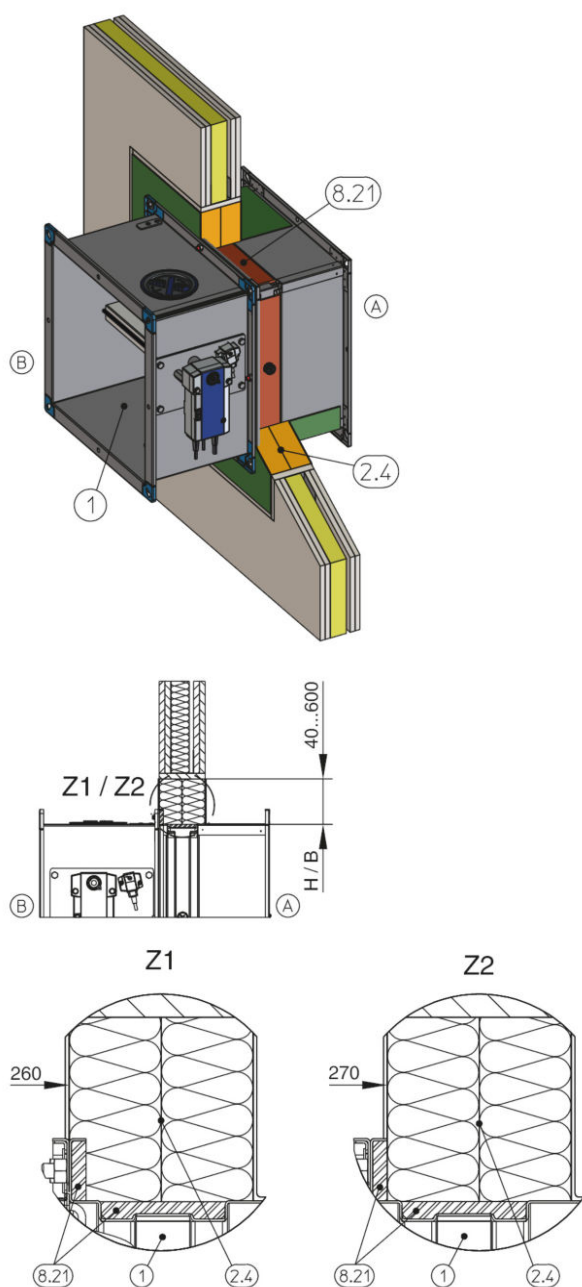


Fig. 19: Fire-resistant sealant

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

Dimensions and distances for fire batt systems

Damper combinations up to EI 90 S*	s1 min. [mm]	s1 max. [mm]	s2 min. [mm]
FK-EU – FK-EU	40	600	≥ 70
FK-EU – FKRS-EU			≥ 50

*With performance classes EI 120 S and EI 180 S: 200 mm distance between two FK-EU fire dampers in separate installation openings.

Fire batt system	B max. [mm]	H max. [mm]
Promat®	≤ 3750	≤ 1840
Hilti	≤ 2100	≤ 2115
Hensel	≤ 1900	≤ 1400
SVT		
OBO Bettermann		
Würth		
AGI		

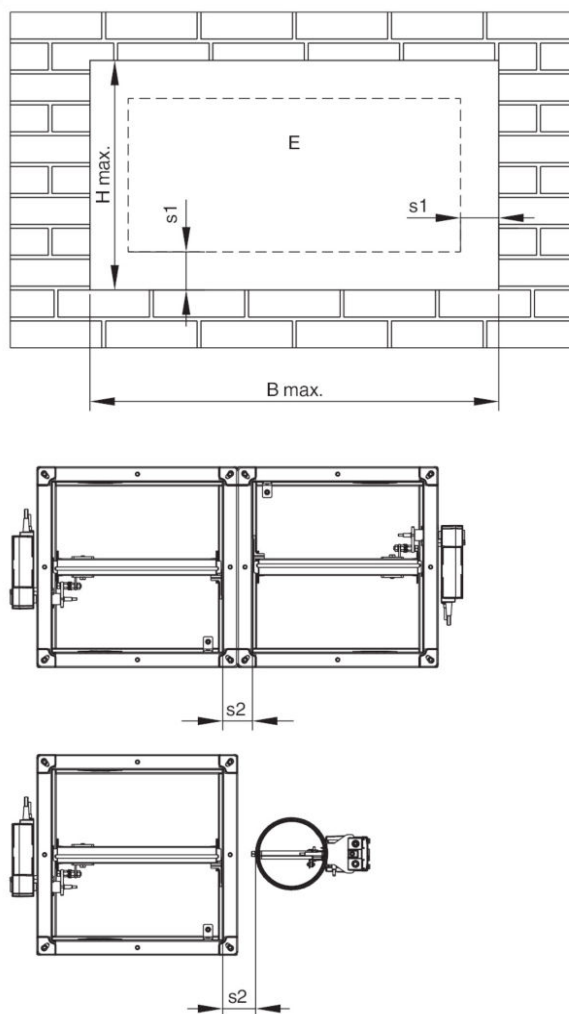


Fig. 20: Fire batt – Installation of two fire dampers in a solid wall, lightweight partition wall or timber stud wall

E Installation area

Requirements for wall and ceiling systems

FK-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 $\geq 350 \text{ kg/m}^3$.
- Wall thickness $W \geq 100 \text{ mm}$.
- Provide each installation opening according to the local and structural conditions and with regard to the size of the fire damper.

Distance between different TROX fire dampers – mortar-based installation into solid walls

Damper combinations up to EI 90 S*	s2 min. [mm]
FK-EU – FK-EU	≥ 70
FK-EU – FKR-EU	≥ 70 (≥ 80 with flange construction)
FK-EU – FKRS-EU	≥ 50

*With performance class EI 120 S: 200 mm distance between two FK-EU fire dampers in separate installation openings.

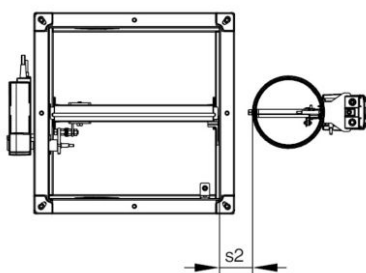


Fig. 21: Distance between FK-EU and FKRS-EU

Solid ceiling slabs

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density $\geq 600 \text{ kg/m}^3$.
- Ceiling thickness $D \geq 100 \text{ mm}$, thickness increased to $D \geq 125 \text{ mm}$ (up to EI 90 S) or $D \geq 150 \text{ mm}$ (EI 120 S or EI 180 S) where required.
- In conjunction with wooden beam ceilings (also gluelam) with fire-resistant cladding
- In conjunction with fire-resistant solid wood ceilings.
- In conjunction with lightweight ceilings (only Cadolto modular ceiling system, ceiling construction according to certificate, fire resistance up to 90 minutes).

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, 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 $W \geq 98 \text{ mm}$, for compartment walls or safety partition walls $W \geq 100 \text{ mm}$.
- $\leq 625 \text{ mm}$ distance between metal studs;
 $\leq 312.5 \text{ mm}$ distance between metal studs in compartment walls.
- 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 $W \geq 130$ mm ($W \geq 105$ for F30); wall thickness of half-timbered constructions $W \geq 140$ mm.
- Create an opening in the timber support structure with studs and trimmers.
- ≤ 625 mm distance between the timber studs.
- 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.
- Trim panels and reinforcing boards have to be made of cladding material and have to be fixed to the frame.

Solid wood walls

- Solid wood walls or CLT walls with European or national certificate.
- Wall thickness $W \geq 95$ mm (with reinforcing board $W \geq 100$ mm near the installation opening).

Shaft walls with metal support structure

- Shaft walls or additional leaves with metal support structure or steel support structure, 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 $W \geq 90$ mm (cladding 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.

Shaft walls without metal support structure

- Shaft walls without metal support structure, with European classification according 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 $W \geq 40$ mm.
- Wall width ≤ 2000 mm.
- Ensure accessibility to the shaft from the rear.

After installation

- Clean the fire damper.
- Remove transport and installation protection, 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 Assembly of installation kits E1, E2, ES

Supply package

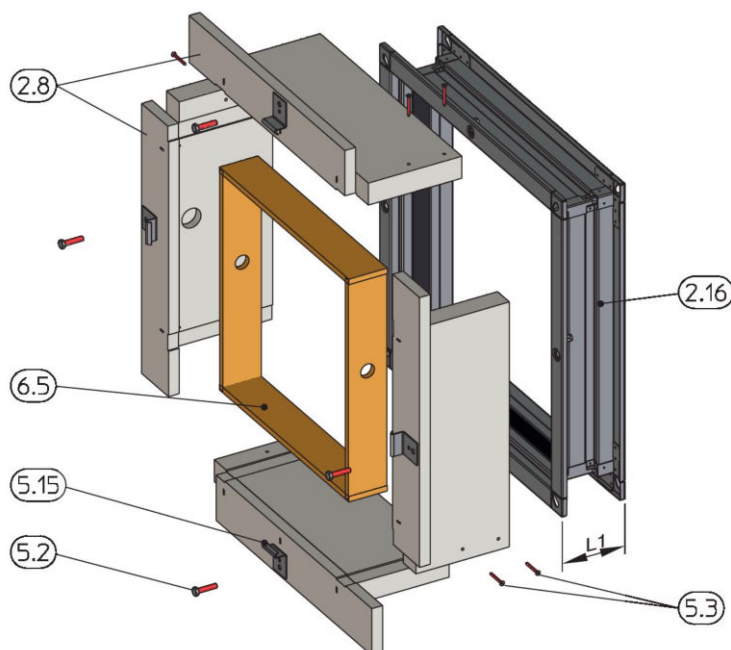


Fig. 22: Installation kit E1/E2 for dry mortarless installation into solid walls

2.8	Installation kit E1/E2 (2 × B section, 2 × H section)	5.3	Chipboard screws, Ø 5 × 80 mm (8 screws)
2.16	Installation subframe L ₁ = 115 mm (E1) or L ₁ = 240 mm (E2) (1 frame)	5.15	Brackets (4 – 16 brackets), at factory marked positions
5.2	Hexagon head screw M8 × 35 mm (4 – 16 screws)	6.5	Mineral wool (2 × B section, 2 × H section)

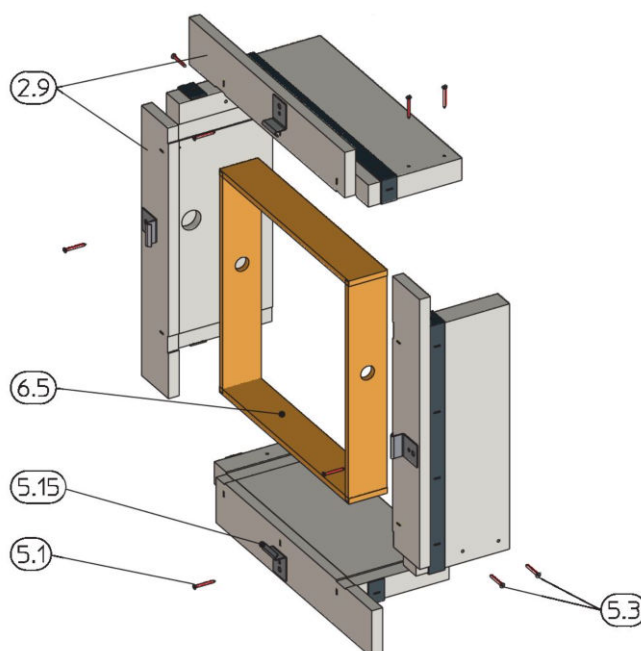


Fig. 23: Installation kit ES for dry mortarless installation into lightweight partition walls

2.9	Installation kit ES (2 × B section, 2 × H section)	5.15	Brackets (6 – 8 brackets)
5.1*	Dry wall screw Ø 5.5 × 70 mm (6 – 8 screws)	6.5	Mineral wool (2 × B section, 2 × H section)
5.3	Chipboard screws, Ø 5 × 80 mm (8 screws)	*	The dry wall screws have to be long enough (to be provided by others).

Assembly

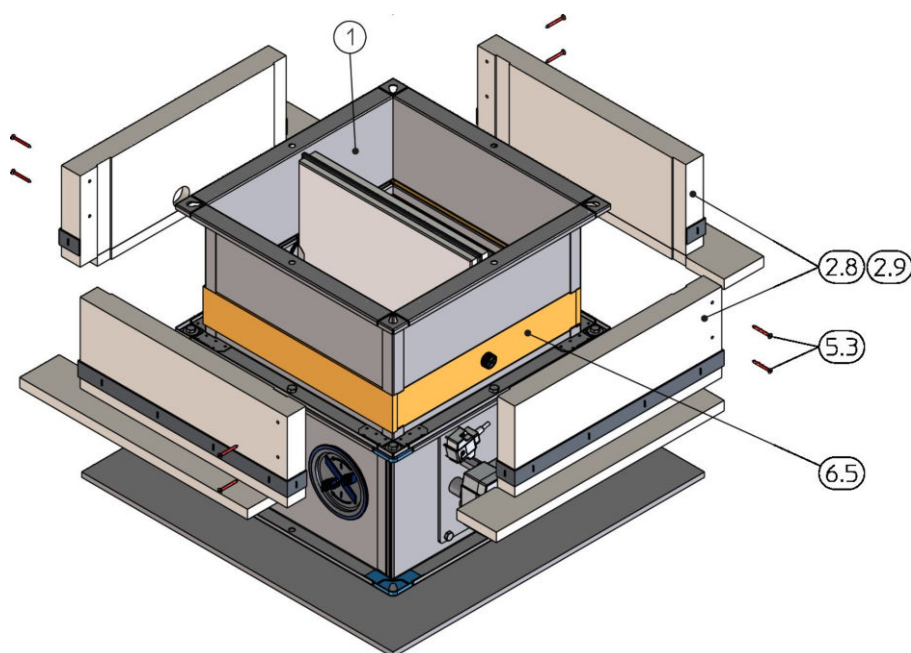


Fig. 24: Assembling the installation kit

2.8 Installation kit (2 × B section, 2 × H section)

2.9 Installation kit (2 × B section, 2 × H section)

5.3 Chipboard screws, Ø 5 × 80 mm (8 screws)

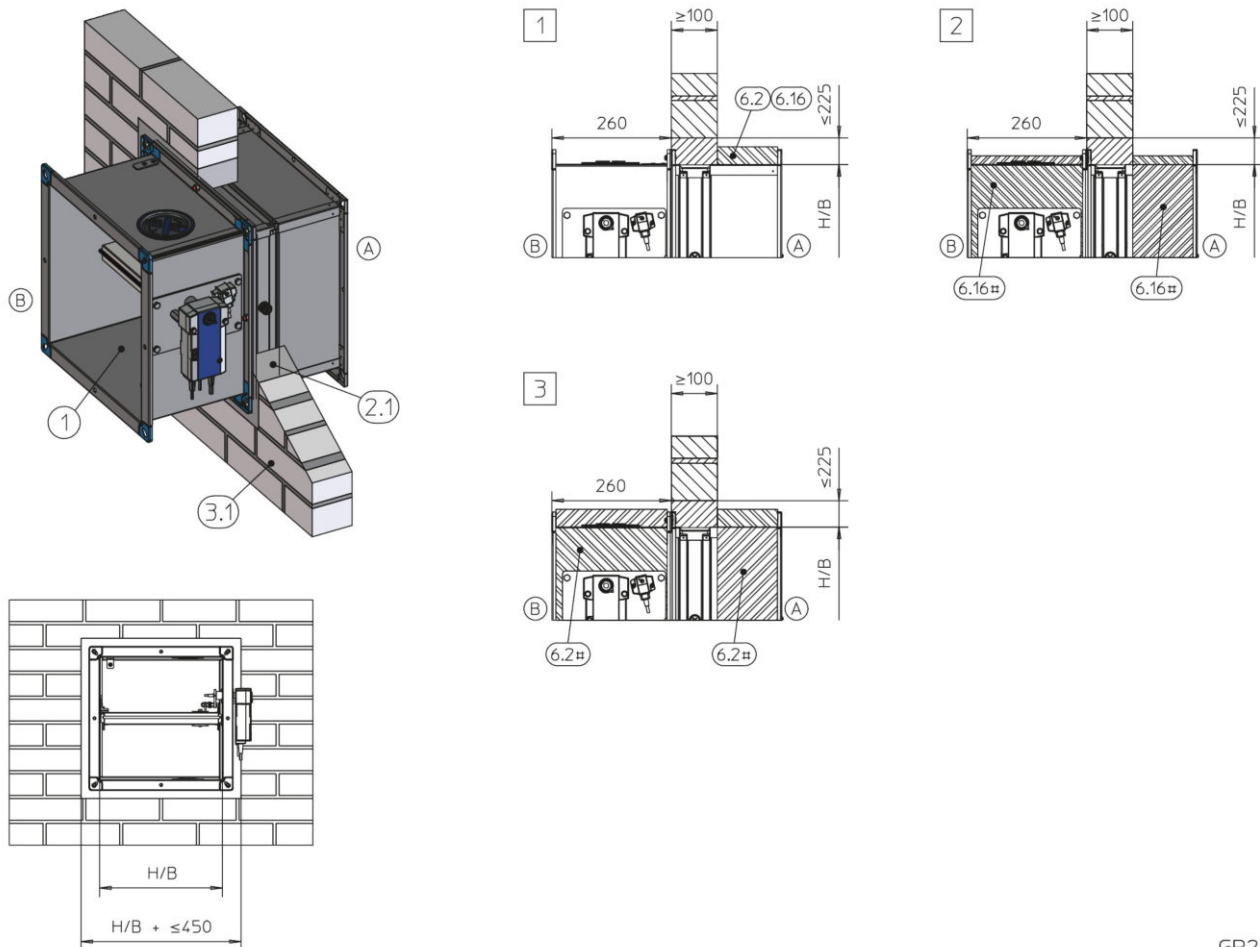
6.5 Mineral wool (2 × B section, 2 × H section)

1. ▶ Place the fire damper with the flange on the operating side facing downwards onto a sheet of cardboard or a thin wooden board for protection.
2. ▶ Place mineral wool (6.5) near the damper blade in the groove of the fire damper casing.
3. ▶ Arrange the installation kit (2.8) or (2.9) near the damper blade around the fire damper and secure it.
4. ▶ Screw the installation kit together using chipboard screws (5.3). Be sure to pre-drill the installation kit with a drill bit Ø 3.5 mm!

(5.15) and (5.2) – Fig. 22 and Fig. 23 – are used to fix the damper to the wall. For subsequent assembly and installation steps see the installation details.

5.4 Solid walls

5.4.1 Mortar-based installation



GR2893450

Fig. 25: Mortar-based installation into a solid wall

1	FK-EU	#	Around the perimeter, leave out the actuator and release mechanisms; inspection openings must remain accessible
2.1	Mortar	1 2	Up to EI 90 S
3.1	Solid wall	3	Up to EI 120 S
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	A	Installation side
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions	B	Operating side

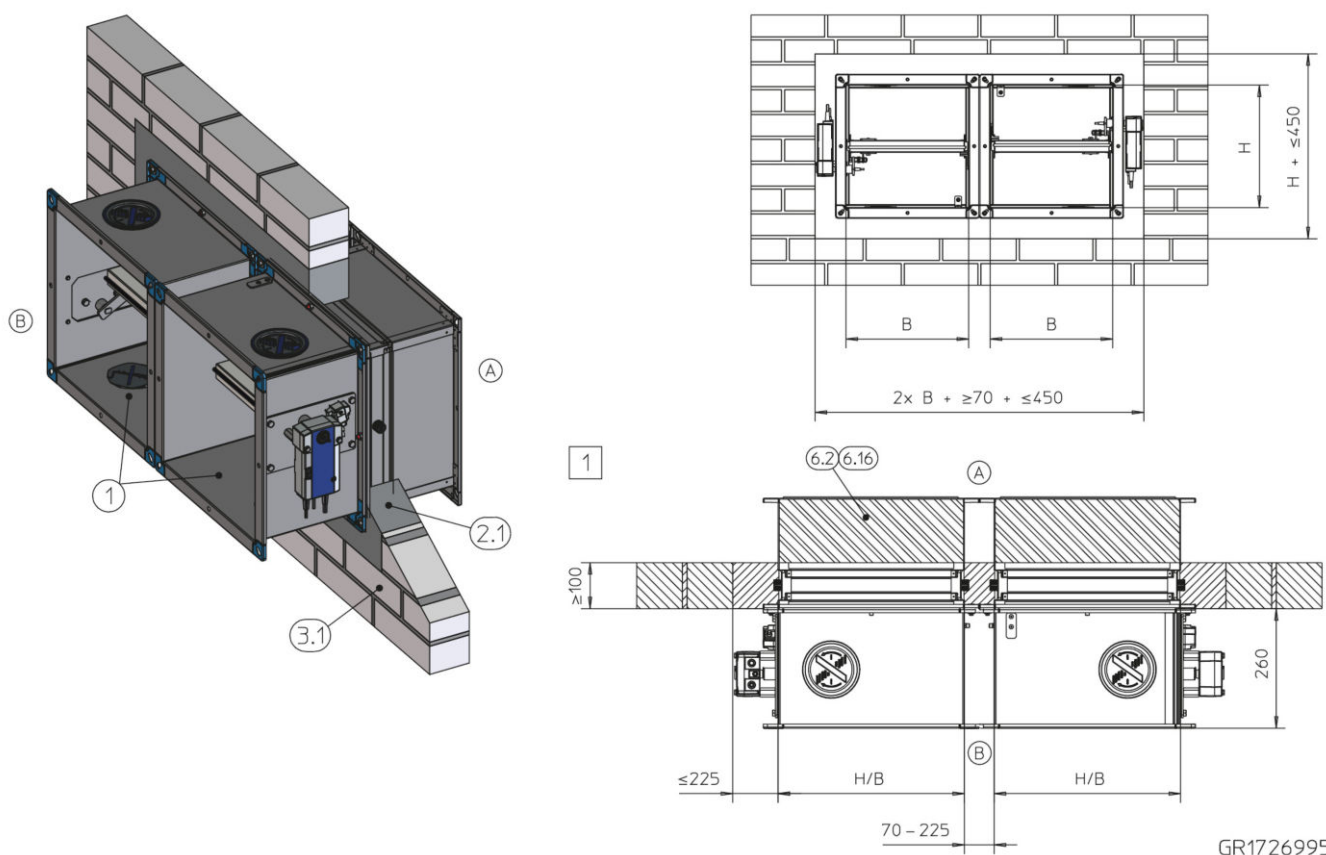
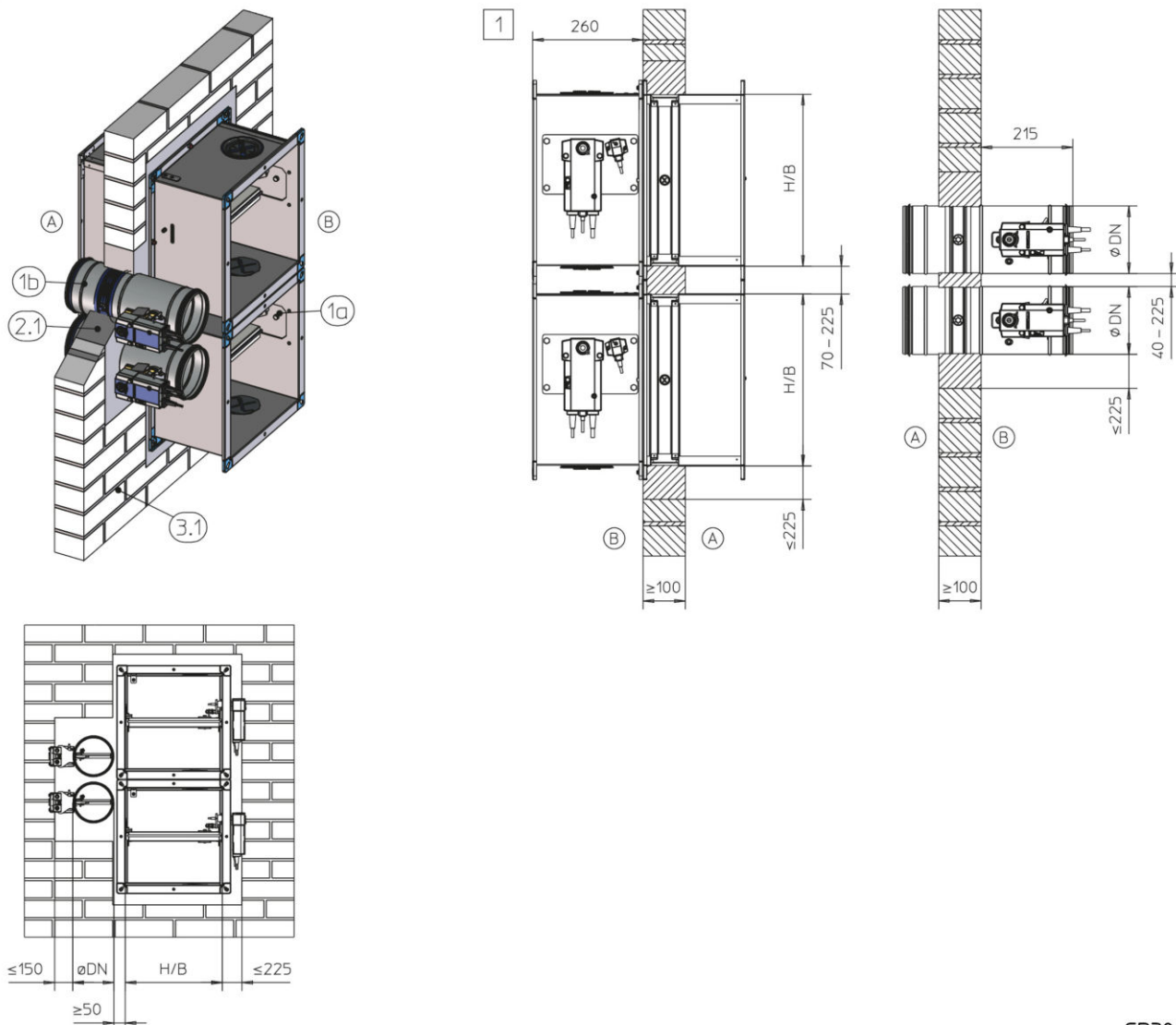


Fig. 26: Mortar-based installation into a solid wall, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

- 1 FK-EU
- 2.1 Mortar
- 3.1 Solid wall
- 6.2 Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, required only on the top and only for stainless steel constructions

- 6.16 Armaflex AF / Armaflex Ultima, d = 20 mm, required only on the top and only for stainless steel constructions
- 1 Up to EI 90 S
- A Installation side
- B Operating side




GR3046270

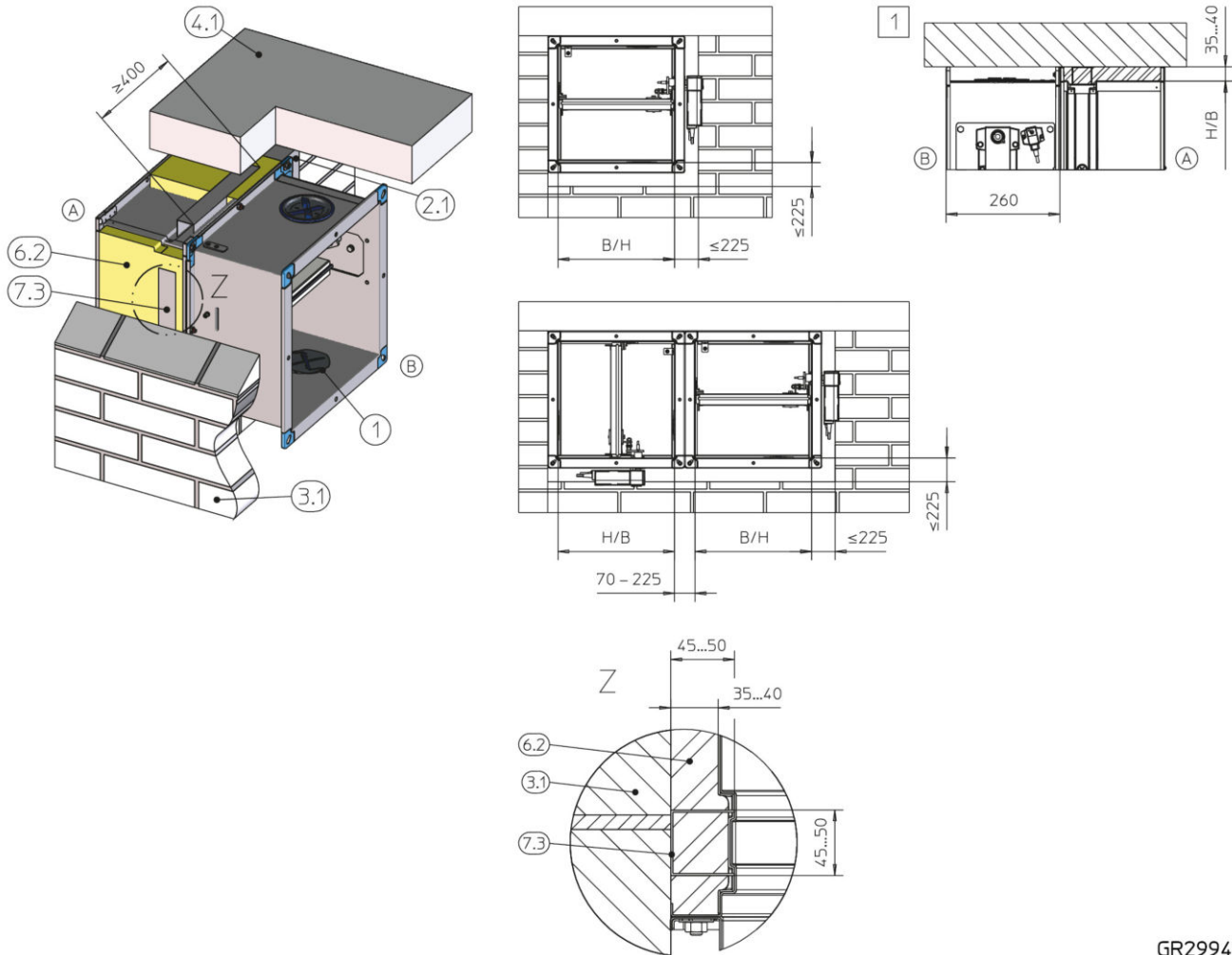
Fig. 27: Mortar-based installation into a solid wall, FK-EU and FKRS-EU combined

- | | | | |
|-----|--|---|-------------------|
| 1a | FK-EU up to $B \times H = 800 \times 400$ mm | 1 | Up to EI 90 S |
| 1b | FKRS-EU | A | Installation side |
| 2.1 | Mortar | B | Operating side |
| 3.1 | Solid wall | | |

Additional requirements

- Solid wall  on page 31
- Casing length $L = 375$ or 500 mm
- 'Flange-to-flange' installation of two FK-EU fire dampers into one installation opening is only possible if both dampers are of the same size. If FK-EU and FKRS-EU are to be installed together in the same installation opening, the size of FK-EU must not exceed $B \times H = 800 \times 400$ mm.
- For the maximum size of installation openings see Fig. 25 to Fig. 27

5.4.2 Mortar-based installation with partial mortaring



GR2994247

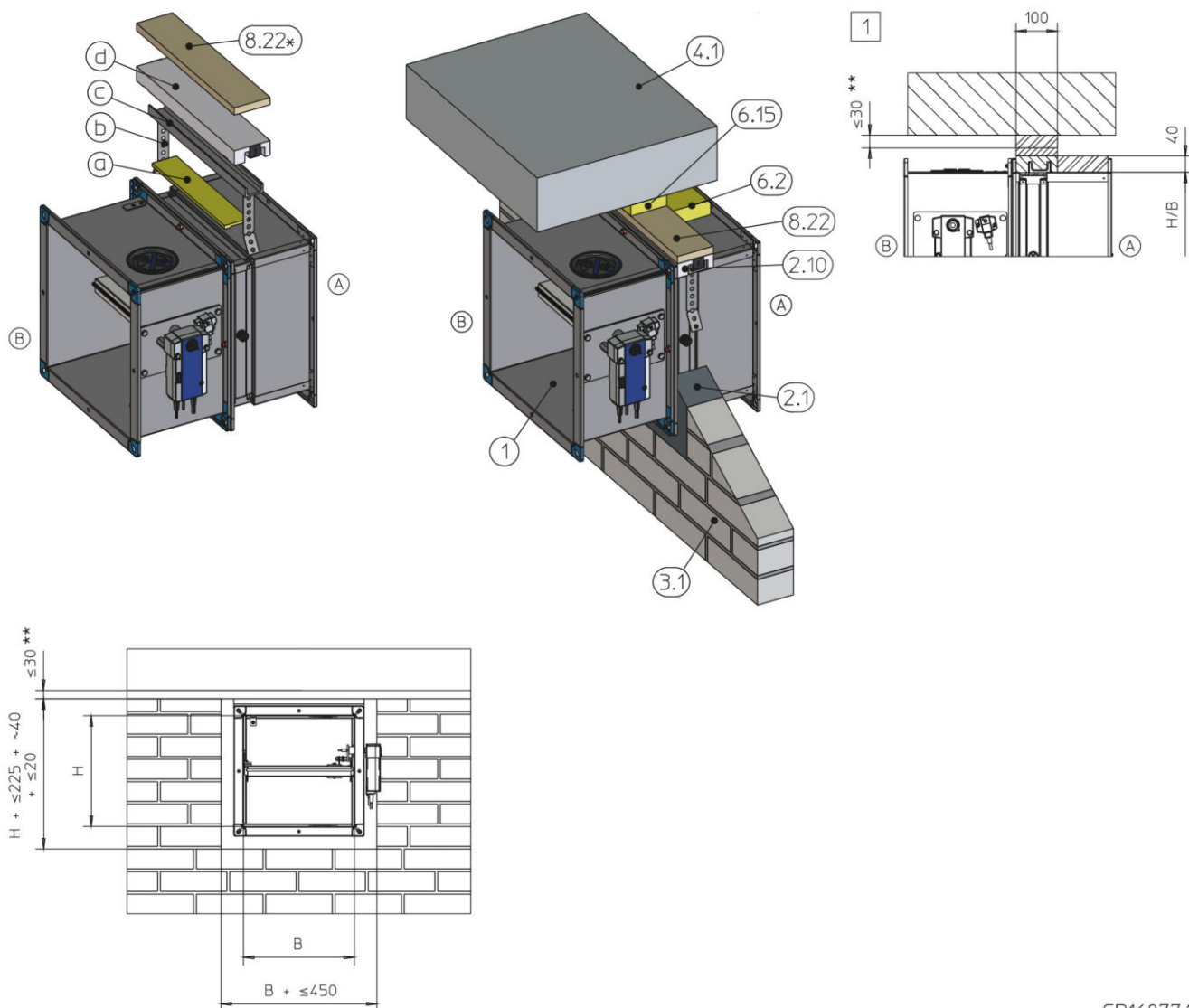
Fig. 28: Mortar-based installation into a solid wall, with partial mortaring

- | | | | |
|-----|---|-----|---|
| 1 | FK-EU (galvanised and stainless steel constructions) | 7.3 | U-channel, sheet thickness ≥ 1.25 mm |
| 2.1 | Mortar | 1 | Up to EI 90 S |
| 3.1 | Solid wall | A | Installation side |
| 4.1 | Solid ceiling slab | B | Operating side |
| 6.2 | Mineral wool, ≥ 1000 °C, ≥ 80 kg/m ³ | | |

Additional requirements

- Solid wall on page 31
 - Casing length L = 375 or 500 mm
 - 35 – 40 mm distance to load-bearing structural elements
 - ≥ 70 mm distance between two fire dampers
1. ► For difficult to access installation gaps, place one or two U-channels (depending on the size of the fire damper) in the middle of the installation gap on each side of the fire damper and completely fill the gap, including the U-channel, up to the flange on the installation side with mineral wool.
- U-channels
- Side H: 1 section
 - Side B: if $B \leq 1000$ mm, use 1 section; if $B > 1000$ mm, use 2 sections
- You may use shorter sections for fire dampers with a nominal H or B size of < 400 mm.
2. ► Completely close off the remaining gaps »s« (on 2 or 3 sides) with mortar.

5.4.3 Mortar-based installation with flexible ceiling joint



GR1687747

Fig. 29: Mortar-based installation into a solid wall with flexible ceiling joint, with installation kit GM

1	FK-EU	4.1	Solid ceiling slab
2.1	Mortar	6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$
2.10	Installation kit GM, consisting of:	6.15	Mineral wool, depending on the flexible ceiling joint**
a	Mineral wool	8.22	Calcium silicate board, or alternatively mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 140\text{ kg/m}^3$ (if required 20 mm max., to be provided by others)
b	Fixing tabs, welded to steel channel	1	Up to EI 90 S
c	Steel channel	A	Installation side
d	Calcium silicate board	B	Operating side
3.1	Solid wall		

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

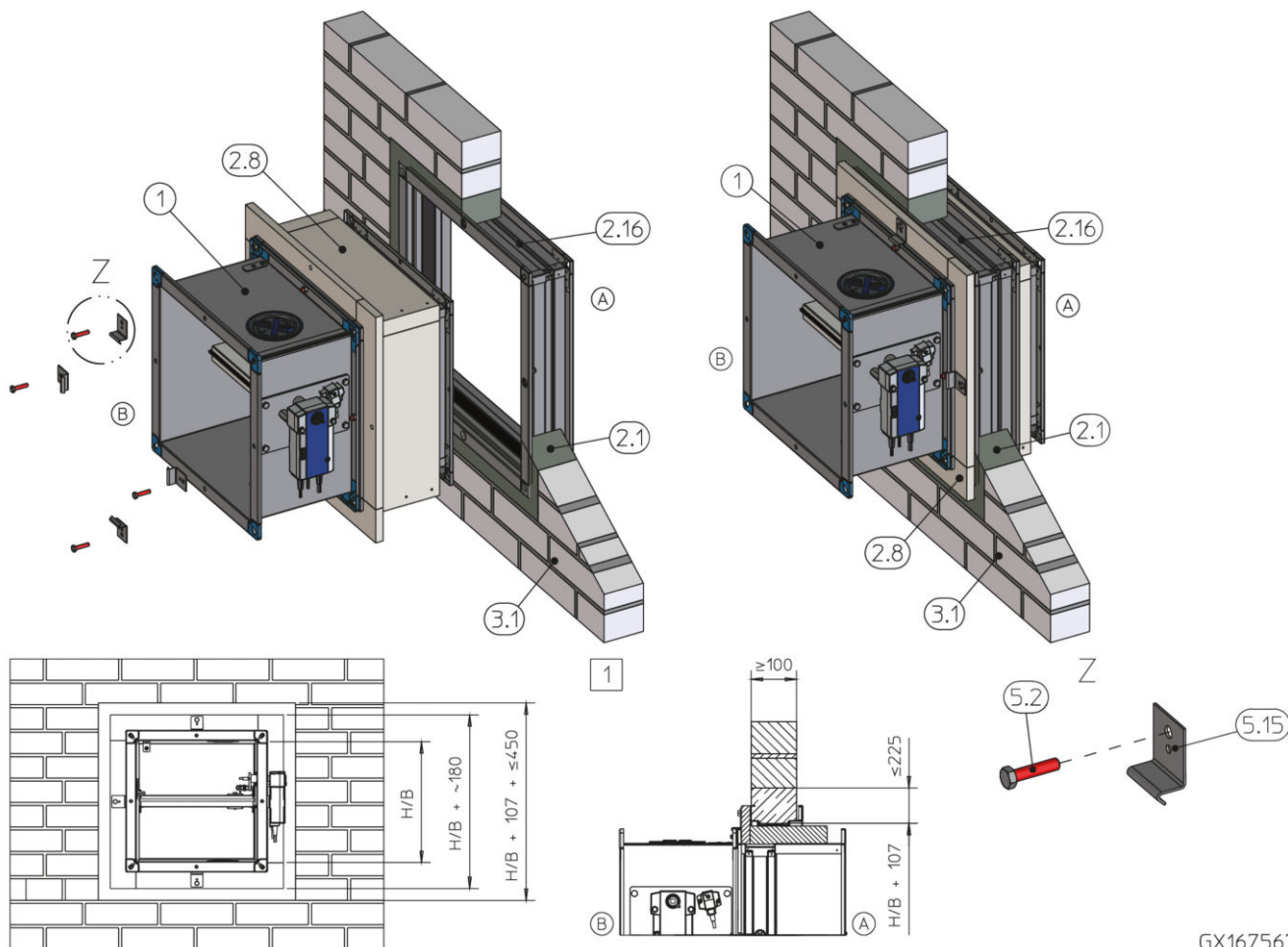
*If there is a difference of up to 20 mm between a calcium silicate board (d) and the upper edge of a wall, you may use a calcium silicate reinforcing board (8.22) or mineral wool (8.22) to compensate for the difference.

**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

- Solid wall ↗ on page 31
 - Horizontal installation (shaft)
 - Casing length L = 500 mm
 - ≥ 100 mm distance between two fire dampers
 - 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.
 2. ▶ Fill the area above the fire damper up to the flange on the installation side with mineral wool (6.2, 40 mm).
 3. ▶ Use mineral wool (depending on the flexible ceiling joint) above the installation kit.

5.4.4 Dry mortarless installation with installation subframe and installation kit E1 or E2



GX1675677

Fig. 30: Dry mortarless installation into a solid wall, with installation subframe and installation kit E1 or E2

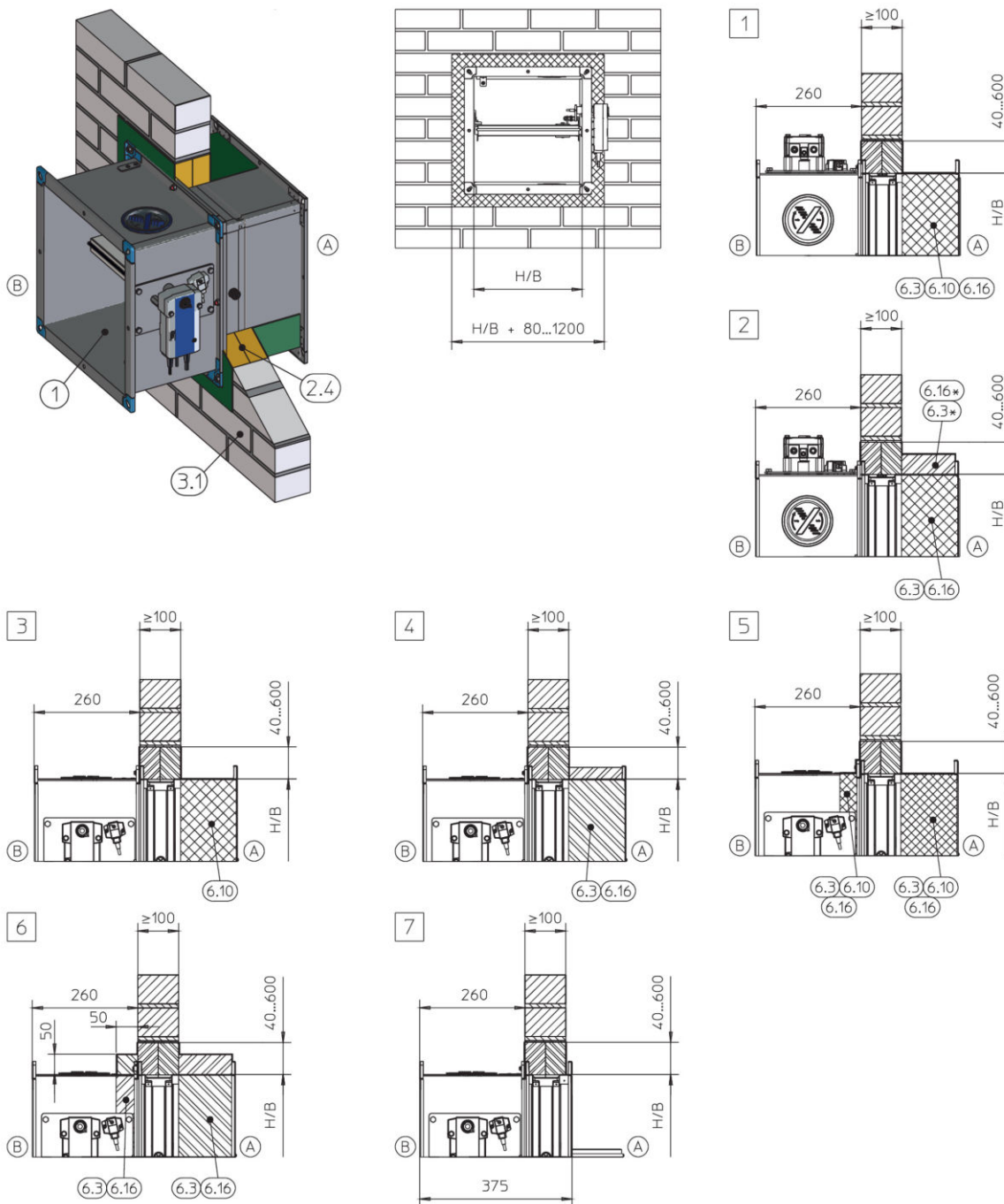
1	FK-EU	5.2	Hexagon head screw M8 × 35 (4 – 16 screws)
2.1	Mortar	5.15	Bracket (4 – 16 brackets)
2.8	Installation kit E1/E2	1	Up to EI 90 S
2.16	Installation subframe	A	Installation side
3.1	Solid wall	B	Operating side

Additional requirements

- Solid wall ↗ on page 31
 - Casing length L = 500 mm
 - ≥ 75 mm distance to load-bearing structural elements (perimeter installation dimensions ≥ 95 mm)
 - ≥ 200 mm distance between two fire dampers
1. ▶ Push the installation subframe into the wall opening and secure it. For wall thicknesses ≥ 115 mm, use installation subframe E2, L₁ = 240 mm.
 2. ▶ Mount the installation kit onto the fire damper ↗ 33.
 3. ▶ Push the fire damper with the installation kit into the installation subframe (the mortar on the installation subframe must have cured).
If the wall thickness is > 240 mm, extend the fire damper with an extension piece (attachment or provided by others) on the installation side.
 4. ▶ Screw-fix the fire damper to the installation subframe using brackets (5.15) and hexagon head screws (5.2).

Note: Connection of the duct to the fire damper.

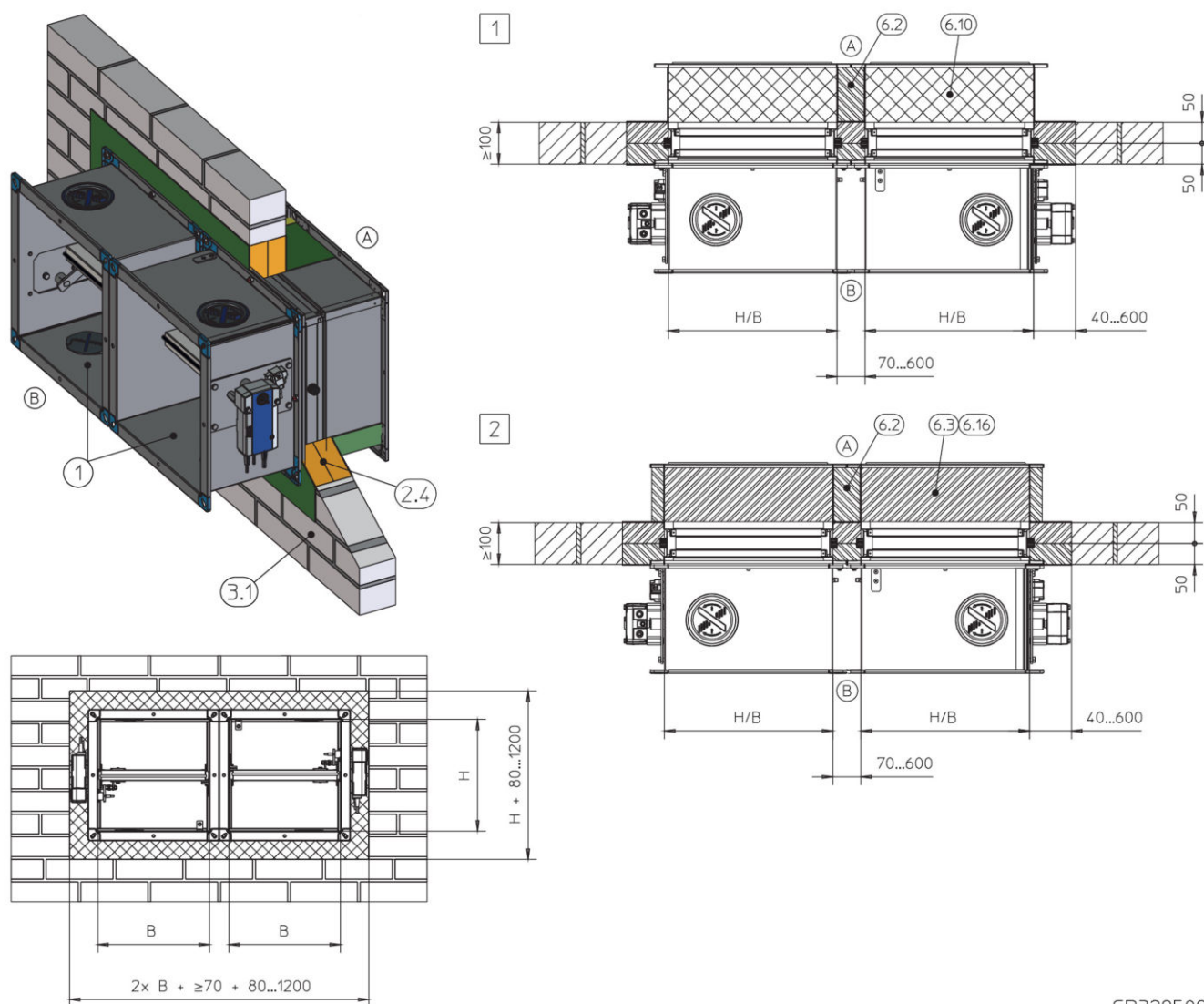
5.4.5 Dry mortarless installation with fire batt



GR2903849

Fig. 31: Dry mortarless installation with fire batt into a solid wall

- | | | | |
|------|---|-----|---|
| 1 | FK-EU | 2 | Up to EI 90 S (vertical damper blade): |
| 2.4 | Fire batt with ablative coating | | $B \times H = 801 \times 401 \text{ mm} - 1500 \times 800 \text{ mm}$ |
| 3.1 | Solid wall | 3 4 | Up to EI 90 S: |
| 6.3 | Mineral wool, $\geq 1000^\circ\text{C}$, $\geq 100 \text{ kg/m}^3$,
$d = 30 \text{ mm}$, around the perimeter | | $B \times H = 200 \times 200 \text{ mm} - 1500 \times 800 \text{ mm}$ |
| 6.10 | Ablative coating around the perimeter,
$d = \text{at least } 2.5 \text{ mm}$ | 5 | Up to EI 120 S: |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20 \text{ mm}$ | | $B \times H = 200 \times 200 \text{ mm} - 800 \times 400 \text{ mm}$ |
| * | Placed on the top | 6 | Up to EI 120 S: |
| 1 | Up to EI 90 S (vertical damper blade):
$B \times H = 200 \times 200 \text{ mm} - 800 \times 400 \text{ mm}$ | | $B \times H = 801 \times 401 \text{ mm} - 1500 \times 800 \text{ mm}$ |
| | | 7 | Up to EI 90 S: |
| | | | $B \times H = 200 \times 200 \text{ mm} - 1500 \times 800 \text{ mm}$ |
| | | A | Installation side |
| | | B | Operating side |



GR3295098

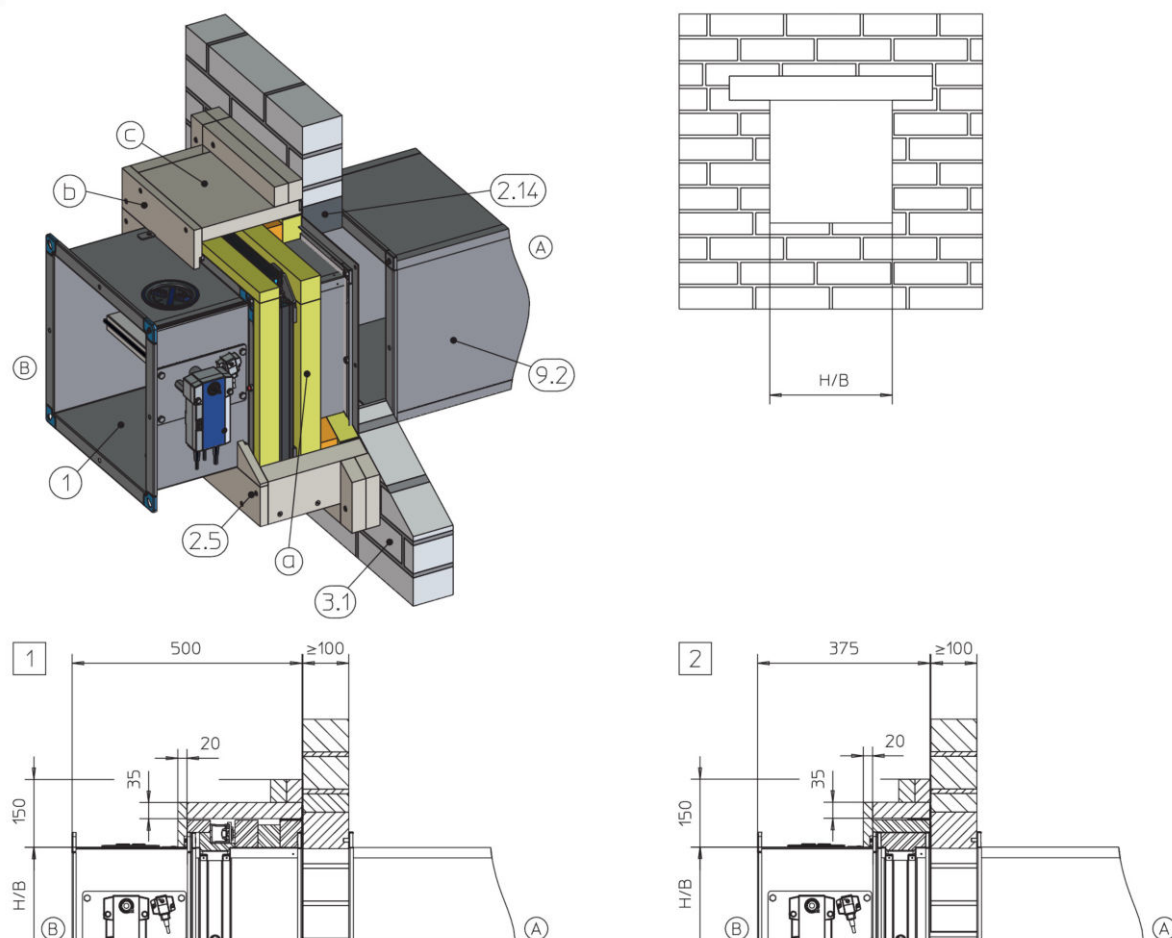
Fig. 32: Dry mortarless installation into a solid wall, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

- | | | | |
|-----|---|------|--|
| 1 | FK-EU | 6.10 | Ablative coating around the perimeter, d = at least 2.5 mm |
| 2.4 | Fire batt with ablative coating | 6.16 | Armaflex AF / Armaflex Ultima, d = 20 mm |
| 3.1 | Solid wall | 12 | Up to EI 90 S |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, required only if the distance between dampers is $\leq 150\text{ mm}$ | A | Installation side |
| 6.3 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, d = 30 mm, around the perimeter | B | Operating side |

Additional requirements

- Solid wall ↗ on page 31
- Fire batt ↗ on page 28
- Suspension ↗ 'Horizontal duct' on page 126
- Casing length L = 375 or 500 mm
- 70 – 600 mm distance between two fire dampers of the same size in one installation opening

5.4.6 Dry mortarless installation with installation kit WA

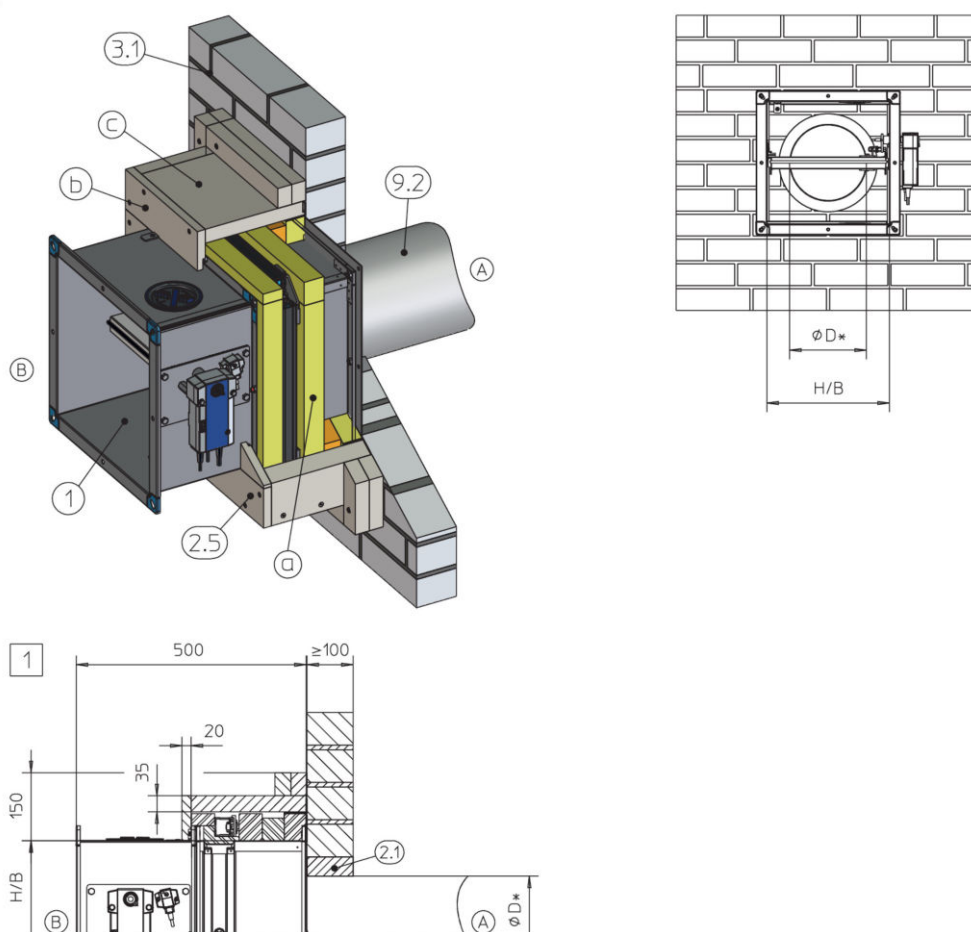


GR2860872

Fig. 33: Dry mortarless installation on a solid wall, with installation kit WA

- | | | | |
|------|---|-----|-------------------|
| 1 | FK-EU | 3.1 | Solid wall |
| 2.5 | Installation kit WA (factory mounted if L=500 mm), consisting of: | 9.2 | Duct, rectangular |
| a | Mineral wool, ≥ 1000 °C, ≥ 140 kg/m ³ , around the perimeter | 12 | Up to EI 90 S |
| b | PROMATECT®-H strips, d = 20 mm | A | Installation side |
| c | PROMATECT®-LS board, d = 35 mm | B | Operating side |
| 2.14 | Lintel (if required) | | |

Note: For more installation details see the WA installation manual.



GR3144778

Fig. 34: Dry mortarless installation on a solid wall, with installation kit WA

1	FK-EU (only L = 500 mm, H ≤ 350 mm)	3.1	Solid wall
2.1	Mortar	9.2	Duct, circular
2.5	Installation kit WA (factory mounted), consisting of:	*	$D \leq H$ and B ; the movement of the damper blade must not be impaired
a	Mineral wool, $\geq 1000^\circ\text{C}$, $\geq 140\text{ kg/m}^3$, around the perimeter	1	Up to EI 90 S
b	PROMATECT®-H strips, d = 20 mm	A	Installation side
c	PROMATECT®-LS board, d = 35 mm	B	Operating side

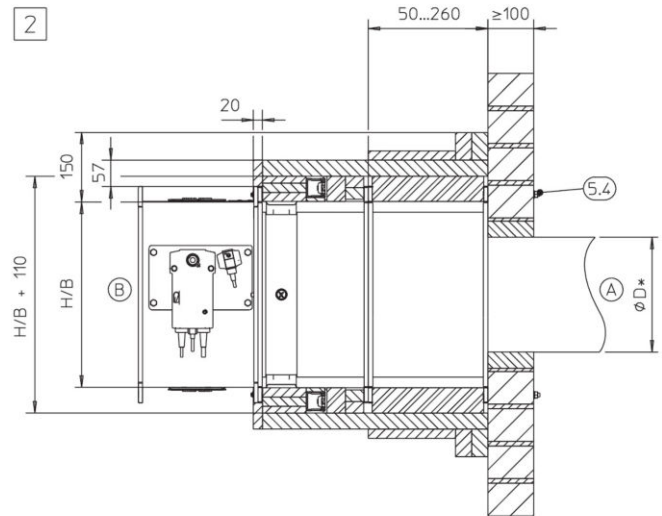
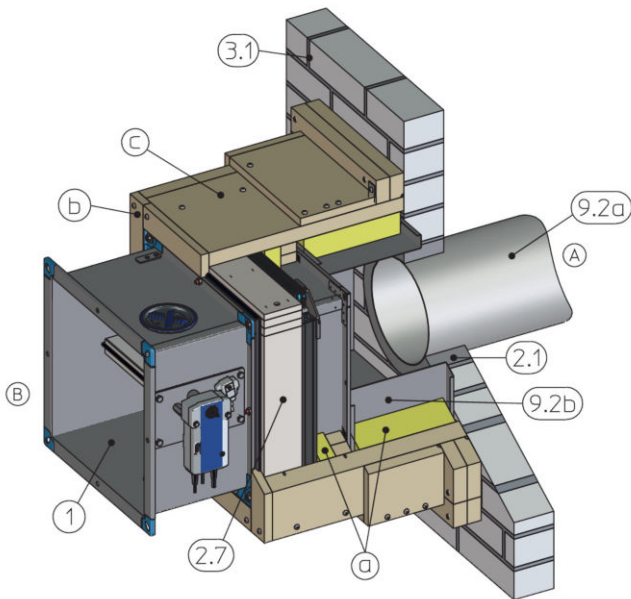
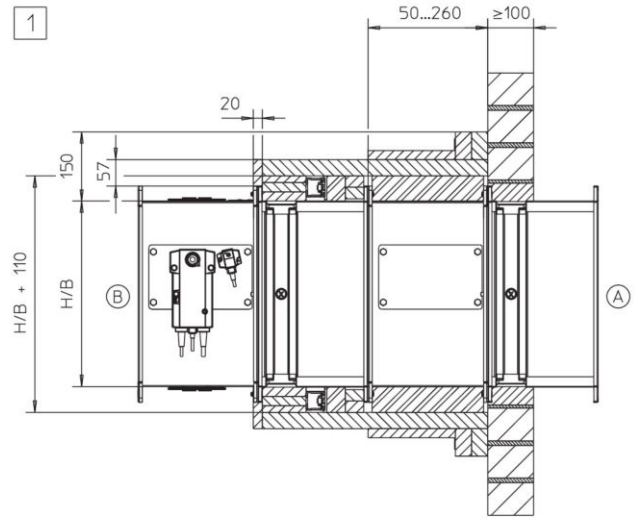
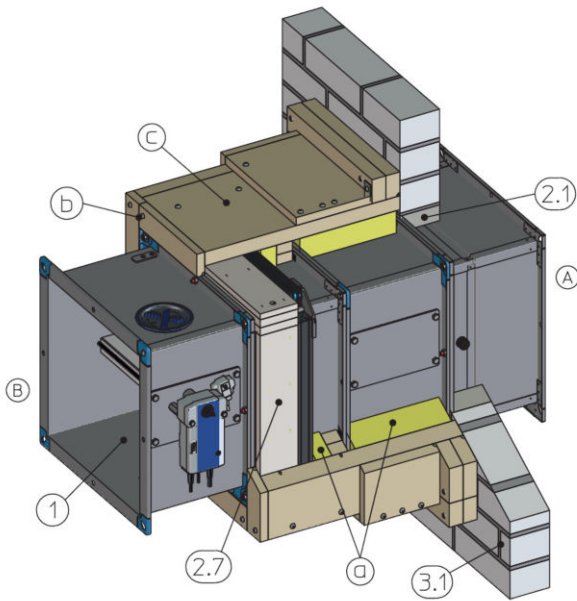
Note: For more installation details see the WA installation manual.

Additional requirements

- Solid wall ↗ on page 31
 - Casing length L = 375 or 500 mm
 - $\geq 150\text{ mm}$ distance to the wall or ceiling slab
 - $\geq 300\text{ mm}$ distance between two fire dampers
 - ▶ Install the fire damper according to the supplied installation manual for installation kit WA.
- Enough clear space is required to attach the installation kit to the fire damper, preferably:
- 400 mm to the left and to the right of the fire damper
 - 200 mm above and below the fire damper
 - 500 mm between each two fire dampers

Note: No suspension is required for fire dampers with installation kit WA.

5.4.7 Dry mortarless installation with installation kit WV



GR2842090
GR2203655

Fig. 35: Dry mortarless installation adjacent to a solid wall, with installation kit WV

- | | | | |
|-----|--|------------|--|
| 1 | FK-EU | 9.2 | Duct or old fire damper |
| 2.1 | Mortar | 9.2a | Duct, circular |
| 2.7 | Installation kit WV (factory mounted), consisting of: | 9.2b | Duct, rectangular |
| a | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, around the perimeter | * | $D \leq H$ and B ; the movement of the damper blade must not be impaired |
| b | PROMATECT®-H strips, $d = 20\text{ mm}$ | 1 2 | Up to EI 90 S |
| c | PROMATECT®-LS board, $d = 35\text{ mm}$ | A | Installation side |
| 3.1 | Solid wall | B | Operating side |
| 5.4 | Fixing: Threaded rods (push through) or suitable anchors | | |

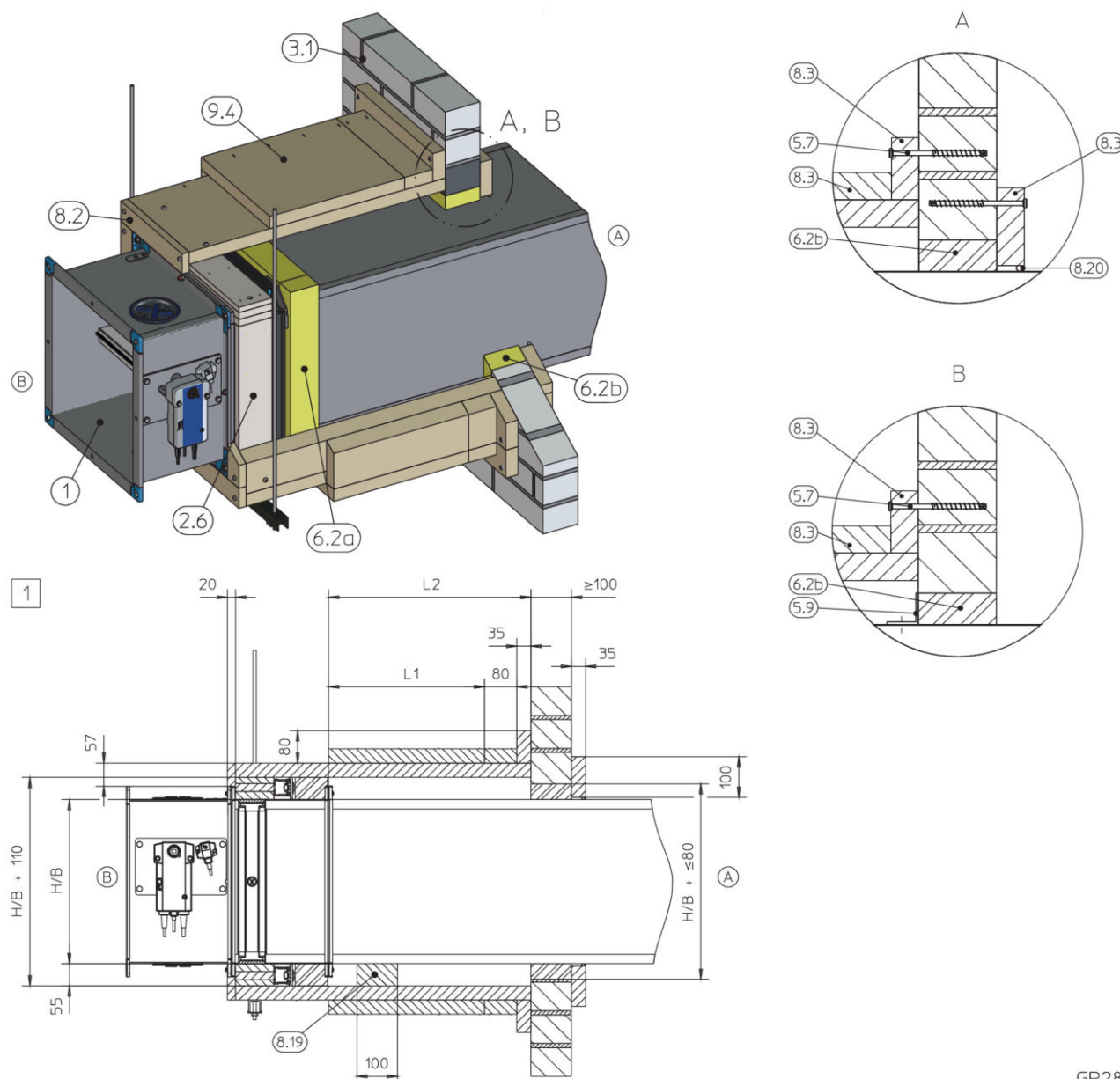
Note: For more installation details see the WV installation manual.

Additional requirements

- Solid wall ↗ *on page 31*
- Installation on an existing fire damper that has been installed with mortar, or on a sheet steel duct that has been mortared in, has no openings and is not longer than 260 mm.
If you install the fire damper at the end of a circular duct, be sure to properly fix the rectangular sheet steel duct (extension piece).
- Casing length L = 500 mm
- ≥ 150 mm distance to the wall or ceiling slab
- ≥ 300 mm distance between two fire dampers
 - ▶ Install the fire damper according to the supplied installation manual for installation kit WV.
Enough clear space is required to attach the installation kit to the fire damper, preferably:
 - 400 mm to the left and to the right of the fire damper
 - 400 mm above and below the fire damper
 - 500 mm between each two fire dampers

Note: No suspension is required for fire dampers with installation kit WV.

5.4.8 Dry mortarless installation with installation kit WE

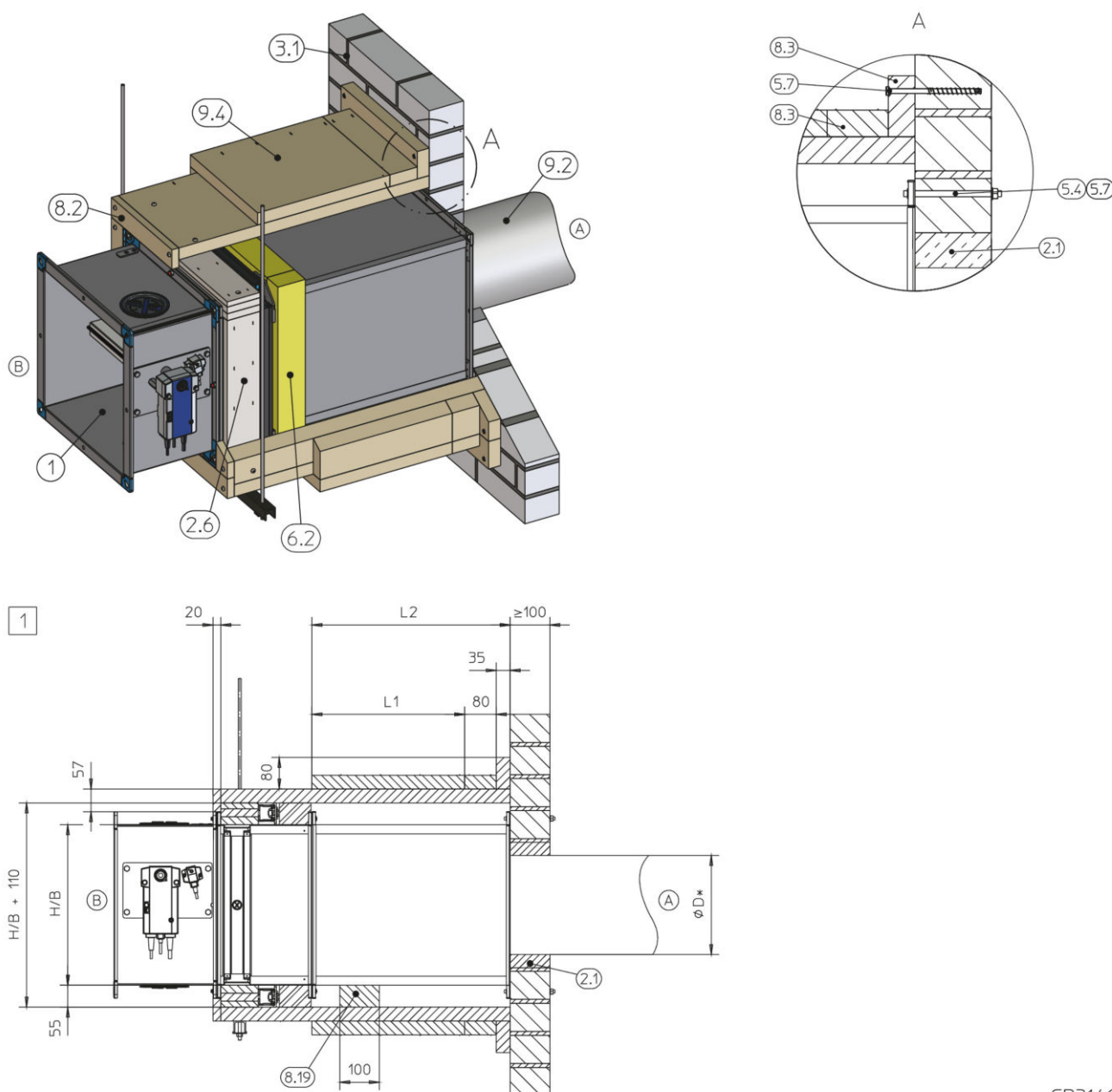


GR2837196

Fig. 36: Dry mortarless installation with installation kit WE, remote from a solid wall

1	FK-EU	8.19	Support (PROMATECT®-LS board)
2.6	Installation kit WE (factory assembled)	8.20	Promaseal®-Mastic intumescent sealant, Ø8 mm
3.1	Solid wall	9.4	Sheet steel duct with fire-rated cladding according to Promat® manual, construction 478, latest edition
5.7	Fire-rated anchor (with suitability certificate), type Hilti HUS-6 or equivalent	L1	185 – 385 mm
5.9	Steel angle section, 40 × 40 × 3 mm, around the perimeter, screw-fixed or riveted (steel rivets) to the duct every 150 mm	L2	300 – 500 mm
6.2a	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³, around the perimeter	1	Up to EI 90 S
6.2b	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m³, mortar as an alternative	A	Installation side
8.2	PROMATECT®-H strips, d = 20 mm, or 2 × 10 mm	B	Operating side
8.3	PROMATECT®-LS board d = 35 mm		

Note: For more installation details and for components to be provided by others refer to the WE installation manual.



GR3146375

Fig. 37: Dry mortarless installation with installation kit WE, remote from a solid wall

- | | | | |
|-----|--|------|---|
| 1 | FK-EU | 8.19 | Support (PROMATECT®-LS board) |
| 2.1 | Mortar | 9.2 | Duct, circular |
| 2.6 | Installation kit WE | 9.4 | Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition |
| 3.1 | Solid wall | * | $D \leq H$ and B ; the movement of the damper blade must not be impaired |
| 5.4 | Fixing with threaded rod, washers and nuts (push through) | L1 | 185 – 385 mm |
| 5.7 | Fire-rated anchor (with suitability certificate), type Hilti HUS-6 or equivalent | L2 | 300 – 500 mm |
| 6.2 | Mineral wool, $\geq 1000\text{ °C}$, $\geq 80\text{ kg/m}^3$, around the perimeter | 1 | Up to EI 90 S |
| 8.2 | PROMATECT®-H strips, $d = 20\text{ mm}$, or $2 \times 10\text{ mm}$ | A | Installation side |
| 8.3 | PROMATECT®-LS board $d = 35\text{ mm}$ | B | Operating side |

Note: For more installation details and for components to be provided by others refer to the WE installation manual.

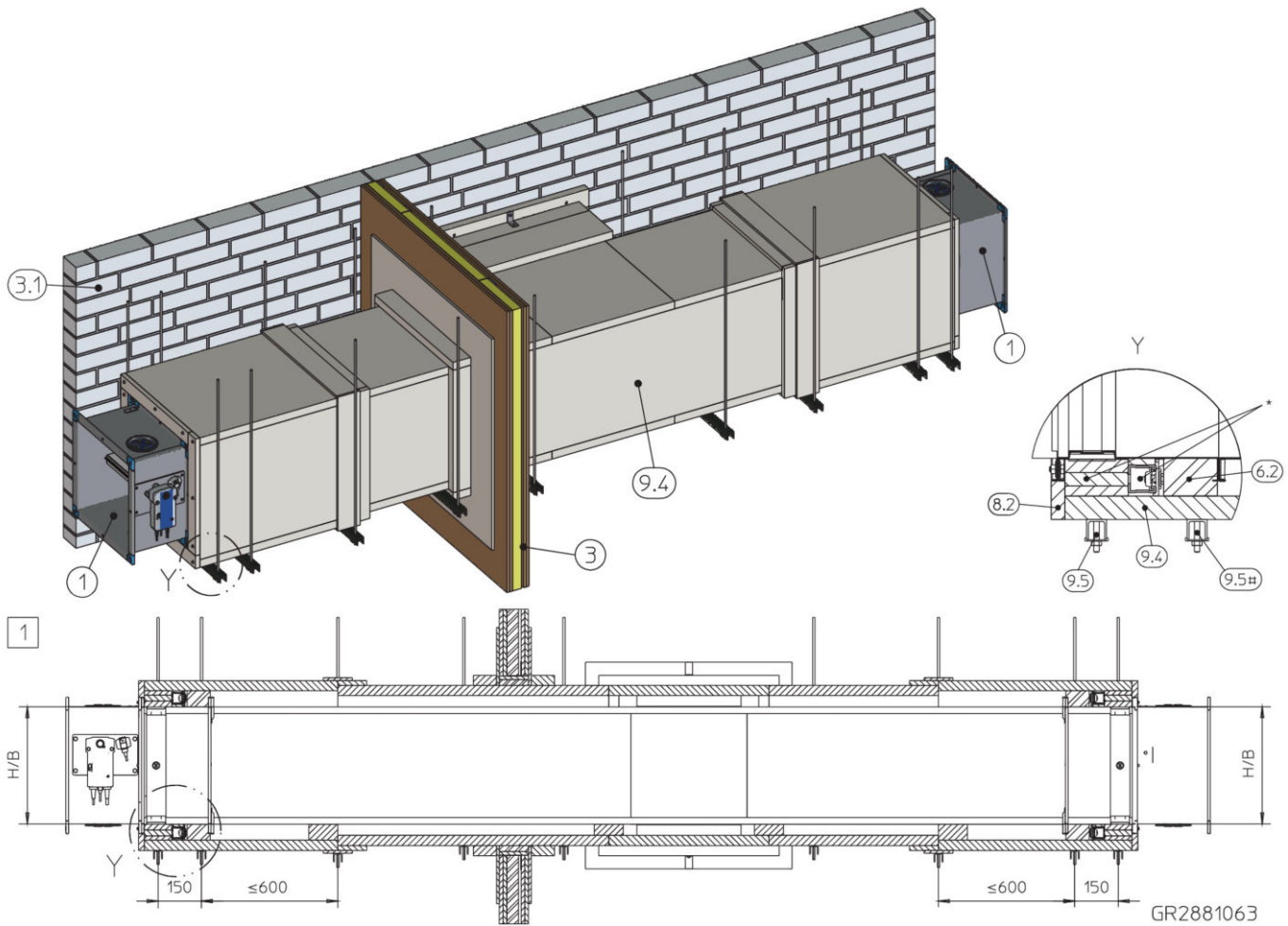


Fig. 38: Dry mortarless installation with installation kit WE, remote from a solid wall

- | | | | |
|-----|---|-----|---|
| 1 | FK-EU | 9.4 | Sheet steel duct with fire-rated cladding according to Promat® manual, construction 478, latest edition |
| 3 | Lightweight partition wall or solid wall (if any), wall penetration according to Promat® manual, construction 478, latest edition | 9.5 | Suspension system |
| 3.1 | Solid wall | * | Supply package |
| 8.2 | PROMATECT®-H strips, d = 20 mm, or d = 2 × 10 mm | # | Dampers from size B × H = 1000 × 600 mm require a second suspension point |

Note: For more installation details and for components to be provided by others refer to the WE installation manual.

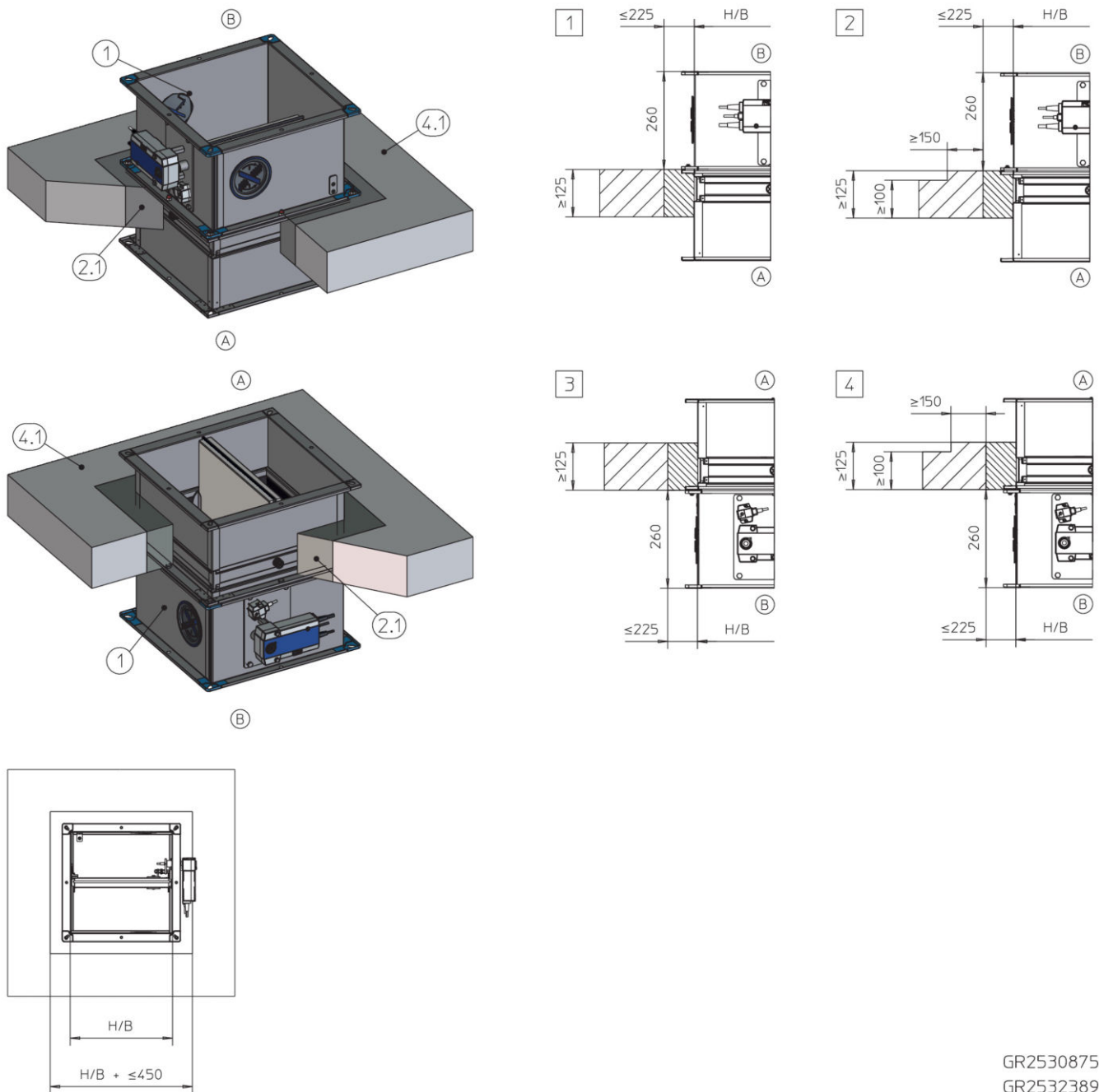
Additional requirements

- Solid wall ↗ on page 31
 - Sheet steel ducts without any openings, with fire-resistant cladding (fittings with cladding according to instructions from Promat®)
 - Casing length L = 500 mm
 - ≥ 175 mm distance to the wall or ceiling slab
 - ≥ 350 mm distance between two fire dampers
 - ▶ Install the fire damper according to the supplied installation manual for installation kit WE.
- Enough clear space is required to attach the installation kit to the fire damper, preferably:
- 400 mm to the left, to the right, above and below the fire damper
 - 500 mm between each two fire dampers

Note: Fire damper and duct must be suspended ↗ 125.

5.5 Solid ceiling slabs

5.5.1 Mortar-based installation into solid ceiling slabs

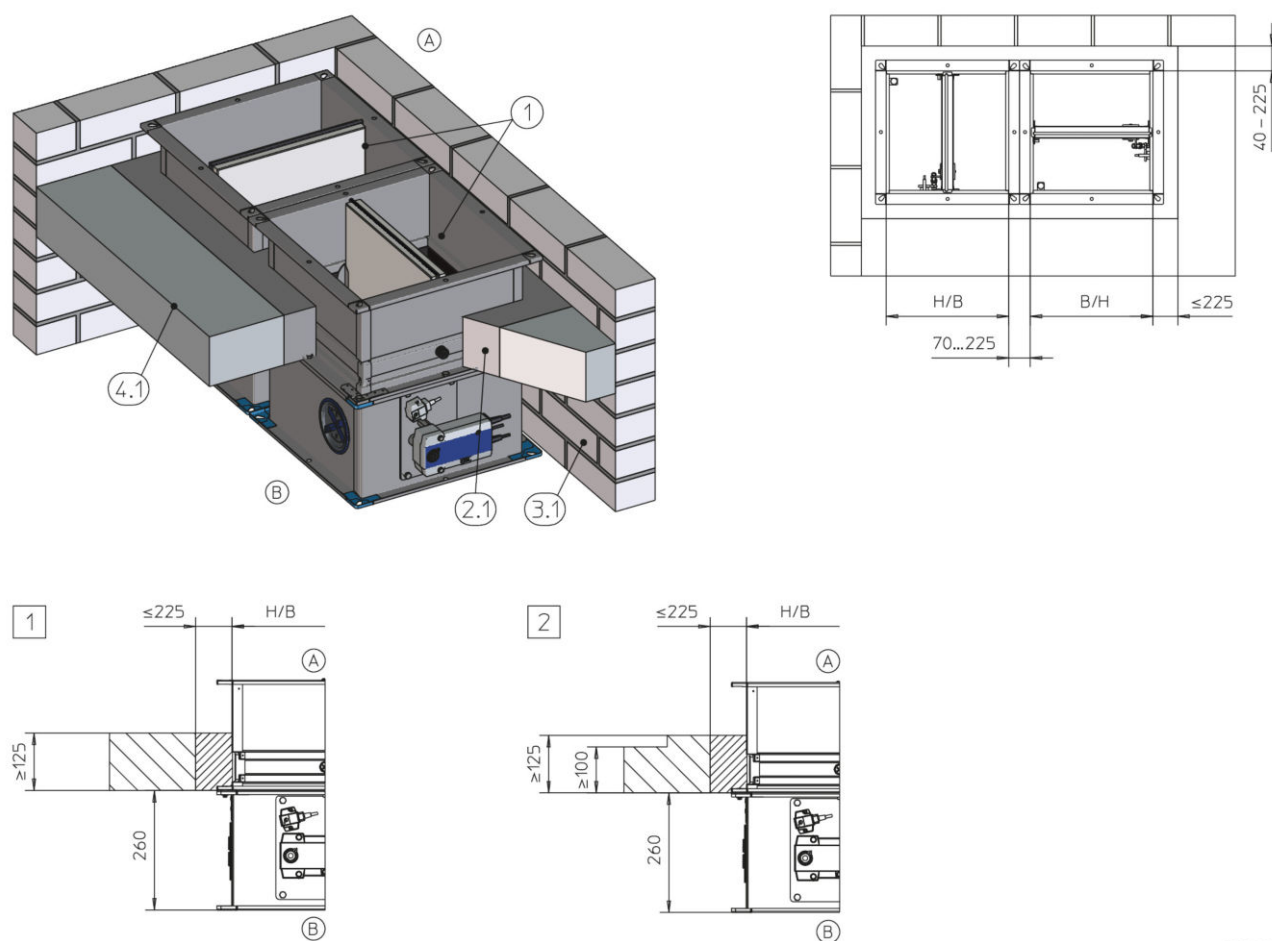


GR2530875
GR2532389

Fig. 39: Mortar-based installation into a solid ceiling slab, suspended or upright

- 1 FK-EU
- 2.1 Mortar
- 4.1 Solid ceiling slab

- 1 – 4 Up to EI 90 S
- A Installation side
- B Operating side



GR2999586

Fig. 40: Mortar-based installation into a solid ceiling slab, suspended (shown) or upright

- 1 FK-EU
- 2.1 Mortar
- 3.1 Solid wall
- 4.1 Solid ceiling slab

- 1 2 Up to EI 90 S
- (A) Installation side
- (B) Operating side

Additional requirements

- Solid wall ↗ on page 31
- Casing length $L = 375$ or 500 mm
- ≥ 70 mm distance between fire dampers; when you install two fire dampers next to each other into the same opening, the mortar bed between the two fire dampers must not exceed 225 mm (reinforcement according to structural requirements).

5.5.2 Mortar-based installation into a concrete base

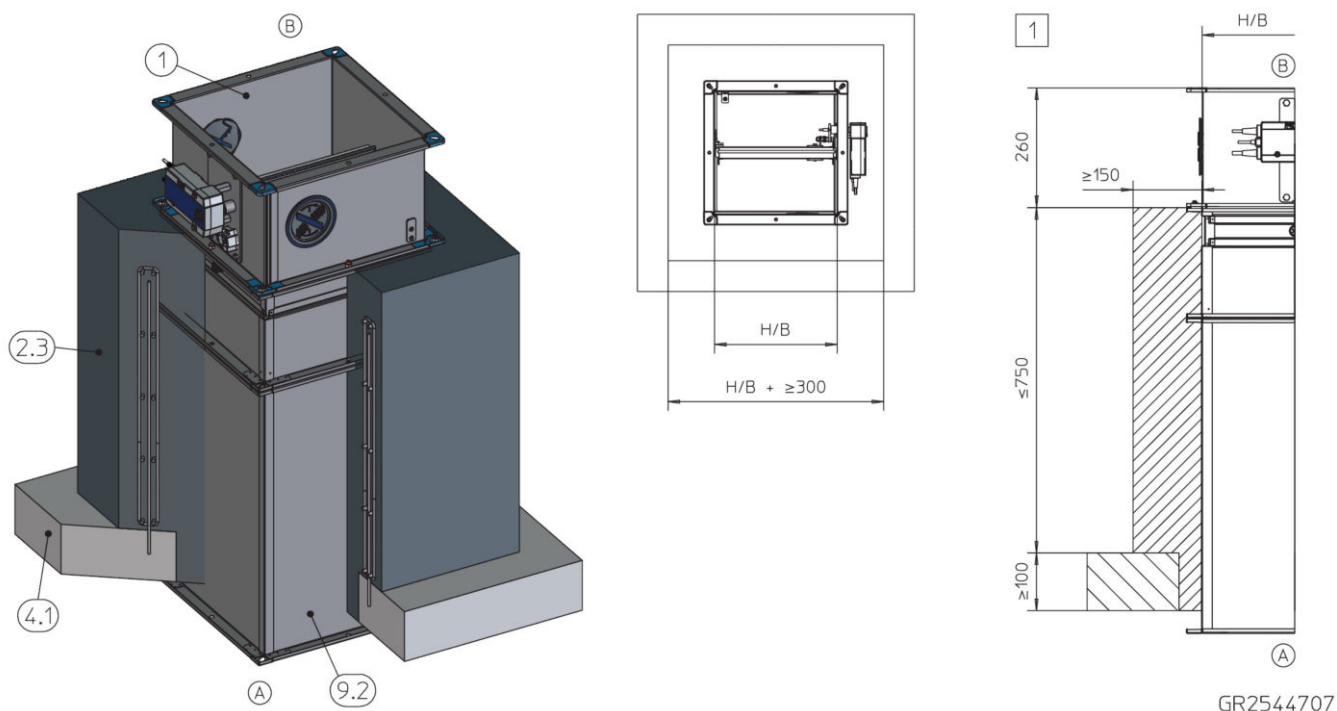


Fig. 41: Mortar-based installation with concrete base into a solid ceiling slab

- | | | | |
|-----|---|---|-------------------|
| 1 | FK-EU | 1 | Up to EI 90 S |
| 2.3 | Concrete base with reinforcement, for details see Fig. 42 | A | Installation side |
| 4.1 | Solid ceiling slab | B | Operating side |
| 9.2 | Extension piece or duct (sheet steel) | | |

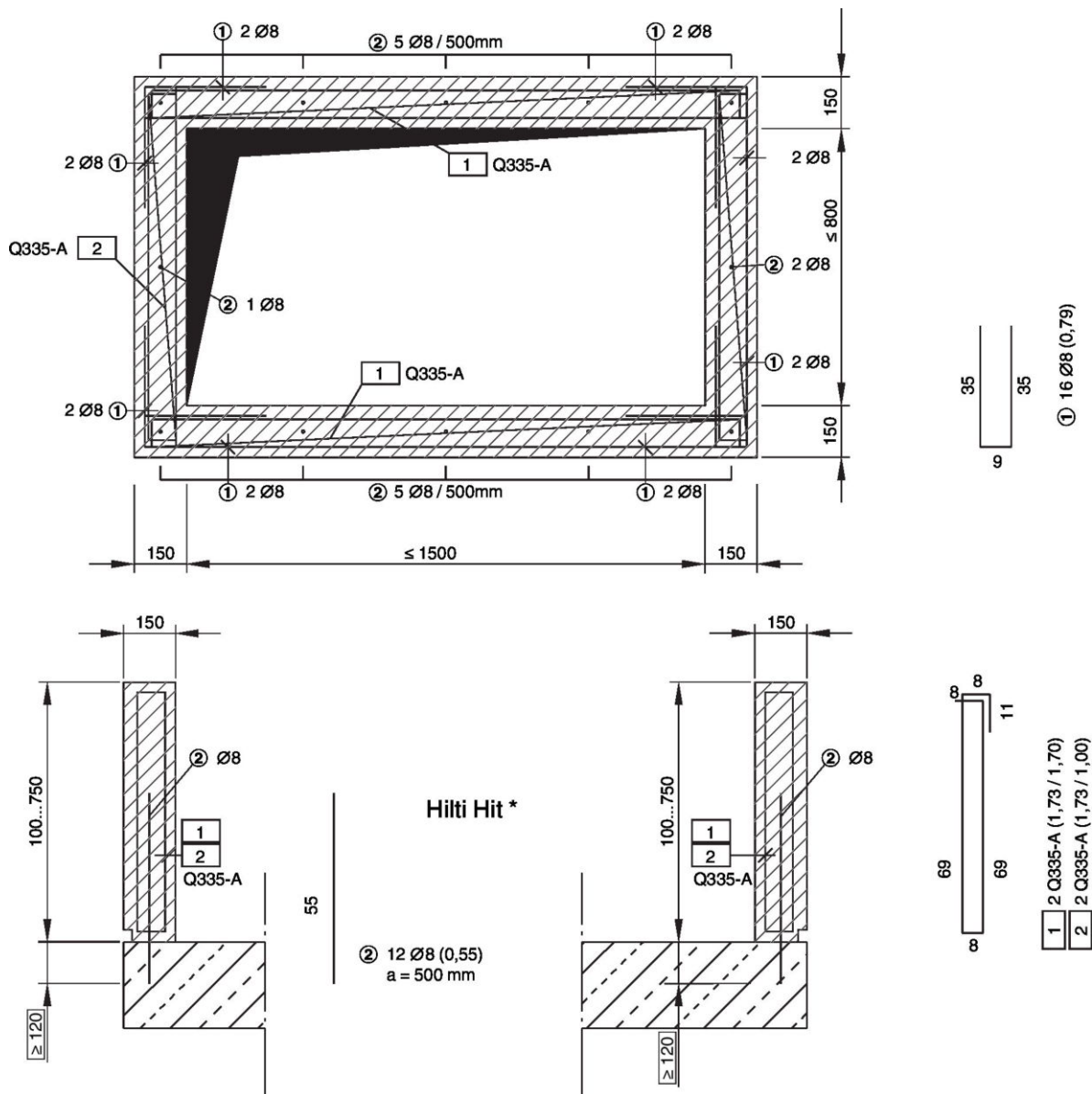



Fig. 42: Reinforcement plan for concrete bases with a height of 100 to 750 mm

* or equivalent, e.g. steel anchor or threaded rods

Additional requirements

- Solid wall  on page 31
- Casing length L = 375 or 500 mm
- ≥ 70 mm distance between two fire dampers

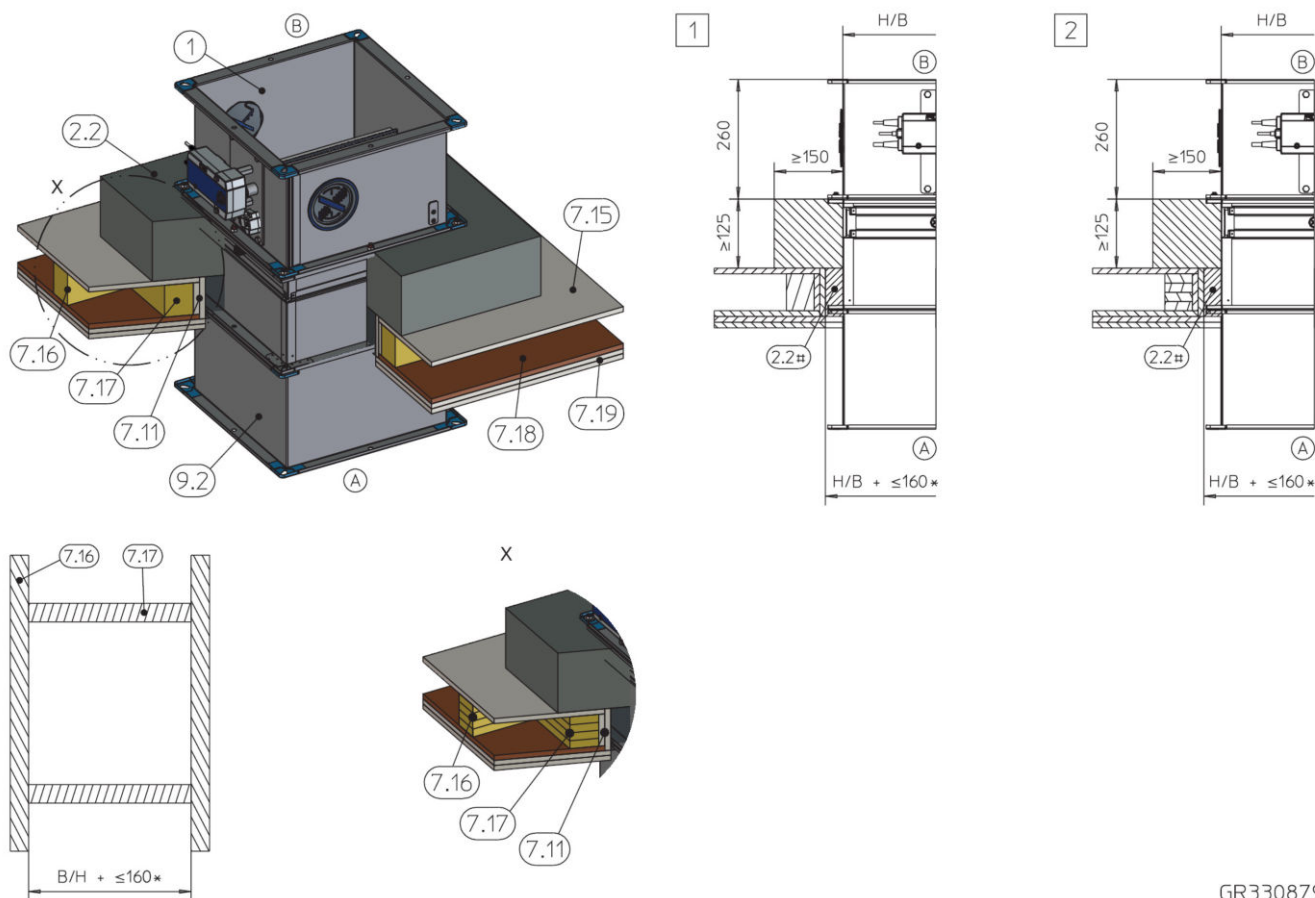
1. ▶ Screw the new fire damper to the existing, dysfunctional fire damper or to the ducting; if necessary, attach a flange to the ducting.

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, for a reinforcement plan see Fig. 42 (or equivalent, e.g. with steel fabric).

No reinforcement is required for bases with a height of ≤ 100 mm. If the distance to adjacent solid walls is < 150 mm and if the concrete base has been correctly attached, no reinforcement is required on the wall side.

5.5.3 Mortar-based installation in conjunction with wooden beam ceilings



GR3308791

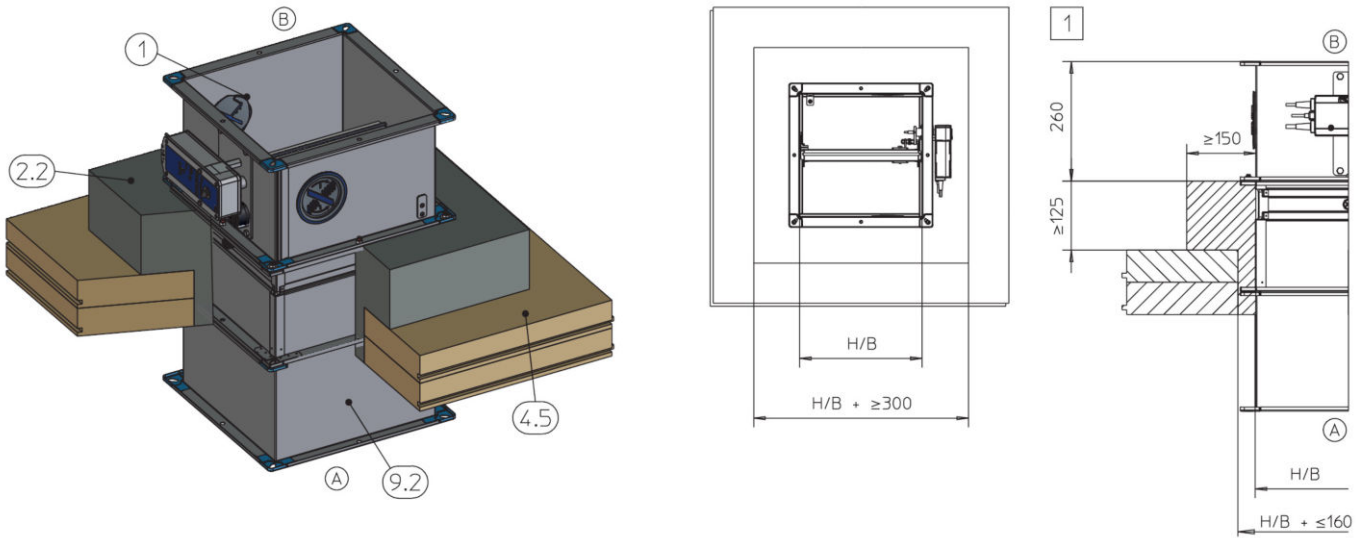
Fig. 43: Mortar-based installation into a solid ceiling slab in combination with a wooden beam ceiling, upright (illustration is an example; installation in other wooden beam ceilings may be possible depending on local conditions)

1	FK-EU	7.19	Fire-resistant cladding
2.2	Reinforced concrete	9.2	Extension piece or duct
7.11	Trim panel, same construction as 7.19	*	Can be increased to account for the thickness of the trim panels
7.15	Wooden floorboard / floor tiles (different ceiling construction may be possible)	#	optional
7.16	Wooden beam / gluelam (reduce distances between wooden beams to the size of the installation opening)	1 2	Up to EI 90 S
7.17	Trimmers, wooden beam / gluelam	(A)	Installation side
7.18	Formwork	(B)	Operating side

Additional requirements

- Wooden beam ceiling with fire-resistant cladding
 - Casing length $L = 375$ or 500 mm
 - ≥ 70 mm distance between 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 an installation opening, maximum size $B + 160$ mm and $H + 160$ mm, in compliance with the local structural requirements. Professionally connect the trimmers.
 2. ► Create a partial concrete ceiling around the fire damper, ≥ 150 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



GR3212778

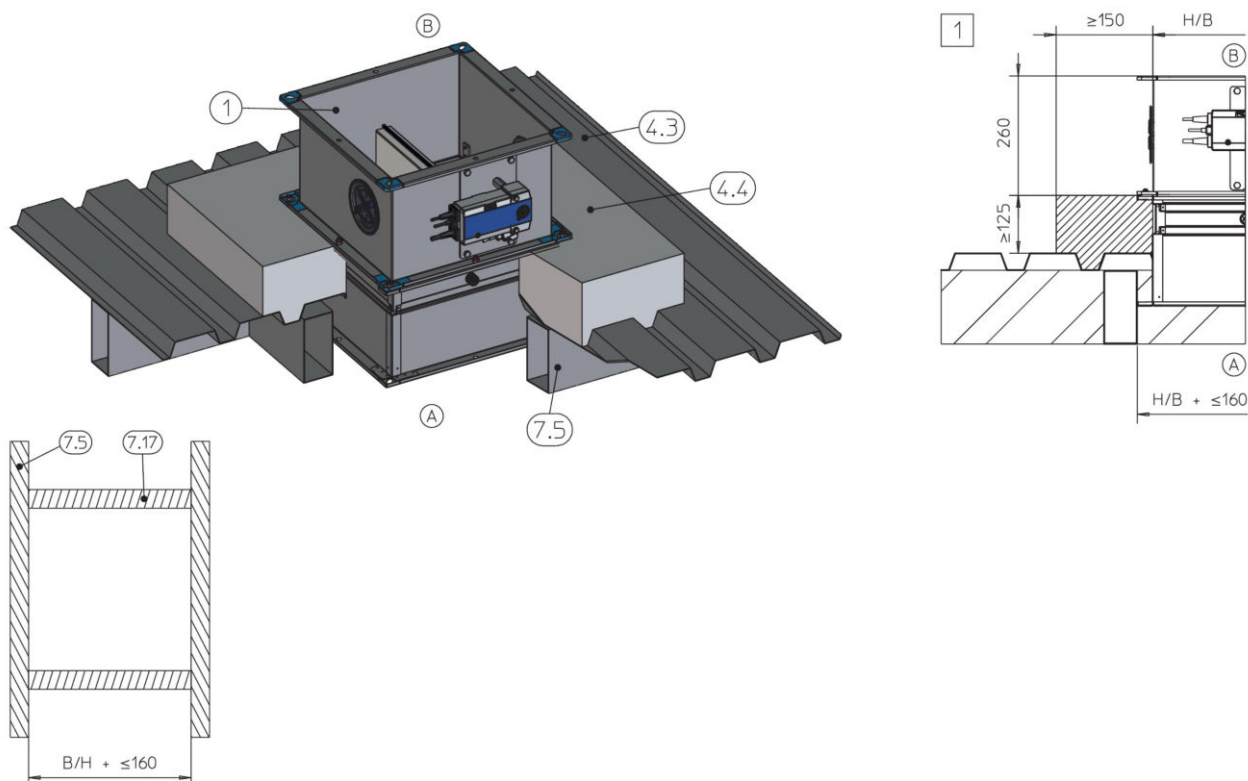
Fig. 44: Mortar-based installation into a solid wood ceiling, upright (illustration is an example; installation into other types of solid wood ceiling systems may be possible depending on local conditions)

- | | | | |
|-----|-------------------------|-----|-------------------|
| 1 | FK-EU | 1 | Up to EI 90 S |
| 2.2 | Reinforced concrete | (A) | Installation side |
| 4.5 | Solid wood ceiling | (B) | Operating side |
| 9.2 | Extension piece or duct | | |

Additional requirements

- Solid wood ceiling ↗ on page 31
 - Casing length L = 375 or 500 mm
 - ≥ 70 mm distance between 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 an installation opening, maximum size B + 160 mm and H + 160 mm, in compliance with the local structural requirements.
 2. ▶ Create a partial concrete ceiling around the fire damper, ≥ 150 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



GR2546335

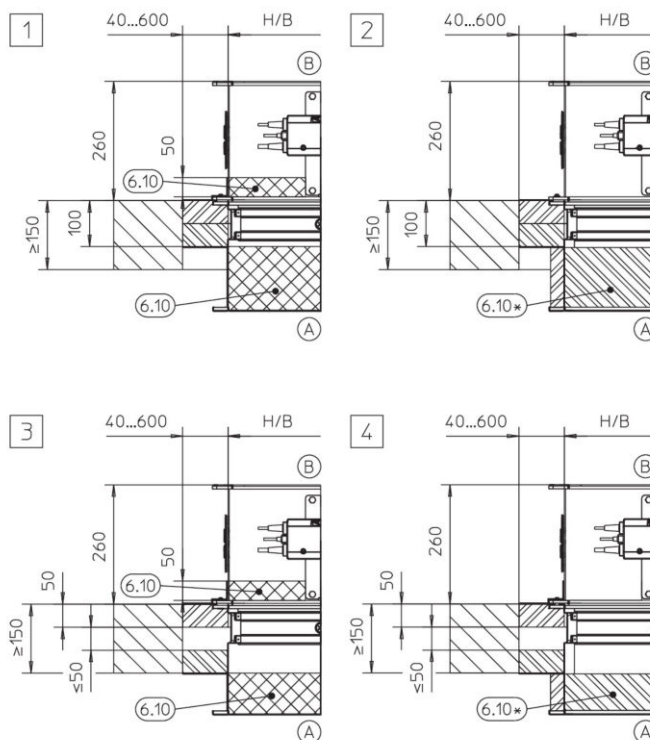
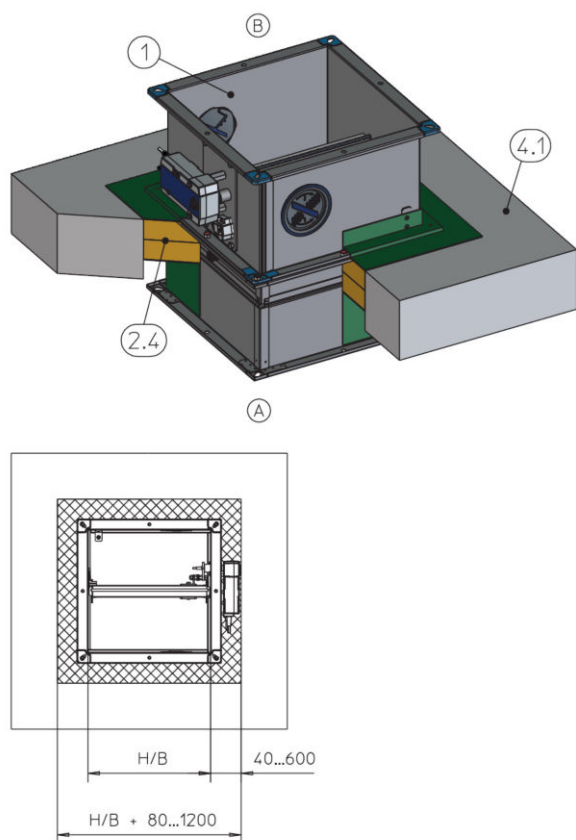
Fig. 45: Mortar-based installation into a solid wall in conjunction with a lightweight ceiling (Cadolto system), upright

- | | | | |
|-----|---|----------|-------------------------|
| 1 | FK-EU | 7.17 | Trimmers, steel section |
| 4.3 | Modular ceiling (Cadolto system), installation according to manufacturer's instructions and general appraisal certificate | 1 | Up to EI 90 S |
| 4.4 | Partial concrete ceiling with reinforcement | A | Installation side |
| 7.5 | Steel support structure | B | Operating side |

Additional requirements

- Modular ceiling (Cadolto) ↗ on page 31
 - Casing length L = 375 or 500 mm
 - ≥ 70 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 160 mm.
1. ▶ Create an installation opening, maximum size B + 160 mm and H + 160 mm, in compliance with the local structural requirements. Create an opening in the lightweight ceiling and professionally connect the trimmers.
 2. ▶ Create a partial concrete ceiling around the fire damper, ≥ 150 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.

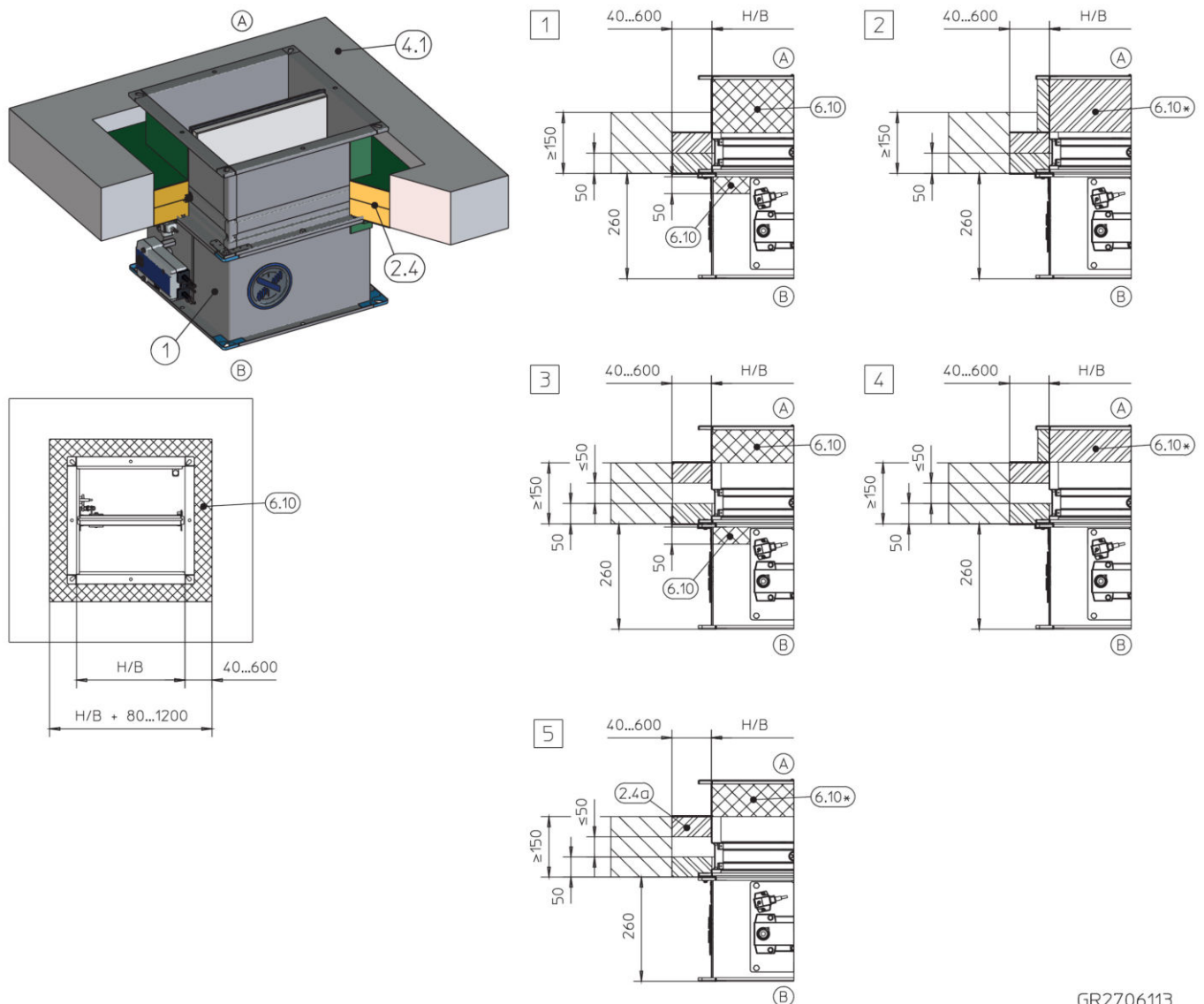
5.5.6 Dry mortarless installation with fire batt



GR2699732

Fig. 46: Dry mortarless installation into a solid ceiling slab, with a fire batt, upright

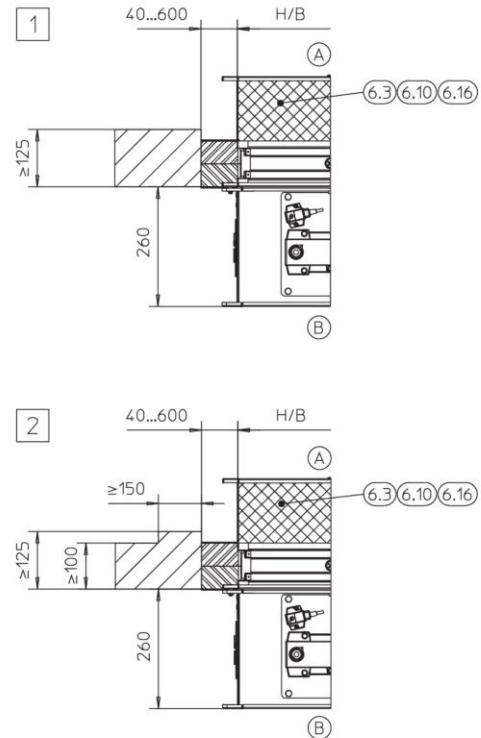
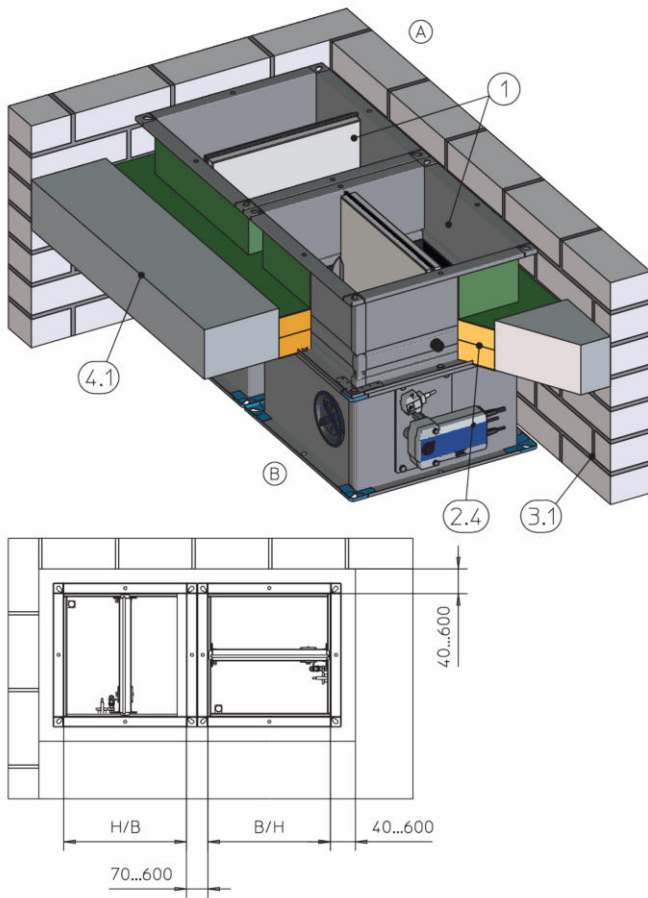
- | | | | |
|------|---|------------|-------------------------------|
| 1 | FK-EU | * | 6.3 or 6.16 as an alternative |
| 2.4 | Fire batt with ablative coating | 1 3 | Up to EI 120 S |
| 4.1 | Solid ceiling slab | 2 4 | Up to EI 90 S |
| 6.3 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, around the perimeter, $d = 30\text{ mm}$ | (A) | Installation side |
| 6.10 | Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$ | (B) | Operating side |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$ | | |



GR2706113

Fig. 47: Dry mortarless installation into a solid ceiling slab, with a fire batt, suspended

- | | | | |
|------|---|------------|-------------------------------|
| 1 | FK-EU | * | 6.3 or 6.16 as an alternative |
| 2.4 | Fire batt with ablative coating | 1 3 | Up to EI 120 S |
| 2.4a | Fire batt (Hensel) | 2 4 | Up to EI 90 S |
| 4.1 | Solid ceiling slab | 5 | Up to EI 180 S |
| 6.3 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, around the perimeter, $d = 30\text{ mm}$ | A | Installation side |
| 6.10 | Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$ | B | Operating side |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$ | | |



GR3002533

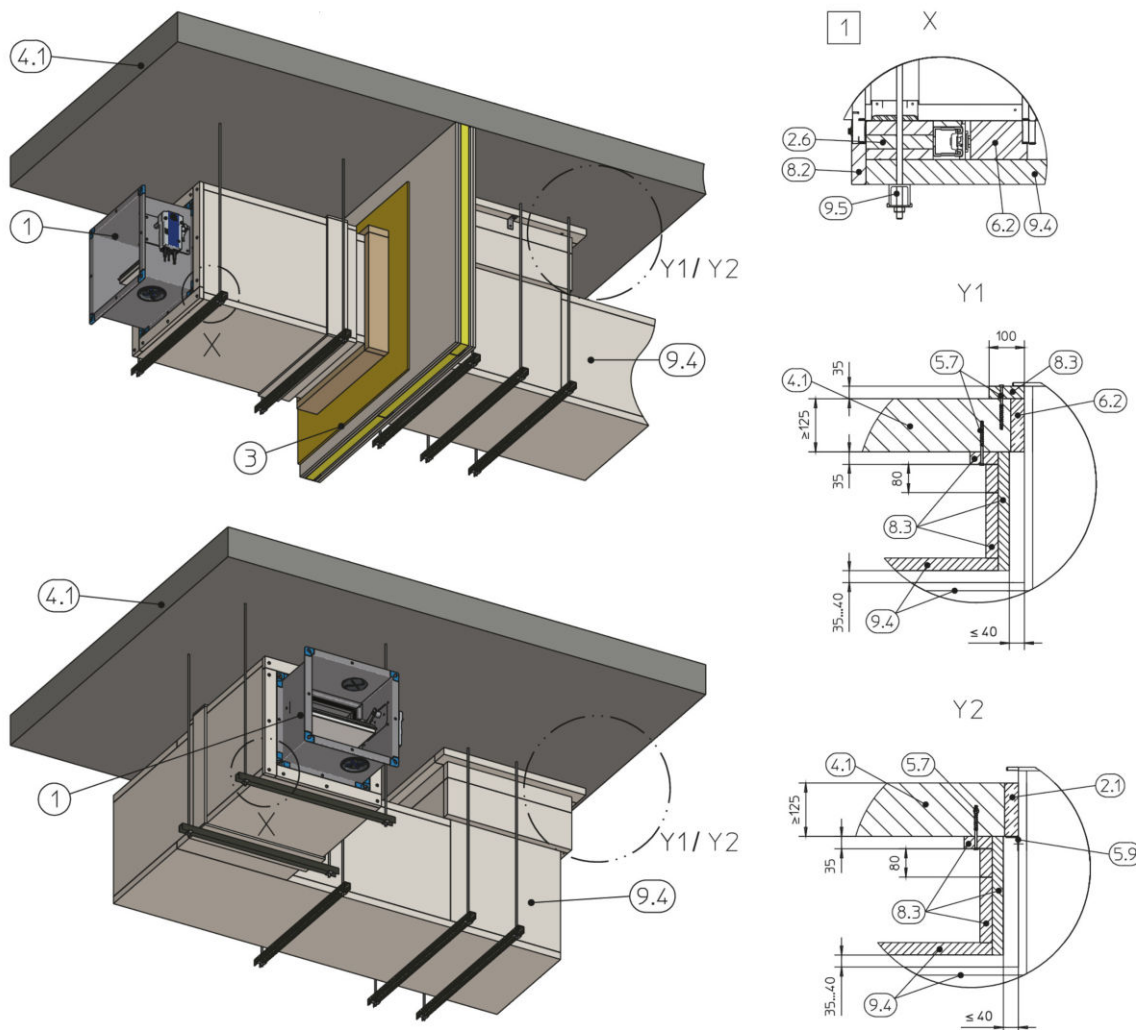
Fig. 48: Dry mortarless installation into a solid ceiling slab, with a fire batt, suspended (shown) or upright

- | | | | |
|-----|--|------|--|
| 1 | FK-EU | 6.10 | Ablative coating around the perimeter, d = at least 2.5 mm |
| 2.4 | Fire batt with ablative coating | 6.16 | Armaflex AF / Armaflex Ultima, d = 20 mm |
| 3.1 | Solid wall | 1 2 | Up to EI 90 S |
| 4.1 | Solid ceiling slab | A | Installation side |
| 6.3 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, around the perimeter, d = 30 mm | B | Operating side |

Additional requirements

- Solid wall ↗ on page 31
- Fire batt ↗ on page 28
- Casing length L = 500 mm
- EI 120 S, EI 180 S: $\geq 200\text{ mm}$ distance between two fire dampers (separate installation openings)
EI 90 S: 70 – 600 mm distance between two fire dampers of the same size; 40 – 600 mm distance between a fire damper and the installation opening (depending on the acceptable maximum size of the installation opening)
- An opening or a cut hole of size B + 80 – 1200 mm and H + 80 – 1200 mm is required; 600 mm maximum distance between the fire damper and the wall opening.
- Fix the fire damper both above and below the ceiling slab, see ↗ 'Vertical duct' on page 128

5.5.7 Dry mortarless installation with installation kit WE



GR2816894

Fig. 49: Dry mortarless installation remote from solid ceiling slabs

- | | | | |
|-----|--|-----|--|
| 1 | FK-EU | 9.5 | FK-EU suspension system, consisting of: |
| 2.1 | Mortar | a | Threaded rod M12 |
| 2.6 | Installation kit WE | b | Hilti mounting rail MQ 41 × 3 mm or equivalent |
| 3 | Lightweight partition wall or solid wall (if any), wall penetration according to Promat® manual, construction 478, latest edition | c | Hilti drilled plate MQZ L13 or equivalent |
| 4.1 | Solid ceiling slab* | d | Hexagon nut M12 with washer |
| 5.7 | Fire-rated anchors (with suitability certificate), type Hilti HUS-6 or equivalent, suitable for the solid ceiling slab (at a distance of ≤ 200 mm) | | Dampers of sizes > 1000 × x 600 mm require two suspension points at a distance of 150 mm |
| 5.9 | Steel angle section, 40 × 40 × 3 mm, around the perimeter, screw-fixed or riveted (steel rivets) to the duct every 150 mm | * | Ceiling penetration according to Promat® manual, construction 478, latest edition; for attachment to the ceiling see detail Y1 or Y2 |
| 6.2 | Mineral wool, ≥ 1000 °C, ≥ 80 kg/m ³ , around the perimeter | 1 | Up to EI 90 S |
| 8.2 | PROMATECT-H strips, d = 20 mm, or d = 2 × 10 mm | A | Installation side |
| 8.3 | PROMATECT-LS board, d = 35 mm | B | Operating side |
| 9.4 | Sheet steel duct with fire-rated cladding and suspension system according to Promat® manual, construction 478, latest edition | | |

Note: For more installation details and for components to be provided by others refer to the WE installation manual.

Additional requirements

- Solid wall ↗ on page 31
 - Ceiling penetration: Duct with perimeter mortar infill or mineral wool.
 - ≥ 350 mm distance between two fire dampers
 - Casing length $L = 500$ mm
 - Sheet steel duct with fire-resistant cladding made from LS35 panels (Promat®). Alternative materials ↗ 27
1. ▶ Connect the fire damper and installation kit to the duct, then attach fire-resistant cladding to the duct according to the manufacturer's instructions (Promat® manual).
 2. ▶ Install the suspension system (detail V ↗ Chapter 5.12.2 'Suspending fire dampers installed remote from solid walls and ceiling slabs' on page 125) as described in this manual (section on installation kit WE) and according to the manufacturer's instructions (Promat® manual).
 3. ▶ Attachment to the ceiling (detail Y1 / Y2):

Seal the perimeter gap between the duct and the ceiling with mineral wool and mortar. Reinforcing section made of calcium silicate (8.3) above the ceiling, or made from a steel angle section (5.9) below the ceiling, $40 \times 40 \times 3$ mm, close off the perimeter gap with mortar.

5.6 Lightweight partition walls with metal support structure

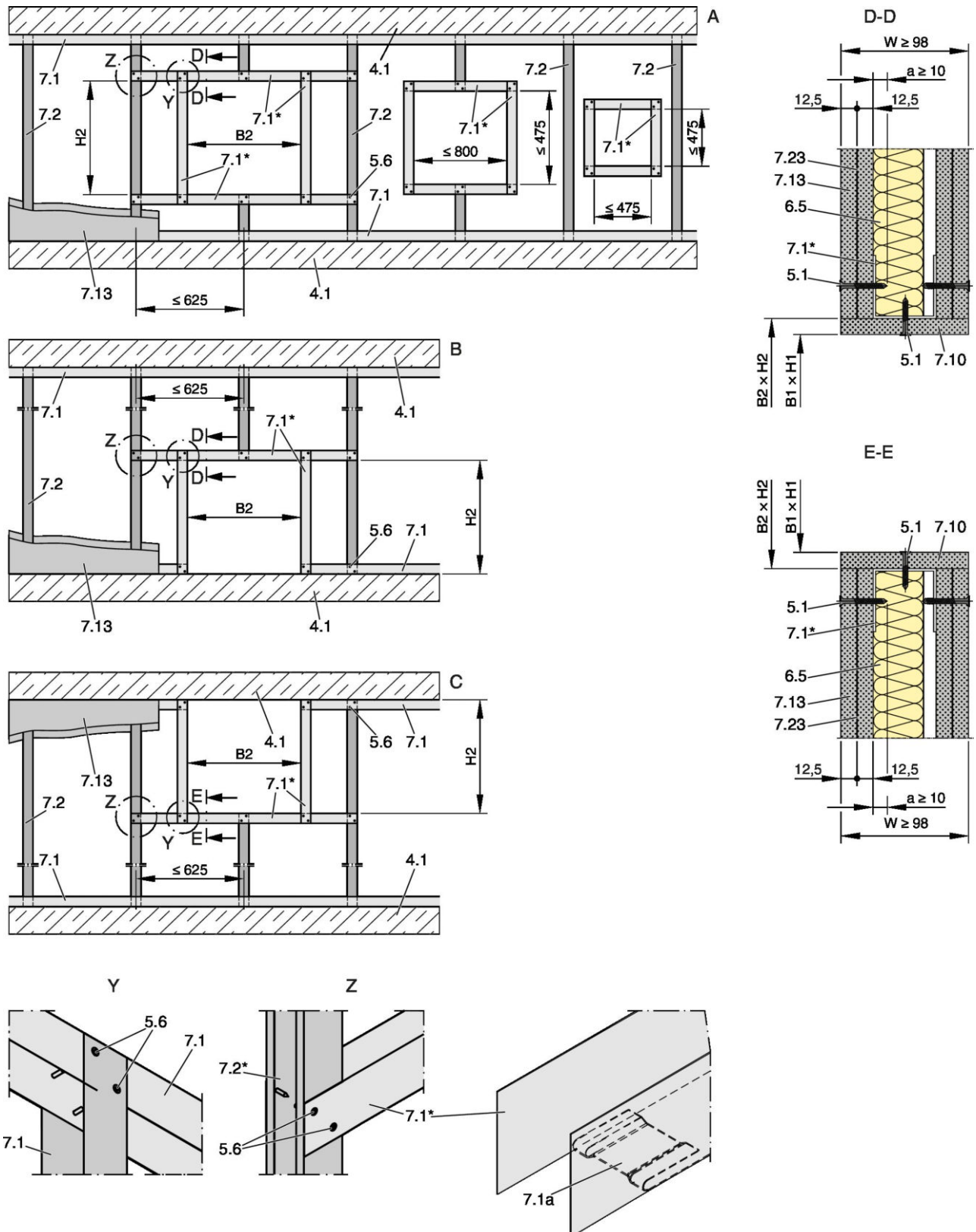


Fig. 50: Lightweight partition wall with metal support structure and cladding on both sides

Lightweight partition walls with metal support structure

A	Lightweight partition wall	7.1a	UW section, cut and bent
B	Lightweight partition wall, installation near the floor	7.2	CW section
C	Lightweight partition wall, installation near the ceiling	7.10	Trim panels, according to installation details
4.1	Solid ceiling slab / solid floor	7.13	Double layer cladding, on both sides of the metal stud system
5.1	Dry wall screw	7.23	Sheet steel insert (according to usability certificate, e.g. for a safety partition wall)
5.6	Screw or steel rivet		
6.5	Mineral wool (depending on wall construction)	B1 × H1	Installation opening
7.1	UW section	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

- Lightweight partition wall  on page 31

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 dry mortarless installation kit ES ^{1, 2}	B + 95	H + 95		
Dry mortarless installation with fire batt ³	B + 80 to 1200	H + 80 to 1200		

¹) Optional trim panels (12.5 mm max. when used together with installation kit ES)

²) Installation opening tolerance + 2 mm

³) Trim panels are required

5.6.1 Mortar-based installation

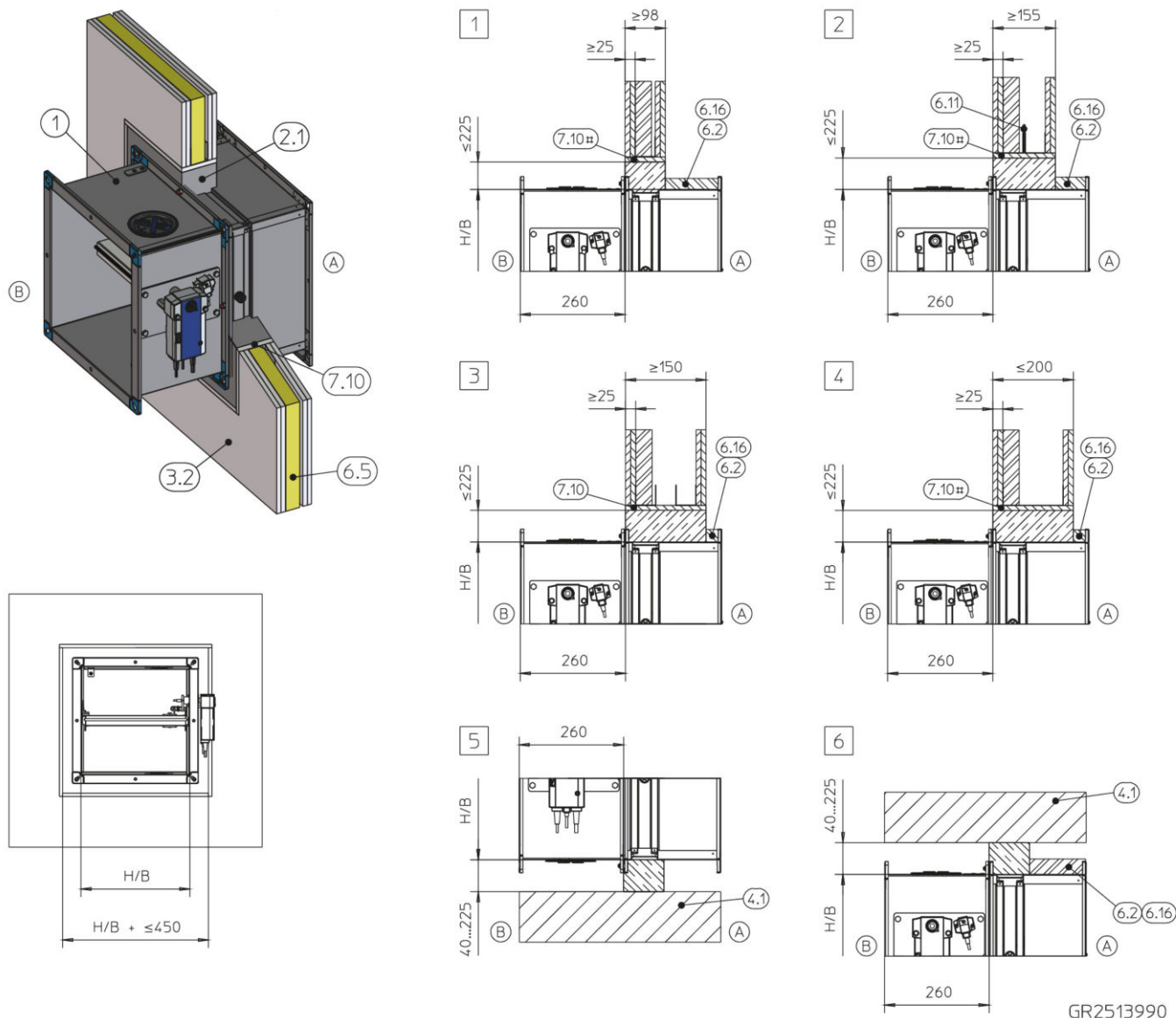
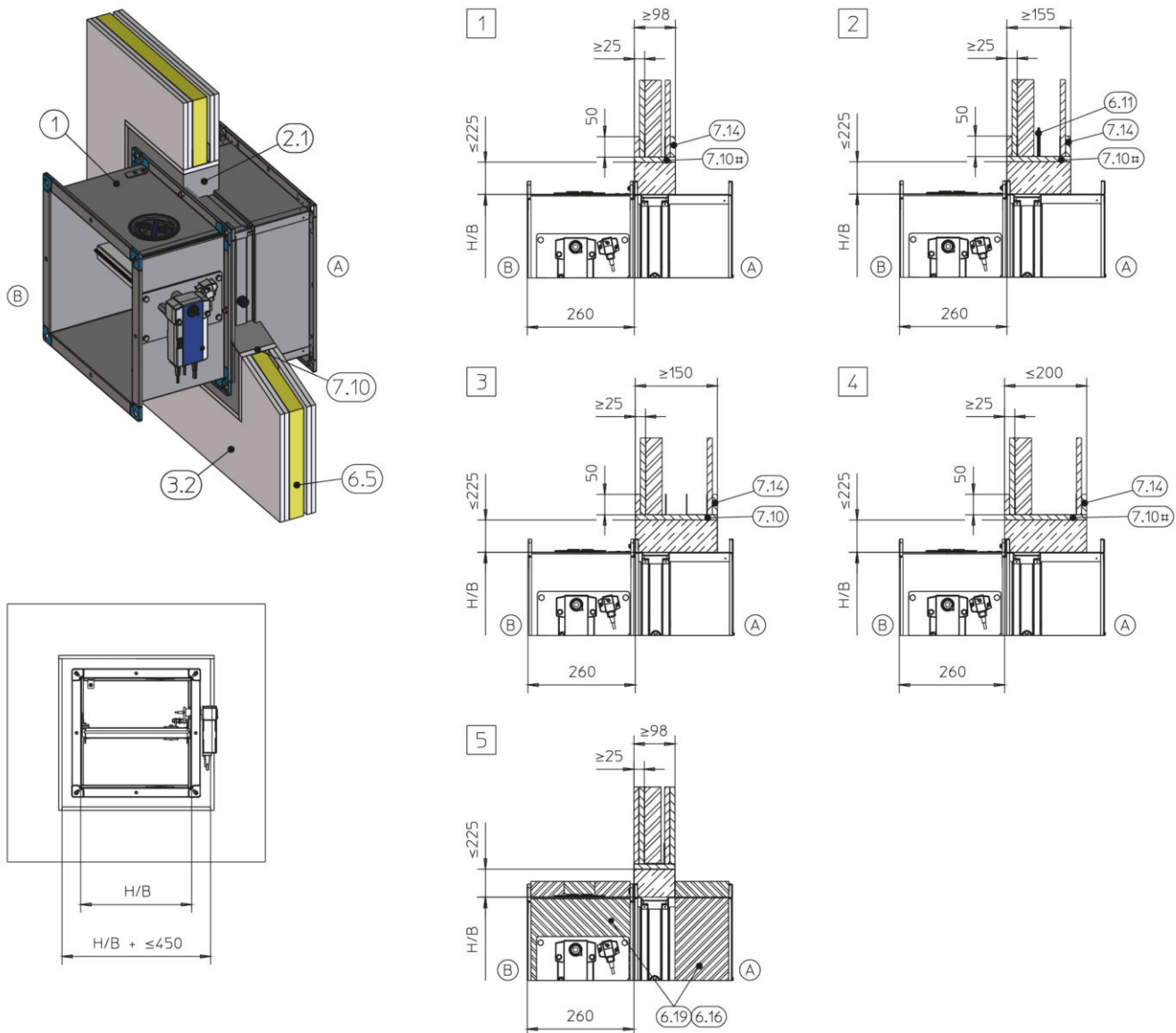


Fig. 51: Mortar-based installation into a lightweight partition wall

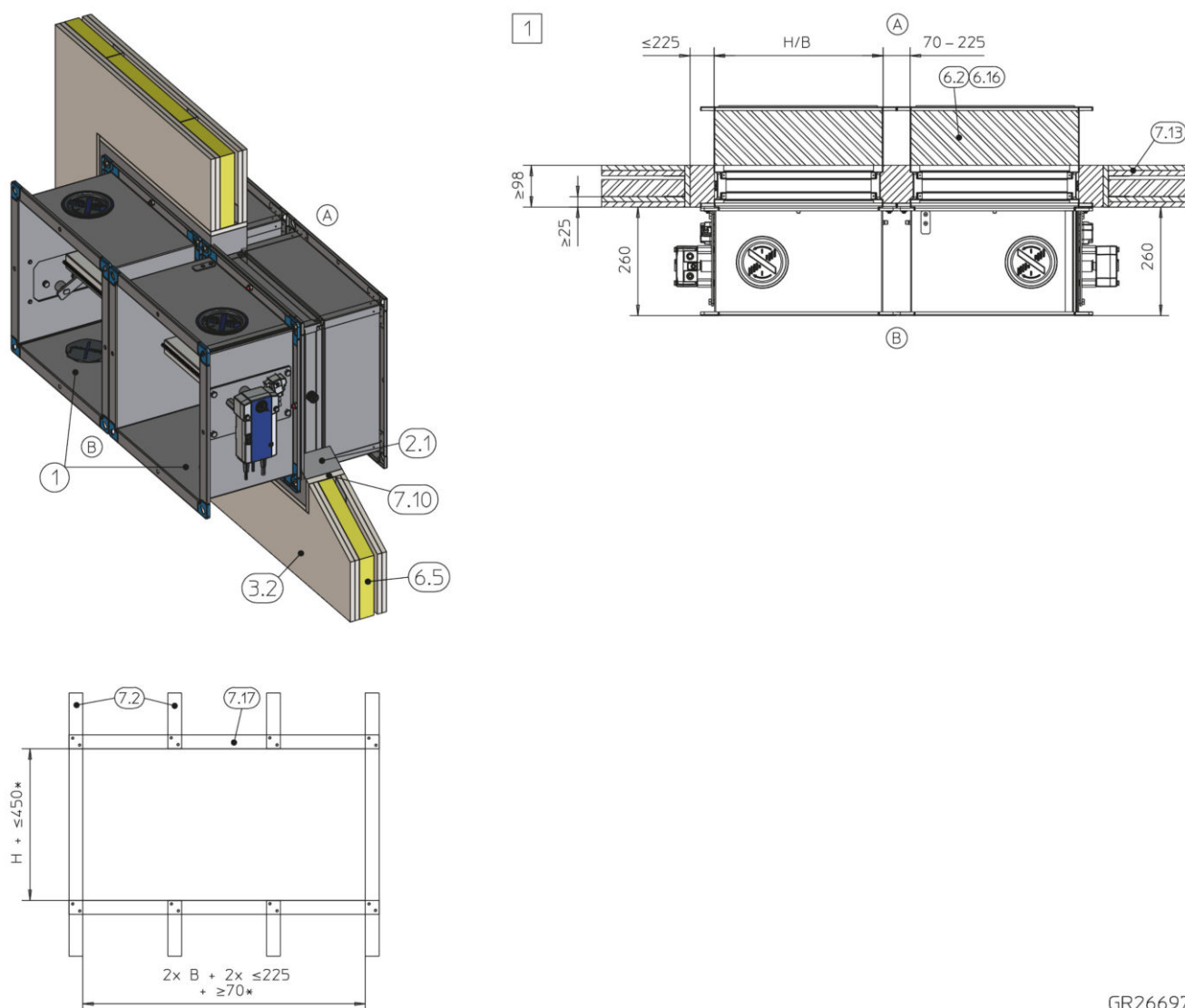
1	FK-EU	6.16	Armaflex AF / Armaflex Ultima, d = 20 mm, required only on the top and only for stainless steel constructions
2.1	Mortar	7.10	Trim panels optional
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	#	Up to EI 90 S
4.1	Solid ceiling slab / solid floor	1 – 6	Installation side
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, d $\geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	A	Operating side
6.5	Mineral wool (depending on wall construction)	B	
6.11	Insulating strip (depending on wall construction)		



GR2513990

Fig. 52: Mortar-based installation into a lightweight partition wall

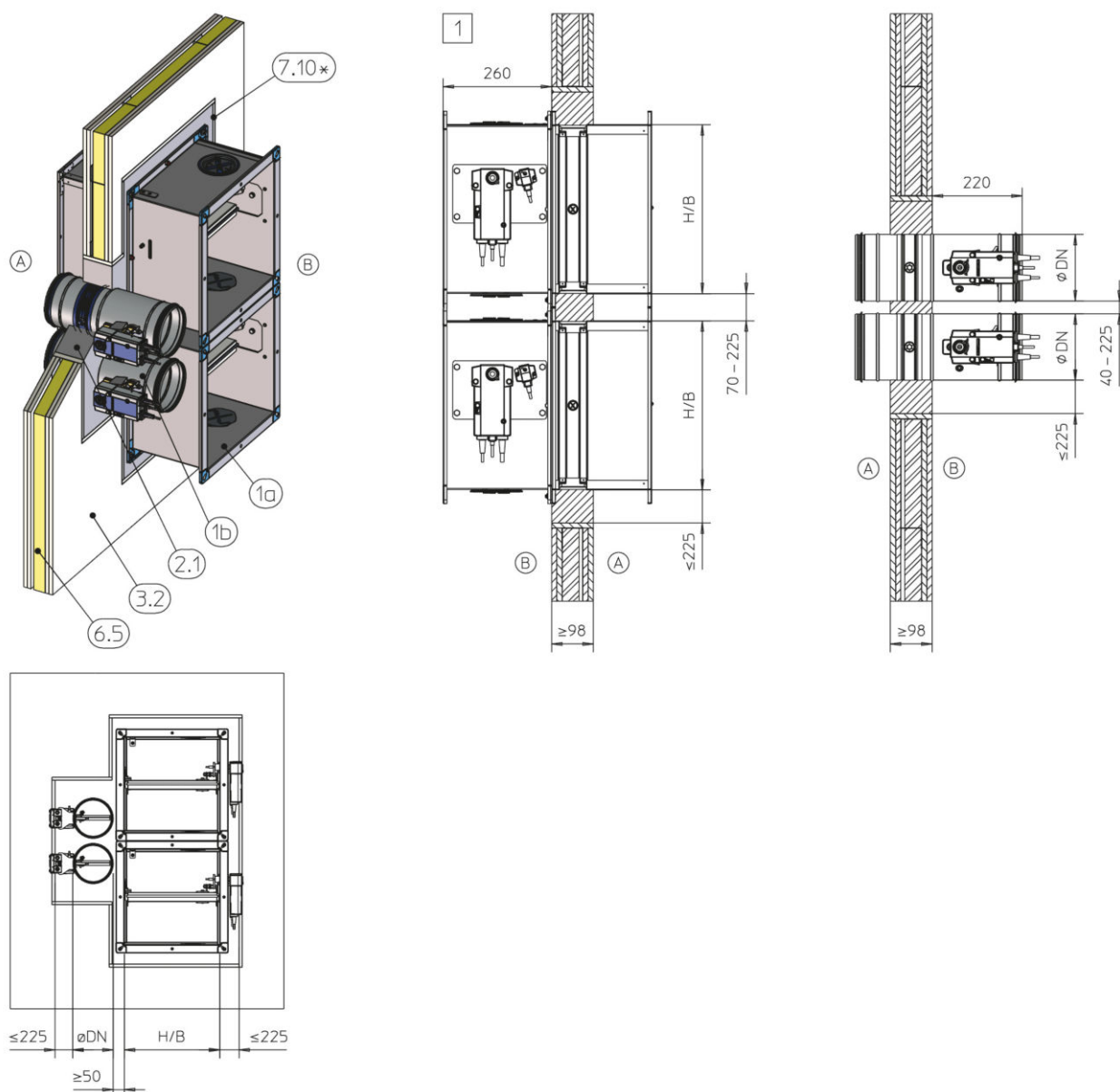
1	FK-EU	7.10	Trim panels
2.1	Mortar	7.14	Reinforcing board of the same material as the wall
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	*	Leave out the actuator and release mechanisms; inspection openings must remain accessible
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	#	optional
6.5	Mineral wool (depending on wall construction)	1 - 4	EI 30 S
6.11	Insulating strip (depending on wall construction)	5	Up to EI 120 S
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, around the perimeter*	A	Installation side
6.19	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, panel material $d > 40\text{ mm}$, around the perimeter*	B	Operating side



GR2669784

Fig. 53: 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	FK-EU	7.13	Cladding, double layer, fire-resistant
2.1	Mortar	7.17	Trimmers, UW section
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	*	Can be increased to account for the thickness of the trim panels
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	#	optional
6.5	Mineral wool (depending on wall construction)	1	Up to EI 90 S
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions	A	Installation side
7.2	CW section	B	Operating side
7.10	Trim panels		



GR3044873

Fig. 54: Mortar-based installation into a lightweight partition wall, FK-EU and FKRS-EU combined

- | | | | |
|-----|--|------|-------------------|
| 1a | FK-EU up to B × H = 800 × 400 mm | 7.10 | Trim panels |
| 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 |
| 6.5 | Mineral wool (depending on wall construction) | B | Operating side |

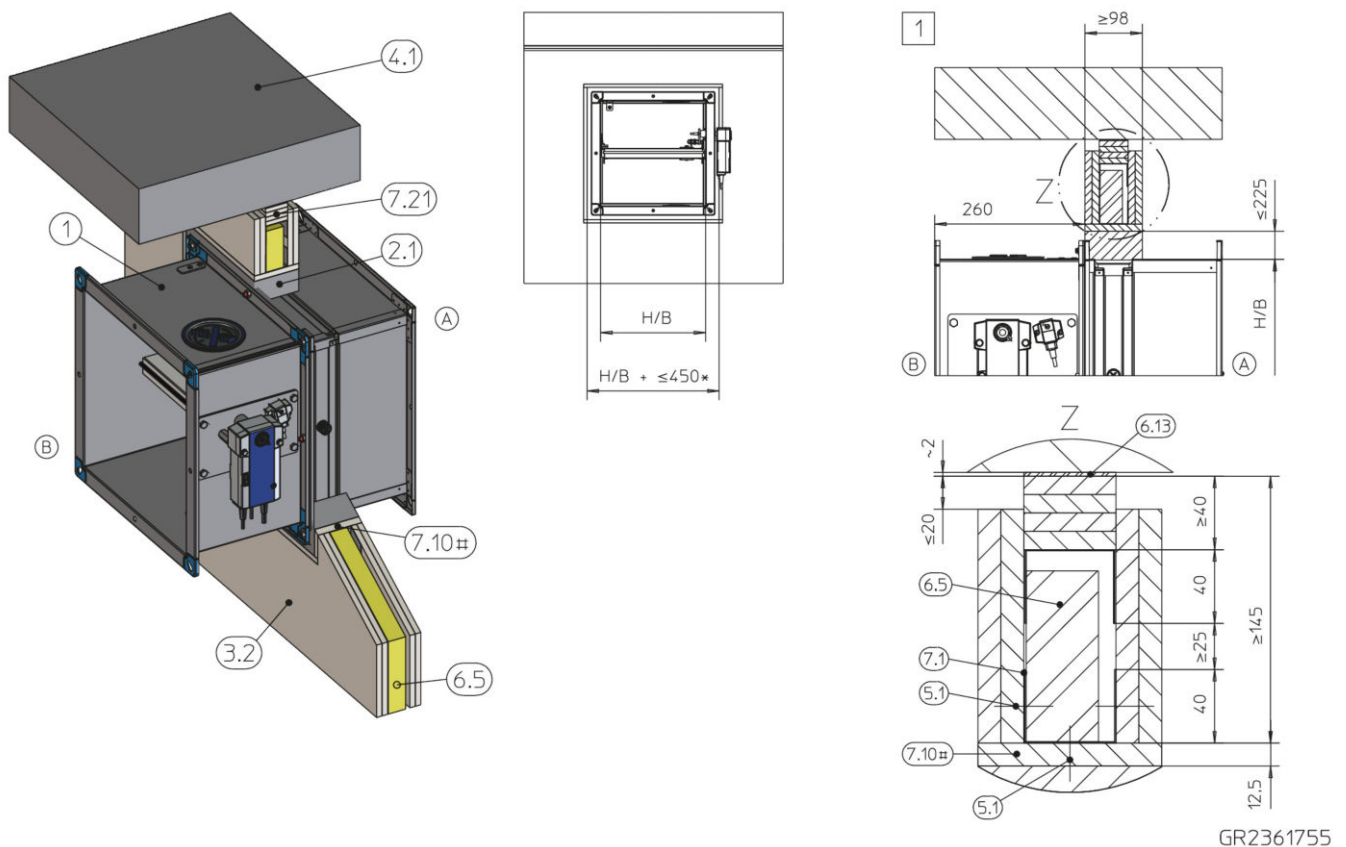
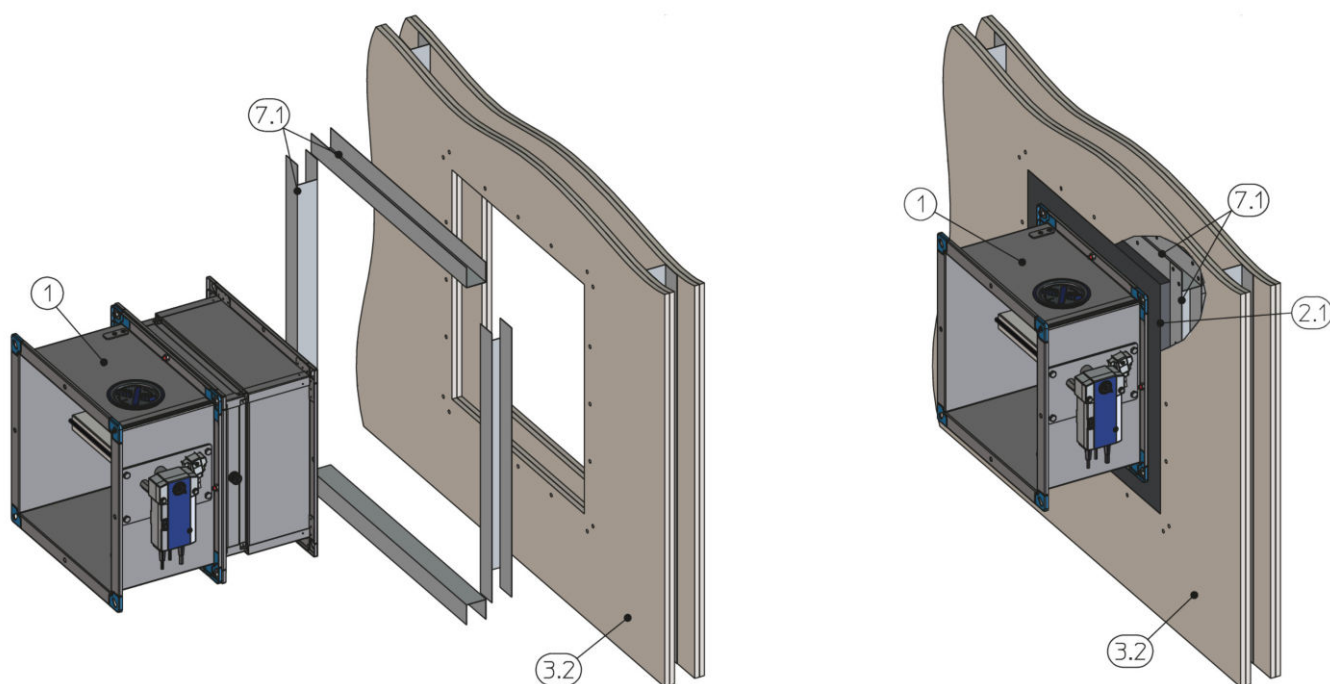


Fig. 55: Mortar-based installation into a lightweight partition wall, below a flexible ceiling joint

- | | | | |
|------|--|----------|--|
| 1 | FK-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 or steel 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 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 |
| 7.1 | UW section | | |



GR3410248

Fig. 56: Installation into a lightweight partition wall at a later stage (applies only to installation openings ≤ 475 mm)

- | | | | |
|-----|--|-----|---|
| 1 | FK-EU | 7.1 | UW sections, cut to size by others, overlapping |
| 2.1 | Mortar | Ⓐ | Installation side |
| 3.2 | Lightweight partition wall with metal support structure or steel support structure, cladding on both sides | Ⓑ | Operating side |

Additional requirements

- Lightweight partition wall ↗ on page 31
- Casing lengths $L = 375$ and 500 mm, for flange-to-flange installation only $L = 500$ mm
- EI 120 S: ≥ 200 mm distance between two FK-EU fire dampers in separate installation openings
EI 90 S: $70 - 225$ mm distance between two FK-EU fire dampers of the same size in one installation opening
- 'Flange-to-flange' installation of two FK-EU fire dampers into one installation opening is only possible if both dampers are of the same size.
- If FK-EU and FKRS-EU are to be installed together in the same installation opening, the size of FK-EU must not exceed $B \times H = 800 \times 400$ mm.

5.6.2 Dry mortarless installation with installation kit ES

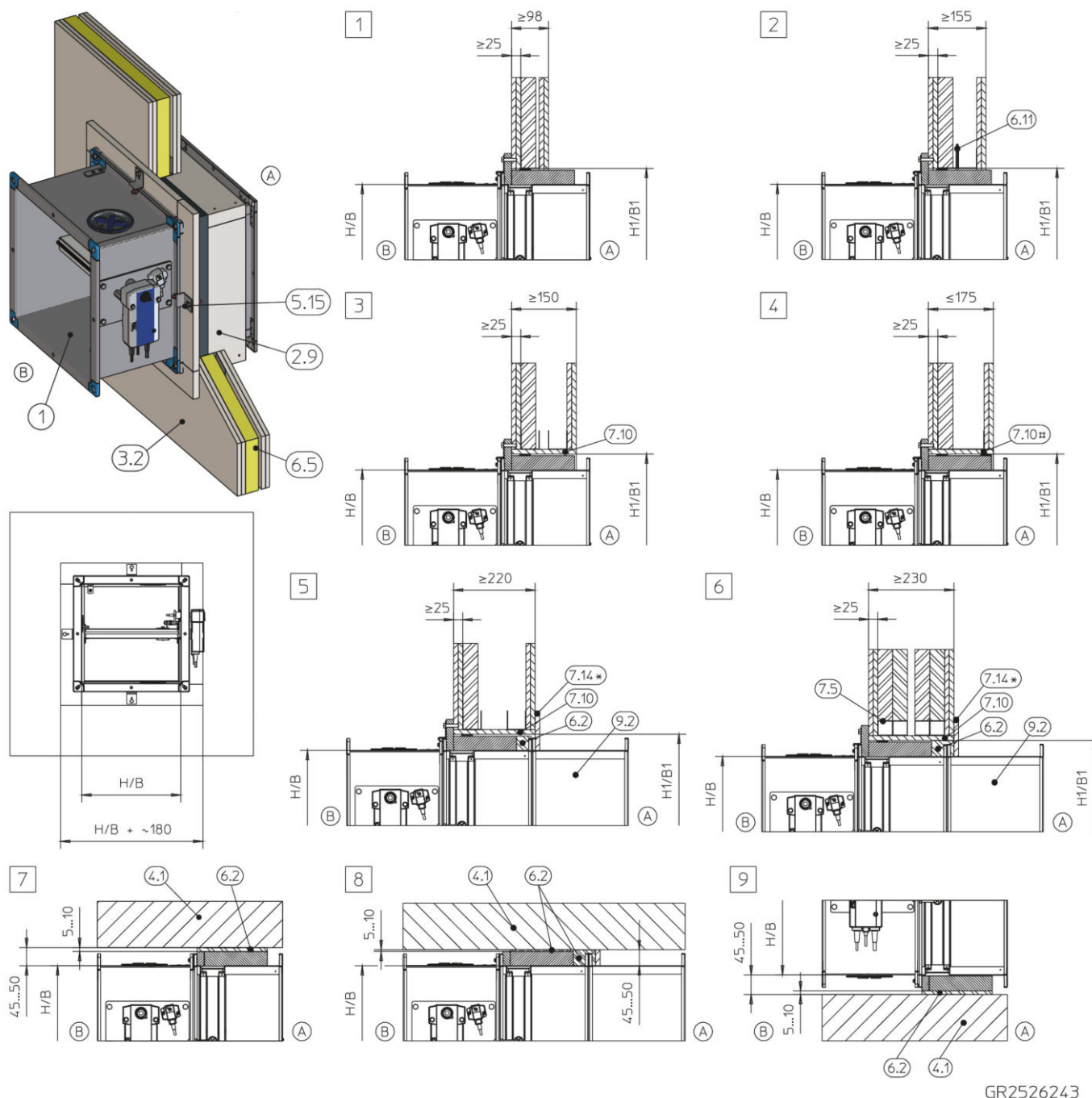
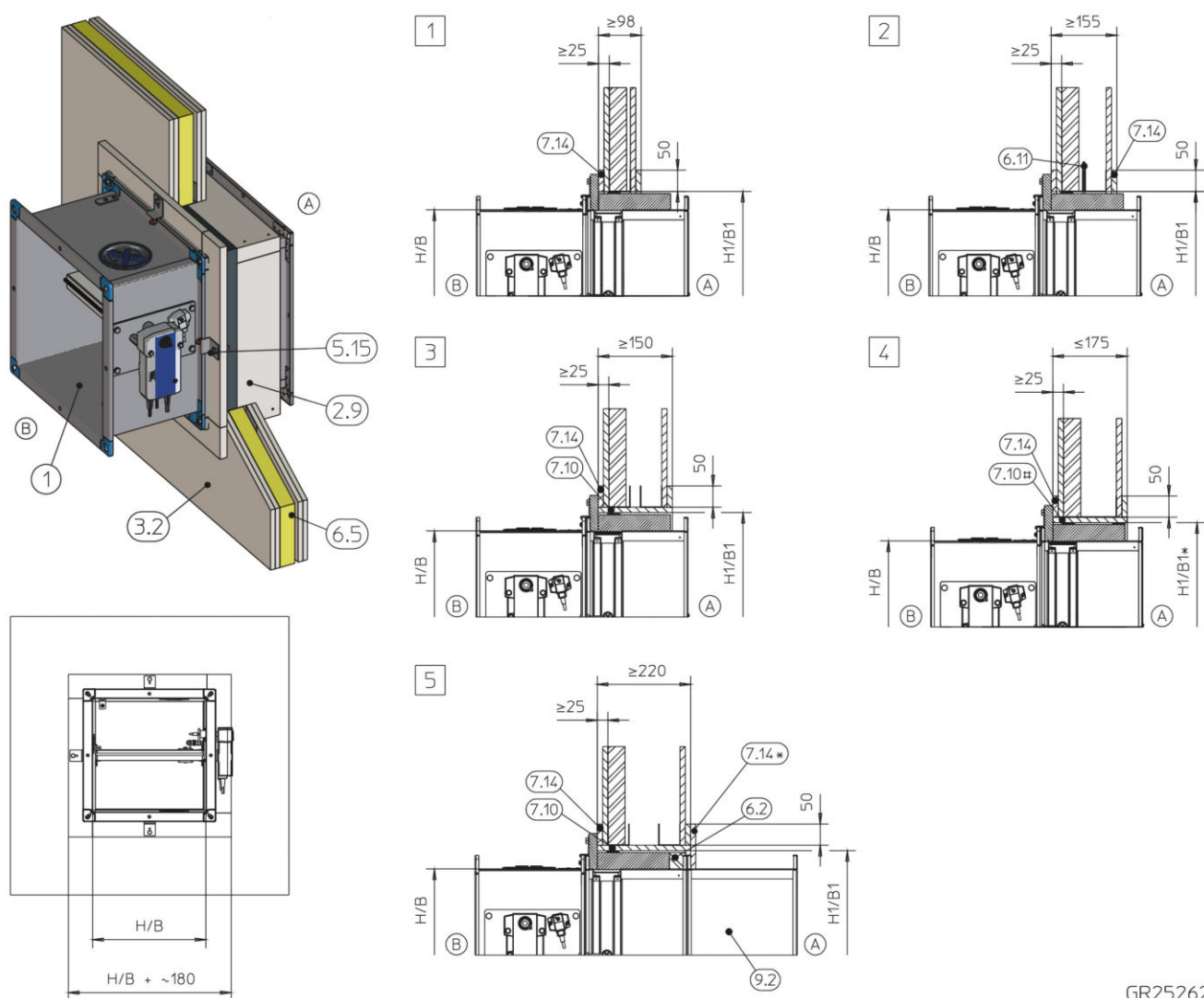


Fig. 57: Dry mortarless installation into a lightweight partition wall, with installation kit ES

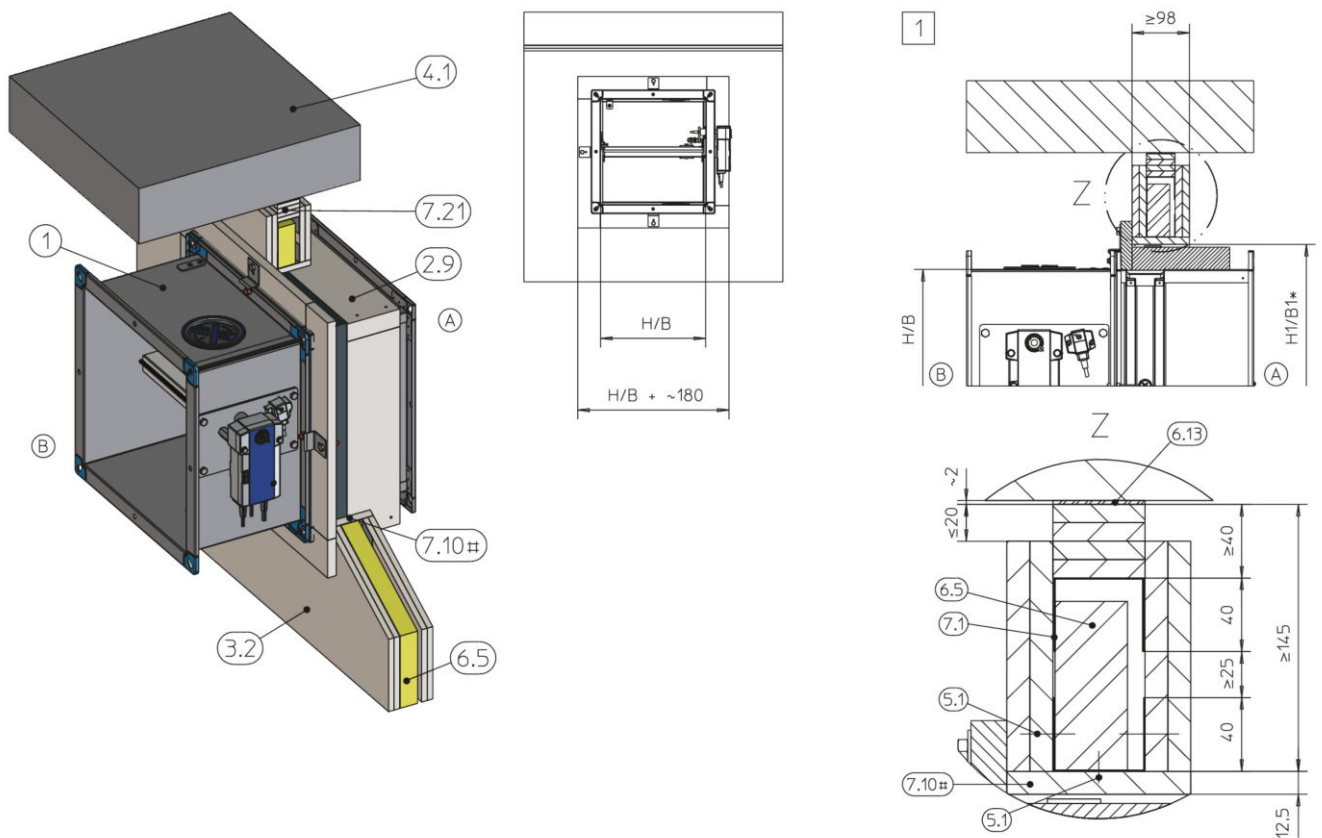
1	FK-EU	7.10	Trim panel (12.5 mm max.)
2.9	Installation kit ES	7.14	Reinforcing board of the same material as the wall
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	9.2	Extension piece or duct
4.1	Solid ceiling slab / solid floor	*	Or extend cladding at the rear up to the damper casing
5.15	Bracket	#	optional
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, or gypsum mortar (to even out an uneven ceiling or floor)	1 – 9	Up to EI 90 S
6.5	Mineral wool (depending on wall construction)	(A)	Installation side
6.11	Insulating strip	(B)	Operating side
7.5	Steel support structure (box section)		



GR2526243

Fig. 58: Dry mortarless installation into a lightweight partition wall, with installation kit ES

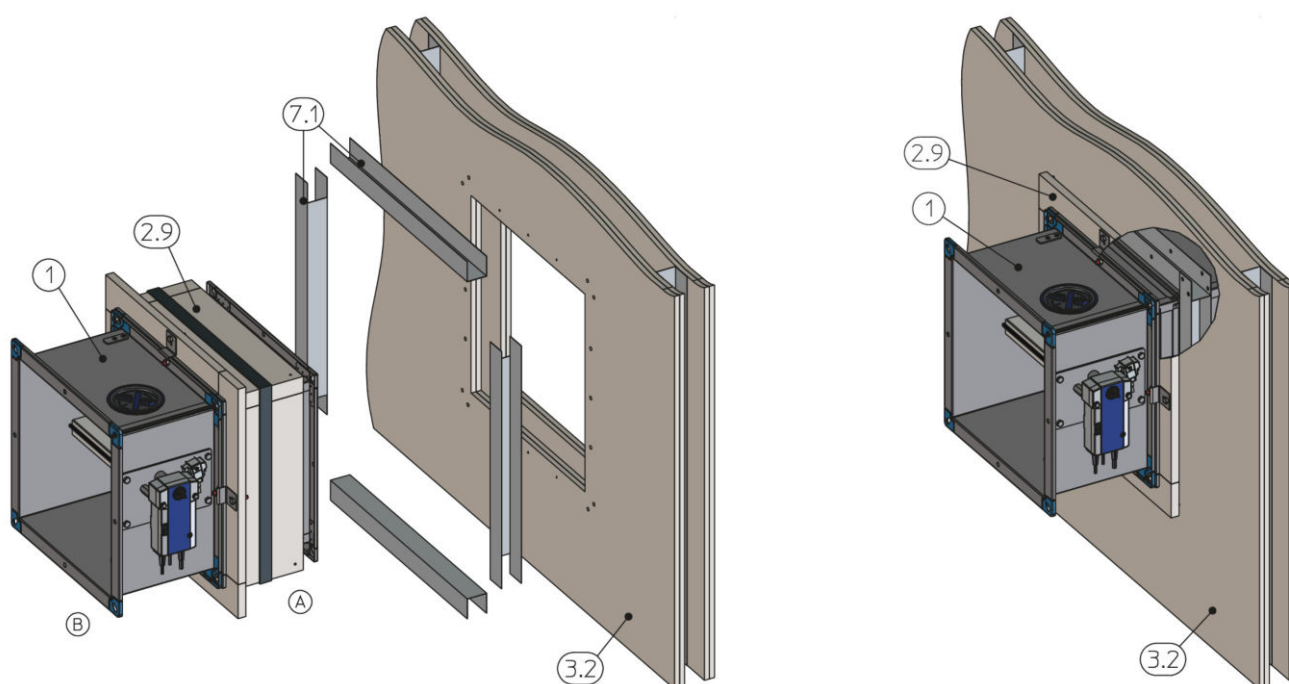
1	FK-EU	7.10	Trim panel (12.5 mm max.)
2.9	Installation kit ES	7.14	Reinforcing board of the same material as the wall
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	9.2	Extension piece or duct
4.1	Solid ceiling slab / solid floor	*	Or extend cladding at the rear up to the damper casing
5.15	Bracket	#	optional
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, or gypsum mortar (to even out an uneven ceiling or floor)	1 – 5	EI 30 S
6.5	Mineral wool (depending on wall construction)	A	Installation side
6.11	Insulating strip	B	Operating side



GR2362168

Fig. 59: Dry mortarless installation into a lightweight partition wall, below a flexible ceiling joint

1	FK-EU	7.10	Trim panel (12.5 mm max.)
2.9	Installation kit ES	7.21	Ceiling joint strips (e.g. 4 × ≥10 mm)
3.2	Lightweight partition wall with metal support structure or steel 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 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
7.1	UW section		



GR3404960

Fig. 60: Installation into a lightweight partition wall at a later stage, with installation kit ES (applies only to installation openings ≤ 475 mm)

- | | | | |
|-----|--|-----|---|
| 1 | FK-EU | 7.1 | UW sections, cut to size by others, overlapping |
| 2.9 | Installation kit ES | Ⓐ | Installation side |
| 3.2 | Lightweight partition wall with metal support structure or steel support structure, cladding on both sides | Ⓑ | Operating side |

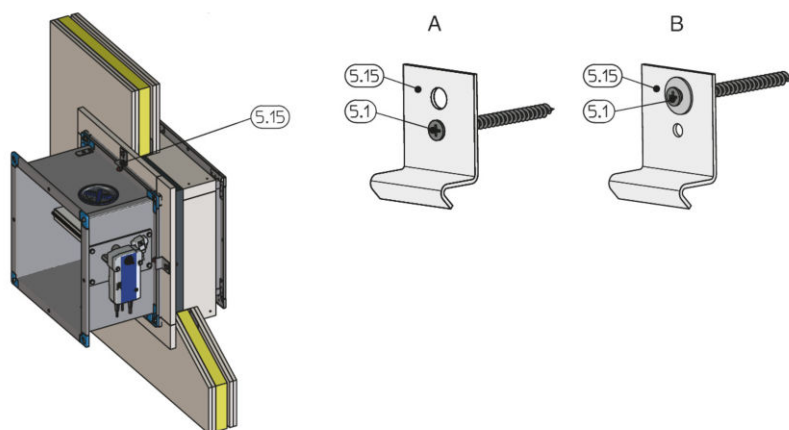


Fig. 61: Fastening the assembly to the metal studs

- | | | | |
|------|--|---|---|
| 5.1 | Dry wall screw / washer (to be provided by others) | A | For installation openings without trim panels |
| 5.15 | Bracket | B | For installation openings with trim panels (12.5 mm) max. |

Additional requirements

- Lightweight partition wall ↗ on page 31
- Casing length L = 500 mm
- 45 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements, Fig. 57, details [7], [8] and [9])
- ≥ 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 ↗ 33.
2. ▶ Attach the fire damper with brackets and dry wall screws to the metal support structure, see Fig. 61.

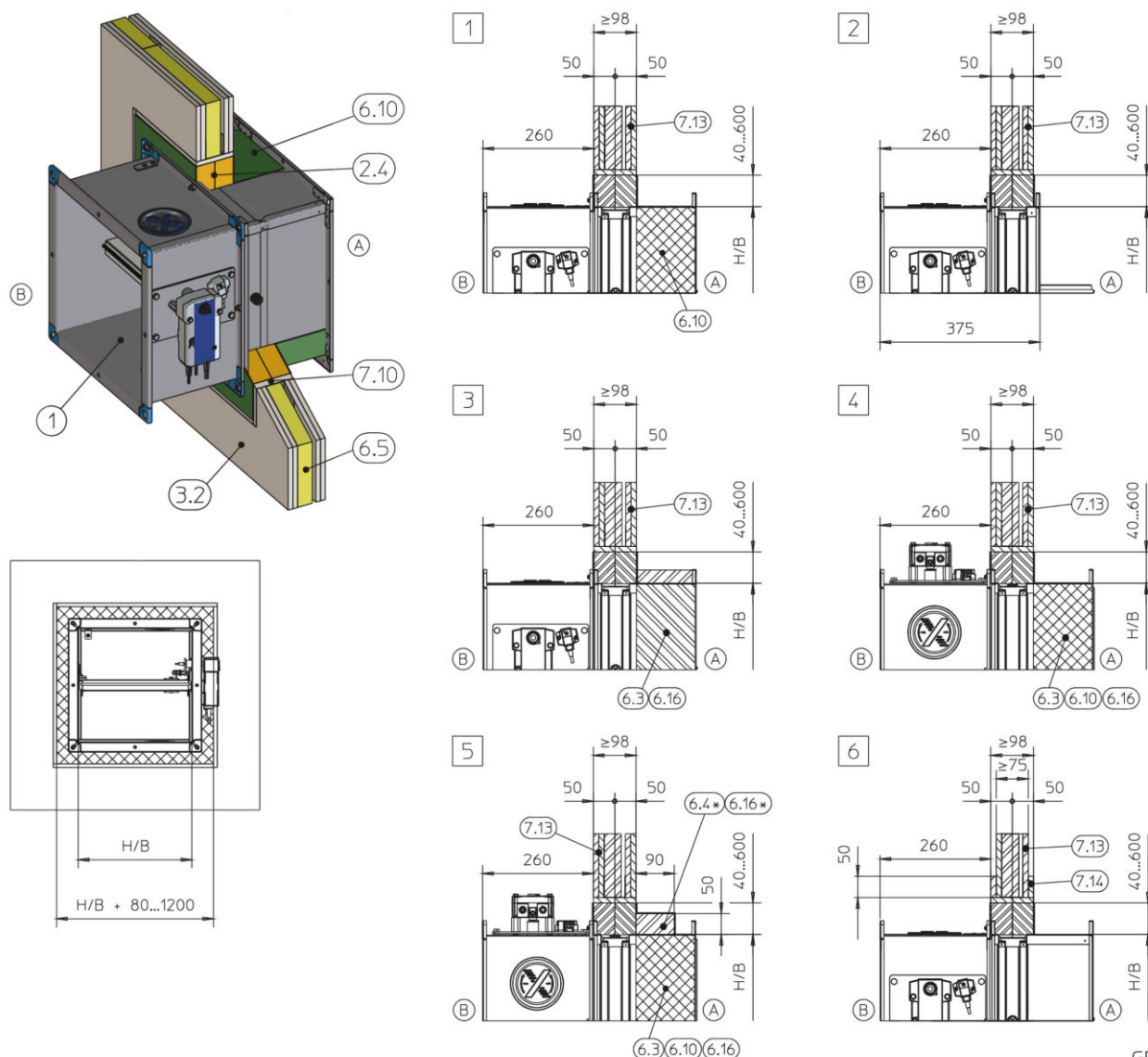
No. of brackets and dry wall screws:

- Side H: 1 each

- Side B: $B \leq 800$ mm: 2 each; $B > 800$ mm: 3 each

If you have shortened the installation kit and cannot fasten the brackets to side B, fasten them to both sides H.

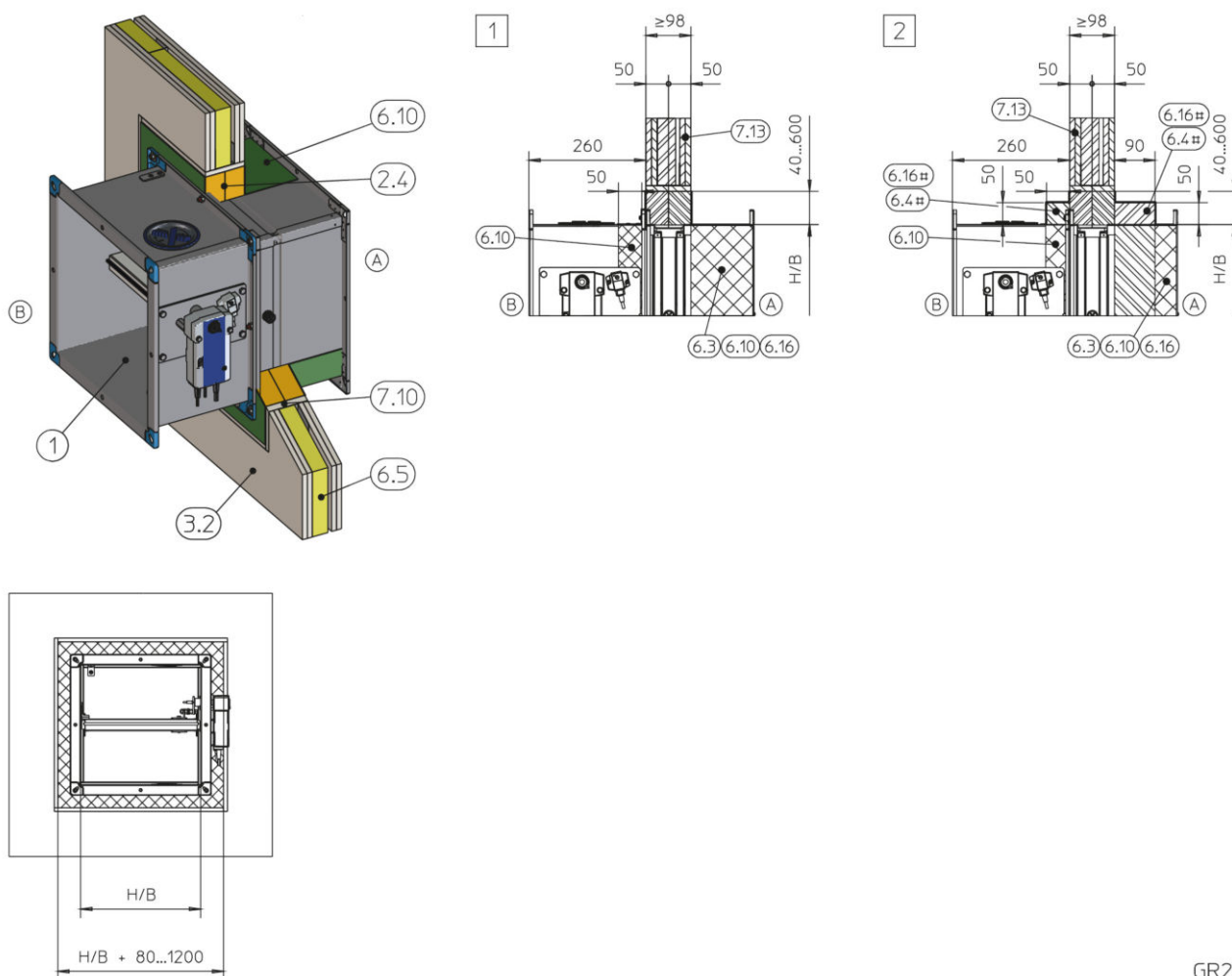
5.6.3 Dry mortarless installation with fire batt



GR2750605

Fig. 62: Dry mortarless installation into a lightweight partition wall, with a fire batt

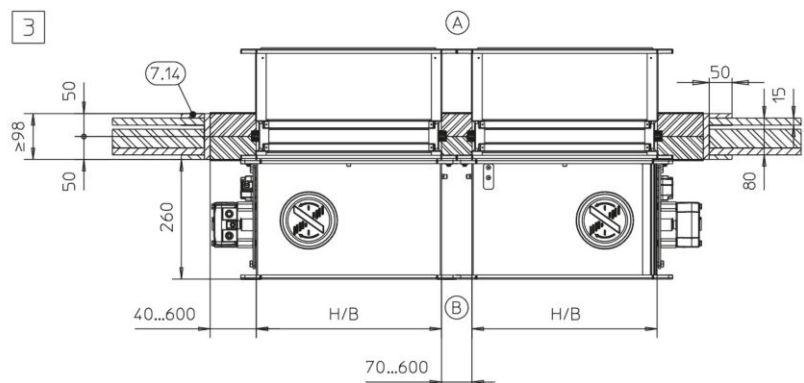
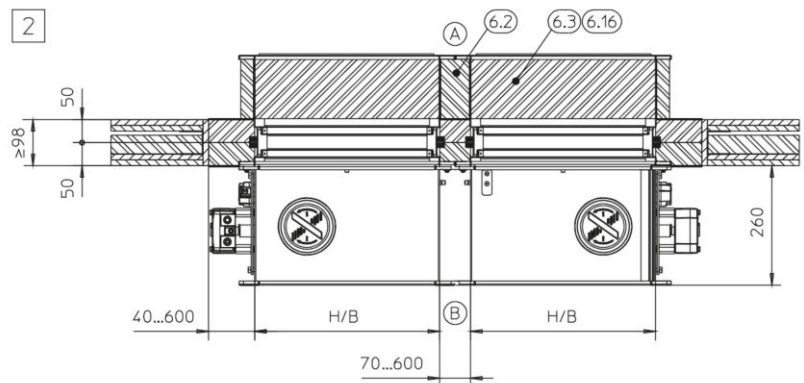
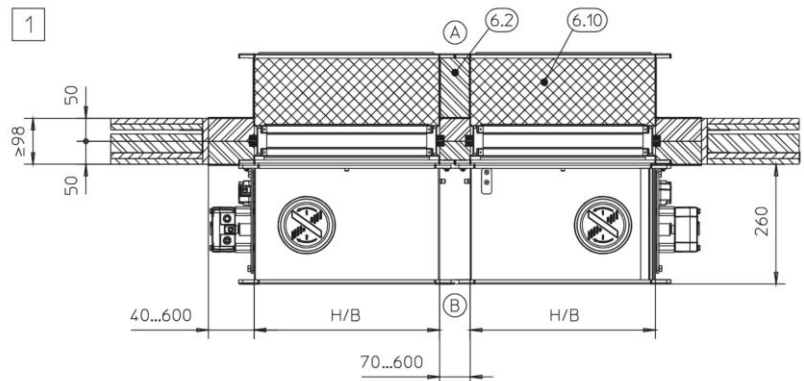
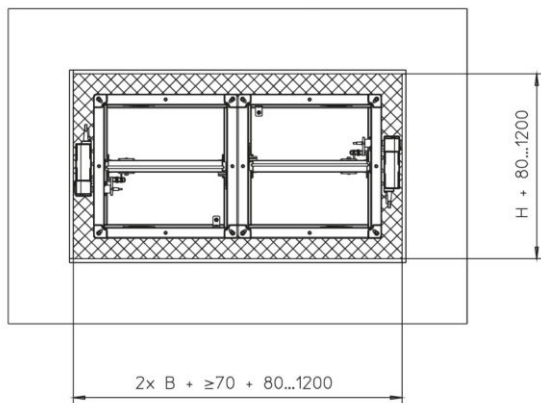
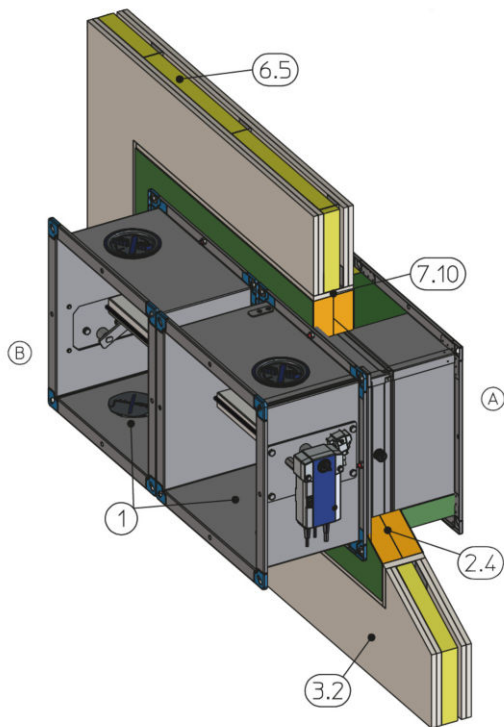
1	FK-EU	7.13	Cladding, double layer, fire-resistant
2.4	Fire batt with ablative coating	7.14	Reinforcing board of the same material as the wall
3.2	Lightweight partition wall with metal support structure, cladding on both sides	*	Placed on the top
6.3	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, $d = 30\text{ mm}$, around the perimeter	1 – 3	Up to EI 90 S
6.4	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 140\text{ kg/m}^3$	4	Up to EI 90 S:
6.5	Mineral wool (depending on wall construction)		$B \times H = 200 \times 200 - 800 \times 400\text{ mm}$
6.10	Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$	5	Up to EI 90 S:
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, around the perimeter	6	$B \times H = 801 \times 401 - 1500 \times 800\text{ mm}$
7.10	Optional trim panels for $W = 100\text{ mm}$	6	EI 30 S
		A	Installation side
		B	Operating side



GR2750605

Fig. 63: Dry mortarless installation into a lightweight partition wall, with a fire batt

- | | | | |
|------|--|------|--|
| 1 | FK-EU | 7.10 | Optional trim panels for W = 100 mm |
| 2.4 | Fire batt with ablative coating | 7.13 | Cladding, double layer, fire-resistant |
| 3.2 | Lightweight partition wall with metal support structure, cladding on both sides | # | On three sides |
| 6.3 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, d = 30 mm, around the perimeter | 1 | Up to EI 120 S:
B x H = 200 x 200 – 800 x 400 mm |
| 6.4 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 140\text{ kg/m}^3$ | 2 | Up to EI 120 S:
B x H = 801 x 401 – 1500 x 800 mm |
| 6.5 | Mineral wool (depending on wall construction) | A | Installation side |
| 6.10 | Ablative coating around the perimeter, d = at least 2.5 mm | B | Operating side |
| 6.16 | Armaflex AF / Armaflex Ultima, d = 20 mm, around the perimeter | | |

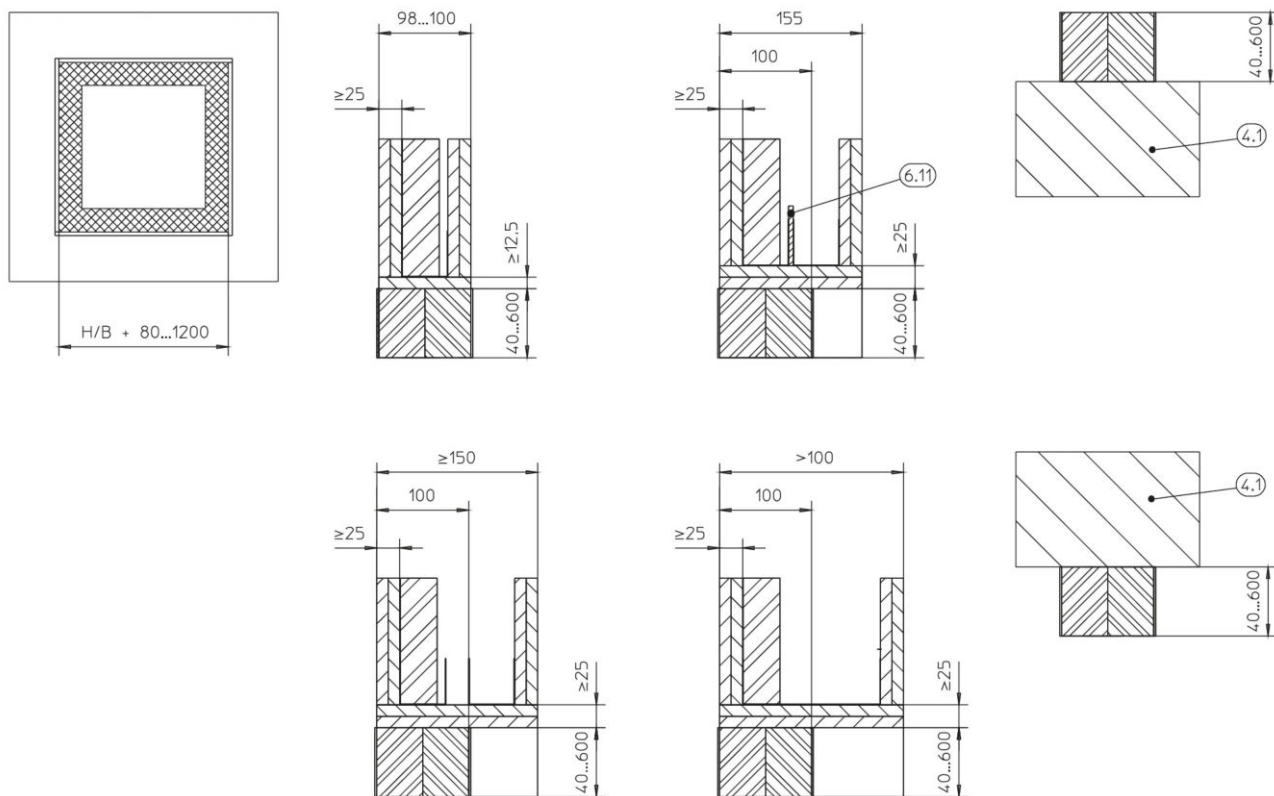


GR1663791
GR2728558

Fig. 64: Dry mortarless installation into a lightweight partition wall, with a fire batt, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

- 1 FK-EU
- 2.4 Fire batt with ablative coating
- 3.2 Lightweight partition wall with metal support structure, cladding on both sides
- 6.2 Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, required only if the distance between dampers is $\leq 150\text{ mm}$
- 6.3 Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, $d = 30\text{ mm}$, around the perimeter
- 6.5 Mineral wool (depending on wall construction)
- 6.10 Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$

- 6.16 Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, around the perimeter
- 7.10 Optional trim panels for $W = 100\text{ mm}$
- 7.14 Reinforcing board of the same material as the wall
- 1 2** Up to EI 90 S
- 3** Up to EI 60 S
- A** Installation side
- B** Operating side



GR2783796

Fig. 65: Dry mortarless installation into a lightweight partition wall, with a fire batt, approved combinations for thicker walls

- 2.4 Fire batt with ablative coating
- 4.1 Solid ceiling slab / solid floor
- 6.5 Mineral wool (depending on wall construction)

- 6.11 Insulating strip
- 7.10 Trim panels (from W > 100 mm a double layer)
- 7.13 Cladding, double layer, fire-resistant

Additional requirements

- Lightweight partition wall ↗ on page 31
- Fire batt ↗ on page 28
- Suspension ↗ 'Horizontal duct' on page 126
- Casing length L = 500 mm
- 70 – 600 mm distance between two fire dampers in one installation opening

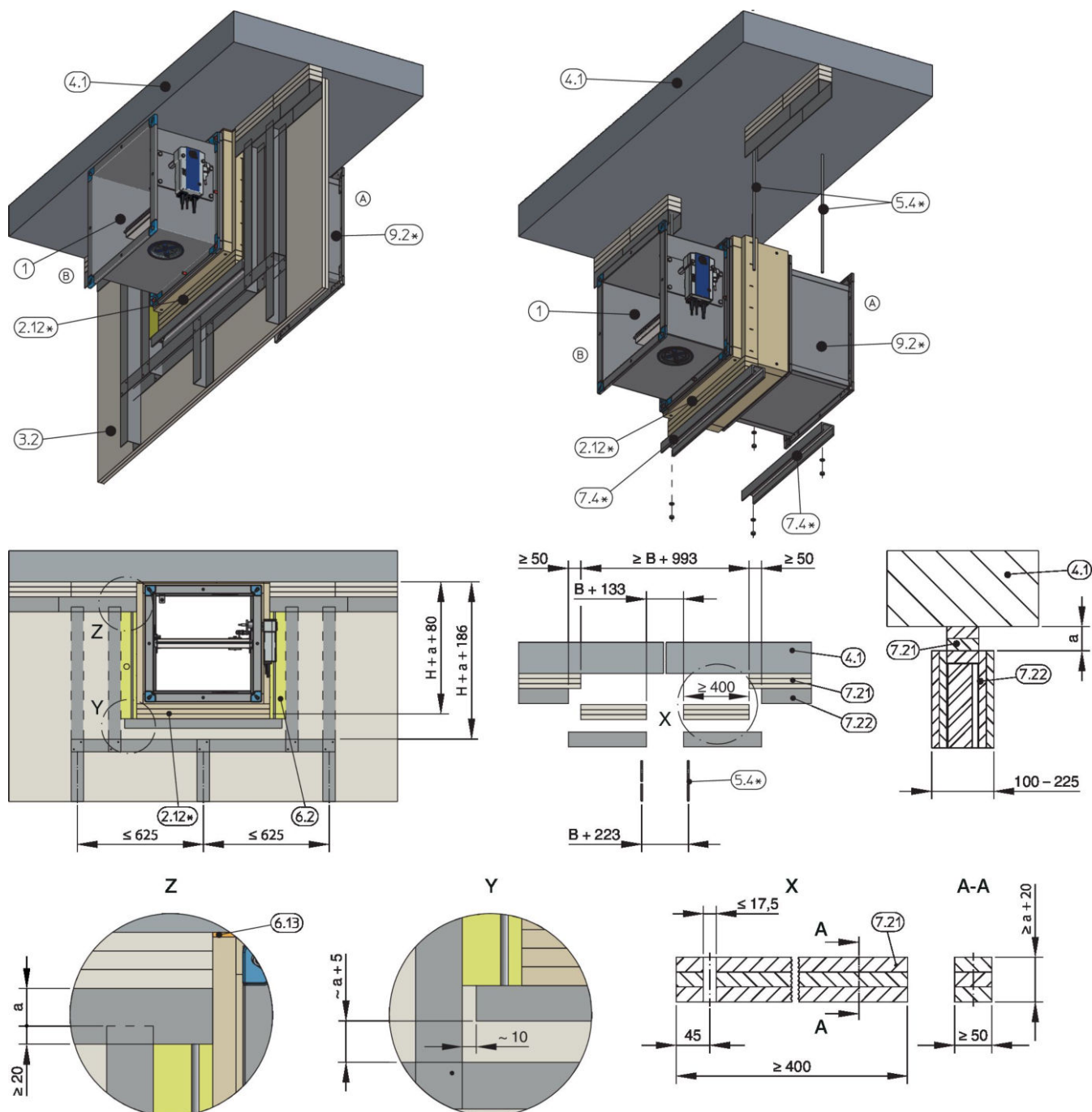
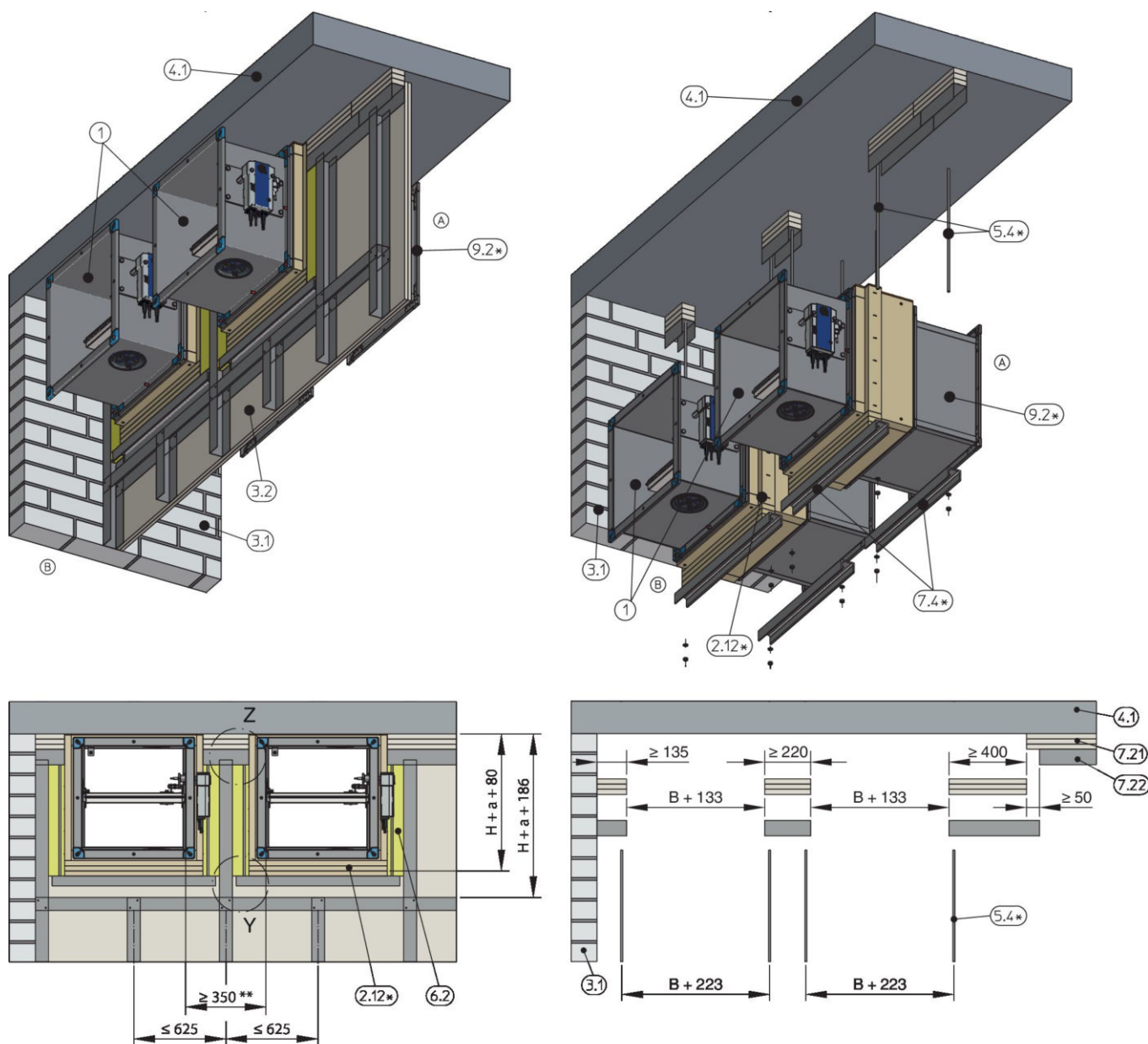


Fig. 66: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint and installation kit GL...

- | | | | |
|------|---|------|---|
| 1 | FK-EU | 7.4 | Steel channel, 50 × 38 × 5 mm |
| 2.12 | Installation kit GL... (factory assembled) | 7.21 | Ceiling joint strips |
| 3.2 | Lightweight partition wall or compartment wall with metal support structure, cladding on both sides | 7.22 | Ceiling joint section |
| | | 9.2 | Extension piece, L = 260 mm (factory mounted) |
| | | * | Supply package |
| 4.1 | Solid ceiling slab | Ⓐ | Installation side |
| 5.4 | Anchor for concrete ceilings and threaded rod M10 or M12 (depending on size) with nut and washer | Ⓑ | Operating side |
| 6.2 | Mineral wool ≥ 1000 °C, ≥ 80 kg/m³ | | |
| 6.13 | Mineral wool A1, filler as an alternative (if required to even out an uneven ceiling) | | |

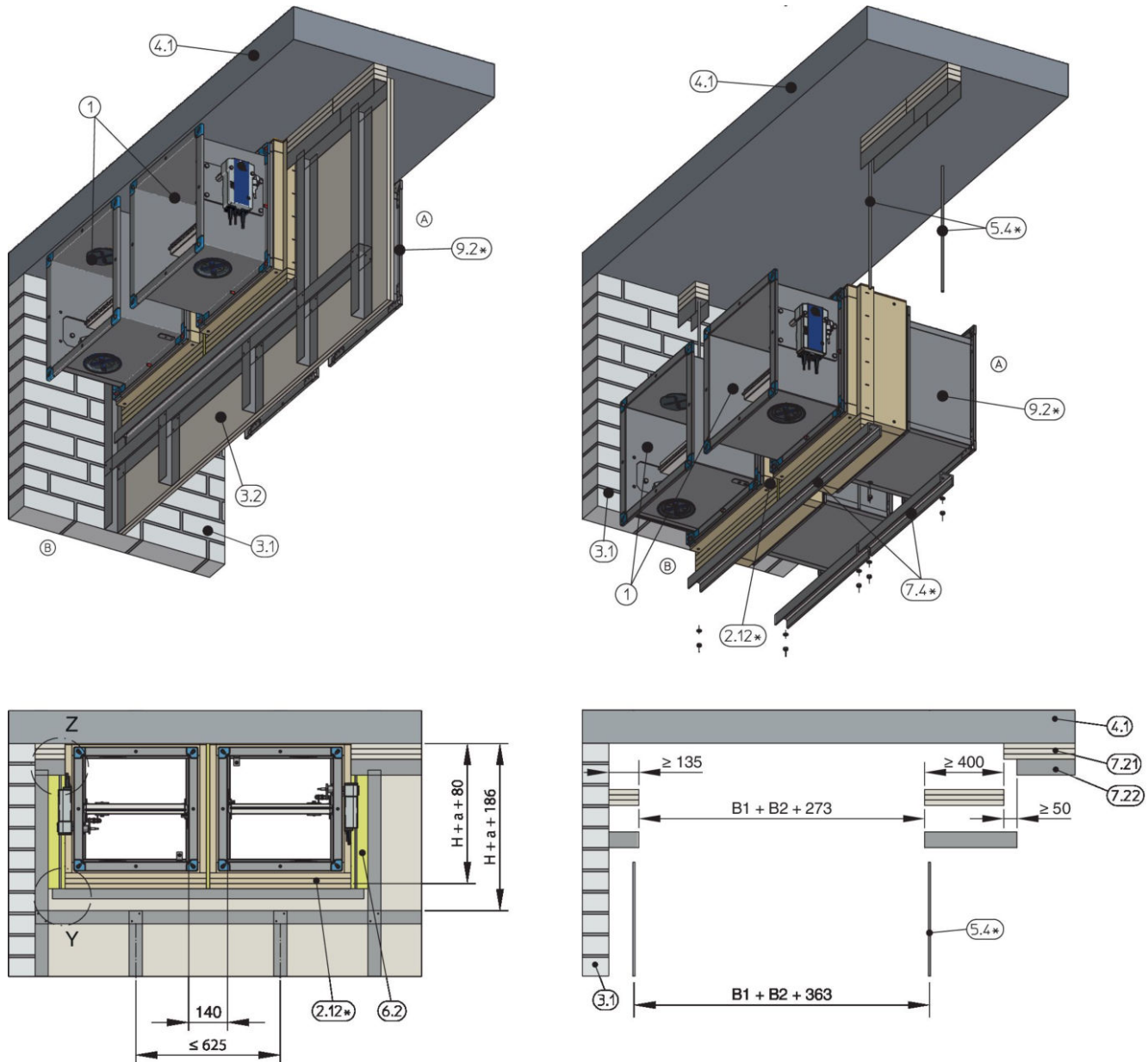


GR3128073

Fig. 67: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint and installation kit GL..., installation of two FK-EU fire dampers side by side in separate installation openings

- | | | | |
|------|---|------|--|
| 1 | FK-EU | 7.4 | Steel channel, 50 × 38 × 5 mm |
| 2.12 | Installation kit GL... (factory assembled) | 7.21 | Ceiling joint strips |
| 3.1 | Solid wall | 7.22 | Ceiling joint section |
| 3.2 | Lightweight partition wall or compartment wall with metal support structure, cladding on both sides | 9.2 | Extension piece, L = 260 mm (factory mounted) |
| 4.1 | Solid ceiling slab | * | Supply package |
| 5.4 | Anchor for concrete ceilings and threaded rod M10 or M12 (depending on size) with nut and washer | ** | Push through installation with threaded rod; ≥ 400 mm if an anchor is used |
| 6.2 | Mineral wool ≥ 1000 °C, ≥ 80 kg/m³ | (A) | Installation side |
| 6.13 | Mineral wool A1, filler as an alternative (if required to even out an uneven ceiling) | (B) | Operating side |

Note: For more installation details see Fig. 66



GR3128073

Fig. 68: Dry mortarless installation into a lightweight partition, wall with flexible ceiling joint and installation kit GL..., arrangement with two equally high FK-EU fire dampers side by side ($B \leq 600$ mm) into one installation opening

- | | | | |
|------|---|------|---|
| 1 | FK-EU | 7.4 | Steel channel, $50 \times 38 \times 5$ mm |
| 2.12 | Installation kit GL... (factory assembled) | 7.21 | Ceiling joint strips |
| 3.1 | Solid wall | 7.22 | Ceiling joint section |
| 3.2 | Lightweight partition wall or compartment wall with metal support structure, cladding on both sides | 9.2 | Extension piece, $L = 260$ mm (factory mounted) |
| 4.1 | Solid ceiling slab | * | Supply package |
| 5.4 | Anchor for concrete ceilings and threaded rod M10 or M12 (depending on size) with nut and washer | Ⓐ | Installation side |
| 6.2 | Mineral wool ≥ 1000 °C, ≥ 80 kg/m ³ | Ⓑ | Operating side |
| 6.13 | Mineral wool A1, filler as an alternative (if required to even out an uneven ceiling) | | |

Note: For more installation details see Fig. 66

Specify the intended fire damper arrangement when you order the dampers; more ordering information upon request.

Lightweight partition walls with metal support structure > Dry mortarless installation with flexible ceiling ...

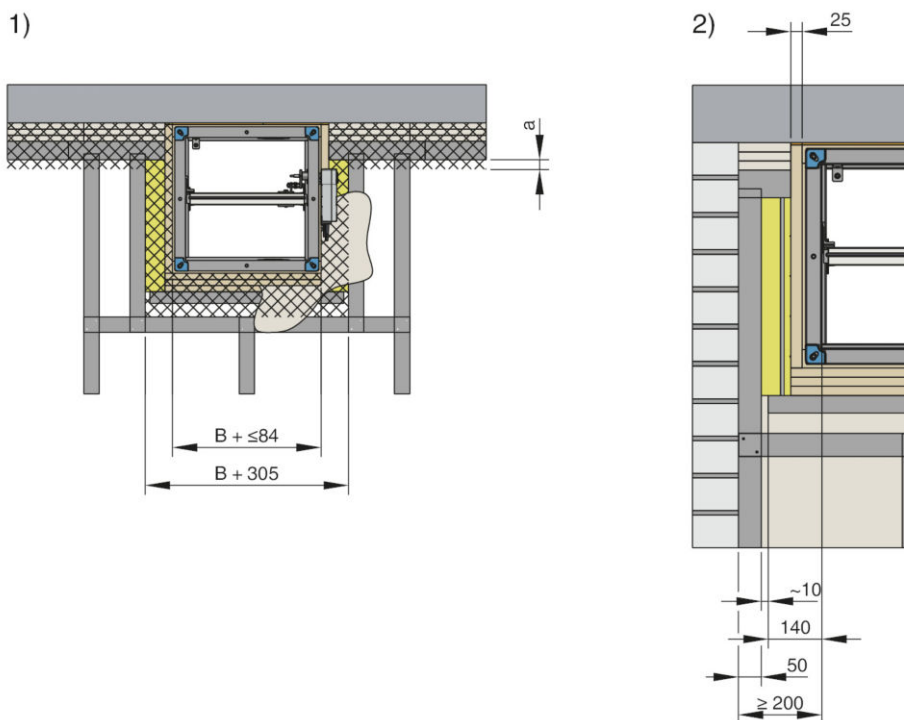


Fig. 69: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint

- 1) No screws in the shaded area to fix the cladding to the metal support structure or fire damper
- 2) Arrangement in relation to adjacent wall

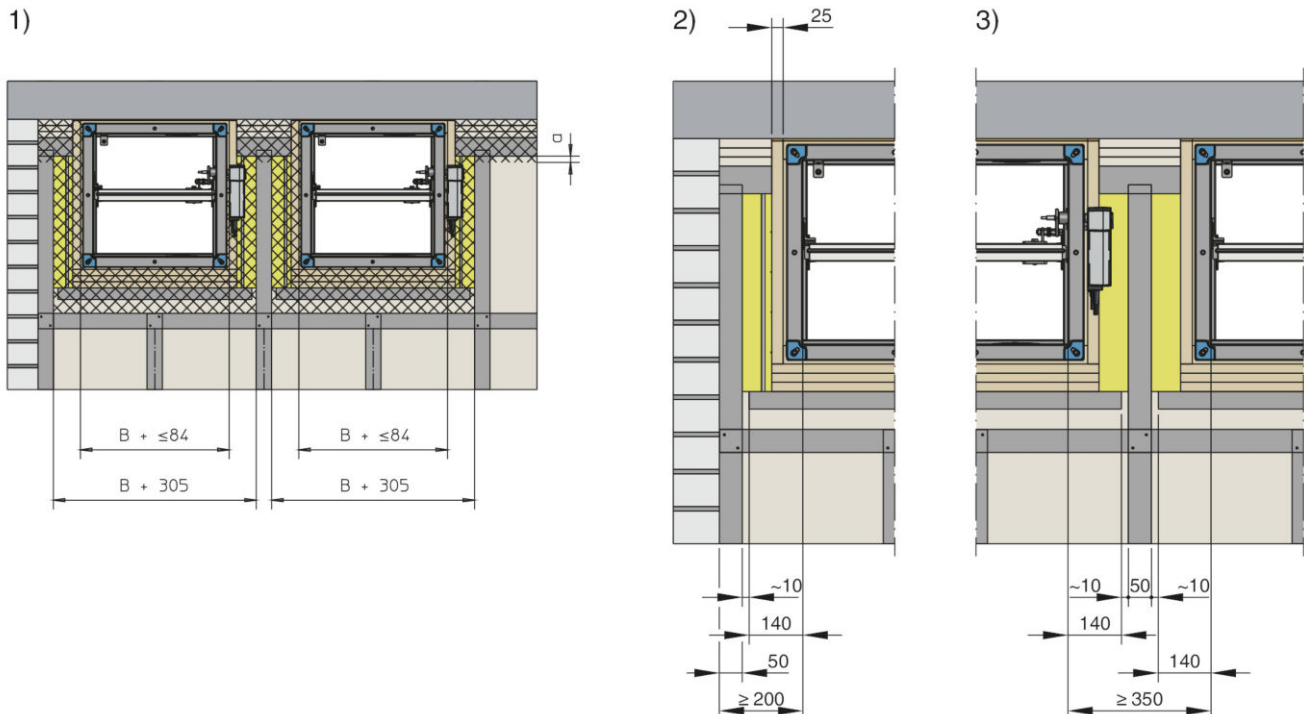


Fig. 70: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint, installation of two FK-EU fire dampers side by side in separate installation openings

- 1) No screws in the shaded area to fix the cladding to the metal support structure or fire damper
- 2) Arrangement in relation to adjacent wall
- 3) Installation of two FK-EU fire dampers side by side in separate installation openings

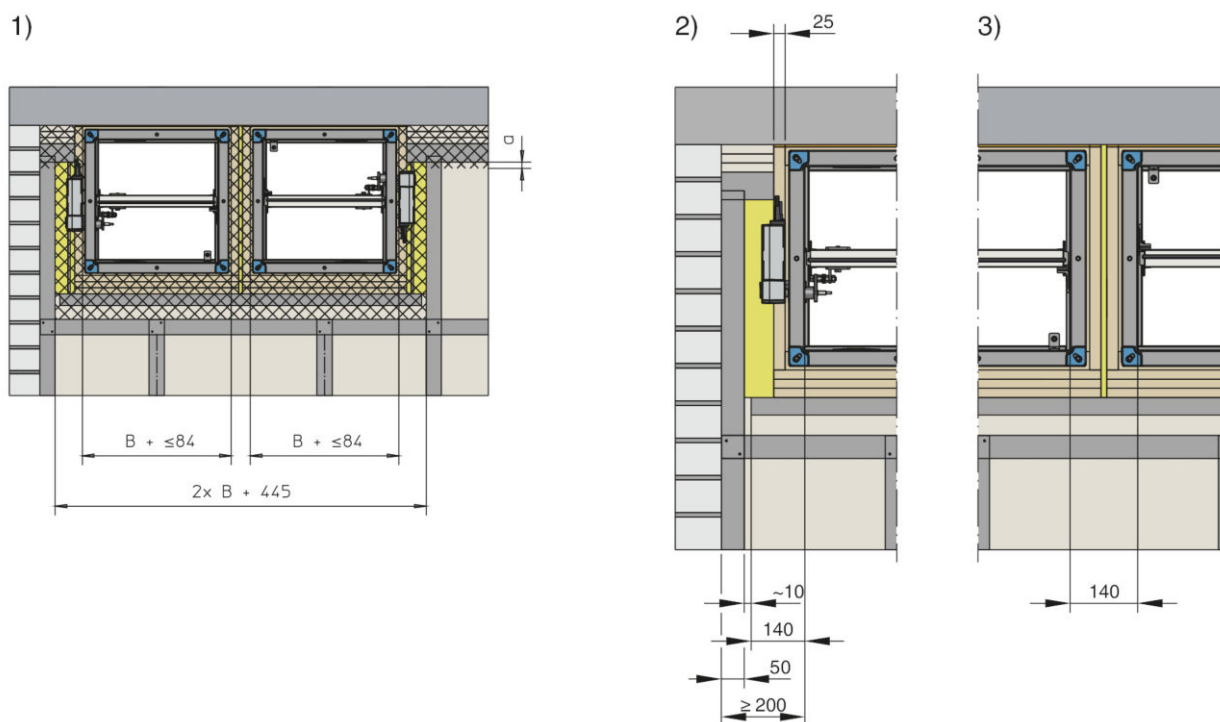


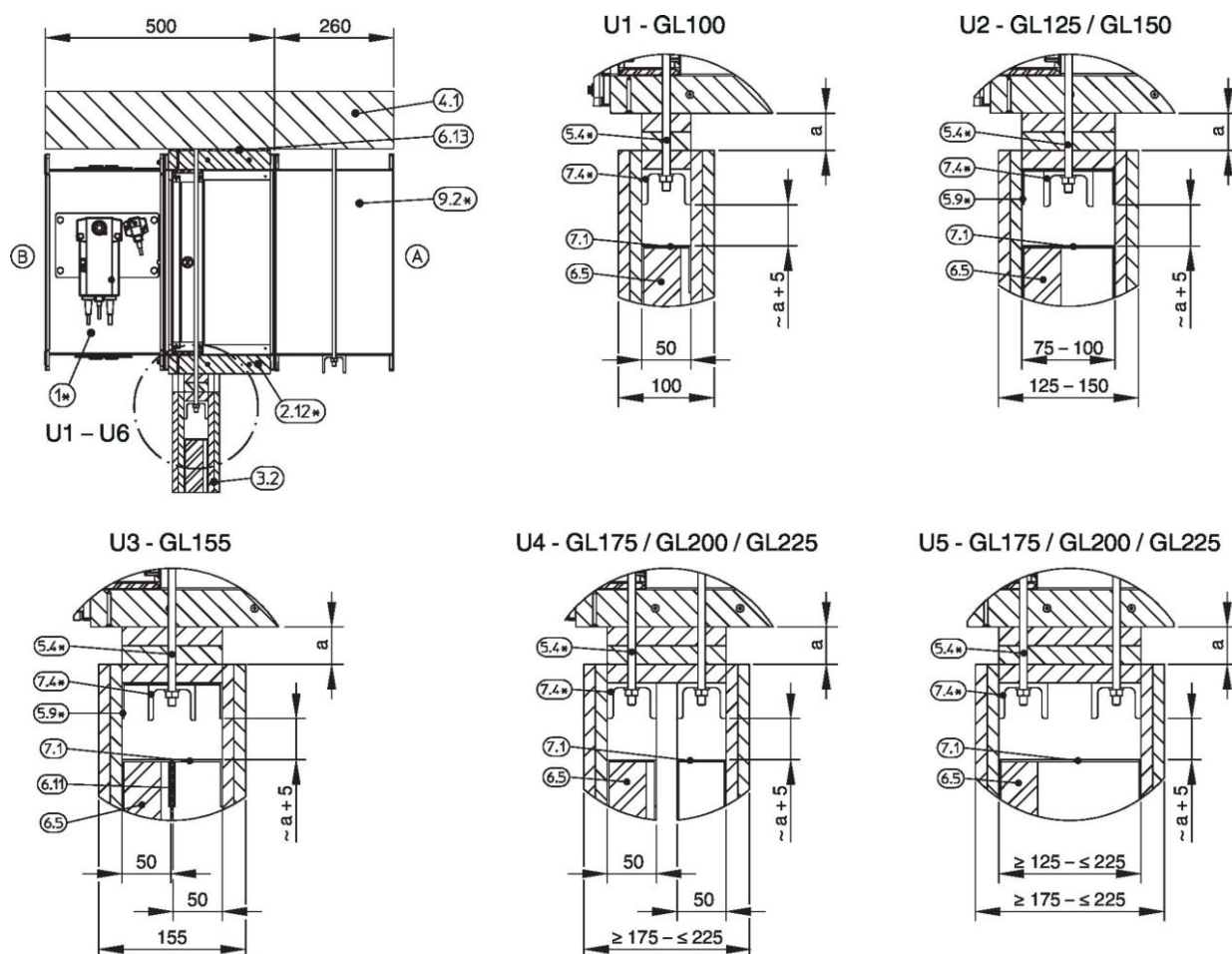
Fig. 71: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint, installation of two FK-EU fire dampers side by side in one installation opening

- 1) No screws in the shaded area to fix the cladding to the metal support structure or fire damper
- 2) Arrangement in relation to adjacent wall
- 3) Installation of two FK-EU fire dampers side by side in one installation opening



Installation of fire dampers side by side

If you intend to install two fire dampers of the same height side by side, these fire dampers have to be factory prepared accordingly. Specify this when you order the fire dampers.



GR2961862

Fig. 72: Dry mortarless installation into a lightweight partition wall, with flexible ceiling joint and installation kit GL... – wall thicknesses

1	FK-EU	6.13	Mineral wool A1, filler as an alternative (if required to even out an uneven ceiling)
2.12	Installation kit GL...	7.1	UW section
3.2	Lightweight partition wall or compartment wall with metal support structure, cladding on both sides	7.4	Steel channel, 50 × 38 × 5 mm
4.1	Solid ceiling slab	9.2	Extension piece, L = 260 mm (factory mounted)
5.4	Anchor for concrete ceilings and threaded rod M10 or M12 (depending on size) with nut and washer	*	Supply package
5.9	Steel section for GL125 / GL155	U1 – U5	Up to EI 90 S
6.5	Mineral wool (depending on wall construction)	Ⓐ	Installation side
6.11	Insulating strip	Ⓑ	Operating side



Installation kit GL

In factory assembled GL installation kits the figure applies to the thickness of a wall with double layer cladding (12.5 mm) on both sides. For example: GL125 is suitable for a wall with double layer cladding (2 × 12.5 mm) on both sides and a 75 mm wide metal support structure. Details on other widths of cladding or on different numbers of layers are available on request.

Additional requirements

- Lightweight partition wall ↗ on page 31
 - Subsidence of the ceiling slab $a \leq 40$ mm
 - Casing length $L = 500$ mm
 - 40 mm distance between the fire damper and a load-bearing ceiling; ≥ 200 mm distance between the fire damper and a load-bearing wall
 - ≥ 350 mm distance between any two fire dampers (if you install two FK-EU fire dampers of the same height and with $B \leq 600$ mm side by side, the distance may be 140 mm *)
1. ▶ Attach the ceiling joint strips (7.21) and the ceiling joint section (7.22) according to the manufacturer's specifications. Even out the surface of the ceiling slab. When you fix anchors and threaded rods (5.4), leave out the area where the fire damper is to be installed (1) (at least $B + 933$ mm; at least $B1 + B2 + 140$ mm + 933 mm if you install two fire dampers side by side). On both sides, the ceiling joint section (7.22) must be ≥ 50 mm shorter than the ceiling joint strips (7.21). Select the ceiling joint strips (7.21) and ceiling joint section (7.22) according to the expected subsidence of the ceiling slab.
 2. ▶ Drill holes for anchors, then place the anchors; for dimensions see Fig. 69 or 72.
 3. ▶ Create ceiling joint strips (7.21) according to the drawing and attach them to the ceiling. The dimensions depend on the ceiling joint (to be provided by others). Leave out an area of $B + 133$ mm (or $B1 + B2 + 140$ mm + 133 mm if you want to install two fire dampers side by side). The surface of the ceiling slab must be even.
 4. ▶ Mount the ceiling joint section (7.22) for the area previously left out. The ceiling joint section must end flush with the ceiling joint strips (7.21).
 5. ▶ Screw the threaded rods (5.4) into the anchors.
 6. ▶ Attach the fire damper (1) with the pre-assembled U50 channel (7.4) to the threaded rods (5.4). Tighten the nuts (5.4) to attach the fire damper and the installation kit firmly to the ceiling.
 7. ▶ Use an additional U50 channel (7.4) to attach the extension piece (9.2) of the fire damper (1) to the ceiling.
 8. ▶ Completely seal off the space between the installation kit and the metal section with mineral wool in order to protect the threaded rods (5.4).
 9. ▶ Once the fire damper has been installed, the metal support structure can be set up or completed. Proceed according to the manufacturer's instructions. As you erect the wall, be sure to adhere to the dimensions given in the drawings. When cladding the walls, no screws must be used in the marked area, see Fig. 69/1). The wall has to be clad up to ≤ 2 mm to the left and right of the installation kit.

*If you intend to install two fire dampers side by side, you have to specify this with your order since the left damper has to be prepared accordingly (damper turned by 180°). Ordering details upon request.

5.7 Lightweight partition walls with timber support structure

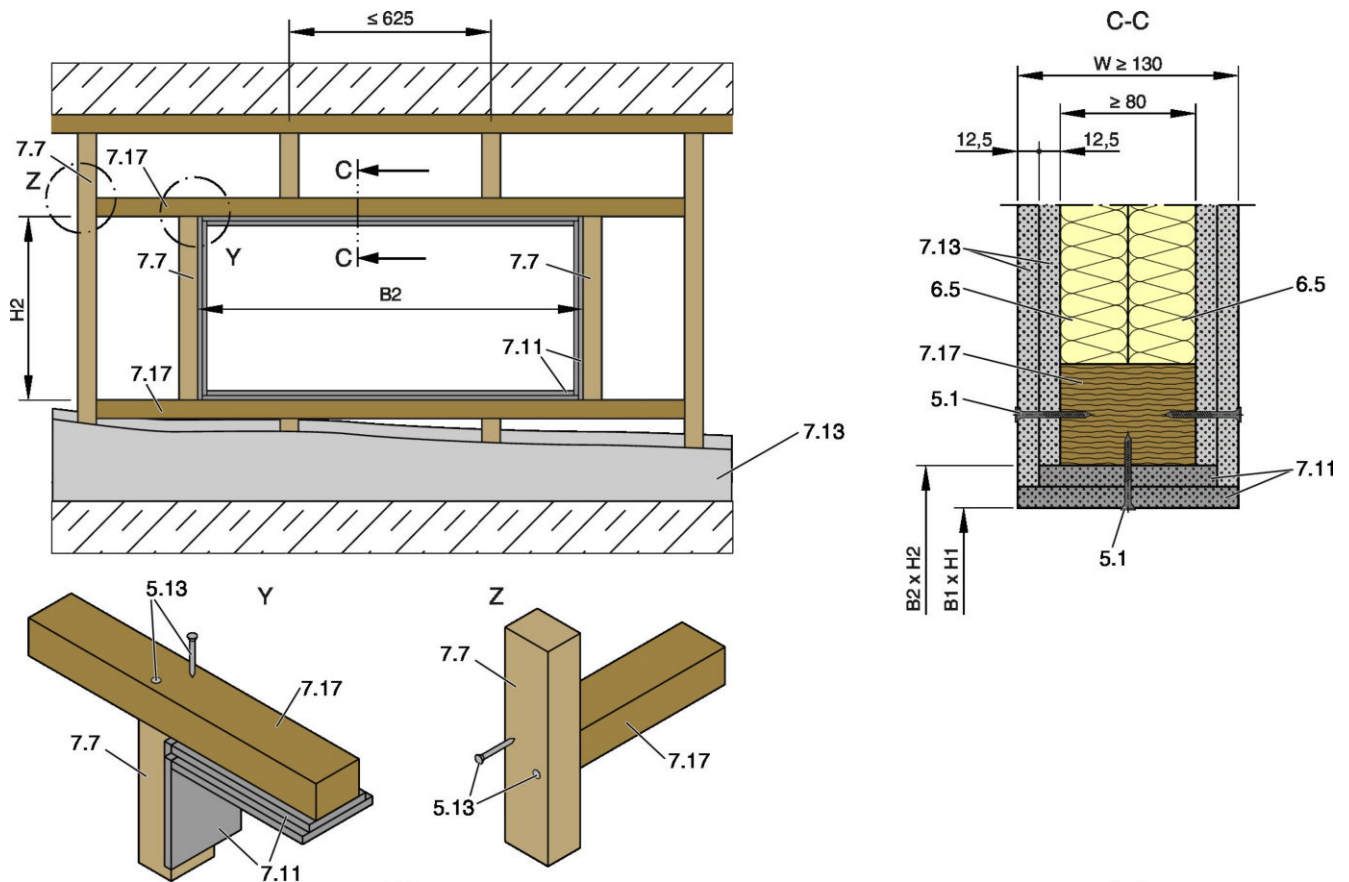


Fig. 73: Lightweight partition wall with timber support structure and cladding on both sides

5.1	Dry wall screw	7.13	Single or double layer cladding, on both sides of the half-timbered construction
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		
7.11	Trim panels, double layer, staggered joints	B1 × H1	Clear installation opening
		B2 × H2	Opening in the half-timbered construction

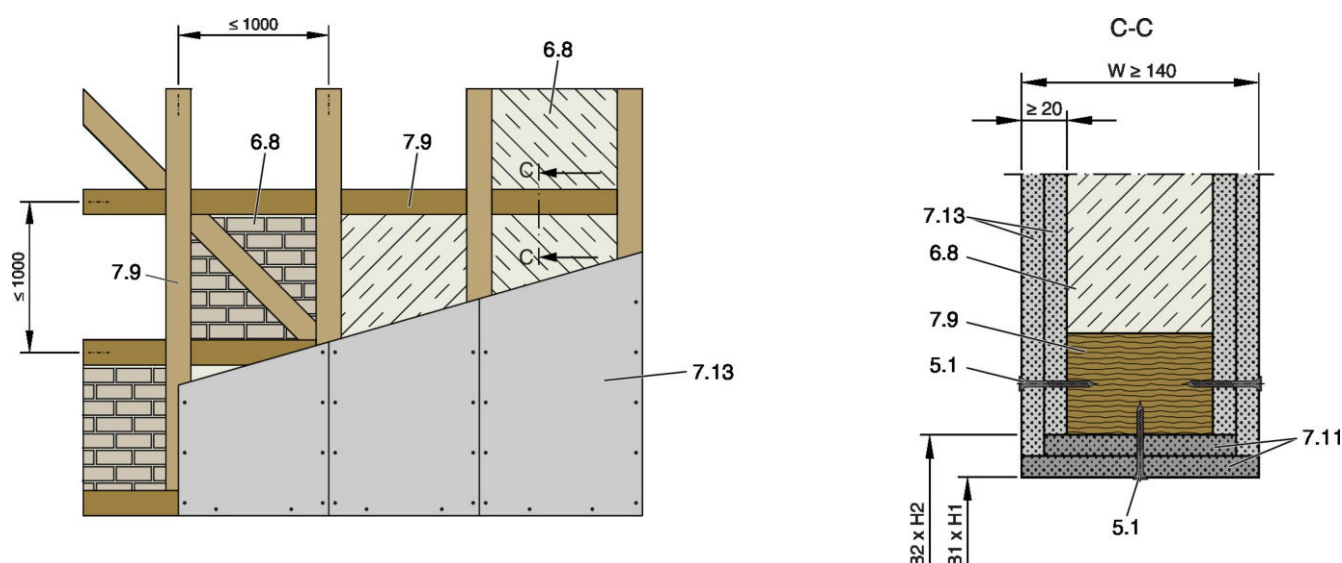


Fig. 74: Lightweight partition wall, half-timbered construction with cladding on both sides

5.1	Dry wall screw	7.13	Single or double layer cladding, on both sides of the half-timbered construction
6.8	Infill*		
7.9	Timber structure	*	Cavities completely filled with mineral wool $\geq 50 \text{ kg/m}^3$, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay
7.11	Trim panels, double layer, staggered joints		
		B1 × H1	Clear installation opening
		B2 × H2	Opening in the half-timbered construction

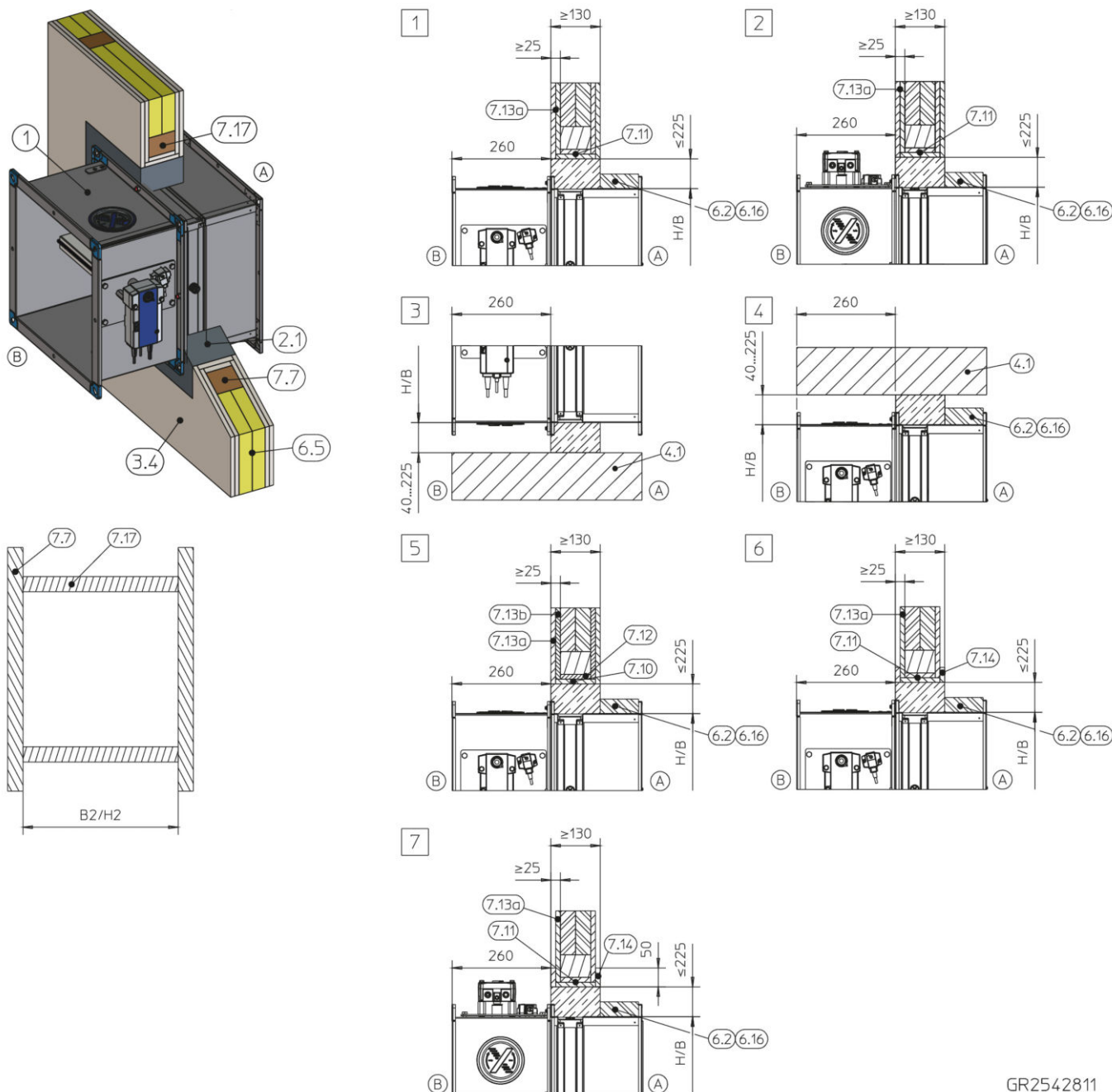
Additional requirements

- Timber stud wall or half-timbered construction, ↗ on page 32

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 dry mortarless installation kit ES ¹	B + 95	H + 95		
Dry mortarless installation with fire batt (EI 120 S / EI 90 S / EI 30 S)	B + 80 to 1200	H + 80 to 1200		

¹⁾ Installation opening tolerance + 2 mm

5.7.1 Mortar-based installation

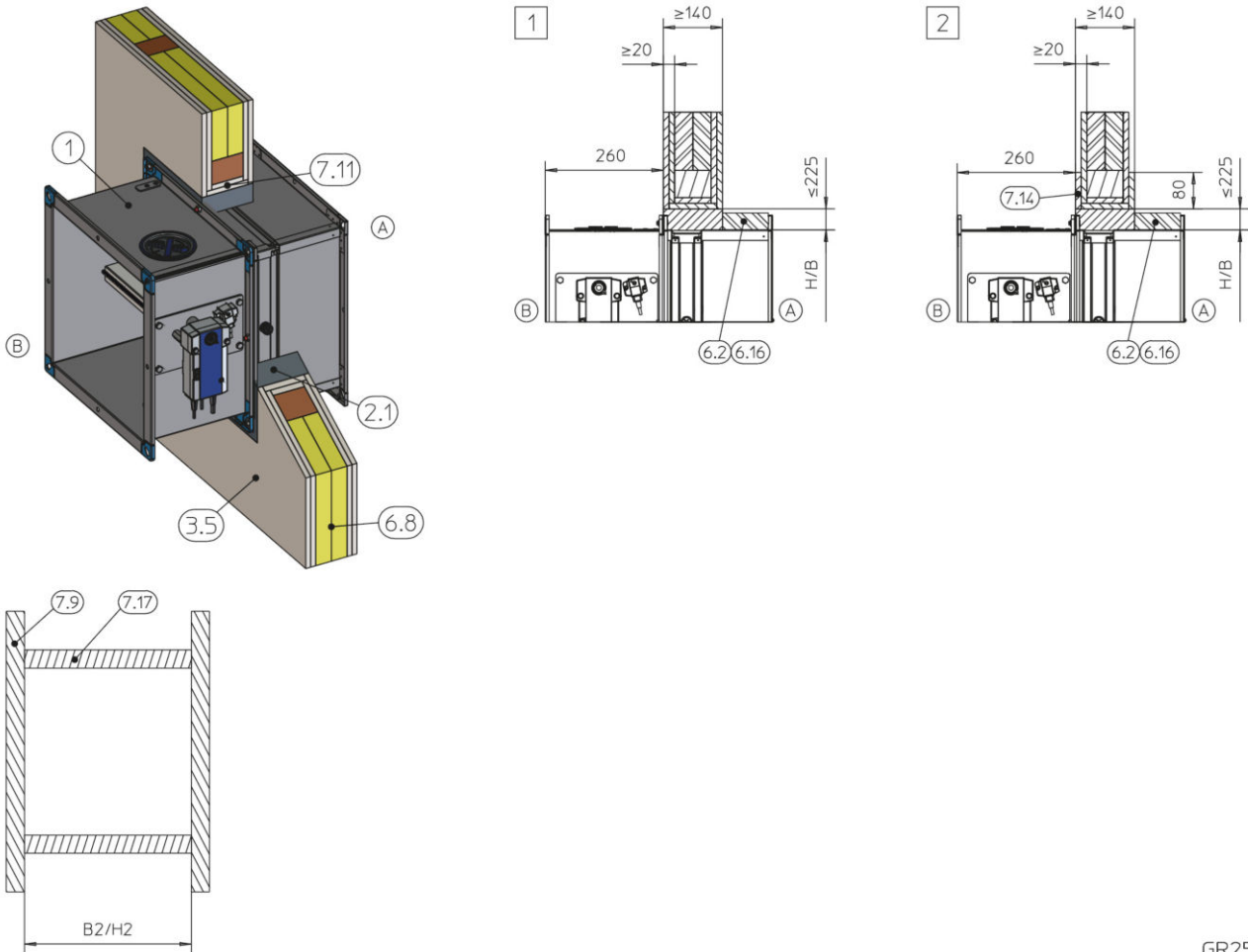


GR2542811

Fig. 75: Mortar-based installation into a lightweight partition wall with timber support structure

1	FK-EU	7.12	Trim panels, wood sheet, at least 600 kg/³
2.1	Mortar	7.13a	Cladding, fire-resistant
3.4	Timber stud wall (also timber panel constructions), cladding on both sides	7.13b	Cladding, wood sheet, at least 600 kg/³
4.1	Solid ceiling slab / solid floor	7.14	Reinforcing board of the same material as the wall
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	7.17	Trimmers, timber stud / nogging
6.5	Mineral wool (depending on wall construction)	1 - 4	Up to EI 90 S
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions	5 - 7	EI 30 S
7.7	Timber stud, at least $60 \times 80\text{ mm}$	A	Installation side
7.10	Trim panels (fire-resistant)	B	Operating side

7.11 Trim panels, double layer, staggered joints



GR2560712

Fig. 76: Mortar-based installation into a lightweight partition wall, half-timbered construction

- | | | | |
|------|--|----------|--|
| 1 | FK-EU | 7.11 | Trim panels, double layer, staggered joints |
| 2.1 | Mortar | 7.14 | Reinforcing board of the same material as the wall |
| 3.5 | Half-timbered construction, cladding on both sides | 7.17 | Trimmers, timber (in a half-timbered construction) |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions | 1 | Up to EI 90 S |
| 6.8 | Infill (cavities completely filled with mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 50\text{ kg/m}^3$, or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay) | 2 | EI 30 S |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions | A | Installation side |
| 7.9 | Timber structure | B | Operating side |

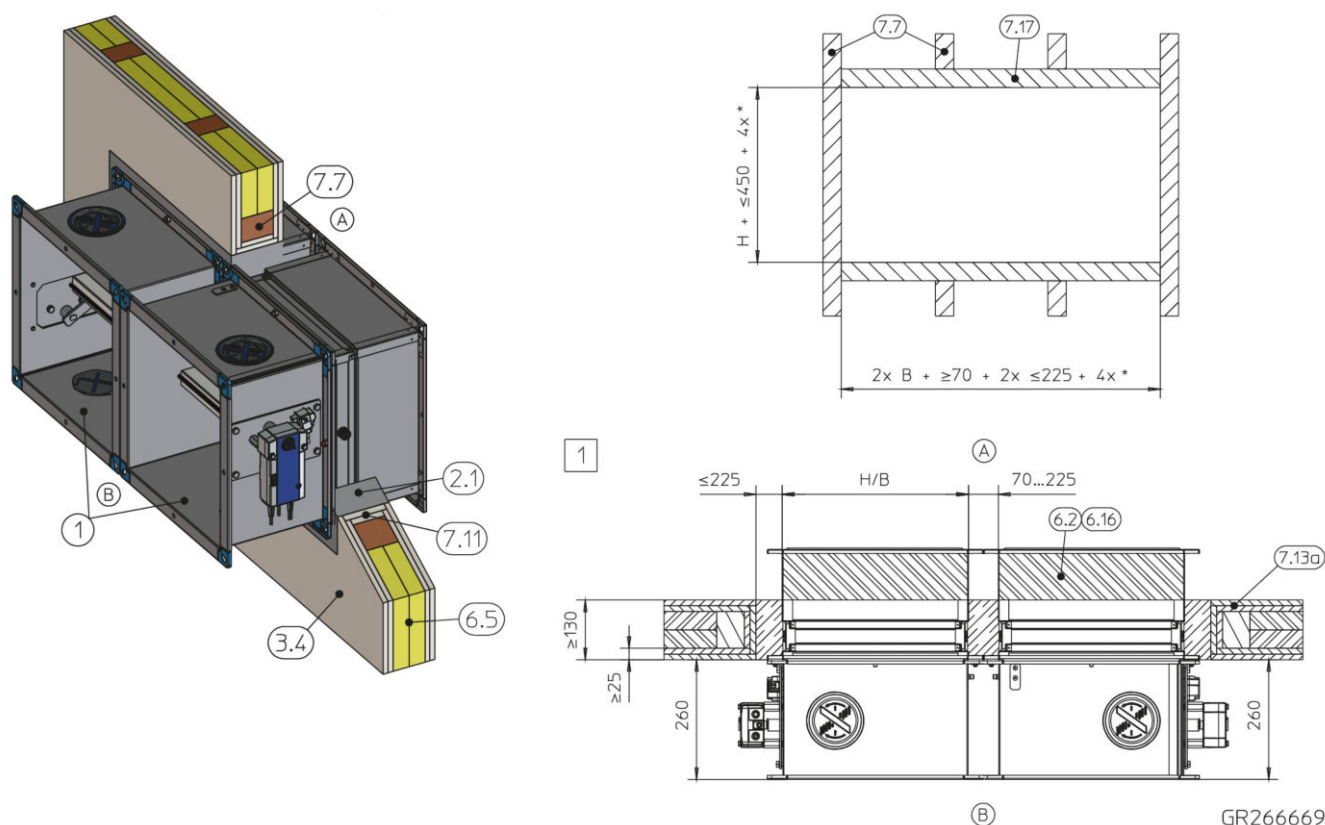



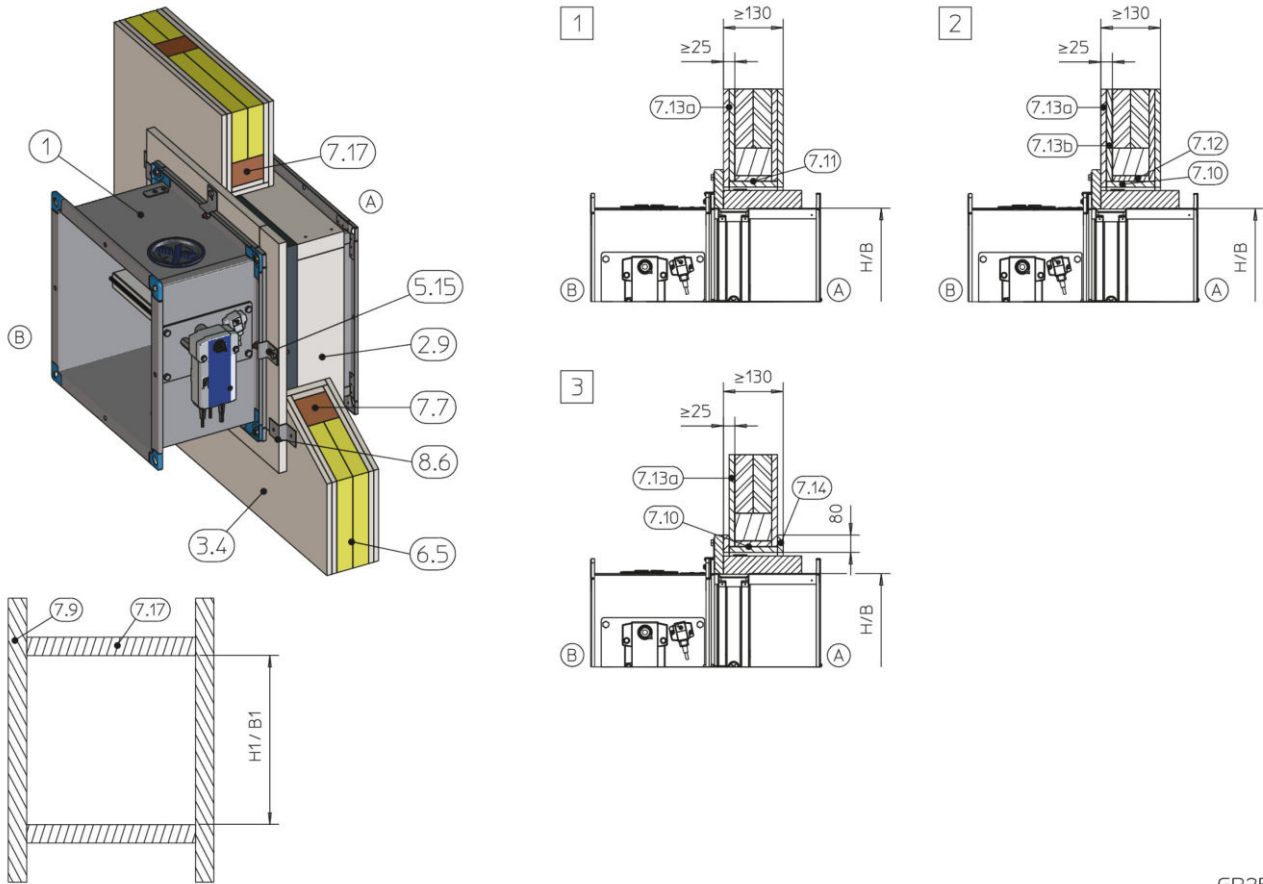
Fig. 77: Mortar-based installation into a lightweight partition wall with timber support structure, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

- | | | | |
|------|---|-------|--|
| 1 | FK-EU | 7.11 | Trim panels, double layer, staggered joints |
| 2.1 | Mortar | 7.13a | Cladding, fire-resistant |
| 3.4 | Timber stud wall (also timber panel constructions), cladding on both sides | 7.17 | Trimmers, timber stud / nogging, at least 60 × 80 mm |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions | * | Trim panels |
| 6.5 | Mineral wool (depending on wall construction) | ① | Up to EI 90 S |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions | Ⓐ | Installation side |
| | | Ⓑ | Operating side |
| 7.7 | Timber stud / nogging, at least 60 × 80 mm | | |

Additional requirements

- Timber stud wall or half-timbered construction,  on page 32
- Casing length 375 or 500 mm, for 'flange-to-flange' installation only L = 500 mm
- 70 – 225 mm distance between two fire dampers in one installation opening

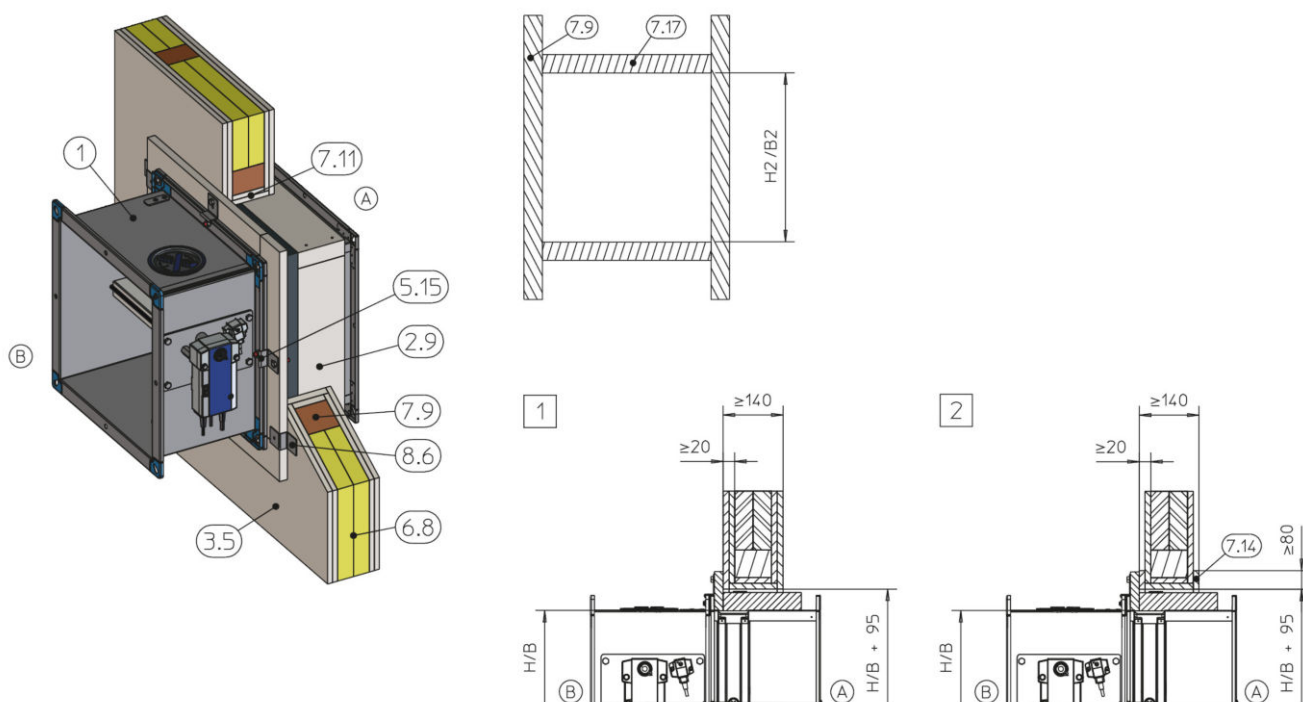
5.7.2 Dry mortarless installation with installation kit ES



GR2536709

Fig. 78: Dry mortarless installation into a lightweight partition wall with timber support structure, with installation kit ES

1	FK-EU	7.13a	Cladding, fire-resistant
2.9	Installation kit ES	7.13b	Cladding, wood sheet, at least 600 kg/³
3.4	Timber stud wall (also timber panel constructions), cladding on both sides	7.14	Reinforcing board of the same material as the wall
5.15	Bracket	7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm
6.5	Mineral wool (depending on wall construction)	8.6	Z bracket (by others), galvanised, at least 40 mm wide, d ≥ 1.5 mm or equivalent, e.g. Hilti fixing band LB26
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		
		1	Up to EI 120 S
		2 3	EI 30 S
		A	Installation side
		B	Operating side



GR2558376

Fig. 79: Dry mortarless installation into a half-timbered construction, with installation kit ES

- | | | | |
|------|--|----------|--|
| 1 | FK-EU | 7.14 | Reinforcing board of the same material as the wall |
| 2.9 | Installation kit ES | 7.17 | Trimmers, timber (in a half-timbered construction) |
| 3.5 | Half-timbered construction, cladding on both sides | 8.6 | Z bracket (by others), galvanised, at least 40 mm wide, $d \geq 1.5$ mm or equivalent, e.g. Hilti fixing band LB26 |
| 5.15 | Bracket | 1 | Up to EI 90 S |
| 6.8 | Infill (cavities completely filled with mineral wool ≥ 1000 °C, ≥ 50 kg/m ³ , or bricks, aerated concrete, lightweight concrete, reinforced concrete or clay) | 2 | EI 30 S |
| 7.9 | Timber structure | A | Installation side |
| 7.11 | Trim panels, double layer, staggered joints | B | Operating side |

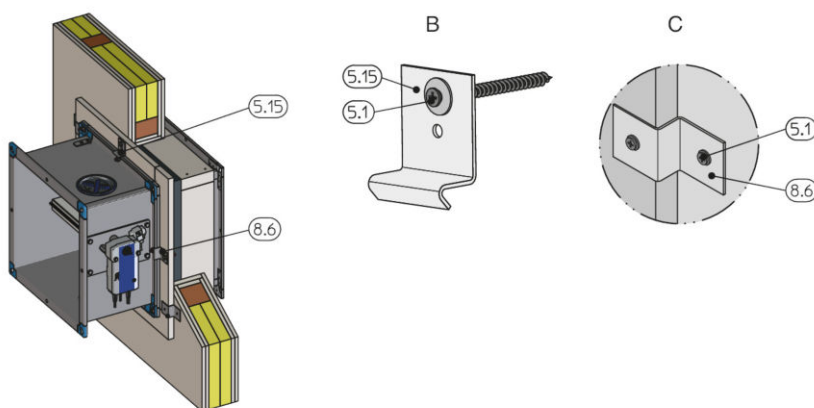



Fig. 80: Fastening the assembly to the timber studs

- | | | | |
|------|--|----------|-------------------------|
| 5.1 | Dry wall screw / washer (to be provided by others) | B | Fixing of the bracket |
| 5.15 | Bracket | C | Fixing of the Z bracket |
| 8.6 | Z bracket (by others), galvanised, at least 40 mm wide, $d \geq 1.5$ mm or equivalent, e.g. Hilti fixing band LB26 | | |

Additional requirements

- Timber stud wall or half-timbered construction,  on page 32
- Casing length L = 500 mm
- 45 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  33.

2. ▶ Fix the fire damper with brackets, Z brackets and dry wall screws to the timber support structure or half-timbered construction, .

No. of brackets and dry wall screws:

- *Side H*: 1 each

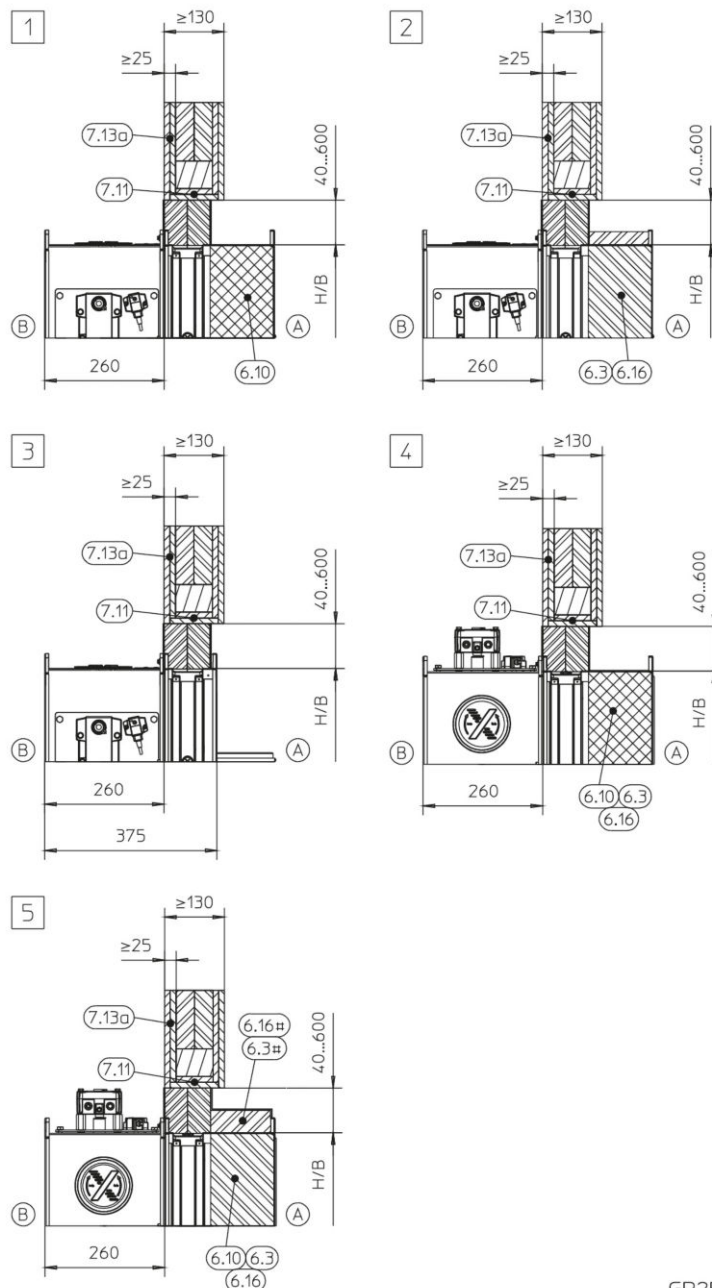
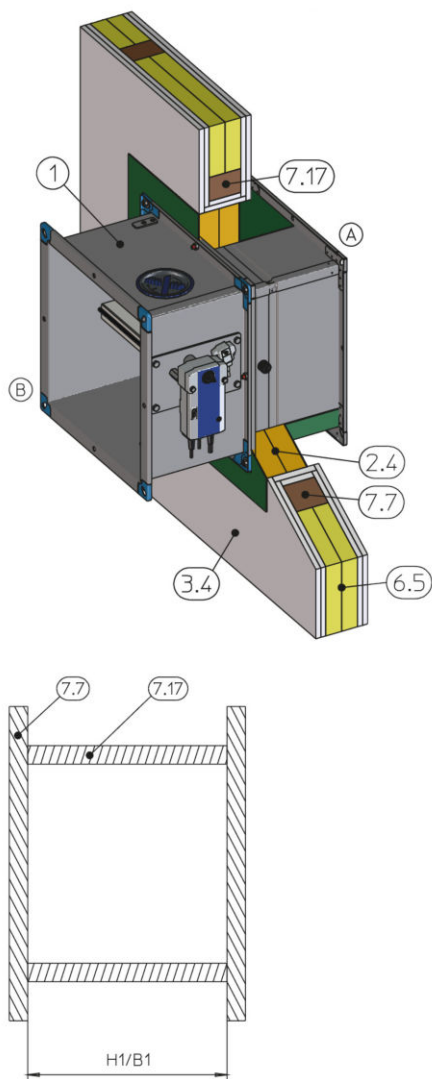
- *Side B*: $B \leq 800$ mm: 2 each; $B > 800$ mm: 3 each

No. of Z brackets and dry wall screws:

- *Side H*: 1 each

- *Side B*: $B \leq 800$ mm: 1 each; $B > 800$ mm: 2 each

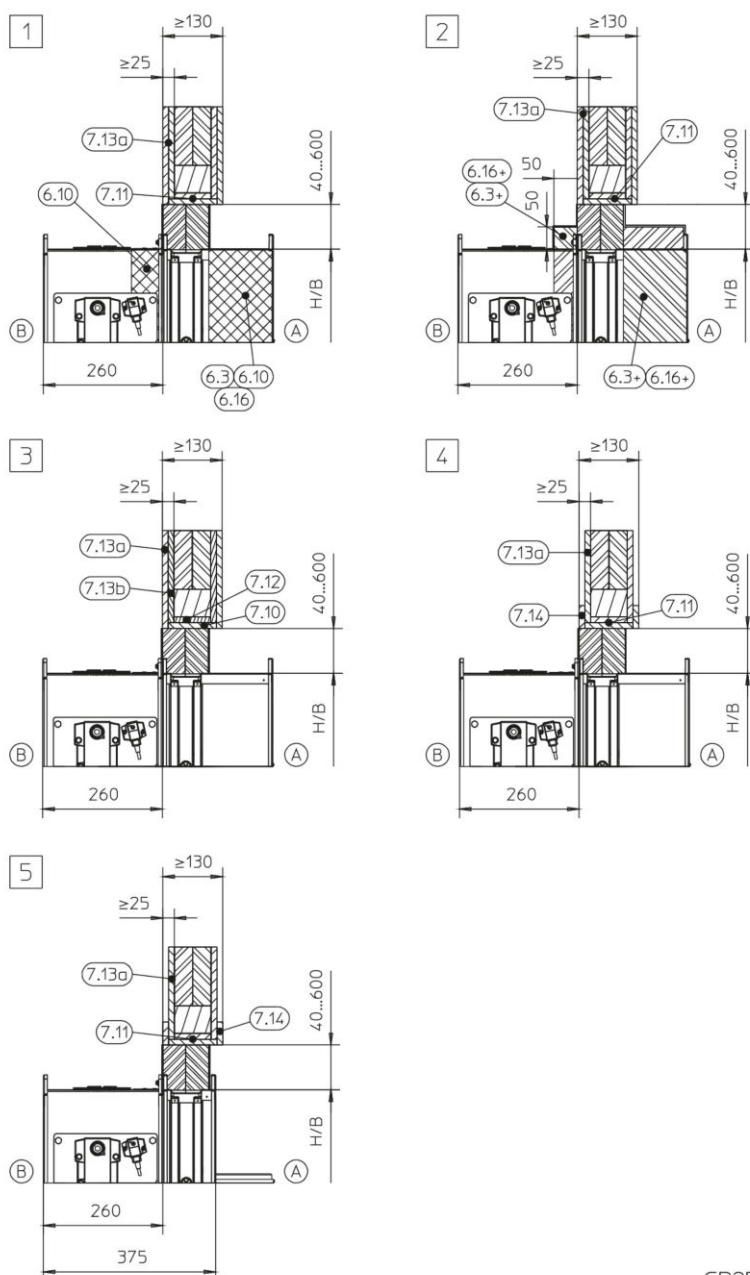
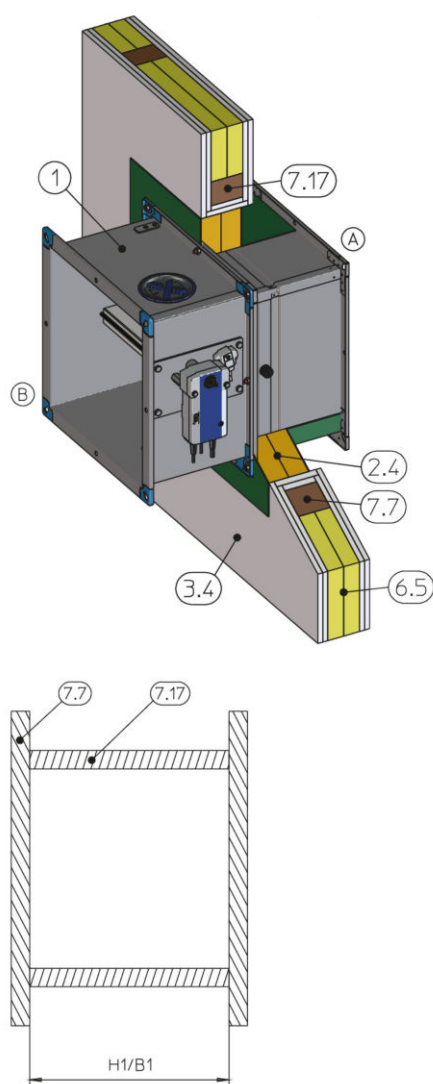
5.7.3 Dry mortarless installation with fire batt



GR2549025

Fig. 81: Dry mortarless installation into a lightweight partition wall with timber support structure, with a fire batt

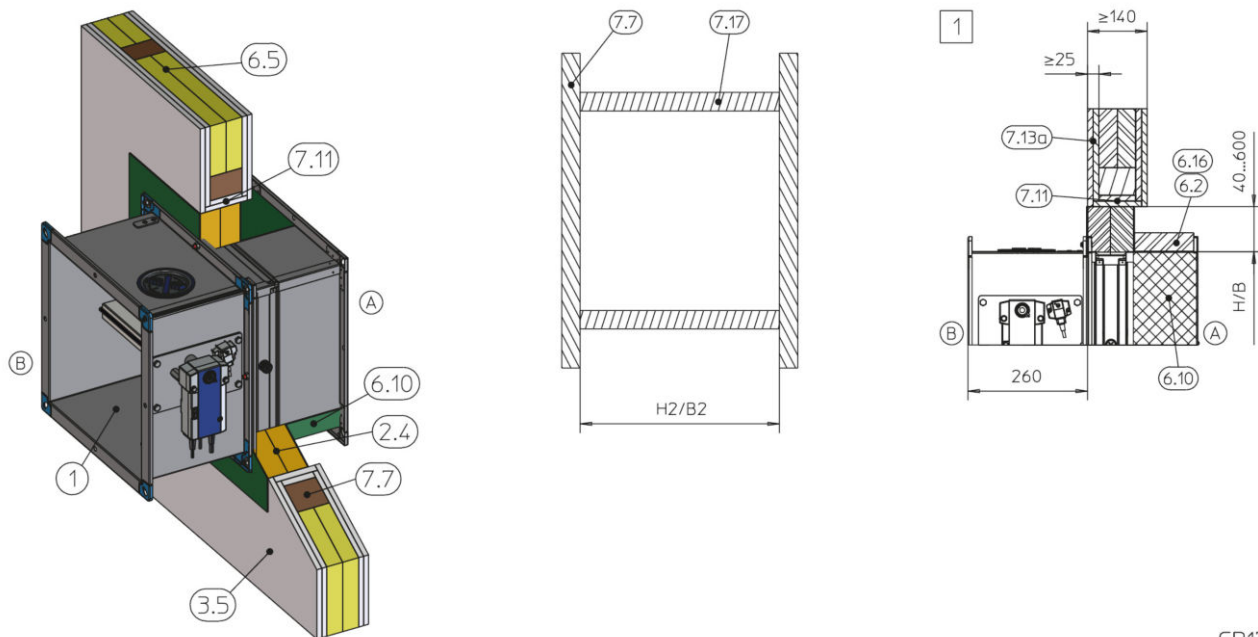
1	FK-EU	7.13a	Cladding, fire-resistant
2.4	Fire batt with ablative coating	7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm
3.4	Timber stud wall (also timber panel constructions), cladding on both sides	*	The actuator and release mechanism must not be coated.
6.3	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, $d = 30\text{ mm}$, around the perimeter	#	Placed on the top only
6.5	Mineral wool (depending on wall construction)	1 - 3	Up to EI 90 S: for all sizes (BxH)
6.10	Ablative coating around the perimeter, at least 2.5 mm thick	4	Up to EI 90 S: B × H = 200 × 200 mm – 800 × 400 mm
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$	5	Up to EI 90 S: B × H = 801 × 401 mm – 1500 × 800 mm
7.7	Timber stud, at least 60 × 80 mm	A	Installation side
7.11	Trim panels, double layer, staggered joints	B	Operating side



GR2549025

Fig. 82: Dry mortarless installation into a lightweight partition wall with timber support structure, with a fire batt

1	FK-EU	7.13a	Cladding, fire-resistant
2.4	Fire batt with ablative coating	7.13b	Cladding, wood sheet, at least 600 kg/m³
3.4	Timber stud wall (also timber panel constructions), cladding on both sides	7.14	Reinforcing board of the same material as the wall
6.3	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, d = 30 mm, around the perimeter	7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm
6.5	Mineral wool (depending on wall construction)	*	The actuator and release mechanism must not be coated.
6.10	Ablative coating around the perimeter, at least 2.5 mm thick	+	At least on three sides (top, right, left)
6.16	Armaflex AF / Armaflex Ultima, d = 20 mm	1	Up to EI 120 S: B × H = 200 × 200 mm – 800 × 400 mm
7.7	Timber stud, at least 60 × 80 mm	2	Up to EI 120 S: B × H = 801 × 401 mm – 1500 × 800 mm
7.10	Trim panels (fire-resistant)	3 - 5	EI 30 S: For all sizes (BxH)
7.11	Trim panels, double layer, staggered joints	(A)	Installation side
7.12	Trim panels, wood sheet, at least 600 kg/m³	(B)	Operating side



GR1728567

Fig. 83: Dry mortarless installation into a half-timbered construction, with a fire batt

- | | | | |
|------|---|----------|--|
| 1 | FK-EU | 7.7 | Timber stud, at least 60 × 80 mm |
| 2.4 | Fire batt with ablative coating | 7.11 | Trim panels, double layer, staggered joints |
| 3.5 | Half-timbered construction, cladding on both sides | 7.13a | Cladding, double layer, fire-resistant |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions | 7.17 | Trimmers, timber (in a half-timbered construction) |
| 6.5 | Mineral wool (depending on wall construction) | 1 | Up to EI 90 S |
| 6.10 | Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$ | (A) | Installation side |
| 6.16 | Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions | (B) | Operating side |

1	FK-EU	7.7	Timber stud, at least 60 × 80 mm
2.4	Fire batt with ablative coating	7.11	Trim panels, double layer, staggered joints
3.4	Timber stud wall (also timber panel constructions), cladding on both sides	7.13	Cladding, double layer, fire-resistant
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, required only if the distance between dampers is $\leq 150\text{ mm}$	7.17	Trimmers, timber stud / nogging, at least 60 × 80 mm, or half-timbered construction
6.3	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$, around the perimeter, $d \geq 40\text{ mm}$	1 2	Up to EI 90 S
6.5	Mineral wool (depending on wall construction)	Ⓐ	Installation side
6.10	Ablative coating around the perimeter, $d = \text{at least } 2.5\text{ mm}$	Ⓑ	Operating side
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, around the perimeter		

Additional requirements

- Timber stud wall or half-timbered construction, ↗ *on page 32*
- Fire batt ↗ *on page 28*
- Casing length L = 375 or 500 mm, for 'flange-to-flange' installation only L = 500 mm
- 70 – 600 mm distance between two fire dampers in one installation opening

5.8 Solid wood walls

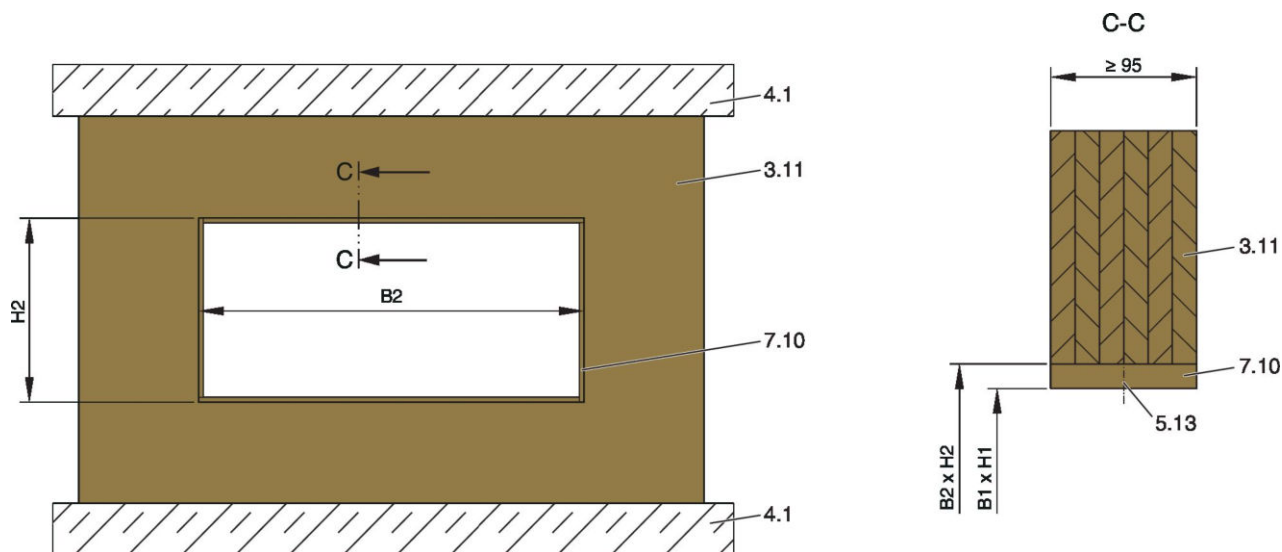


Fig. 85: Solid wood wall

- 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 x H1 Clear installation opening
- B2 x H2 Opening in a solid wood wall / CLT wall
(without trim panels: B2 = B1, H2 = H1)

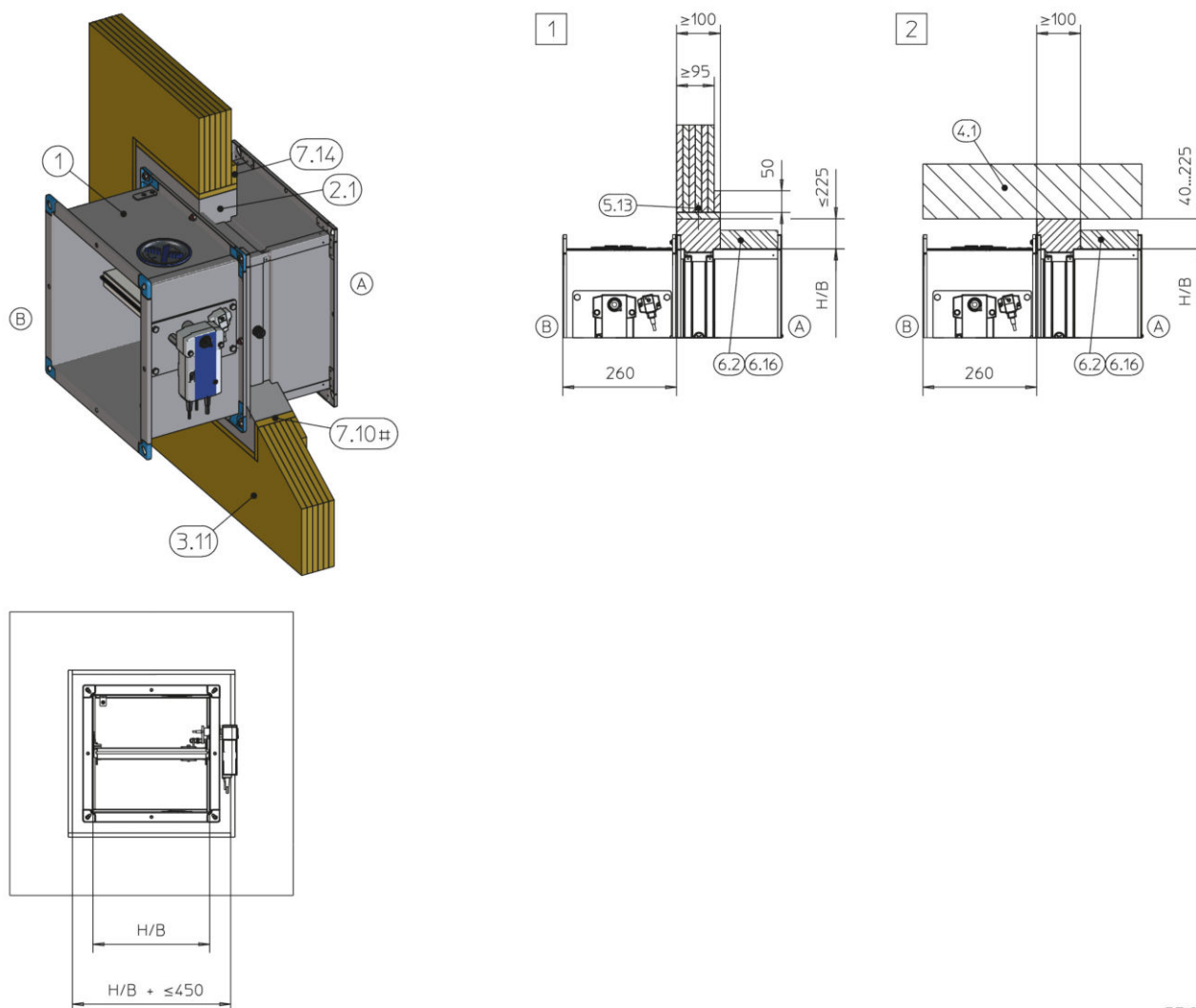
Additional requirements

- Solid wood wall or CLT wall ↗ on page 32

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 dry mortarless installation kit ES ¹	B + 95	H + 95		
Dry mortarless installation with fire batt (EI 90 S)	B + 80 to 1200	H + 80 to 1200		

¹⁾ Installation opening tolerance + 2 mm

5.8.1 Mortar-based installation



GR2730454

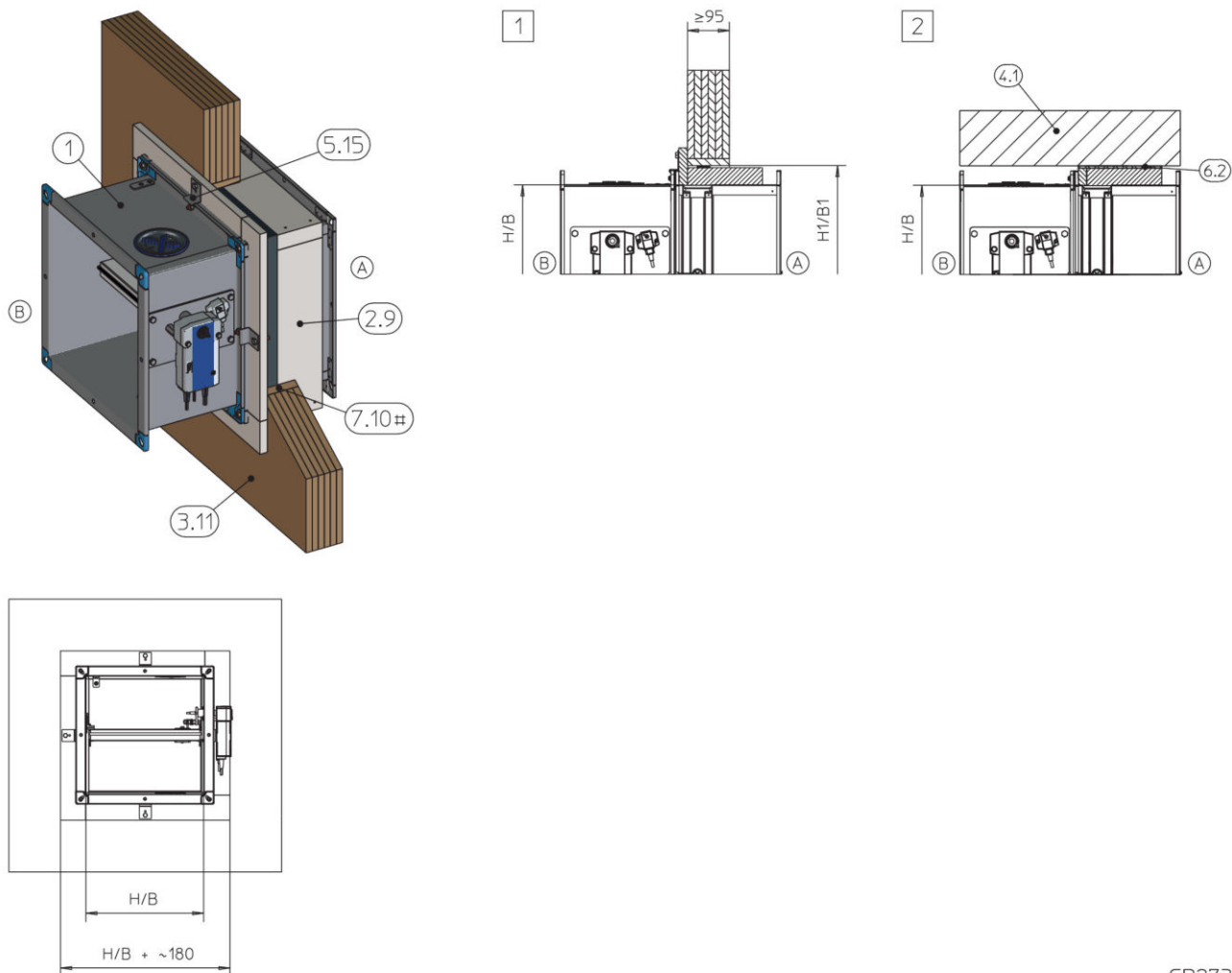
Fig. 86: Mortar-based installation into a solid wood wall or CLT wall

1	FK-EU	7.10	Trim panels
2.1	Mortar	7.14	Reinforcing board of the same material (required if $W < 100$ mm)
3.11	Solid wood wall / CLT wall	#	optional
4.1	Solid ceiling slab	1 2	Up to EI 90 S
5.13	Wood screw or pin	A	Installation side
6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m ³ , $d \geq 40$ mm, required only on the top and only for stainless steel constructions	B	Operating side
6.16	Armaflex AF / Armaflex Ultima, $d = 20$ mm, required only on the top and only for stainless steel constructions		

Additional requirements

- Solid wood wall or CLT wall ↗ on page 32
- Casing length $L = 375$ or 500 mm
- ≥ 200 mm distance between two fire dampers in separate installation openings

5.8.2 Dry mortarless installation with installation kit ES



GR2732211

Fig. 87: Dry mortarless installation into a solid wood wall or CLT wall, with installation kit ES

- | | | | |
|------|---|------------|-------------------|
| 1 | FK-EU | 7.10 | Trim panels |
| 2.9 | Installation kit ES | # | optional |
| 3.11 | Solid wood wall / CLT wall | 1 2 | Up to EI 90 S |
| 4.1 | Solid ceiling slab | Ⓐ | Installation side |
| 5.15 | Bracket | Ⓑ | Operating side |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, gypsum mortar as an alternative | | |

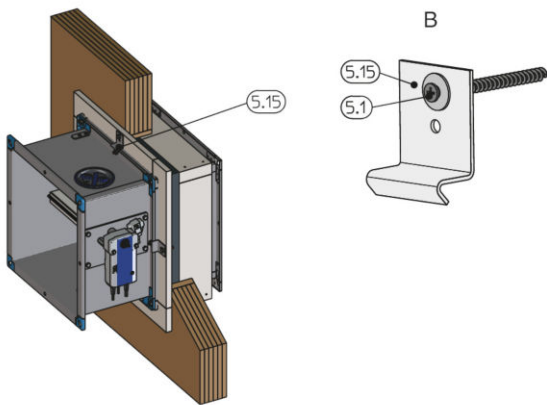


Fig. 88: Fixing to a solid wood wall

5.1 Dry wall screw / washer (to be provided by others)

5.15 Bracket

B For installation openings with trim panels

Additional requirements

- Solid wood wall or CLT wall ↗ on page 32
- Casing length $L = 500 \text{ mm}$
- $\geq 200 \text{ mm}$ distance between two fire dampers in separate installation openings
- 45 mm distance between the fire damper with a shortened installation kit and load-bearing structural elements, see Fig. 87, detail 2

1. ▶ Mount the installation kit onto the fire damper ↗ 33.
2. ▶ Fix the fire damper with brackets and dry wall screws to the solid wood wall, Fig. 88.

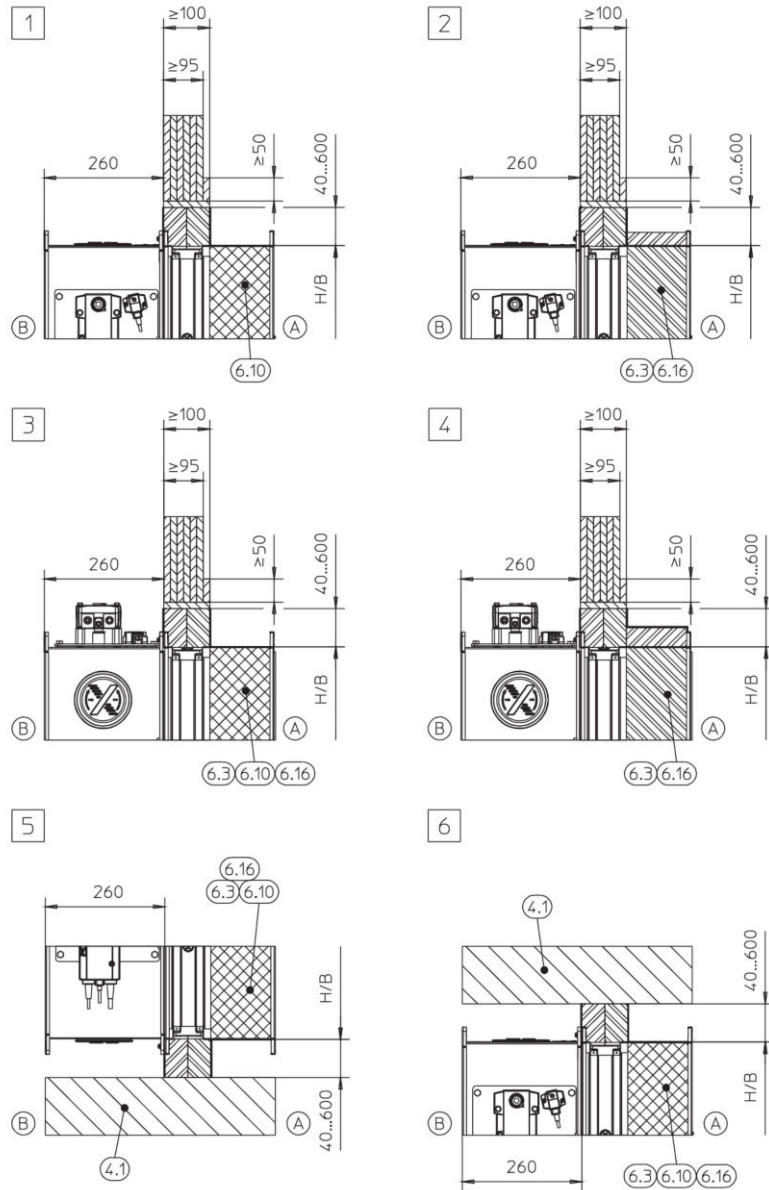
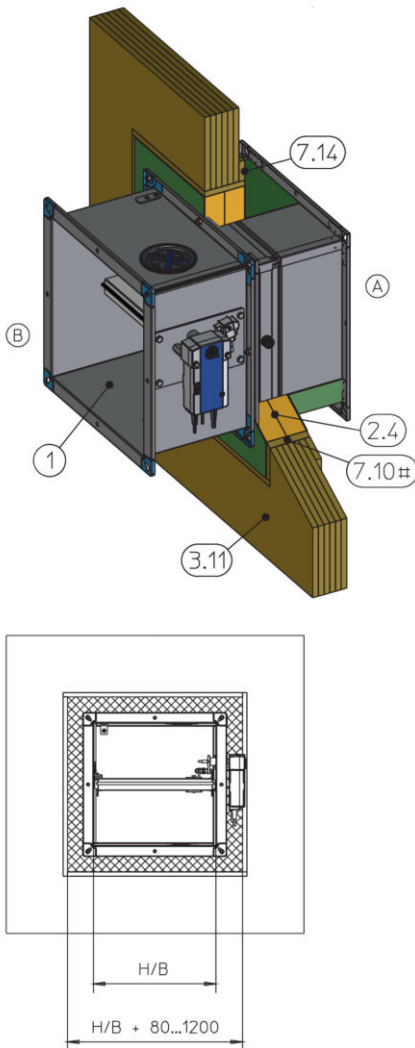
No. of brackets and dry wall screws:

- Side H: 1 each

- Side B: $B \leq 800 \text{ mm}$: 2 each; $B > 800 \text{ mm}$: 3 each

If you have shortened the installation kit and cannot fasten the brackets to side B, fasten them to both sides H.

5.8.3 Dry mortarless installation with fire batt



GR3100938

Fig. 89: Dry mortarless installation into a timber wall or CLT wall, with a fire batt

1	FK-EU	7.14	Reinforcing board of the same material (required if $W < 100$ mm)
2.4	Fire batt with ablative coating	#	optional
3.11	Solid wood wall / CLT wall	1 2	Up to EI 90 S: for all sizes (BxH)
4.1	Solid ceiling slab / solid floor	3	Up to EI 90 S:
6.3	Mineral wool, ≥ 1000 °C, ≥ 100 kg/m ³ , d = 30 mm, around the perimeter		B x H = 200 x 200 mm – 800 x 400 mm
6.10	Ablative coating around the perimeter, d = at least 2.5 mm	4	Up to EI 90 S:
6.16	Armaflex AF / Armaflex Ultima, d = 20 mm		B x H = 801 x 401 mm – 1500 x 800 mm
7.10	Trim panels	5 6	Up to EI 90 S: for all sizes (BxH)
		(A)	Installation side
		(B)	Operating side

Additional requirements

- Solid wood wall or CLT wall ↗ *on page 32*
- Fire batt ↗ *on page 28*
- Casing length L = 375 or 500 mm
- ≥ 200 mm distance between two fire dampers in separate installation openings

5.9 Compartment walls

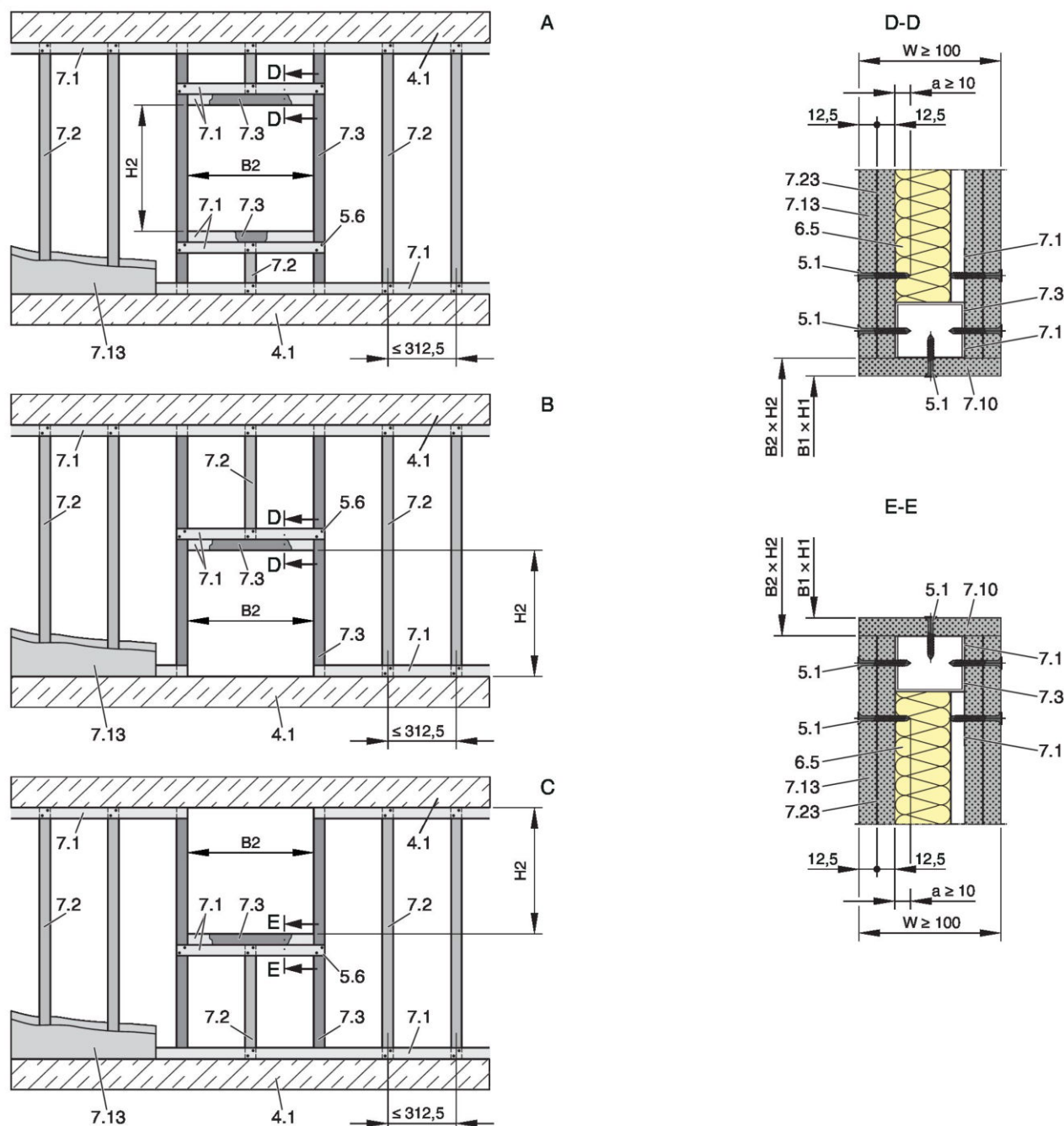


Fig. 90: Compartment wall with metal support structure and cladding on both sides

A	Compartment wall / safety partition wall	7.2	CW section
B	Compartment wall / safety partition wall, installation near the floor	7.3	UA section
C	Compartment wall / safety partition wall, installation near the ceiling	7.10	Optional trim panels, according to installation details
4.1	Solid ceiling slab / solid floor	7.13	Double layer cladding, fire-resistant, on both sides of the metal stud system
5.1	Dry wall screw	7.23	Sheet steel insert depending on wall manufacturer
5.6	Screw or steel rivet	B1 x H1	Installation opening
6.5	Mineral wool (depending on wall construction)	B2 x H2	Opening in the metal support structure (without trim panels: B2 = B1, H2 = H1)
7.1	UW section		

For more details on the metal support structure, see ↗ *'Metal stud system' on page 108*

Additional requirements

- Compartment wall ↗ *on page 31*

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 dry mortarless installation kit ES ^{1, 2}	B + 95	H + 95		

¹⁾ Optional trim panels (12.5 mm max. when used together with installation kit ES)

²⁾ Installation opening tolerance + 2 mm

Metal stud system

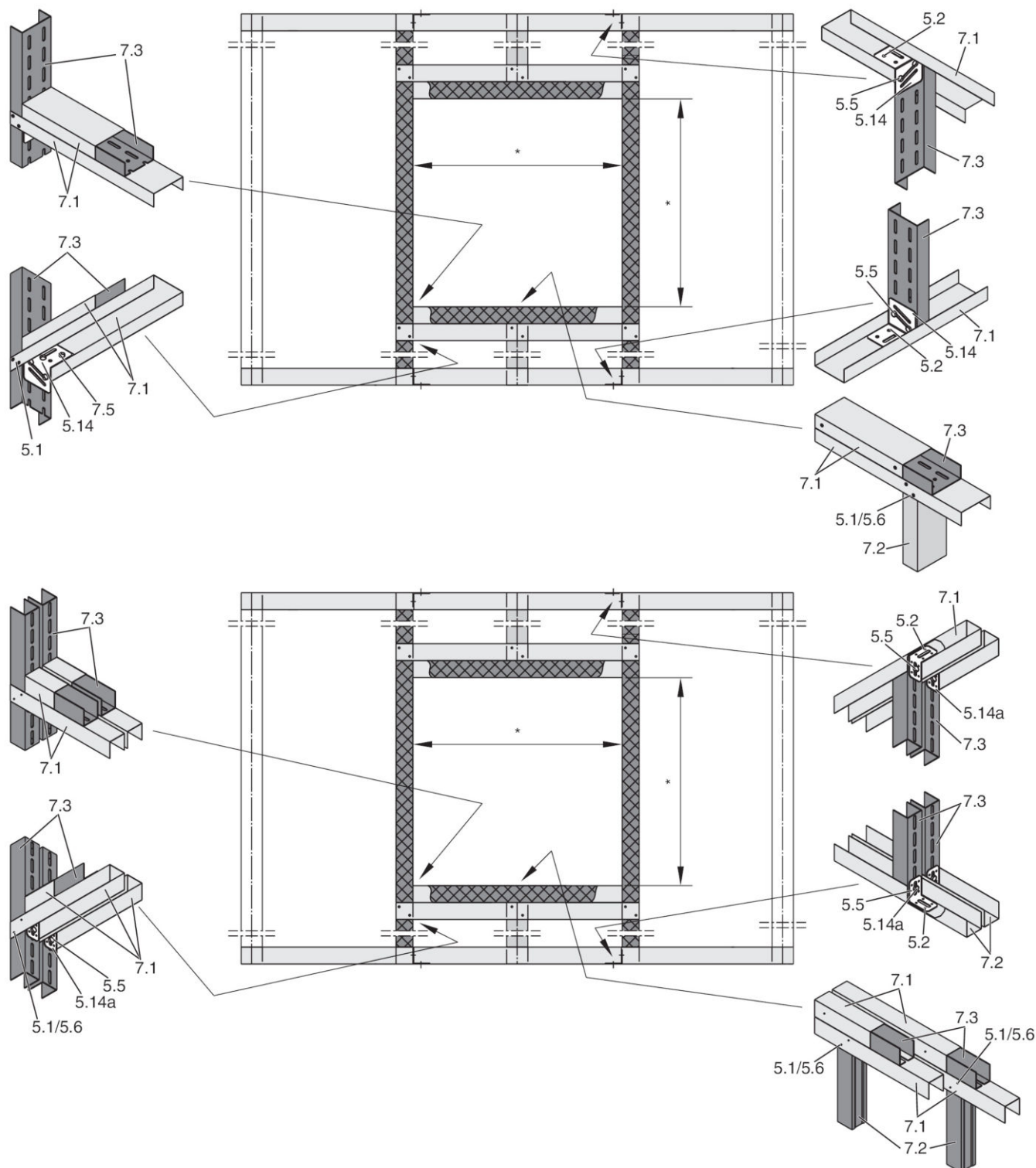
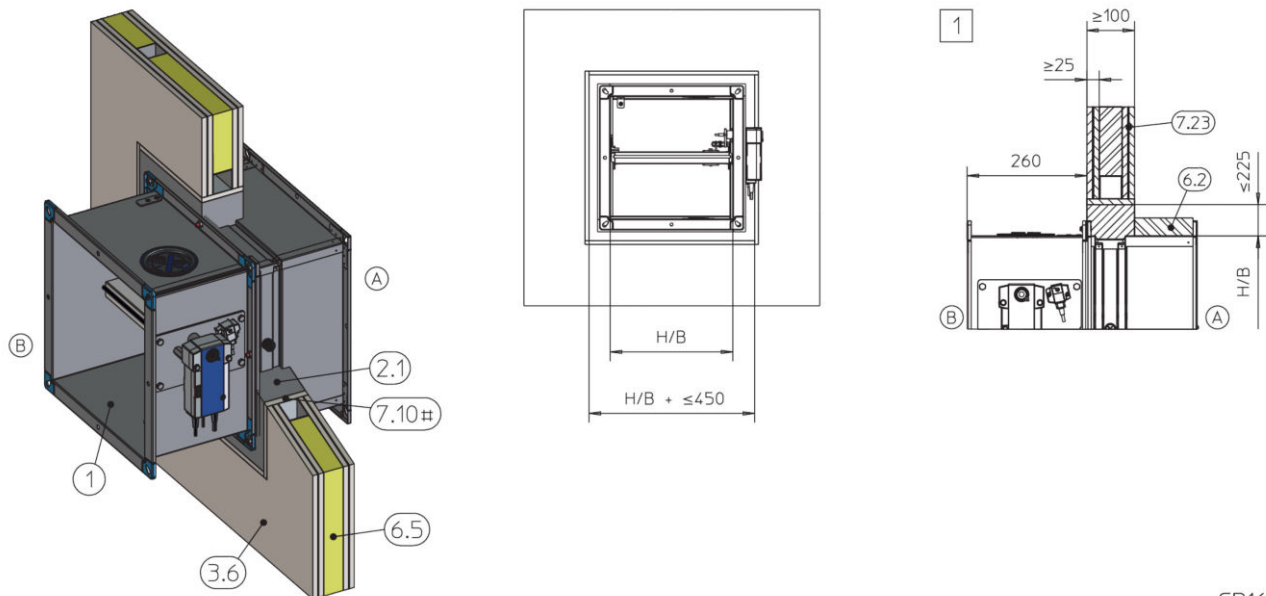


Fig. 91: Single stud system and double stud system

5.1	Dry wall screw	7.1	UW section
5.2	Hexagon head screw M6	7.2	CW section
5.5	Carriage bolt, $L \leq 50$ 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 106

5.9.1 Mortar-based installation



GR1672614

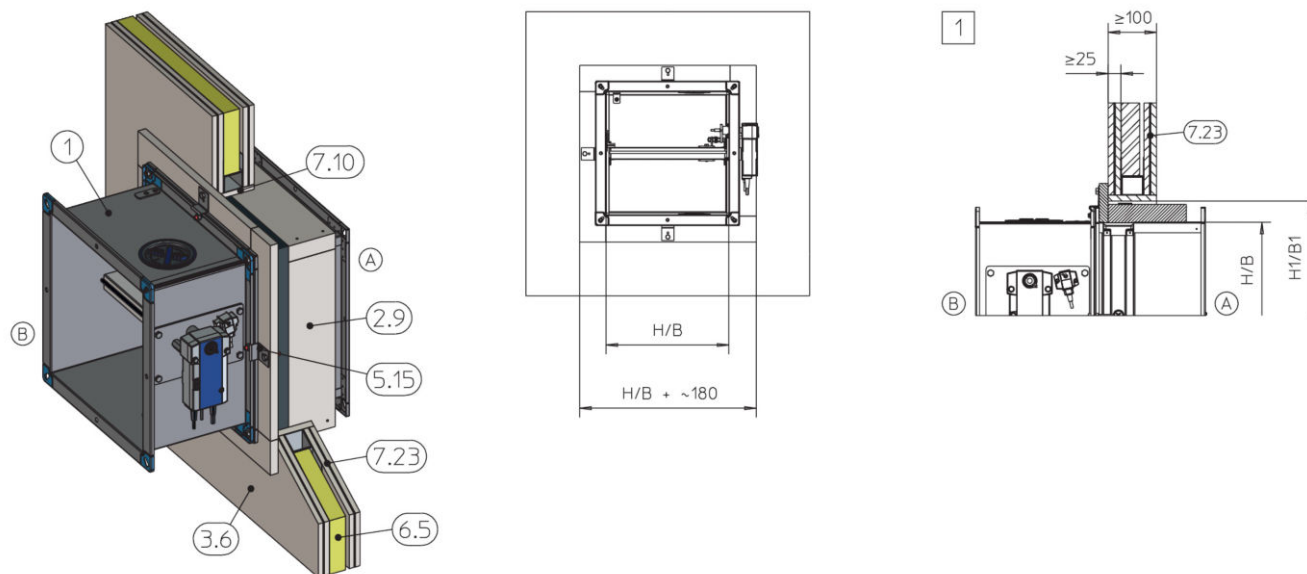
Fig. 92: Mortar-based installation into a compartment wall or safety partition wall

1	FK-EU	7.23	Sheet steel insert depending on wall manufacturer
2.1	Mortar	#	optional
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	1	Up to EI 90 S
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, required only on the top and only for stainless steel constructions	A	Installation side
6.5	Mineral wool (depending on wall construction)	B	Operating side
7.10	Trim panels		

Additional requirements

- Compartment wall ↗ on page 31
- Casing length $L = 375$ or 500 mm
- $\geq 200\text{ mm}$ distance between two fire dampers in separate installation openings

5.9.2 Dry mortarless installation with installation kit ES



GR1672612

Fig. 93: Dry mortarless installation into a compartment wall or safety partition wall, with installation kit ES

1	FK-EU	7.10	Optional trim panels (12.5 mm max.), according to installation details
2.9	Installation kit ES	7.23	Sheet steel insert
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	1	Up to EI 90 S
5.15	Bracket	A	Installation side
6.5	Mineral wool (depending on wall construction)	B	Operating side

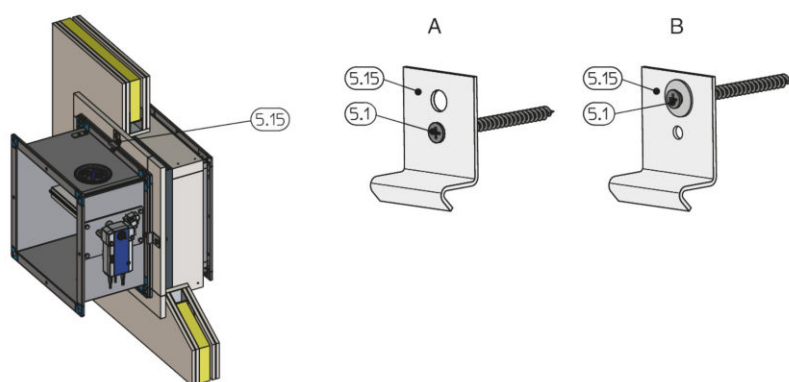


Fig. 94: Fastening the assembly to the metal studs

5.1	Dry wall screw / washer (to be provided by others)	A	For installation openings without trim panels
5.15	Bracket	B	For installation openings with trim panels

Additional requirements

- Compartment wall ↗ on page 31
 - Casing length L = 500 mm
 - 90 mm distance between the fire damper and load-bearing structural elements, around the perimeter
 - 45 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 ↗ 33.
 2. ▶ Attach the fire damper with brackets and dry wall screws to the metal support structure, see Fig. 94.
No. of brackets and dry wall screws:
 - Side H: 1 each
 - Side B: B ≤ 800 mm: 2 each; B > 800 mm: 3 each



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

Additional requirements

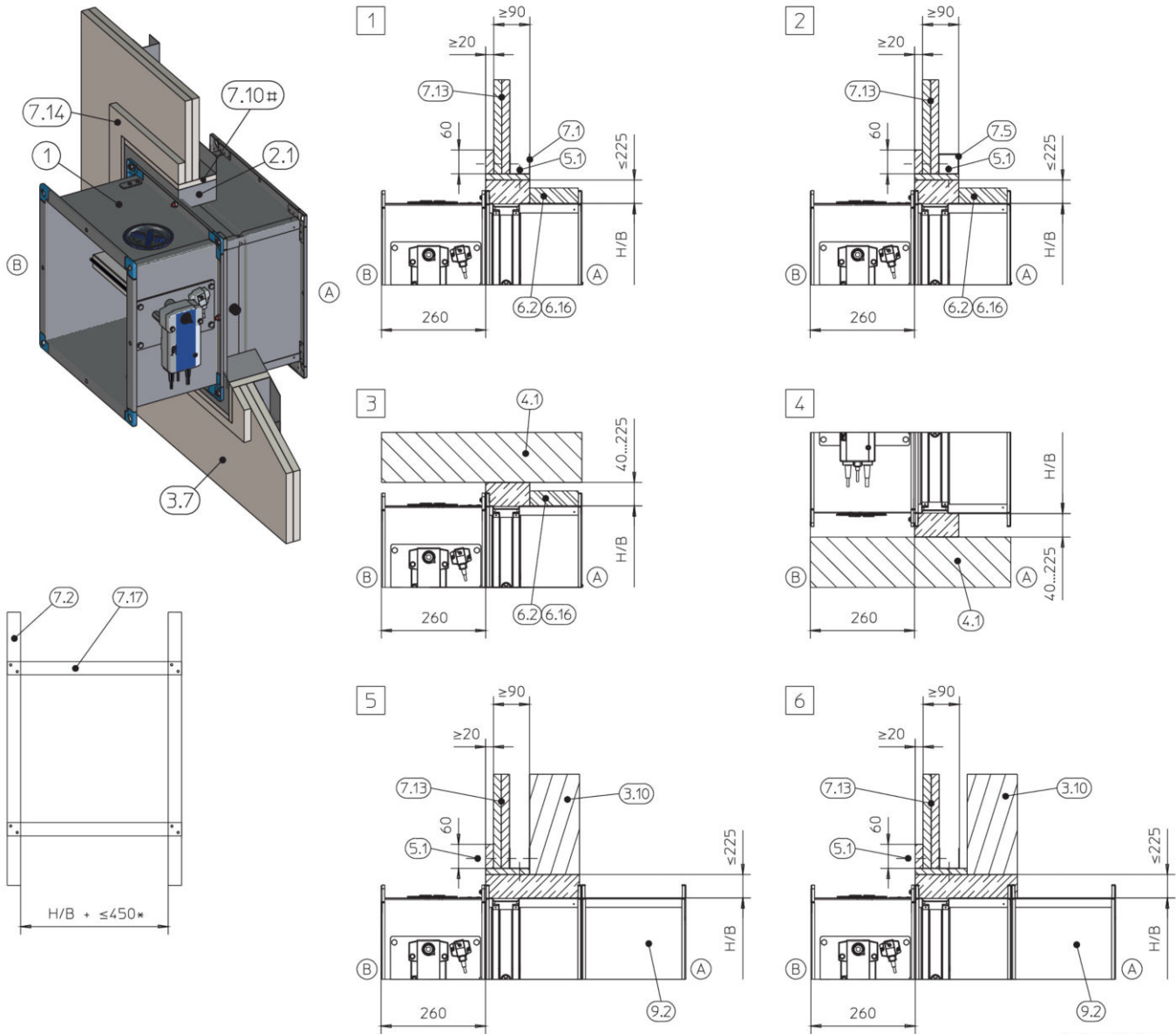
- Shaft wall  on page 32

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 dry mortarless installation kit ES ^{1, 2}	B + 95	H + 95		

¹⁾ Optional trim panels (12.5 mm max. when used together with installation kit ES)

²⁾ Installation opening tolerance + 2 mm

5.10.1 Mortar-based installation



GR2697238

Fig. 96: Mortar-based installation in shaft wall with metal support structure

1	FK-EU	7.13	Cladding, double layer, fire-resistant
2.1	Mortar	7.14	Reinforcing board of the same material as the wall
3.7	Shaft wall with metal support structure, cladding on one side	7.17	Trimmers, UW section
3.10	Wall without adequate fire resistance rating	9.2	Extension piece or duct
4.1	Solid ceiling slab / solid floor	*	Can be increased to account for the thickness of the trim panels
5.1	Dry wall screw	#	optional
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	1 – 4	Up to EI 90 S
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions	5 – 6	EI 30 S
7.1	UW section	(A)	Installation side
7.5	Steel support structure (box section)	(B)	Operating side
7.10	Trim panels		

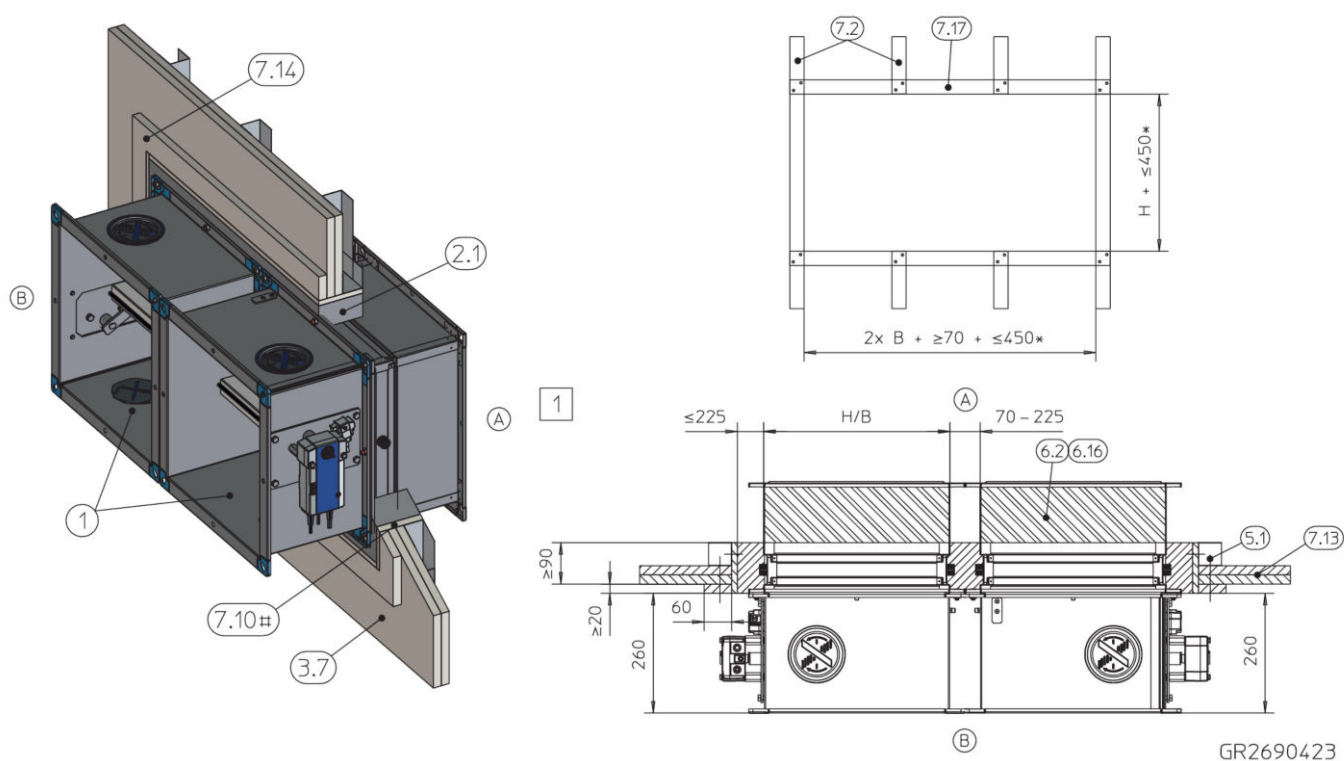
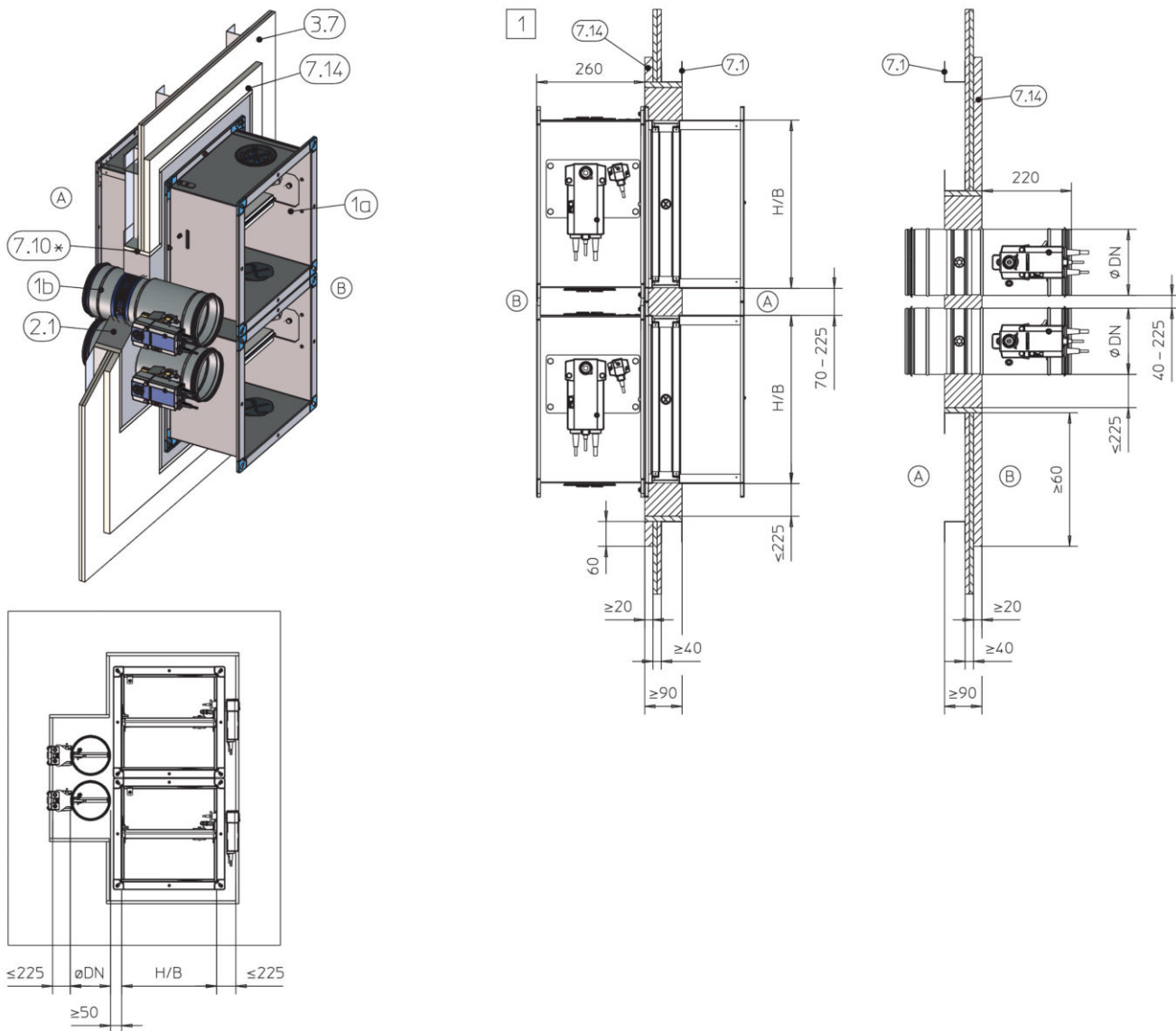


Fig. 97: Mortar-based installation into a shaft wall with metal support structure, flange to flange, illustration shows side by side installation (applies also to installation of dampers on top of each other)

- | | | | |
|------|--|------|--|
| 1 | FK-EU up to B × H = 800 × 400 mm | 7.13 | Cladding, double layer, fire-resistant |
| 2.1 | Mortar | 7.14 | Reinforcing board of the same material as the wall |
| 3.7 | Shaft wall with metal support structure, cladding on one side | 7.17 | Trimmers, UW section |
| 5.1 | Dry wall screw | * | Can be increased to account for the thickness of the trim panels |
| 6.2 | Mineral wool, ≥ 1000 °C, ≥ 80 kg/m ³ , d ≥ 40 mm, required only on the top and only for stainless steel constructions | # | optional |
| 6.16 | Armaflex AF / Armaflex Ultima, d = 20 mm, required only on the top and only for stainless steel constructions | 1 | Up to EI 90 S |
| 7.2 | CW section | A | Installation side |
| 7.10 | Trim panels | B | Operating side |




GR3048273

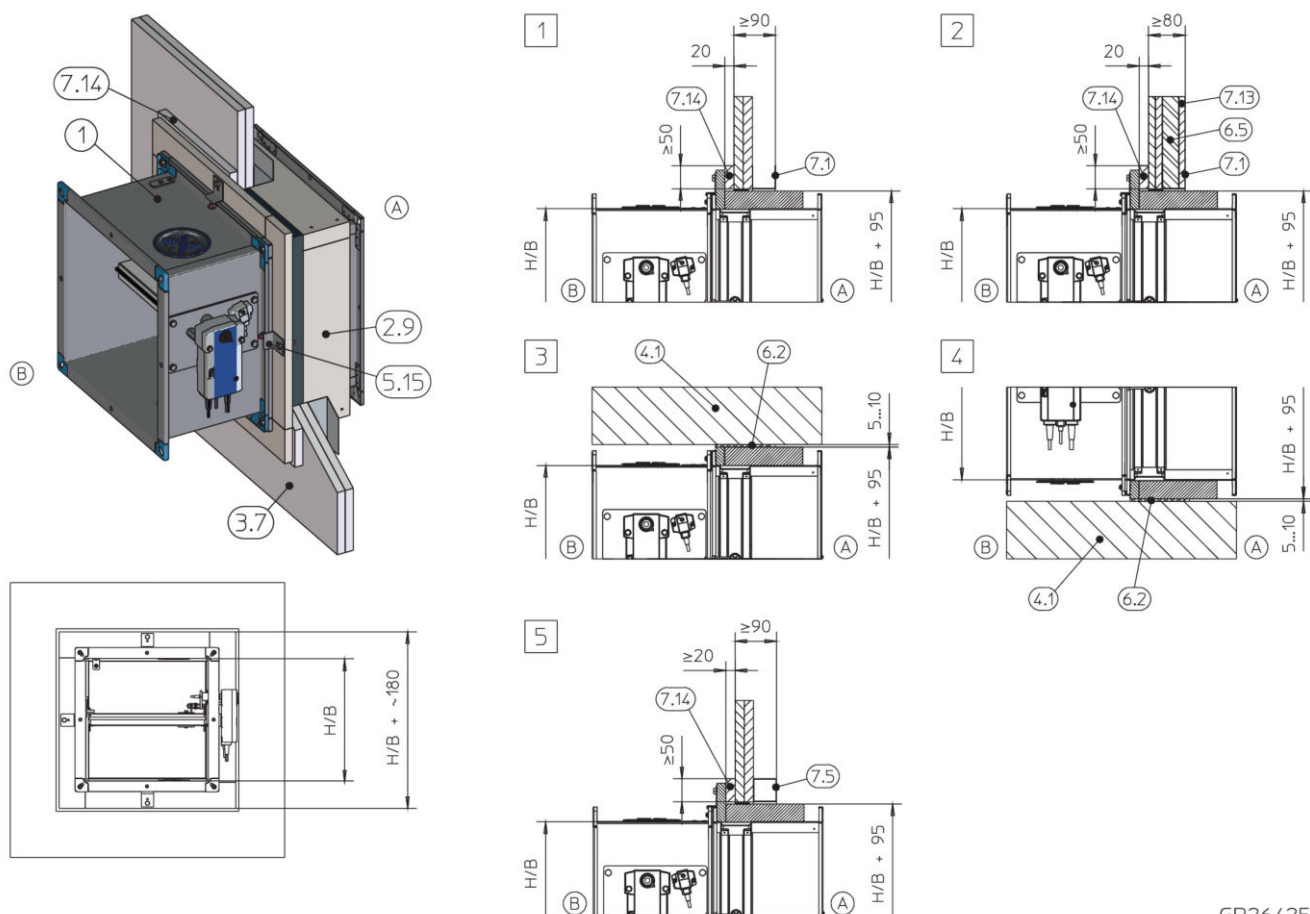
Fig. 98: Mortar-based installation into a shaft wall, FK-EU and FKRS-EU combined

1a	FK-EU up to $B \times H = 800 \times 400$ mm	7.14	Reinforcing board of the same material as the wall
1b	FKRS-EU	#	optional
2.1	Mortar	1	Up to EI 90 S
3.7	Shaft wall with metal support structure, cladding on one side	A	Installation side
7.1	UW section	B	Operating side
7.10	Trim panels		

Additional requirements

- Shaft wall  on page 32
- Casing length $L = 500$ mm
- ≥ 200 mm distance between two fire dampers in separate installation openings
- 'Flange-to-flange' installation of two FK-EU fire dampers into one installation opening is only possible if both dampers are of the same size; if FK-EU and FKRS-EU are to be installed together in the same installation opening, the size of FK-EU must not exceed $B \times H = 800 \times 400$ mm

5.10.2 Dry mortarless installation with installation kit ES



GR2642540

Fig. 99: Dry mortarless installation into a shaft wall with metal support structure, with installation kit ES

- | | | | |
|------|---|--------------|--|
| 1 | FK-EU | 7.1 | UW section |
| 2.9 | Installation kit ES (shortened for installation near the floor or ceiling) | 7.5 | Steel support structure (box section) |
| 3.7 | Shaft wall with metal support structure, cladding on one side | 7.13 | Cladding / inserted layer |
| 4.1 | Solid ceiling slab / solid floor | 7.14 | Reinforcing board of the same material as the wall |
| 5.15 | Bracket | 1 – 5 | Up to EI 90 S |
| 6.2 | Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, or gypsum mortar (to even out an uneven ceiling or floor) | A | Installation side |
| 6.5 | Mineral wool (depending on wall construction) | B | Operating side |

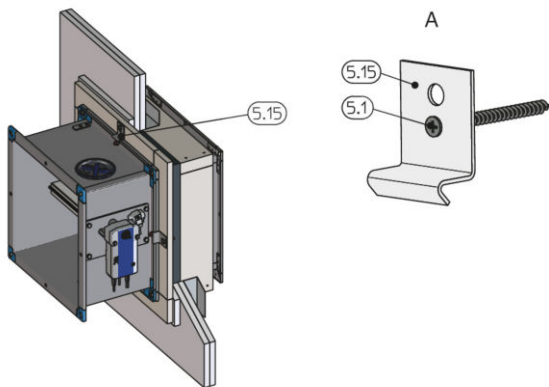


Fig. 100: Fastening the assembly to the metal studs

5.1 Dry wall screw

5.15 Bracket

A For installation openings without trim panels

Additional requirements

- Shaft wall ↗ on page 32
- Casing length L = 500 mm
- 90 mm distance between the fire damper and load-bearing structural elements, around the perimeter
- 45 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 ↗ 33.
2. ▶ Attach the fire damper with brackets and dry wall screws to the metal support structure, see Fig. 100.

No. of brackets and dry wall screws:

- Side H: 1 each

- Side B: B ≤ 800 mm: 2 each; B > 800 mm: 3 each

If you have shortened the installation kit and cannot fasten the brackets to side B, fasten them to both sides H.

5.11 Shaft walls without metal support structure

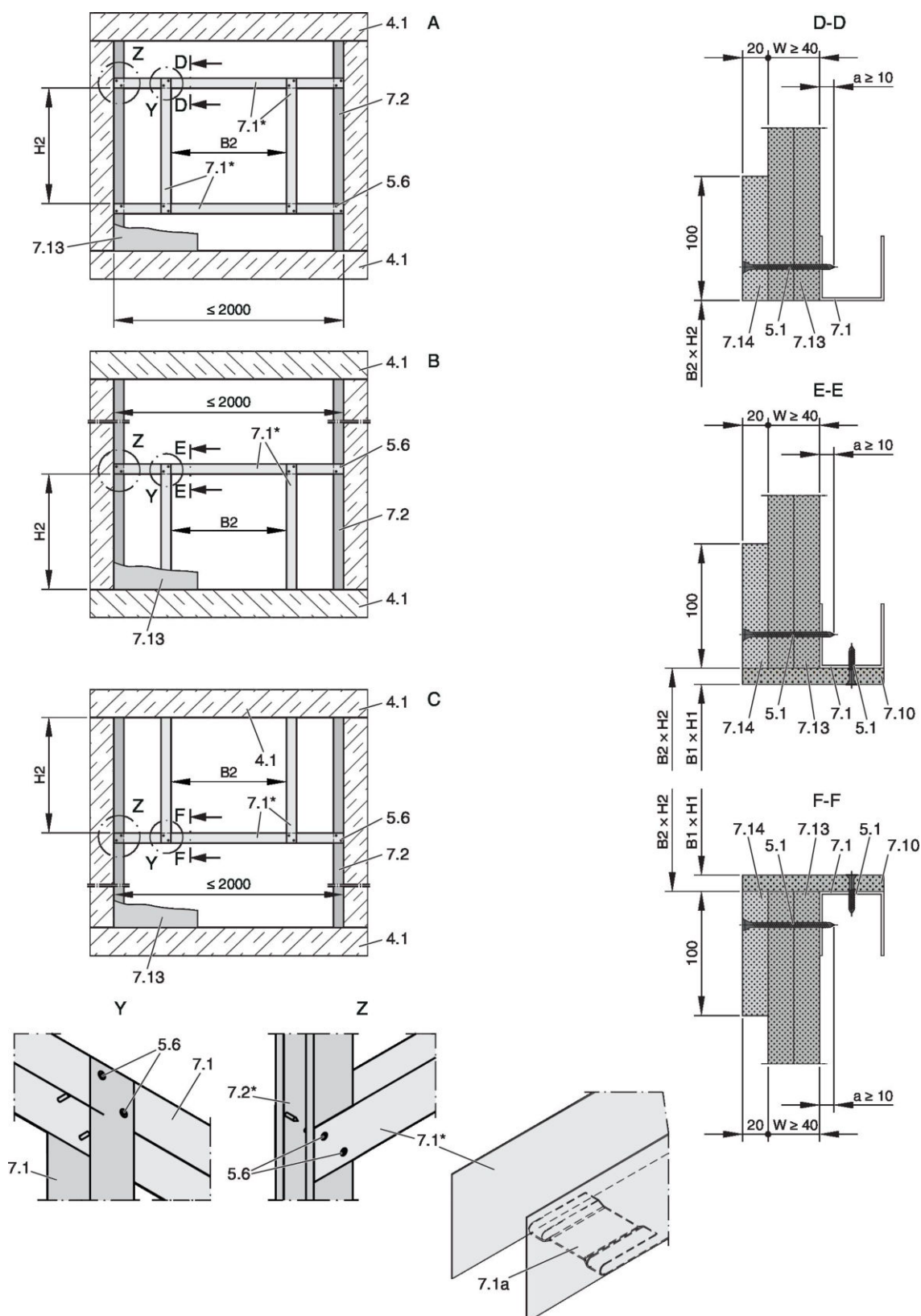


Fig. 101: Shaft wall without metal support structure and with cladding on one side

Shaft walls without metal support structure

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

Additional requirements

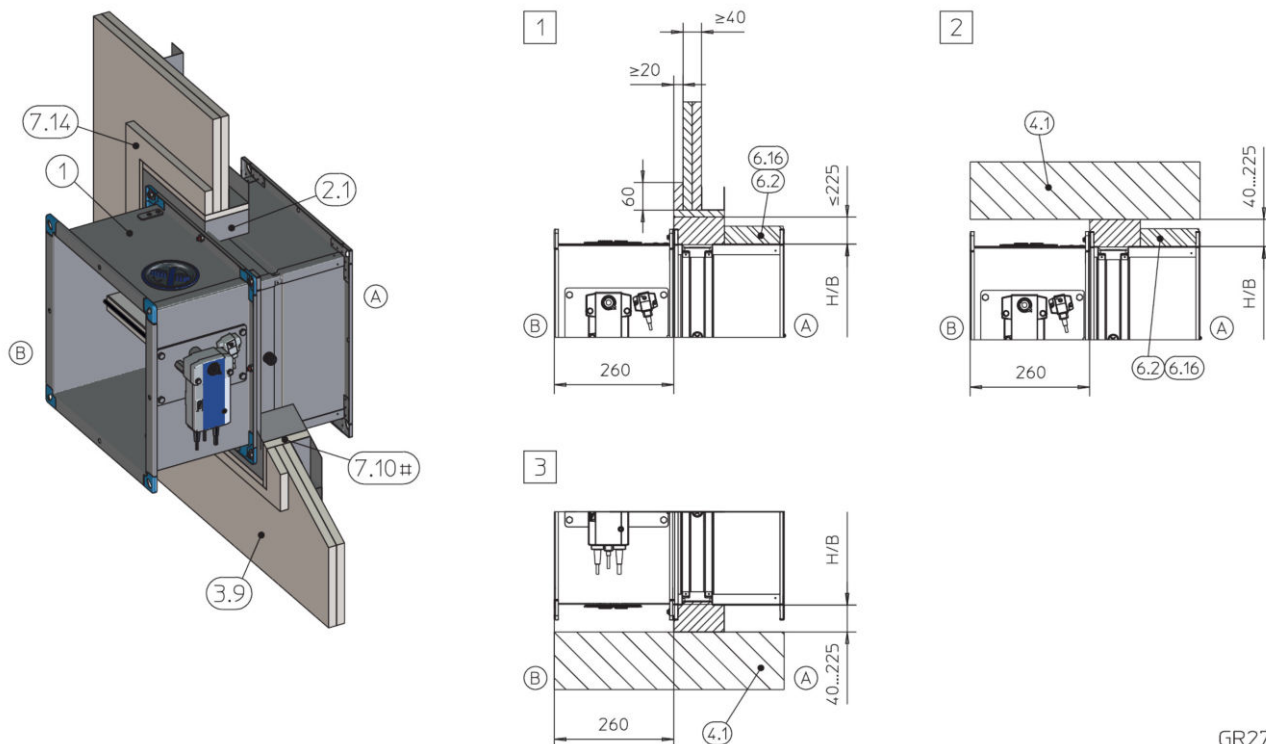
- Shaft wall  on page 32

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 dry mortarless installation kit ES ^{1, 2}	B + 95	H + 95		

¹⁾ Optional trim panels (12.5 mm max. when used together with installation kit ES)

²⁾ Installation opening tolerance + 2 mm

5.11.1 Mortar-based installation




GR2740230

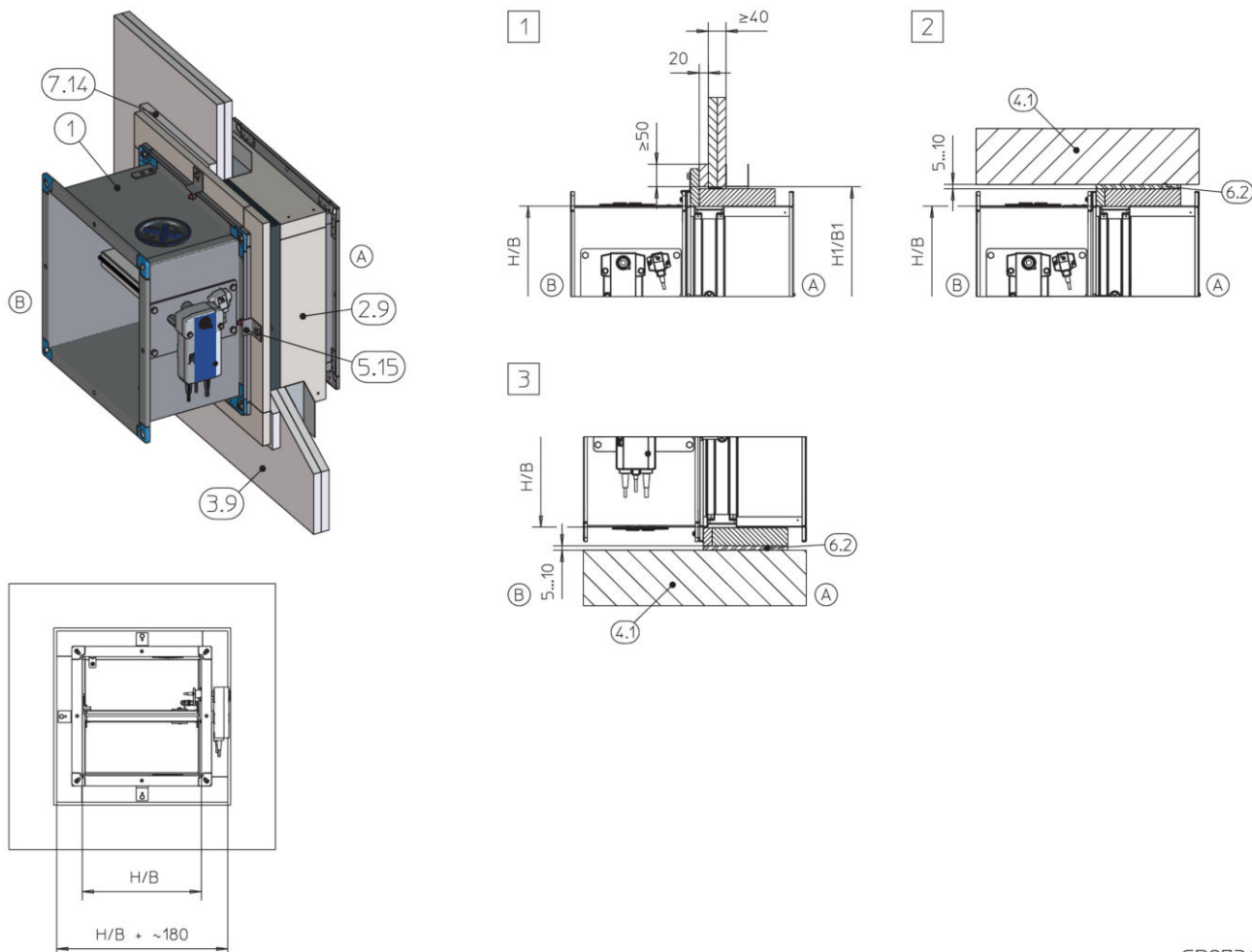
Fig. 102: Mortar-based installation in a shaft wall without metal support structure

1	FK-EU	7.10	Trim panels
2.1	Mortar	7.14	Reinforcing board of the same material as the wall
3.9	Shaft wall without metal support structure, cladding on one side	#	optional
4.1	Solid ceiling slab / solid floor	1 – 3	Up to EI 90 S
6.2	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$, $d \geq 40\text{ mm}$, required only on the top and only for stainless steel constructions	A	Installation side
6.16	Armaflex AF / Armaflex Ultima, $d = 20\text{ mm}$, required only on the top and only for stainless steel constructions	B	Operating side

Additional requirements

- Shaft wall  on page 32
- Casing length $L = 500\text{ mm}$
- $\geq 200\text{ mm}$ distance between two fire dampers in separate installation openings

5.11.2 Dry mortarless installation with installation kit ES



GR2736517

Fig. 103: Dry mortarless installation in shaft wall without metal support structure

1	FK-EU	6.2	Mineral wool, ≥ 1000 °C, ≥ 80 kg/m ³ , or gypsum mortar (to even out an uneven ceiling or floor)
2.9	Installation kit ES	7.14	Reinforcing board of the same material as the wall
3.9	Shaft wall without metal support structure, cladding on one side	1 – 3	Up to EI 90 S
4.1	Solid ceiling slab / solid floor	(A)	Installation side
5.15	Bracket	(B)	Operating side

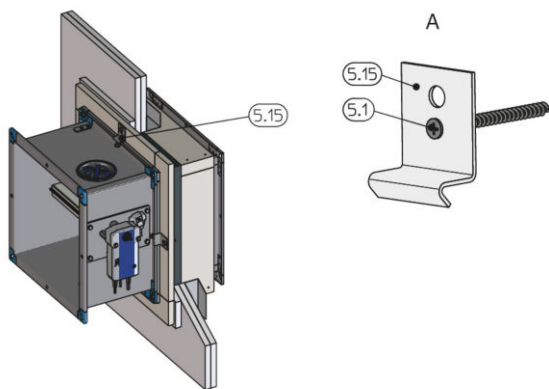


Fig. 104: Fixing the damper to the perimeter metal sections

5.1 Dry wall screw

5.15 Bracket

A For installation openings without trim panels

Additional requirements

- Shaft wall ↗ on page 32
- Casing length L = 500 mm
- 90 mm distance between the fire damper and load-bearing structural elements, around the perimeter
- 45 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 ↗ 33.
2. ▶ Fix the fire damper with brackets and dry wall screws to the perimeter metal sections, see Fig. 104.

No. of brackets and dry wall screws:

- Side H: 1 each

- Side B: B ≤ 800 mm: 2 each; B > 800 mm: 3 each

If you have shortened the installation kit and cannot fasten the brackets to side B, fasten them to both sides H.

5.12 Fixing the fire damper

5.12.1 General

Fire dampers installed remote from walls can be suspended using adequately sized threaded steel rods. 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 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. Ducts must be suspended separately. For weights [kg] of FK-EU fire dampers see [on page 10](#)

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).

Size of threaded rods

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

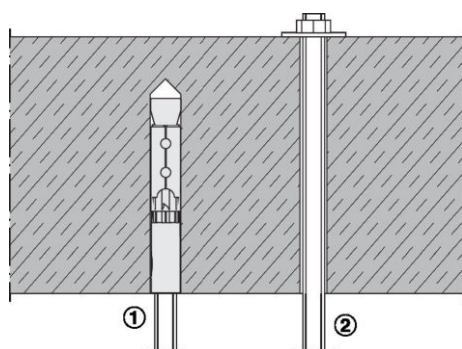
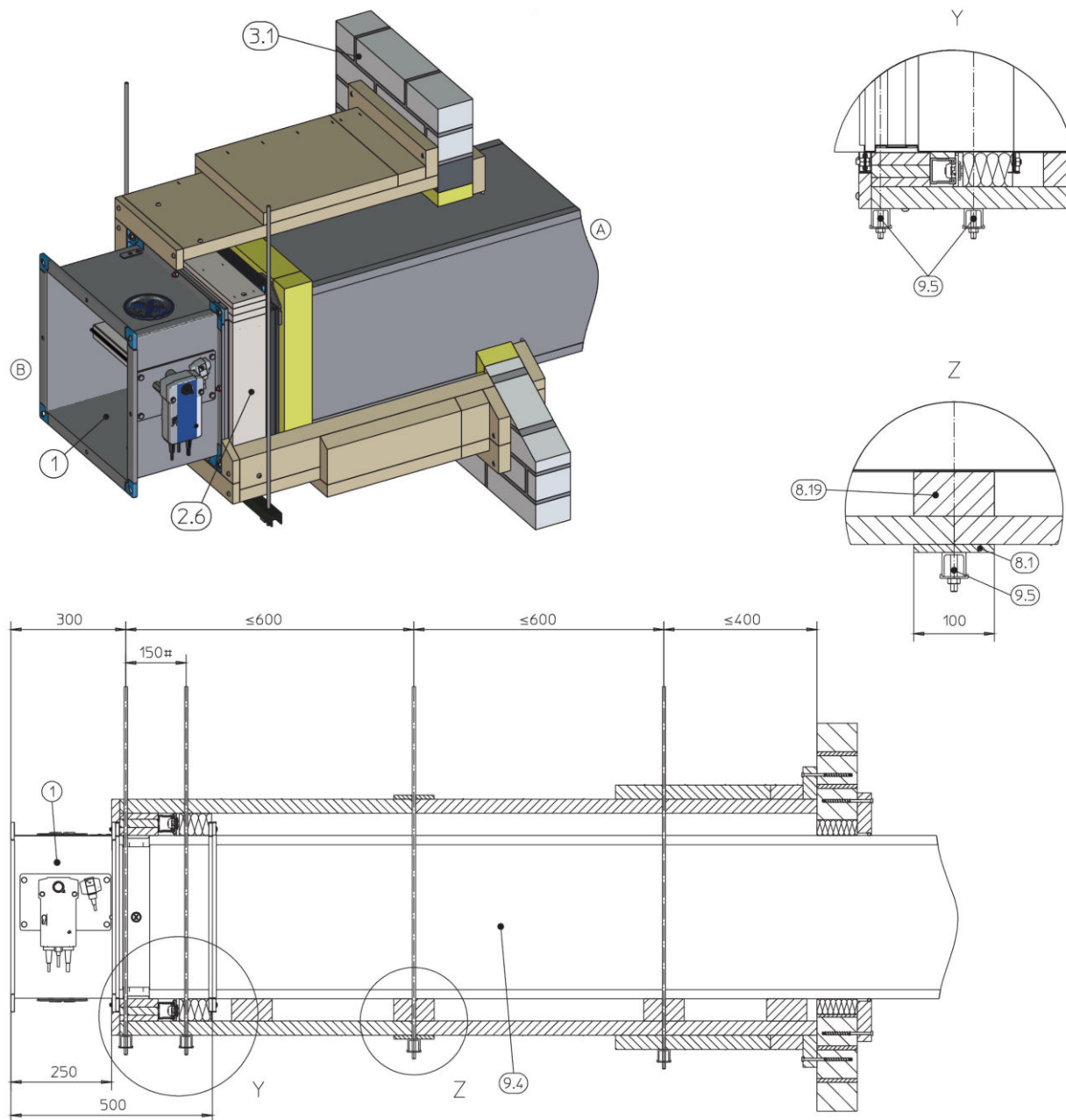


Fig. 105: Fixing to the ceiling slab

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

Fixing the fire damper > Suspending fire dampers installed remote from solid walls and ceiling slab...

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



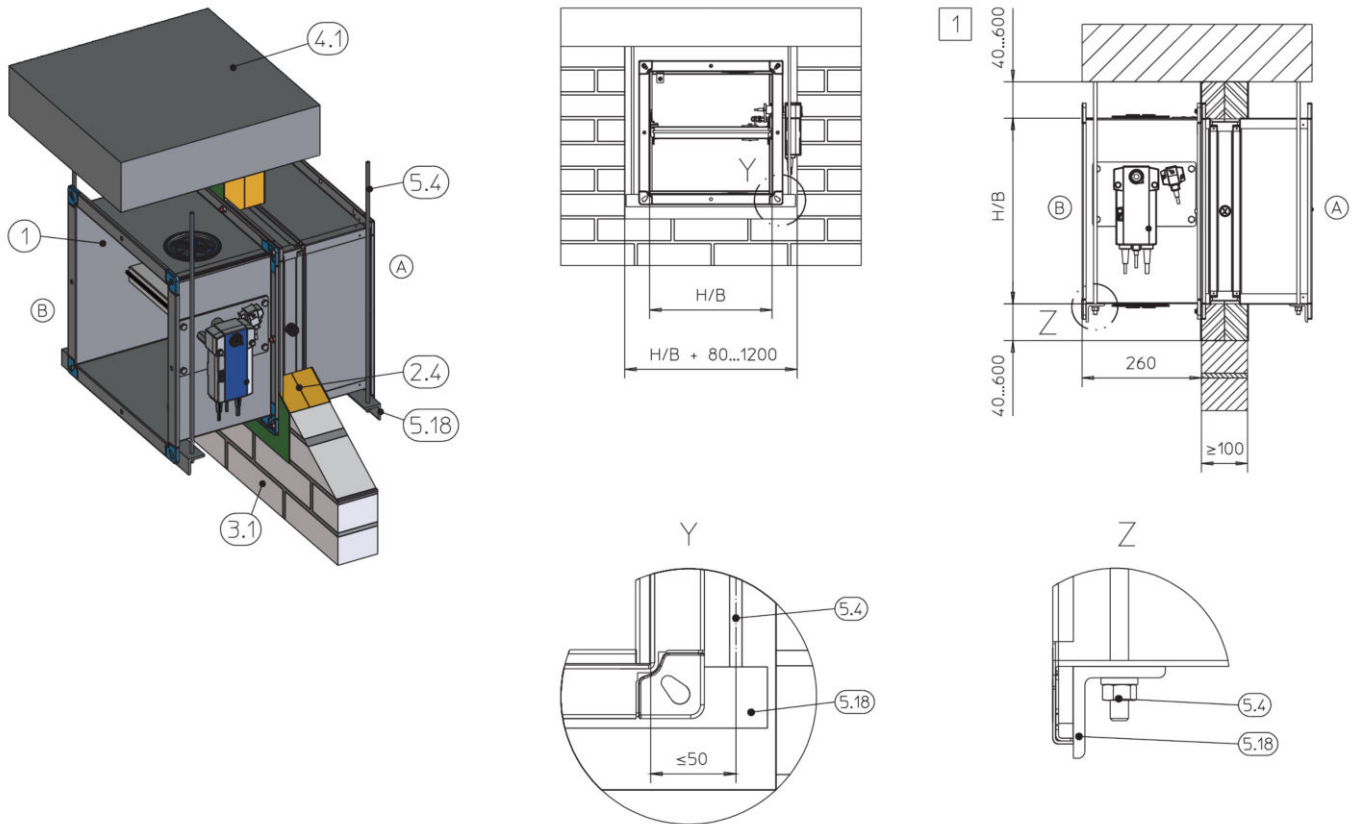
GR3119639

Fig. 106: Dry mortarless installation into a solid wall, with installation kit WE

- | | | | |
|------|--|-----|---|
| 1 | FK-EU | a | Threaded rod M12 |
| 2.6 | Installation kit WE (factory assembled) | b | Hilti mounting rail MQ, 41 × 3, or equivalent |
| 3.1 | Solid wall | c | Hilti drilled plate, MQZ L13 or equivalent |
| 8.1 | PROMATECT®-H strips, b ≥ 100 mm, d = 10 mm | d | Hexagon nut M12 with washer |
| 8.19 | Support (PROMATECT®-LS board) | # | Damper sizes > 1000 × 600 mm require two suspension points underneath the damper, at a distance of 150 mm from each other |
| 9.4 | Sheet steel duct with L90 cladding and suspension system according to Promat® manual, construction 478, latest edition | (A) | Installation side |
| 9.5 | Suspension system consisting of: | (B) | Operating side |

5.12.3 Fixing the damper when a fire batt is used

Horizontal duct



GR1940250

Fig. 107: Dry mortarless installation with a fire batt, illustration shows installation into a solid wall (applies also to installation into a lightweight partition wall)

- | | | | |
|-----|--------------------------------------|------|---|
| 1 | FK-EU | 5.18 | Steel angle section to EN 10056-1,
L ≥ 40 mm × 40 mm × 5 mm, galvanised or
painted, or equivalent |
| 2.4 | Fire batt with ablative coating | 1 | Up to EI 60 S |
| 3.1 | Solid wall | A | Installation side |
| 4.1 | Solid ceiling slab | B | Operating side |
| 5.4 | Threaded rod M12 with washer and nut | | |

Note: Each fire damper has to be suspended both on the operating side and on the installation side.

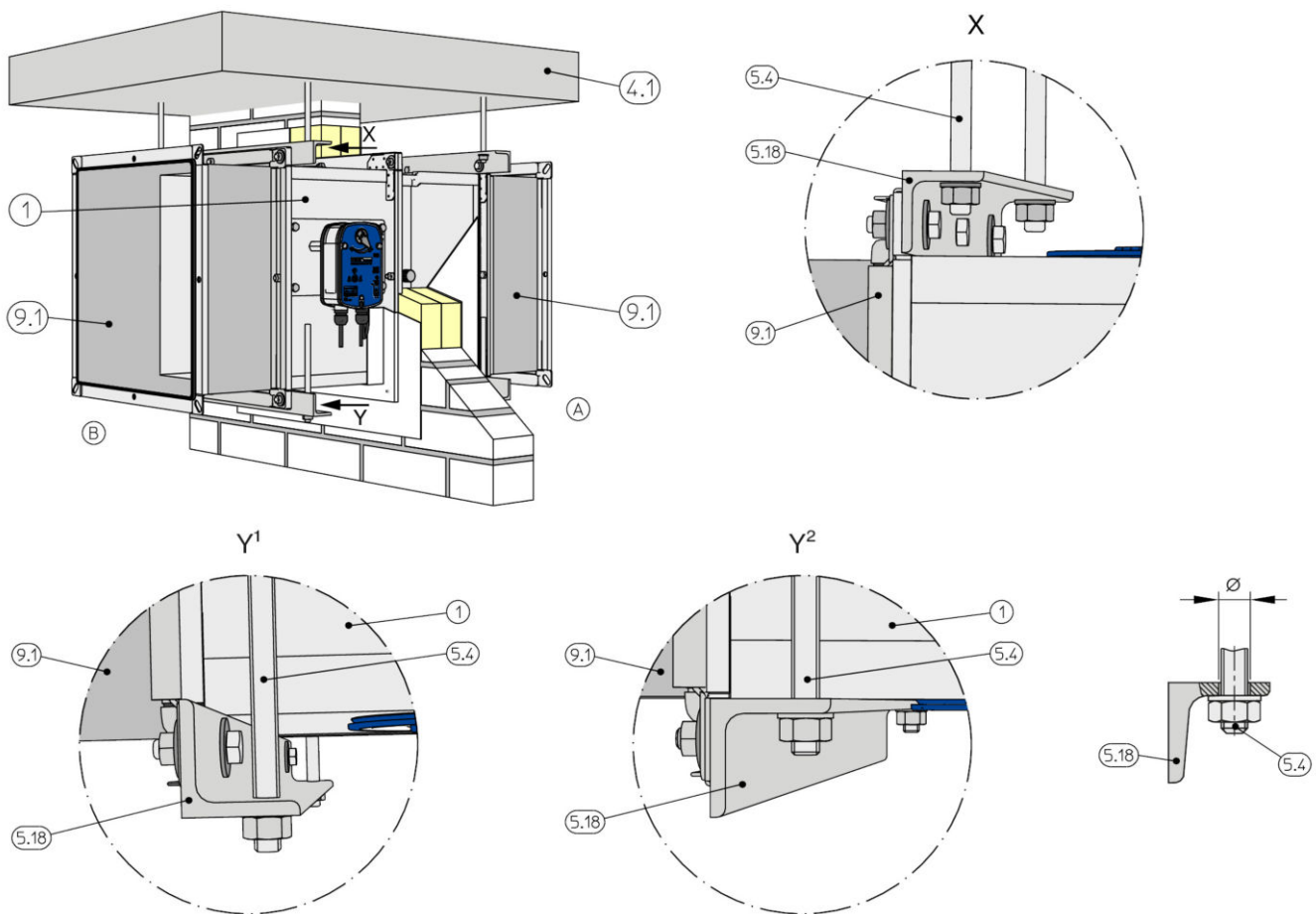
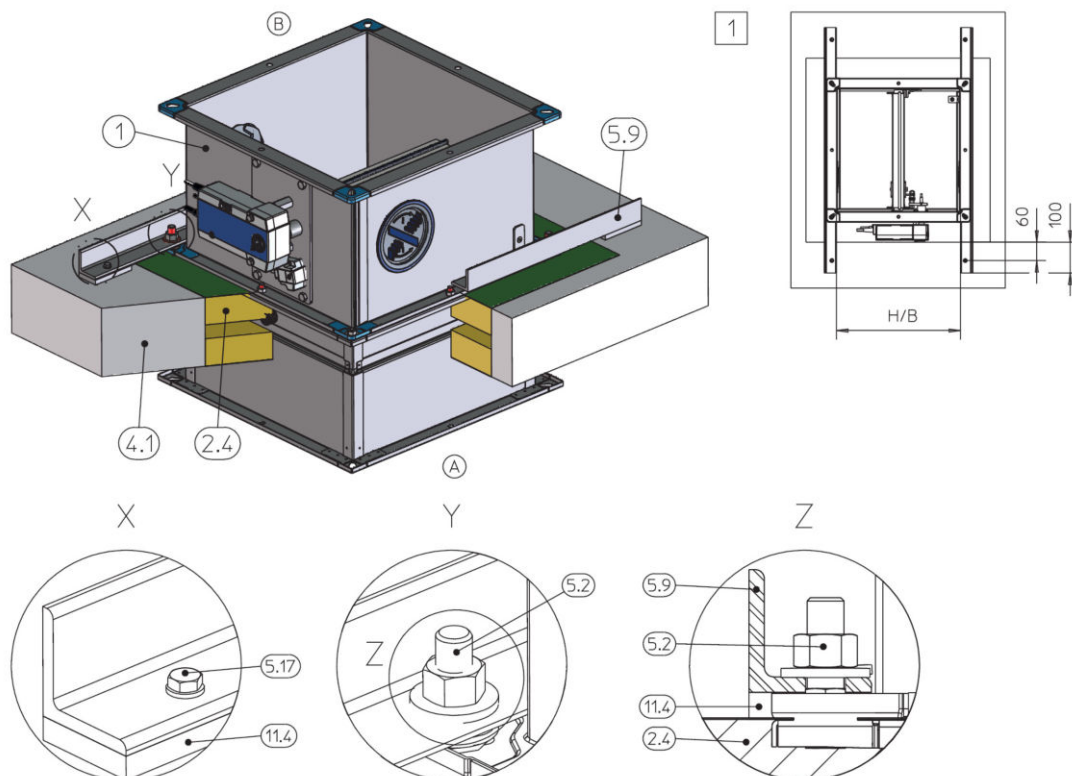


Fig. 108: Suspension of FK-EU when a fire batt is used above (detail X) or below (detail Y) the damper

- | | | | |
|------|---|----------------|-------------------------|
| 1 | FK-EU | Ø | Ø threaded rod + 1 mm |
| 4.1 | Solid ceiling slab | Y ¹ | Suspension from EI 90 S |
| 5.4 | Threaded rod M12 with washer and nut | Y ² | Suspension with EI 60 S |
| 5.18 | Steel angle section to EN 10056-1, L ≥ 40 mm × 40 mm × 5 mm, galvanised or painted, or equivalent | Ⓐ | Installation side |
| 9.1 | Flexible connector (recommended) | Ⓑ | Operating side |

Note: Each fire damper has to be suspended both on the operating side and on the installation side.

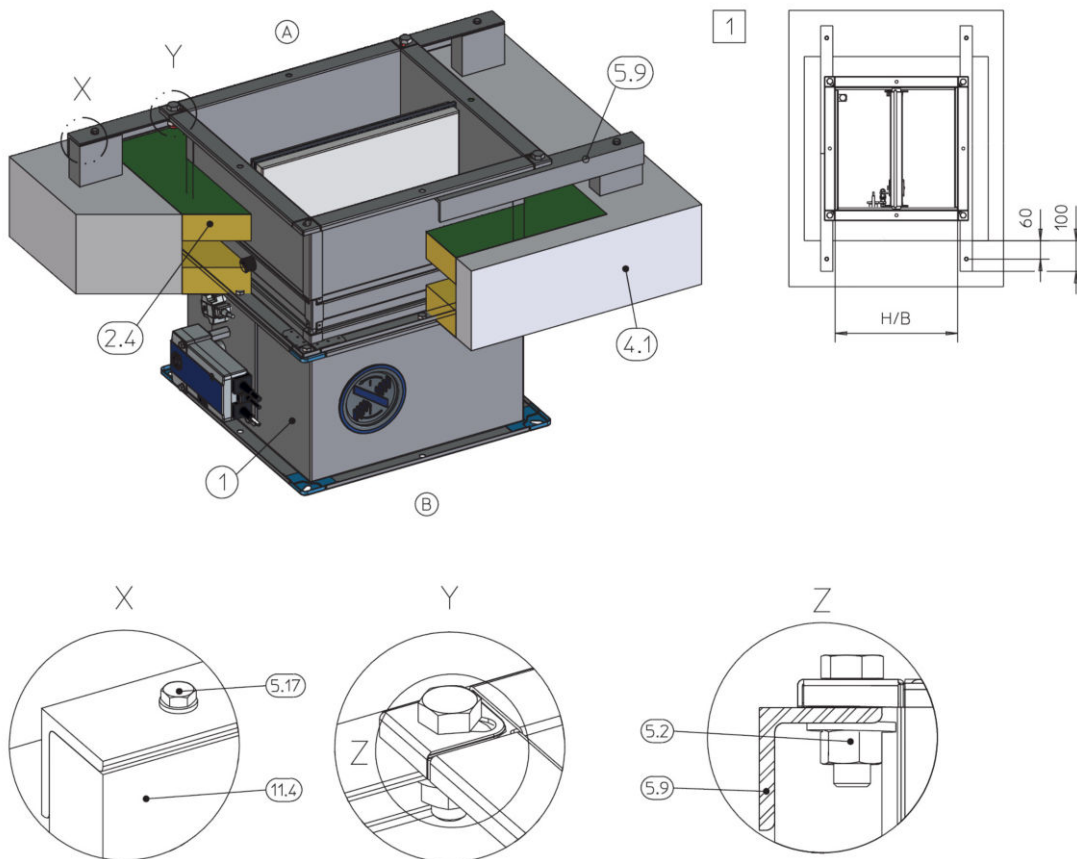
Vertical duct



GR2280038

Fig. 109: Dry mortarless installation into a solid ceiling slab, with a fire batt, upright

- | | | | |
|-----|---|------|--|
| 1 | FK-EU | 5.17 | Anchor bolt or equivalent (for attachment to the ceiling slab) |
| 2.4 | Fire batt with ablative coating | 11.4 | Underlay material, non-combustible, to be provided by others |
| 4.1 | Solid ceiling slab | 1 | Up to EI 60 S |
| 5.2 | Screw M12 with washer and nut | A | Installation side |
| 5.9 | Steel angle section, 40 mm × 40 mm × 5 mm | B | Operating side |



GX2289464

Fig. 110: Dry mortarless installation into a solid ceiling slab, with a fire batt, suspended

- | | | | |
|-----|---|----------|--|
| 1 | FK-EU | 5.17 | Anchor bolt or equivalent (for attachment to the ceiling slab) |
| 2.4 | Fire batt with ablative coating | 11.4 | Underlay material, non-combustible, to be provided by others |
| 4.1 | Solid ceiling slab | 1 | Up to EI 60 S |
| 5.2 | Screw M12 with washer and nut | A | Installation side |
| 5.9 | Steel angle section, 40 mm × 40 mm × 5 mm | B | Operating side |

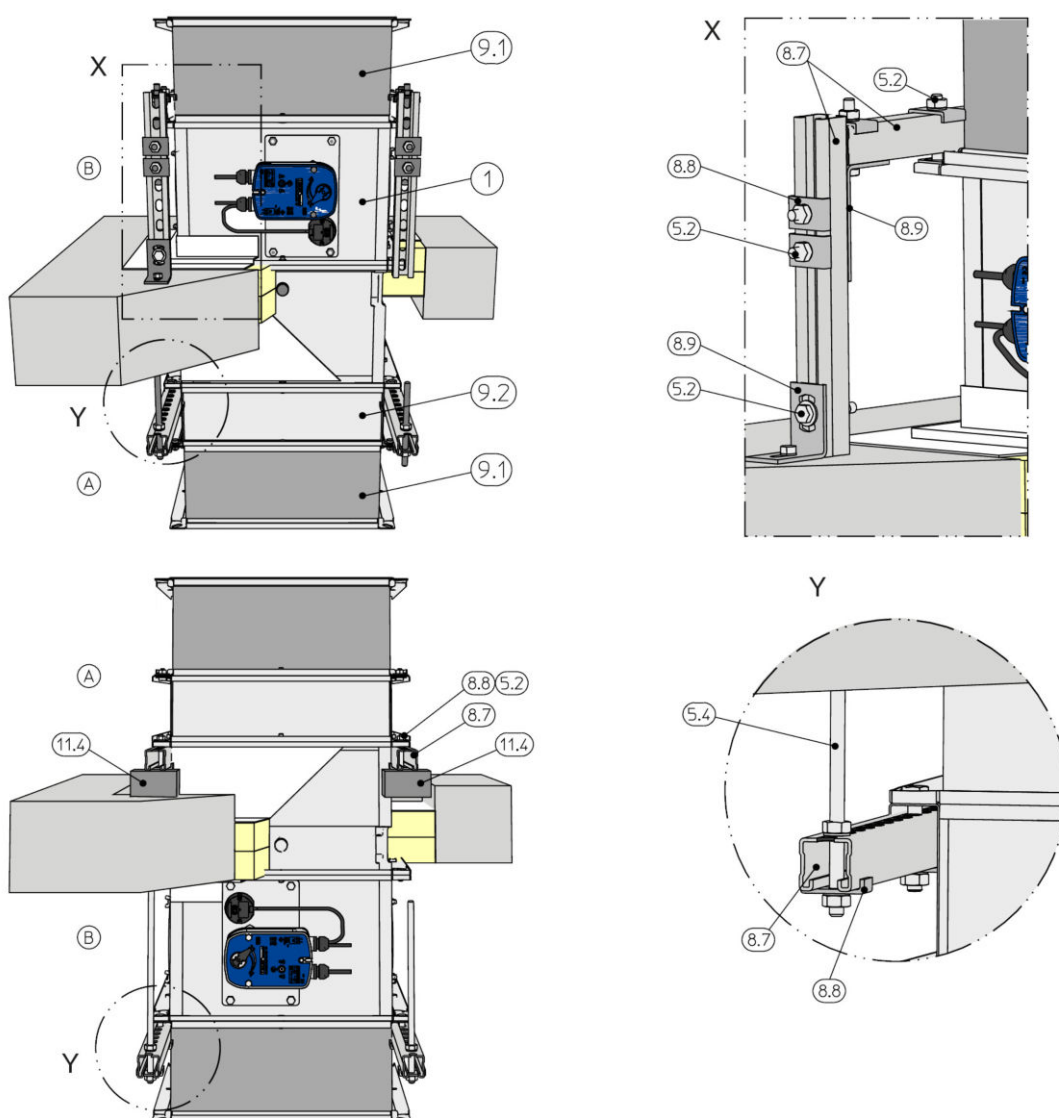


Fig. 111: Suspension in fire batt, FK-EU suspended or upright

1	FK-EU	8.9	Bracket, Varifix ANSHWNKL-PRFL36-90GRAD or Müpro mounting bracket 90°, galvanised, or equivalent
5.2	Screw M10 × 70 mm, with washer and nut	9.1	Flexible connector (recommended)
5.4	Threaded rod M12 with washer and nut	9.2	Extension piece
8.7	Mounting rail, Würth Varifix 36 × 36 × 2.5 or Müpro MPC 38/40 or equivalent	11.4	Underlay material, non-combustible
8.8	Fixing bracket, Varifix or Müpro MPC or equivalent		

Installation of the fire damper in vertical ducts with a fire batt from EI 90 S requires the fire damper to be fixed both above and below the ceiling slab, see 128 and 129. The fire damper should be suspended along the shorter casing sides if at all possible.

⚠ DANGER!

Danger of falling off! Do not step onto the fire batt!

The fire batt cannot carry any loads. Adequate means, e.g. a permanent barrier, must be installed to prevent people from stepping onto the fire batt.

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]		
H	Operating side	Installation side
200 – 300	–	–
301 – 550	–	120
> 550	120	260

Open blade protrusion [mm]													
H	200	250	300	350	400	450	500	550	600	650	700	750	800
x	-224	-199	-174	-149	-124	-99	-74	-49	-24*	1*	26*	51*	76*
y													
L = 375	23*	48*	73*	98*	123*	148*	173*	198*	223*	248*	273*	298*	323*
L = 500	-102	-77	-52	-27*	-2*	23*	48*	73*	98*	123*	148*	173*	198*

*Extension piece required

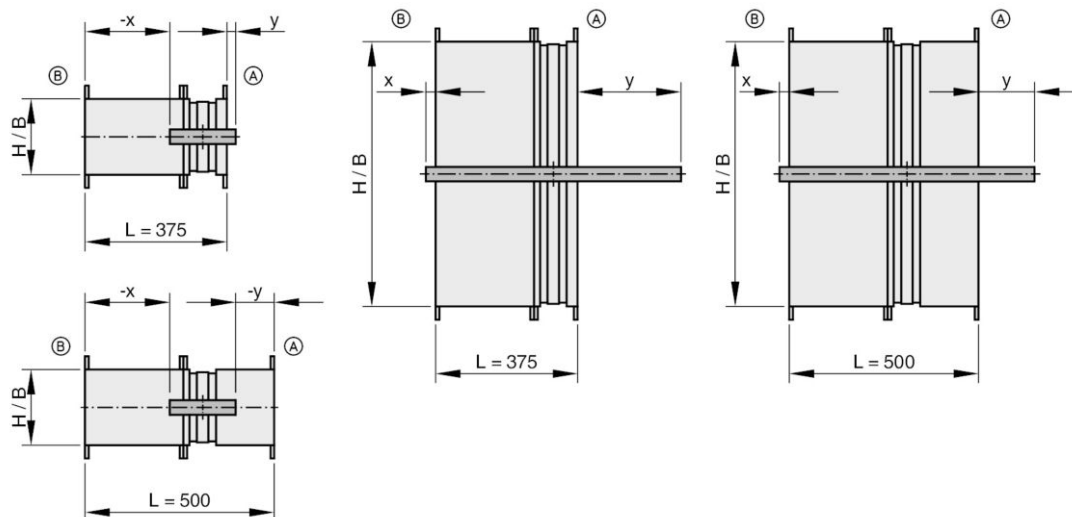


Fig. 112: Open blade protrusion

- Ⓐ Installation side
- Ⓑ 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.

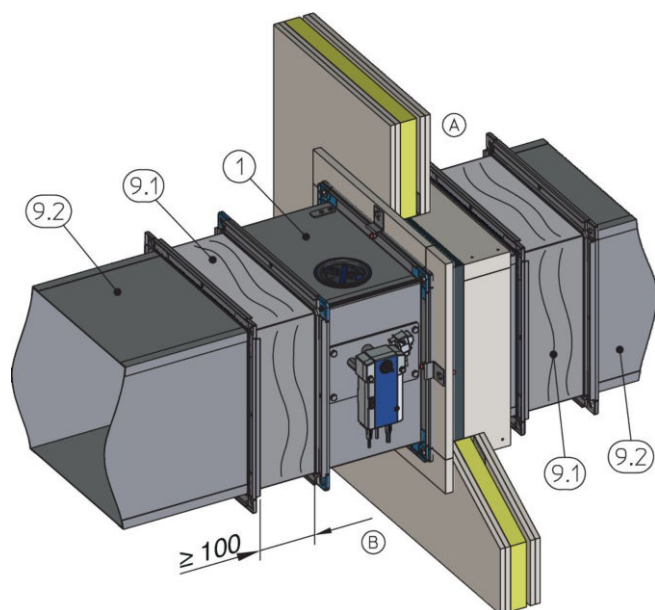


Fig. 113: Fire damper with flexible connectors

- 1 FK-EU
- 9.1 Flexible connector
- 9.2 Duct
- (A) Installation side
- (B) Operating side

Circular spigot

For the connection of circular ducts.

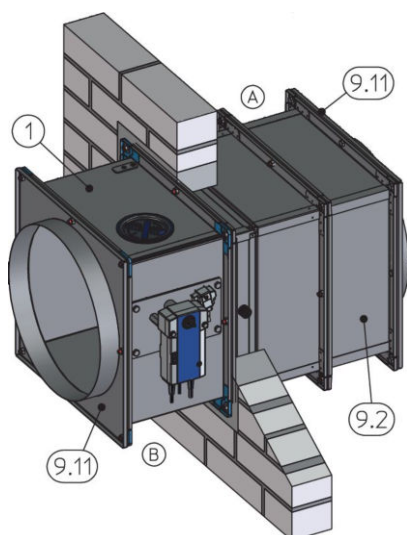


Fig. 114: Fire damper with circular spigots

- 1 FK-EU (square)
- 9.2 Extension piece
- 9.11 Circular spigot
- (A) Installation side
- (B) Operating side

Cover grilles

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

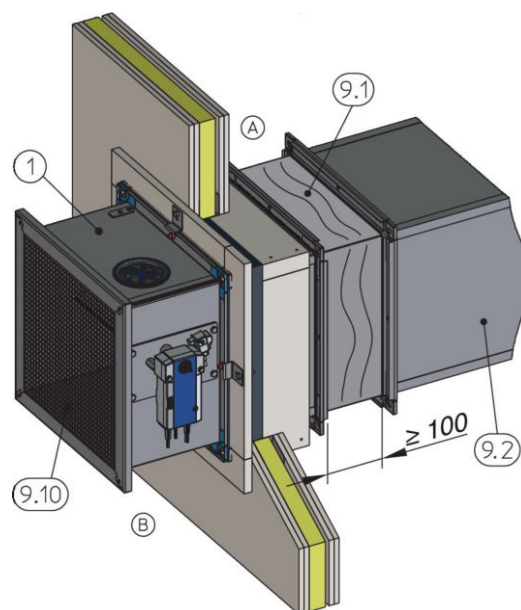


Fig. 115: Fire damper with cover grille

- 1 FK-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

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)

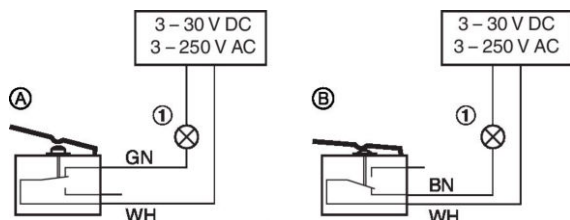


Fig. 116: Wiring of limit switches, example

- 1 Indicator light or relay, to be provided by others
- The limit switches must be connected according to the wiring example Fig. 116
 - 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
Ⓐ NC contact	not actuated	CLOSED or OPEN position is <u>not</u> reached	Closed
Ⓑ NO contact	actuated	CLOSED or OPEN position is reached	Closed

Note: For the wiring of explosion-proof actuators see the additional FK-EU Ex operating manual

7.2 Spring return actuator

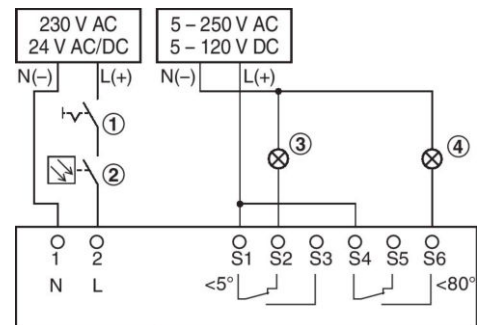


Fig. 117: Actuator connection, example

- 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.

Note: For the wiring of explosion-proof actuators see the additional FK-EU Ex operating manual

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.

8.1 Fire damper with fusible link

Damper blade position indicator

The position of the damper blade is indicated by the position of the operating lever.

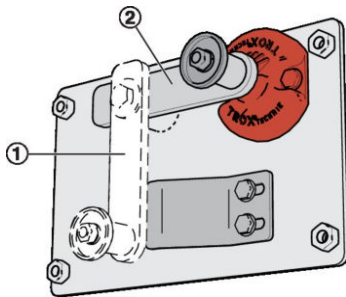


Fig. 118: Damper blade position indicator

- 1 Damper blade is closed
- 2 Damper blade is open

Closing the damper blade

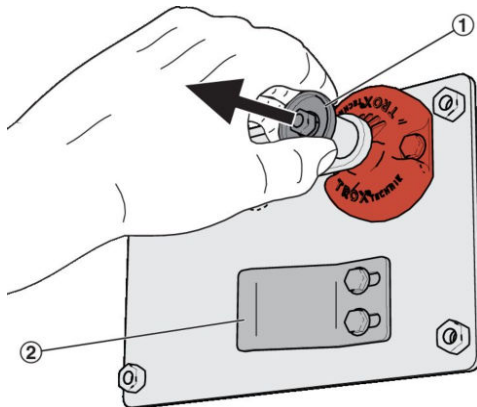


Fig. 119: Closing the damper blade

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
 - ▶ Pull the handle ① towards you, then release it again.
 - ⇒ The damper blade closes automatically and locks in the CLOSED position ②.

Opening the damper blade

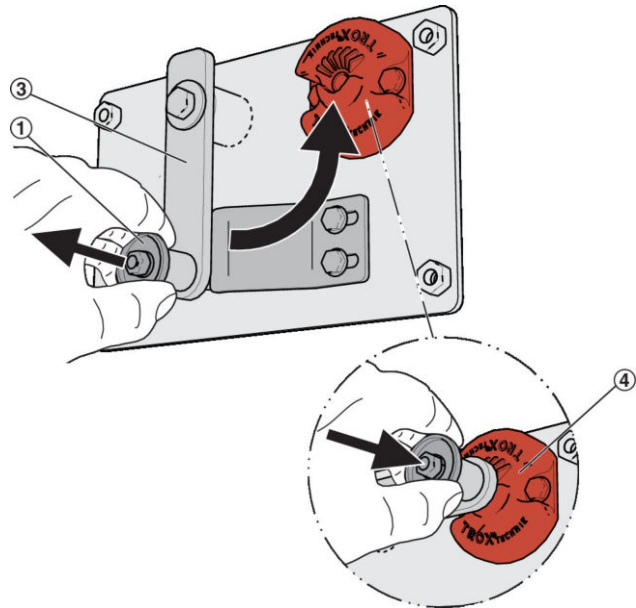


Fig. 120: Opening the damper blade

Requirement

- The damper blade is CLOSED
 - 1. ▶ Pull the handle ① towards you and hold it.
 - 2. ▶ Then rotate the lever ③ by 90° towards the release mechanism ④.
 - 3. ▶ Push the handle into the release mechanism.
 - ⇒ The handle locks into the OPEN position; the damper blade is now open.

8.2 Fire damper with spring return actuator

8.2.1 Spring return actuator BFL... / BFN...

Status indicator

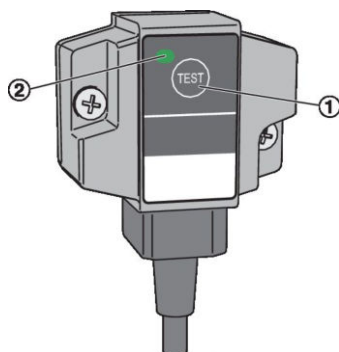


Fig. 121: Thermoelectric release mechanism BAT (BFL..., BFN... or BF...TN)

- 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 is indicated by the pointer on the actuator.

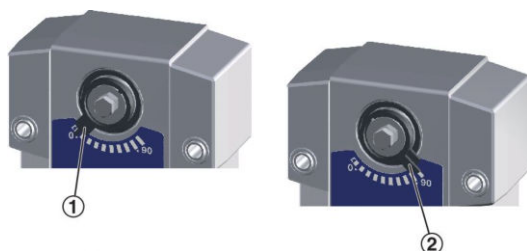


Fig. 122: Damper blade position indicator

- 1 Damper blade is closed
- 2 Damper blade is open

Closing/opening the damper blade with spring return actuator

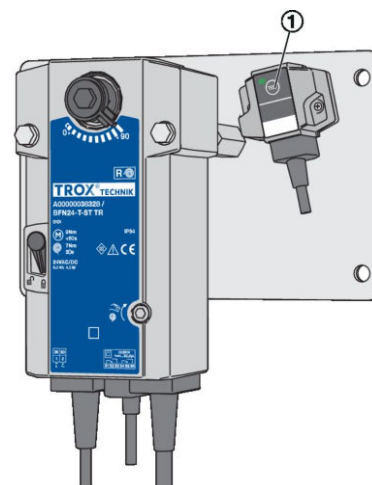


Fig. 123: Functional test

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. 124: 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 into the direction of the arrow ② to just short of the travel stop and hold it.
- 3. ▶ Set the interlock ③ to 
 - ⇒ The damper blade remains in the OPEN position.
- 4. ▶ Remove the crank handle.

Closing the damper blade




Fig. 125: 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 
 - ⇒ The damper blade is released and closes.

8.2.2 Spring return actuator BF...

Status indicator

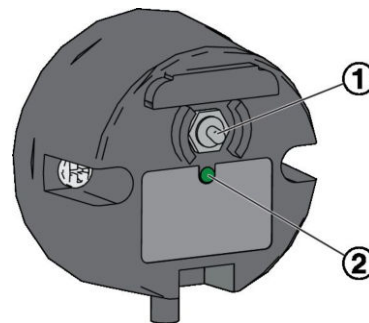


Fig. 126: Thermoelectric release mechanism BAE

- 1 Toggle switch for functional test
- 2 LED

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

- Power is supplied.
- The thermoelectric release is in order.
- The toggle switch is not being pushed.

Damper blade position indicator

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



Fig. 127: Damper blade position indicator

- 1 Damper blade is closed
- 2 Damper blade is open

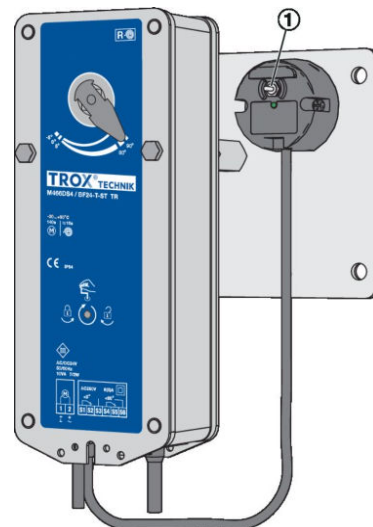
Closing/opening the damper blade with spring return actuator

Fig. 128: Functional test

**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 toggle switch 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 toggle switch 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. 129: 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. (The crank handle is clip-fixed to the connecting cable.)
- 2. ▶ Turn the crank handle into the direction of the arrow ② to just short of the travel stop.
- 3. ▶ Then quickly rotate the crank handle by approx. 90° towards the 'lock' position .
 - ⇒ The damper blade remains in the OPEN position.
- 4. ▶ Remove the crank handle.

Closing the damper blade using the crank handle




Fig. 130: 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
- 1. ▶ Insert the crank handle ① into the opening for the spring-winding mechanism. (The crank handle is clip-fixed to the connecting cable.)
- 2. ▶ Rotate the crank handle by approx. 90° towards the 'unlock' position  until a click can be heard.
 - ⇒ The damper blade is released and closes.
- 3. ▶ Remove the crank handle.

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 information 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  *Table on page 143.*


Operation

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

If the temperature in the duct or the ambient temperature rises in the event of a fire ($\geq 72\text{ °C}$ / $\geq 95\text{ °C}$), 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 141.

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 139.*

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.

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 ↗ *Table on page 143.* 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 ↗ *134* is required after any repair work.

10.2 Replacing the fusible link

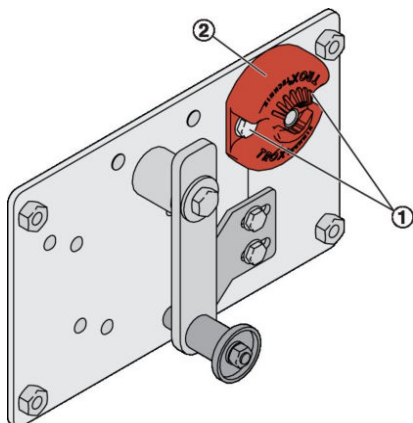


Fig. 131: Removing the fusible link holder

1. ▶ Close the damper blade.
2. ▶ Release screws ① on the fusible link holder ②.
3. ▶ Remove fusible link holder ② from the fire damper.

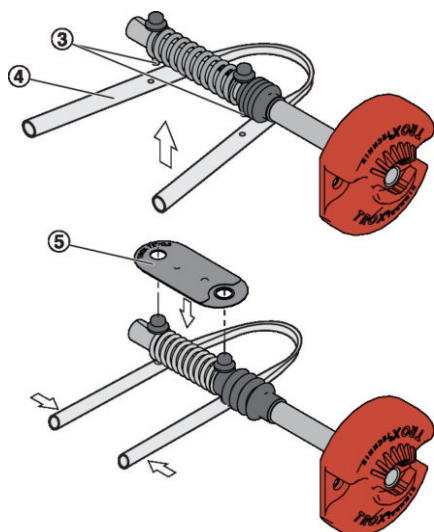





Fig. 132: Replacing the fusible link

4. ▶ Insert the pins ③ of the fusible link holder into the corresponding holes of the tool ④ (article no. E 571 NE 0).
5. ▶ Use the tool to compress the spring of the fusible link holder.
6. ▶ Remove old fusible link, hook in new fusible link ⑤.
7. ▶ Put the fusible link holder back into the fire damper and fix it with screws ①.
8. ▶ Carry out functional test.

10.3 Inspection, maintenance and repair measures

Interval	Measure	Personnel
A	Access to the fire damper <ul style="list-style-type: none"> Internal and external accessibility <ul style="list-style-type: none"> Provide access 	Specialist personnel
	Installation of the fire damper <ul style="list-style-type: none"> Installation according to the operating manual  on page 25 <ul style="list-style-type: none"> Install the fire damper correctly. 	Specialist personnel
	Transport and installation protection, if any <ul style="list-style-type: none"> Transport/installation protection has been removed <ul style="list-style-type: none"> Remove transport/installation protection 	Specialist personnel
	Connection of ductwork/cover grille/flexible connector <ul style="list-style-type: none"> Connection according to this manual <ul style="list-style-type: none"> Establish correct connection 	Specialist personnel
	Power supply to the spring return actuator <ul style="list-style-type: none"> Power supply according to spring return actuator rating plate <ul style="list-style-type: none"> Provide correct voltage 	Skilled qualified electrician
A / B	Check fire damper for damage <ul style="list-style-type: none"> Fire damper, damper blade and seal must be intact <ul style="list-style-type: none"> Replace the damper blade Repair or replace the fire damper. 	Specialist personnel
	Function of the release mechanism <ul style="list-style-type: none"> Function OK Fusible link intact/no corrosion <ul style="list-style-type: none"> Replace the fusible link Replace the release mechanism 	Specialist personnel
	Functional test of the fire damper with fusible link  134 <ul style="list-style-type: none"> Fire damper can be opened manually Handle can be locked in the OPEN position Damper blade closes when triggered manually <ul style="list-style-type: none"> 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  135 <ul style="list-style-type: none"> Actuator function OK Damper blade closes Damper blade opens <ul style="list-style-type: none"> Determine and eliminate the cause of the fault Replace the spring return actuator Repair or replace the fire damper. 	Specialist personnel
	Function of external duct smoke detector <ul style="list-style-type: none"> Function OK Fire damper closes when triggered manually or when smoke is detected Fire damper opens after reset <ul style="list-style-type: none"> Determine and eliminate the cause of the fault Repair or replace duct smoke detector 	Specialist personnel

Interval	Measure	Personnel
C	Cleaning the fire damper <ul style="list-style-type: none"> ■ No contamination in the interior or on the exterior of the fire damper ■ No corrosion <ul style="list-style-type: none"> – Remove contamination with a damp cloth – Remove corrosion or replace part 	Specialist personnel
	Function of limit switches <ul style="list-style-type: none"> ■ Function OK <ul style="list-style-type: none"> – Replace the limit switches 	Specialist personnel
	Function of the external signalling (damper blade position indicator) <ul style="list-style-type: none"> ■ Function OK <ul style="list-style-type: none"> – 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, depending on the degree of contamination

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 Explanation

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 lip seal or ring 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
	Materials for fire damper installation
2.1	Mortar or gypsum mortar
2.2	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

Item no.	Description
	Walls
3.1	Solid wall
3.2	Lightweight partition wall with metal support structure or steel 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
	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

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

Item no.	Description
	Fixing material
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

Item no.	Description
	Filling and coating material
6.1	Mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 40\text{ kg/m}^3$
6.2	Mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 80\text{ kg/m}^3$
6.3	Mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 100\text{ kg/m}^3$
6.4	Mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 140\text{ kg/m}^3$
6.5	Mineral wool, depending on wall construction
6.6	Fire batt with ablative coating
6.7	Fire batt
6.8	Infill (cavities completely filled with mineral wool $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 50\text{ kg/m}^3$, bricks, aerated concrete, lightweight concrete, reinforced concrete or clay)
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
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)

Item no.	Description
	Filling and coating material
6.18	Filler
6.19	Mineral wool $> 1000\text{ }^{\circ}\text{C}$, $> 80\text{ kg/m}^3$, panel material around the perimeter, leave out the actuator and release mechanism; inspection openings must remain accessible
6.20	Sleeve

Item no.	Description
	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	Timber structure
7.10	Trim panels (optional)
7.11	Trim panels, double layer, staggered joints
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/m ³
7.14	Reinforcing board made from material x, one, two or three layers
7.15	Wooden floorboard / floor tile
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 for FK-EU
7.21	Ceiling joint strips

Item no.	Description
	Supporting construction
7.22	Ceiling joint section
7.23	Sheet steel insert depending on wall manufacturer

Item no.	Description
	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 bored 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
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

Item no.	Description
	Accessories
9.1	Flexible connector

Item no.	Description
	Accessories
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	Damper blade
9.8	Rivet axis
9.9	Plate
9.10	Cover grille
9.11	Circular spigot

Item no.	Description
	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

Item no.	Description
	Additions
11.1	Cable tray
11.2	Cable set

Item no.	Description
	Additions
11.3	Pipe collar
11.4	Underlay material, non-combustible, to be provided by others

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