



Fire damper

Type FKRS-EU

according to Declaration of Performance
DoP / FKRS-EU / DE / 005



Short version

This is a content-reduced short version. The full version is available at www.trox-docs.com.

TROX[®] TECHNİK

The art of handling air

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General information

About this manual

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

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

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

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

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

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

Copyright

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This applies in particular to:

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

TROX Technical Support

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 defect or issue

Online	www.trox.de
Phone	+49 2845 202-0

Limitation of liability

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

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

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

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

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

We reserve the right to make technical changes.

Warranty claims

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

Safety notes

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

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

DANGER!

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

WARNING!

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

CAUTION!

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

NOTICE!

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

ENVIRONMENT!

Environmental pollution hazard.

Tips and recommendations



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

Safety notes as part of instructions

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

Example:

1. ▶ Loosen the screw.

2. ▶

CAUTION!


Danger of finger entrapment when closing the lid.

Be careful when closing the lid.

3. ▶ Tighten the screw.

Specific safety notes

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

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	Warning – danger zone.

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1 Safety

1.1 General safety notes

Sharp edges, sharp corners and thin sheet metal parts

 **CAUTION!**

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

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

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

Electrical voltage

 **DANGER!**

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

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

1.2 Correct use

- 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 use of the fire damper in potentially explosive atmospheres is permitted with the corresponding special accessories and a CE conformity statement according to ATEX directive 2014/34/EU. Fire dampers for use in areas with potentially explosive atmospheres are marked for the zones for which they have been approved.
- The fire dampers may only be operated in compliance with these installation instructions and the technical data in these installation and operating instructions.
- Modifying the fire damper or using spare parts that have not been approved by TROX is not permitted.

Additional provision for use in Germany:

- Do not use it in extract air systems in commercial kitchens.
- For use as an air transfer damper see general type approval Z-6.50-2516.
- Use with a combined penetration seal requires individual type-approval.
- Use with firestop blocks requires individual type-approval.
- Crossflow fasteners may require a building inspectorate licence. This must be checked and applied for by the client.
- Flame-resistant, non dripping building materials (elastomer foams) must at least comply with fire rating class C - s2, d0 according to the German MVV TB (2019/1) guideline. The applicable local building regulations have to be observed.

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 adequate 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
- Trained 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.

Trained personnel

Trained 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	100 – 315 mm
Casing length L	400 mm
Volume flow rate range	Up to 770 l/s or 2770 m ³ /h
Differential pressure range	Up to 1500 Pa
Temperature range ^{1, 3, 4}	-20 °C – 50 °C
Release temperature ⁴	72 °C or 95 °C (for warm air ventilation systems)
Upstream velocity ^{2, 4}	≤ 8 m/s with fusible link, ≤ 10 m/s with spring return actuator
Closed damper blade air leakage	EN 1751, Class 3
Casing air leakage	EN 1751, Class C
EC conformity	<ul style="list-style-type: none"> ■ EU Construction Products Regulation no. 305/2011 ■ EN 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 installations: Fire dampers ⁵ ■ EN 1751 Ventilation for buildings – Air terminal devices
Declaration of Performance	DoP/FKRS-EU/DE/005

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 dampers.

³⁾ Non-condensing operation or without moisture entry via the fresh air intake.

⁴⁾ For explosion-proof constructions of the FK-EU see the corresponding operating manual.

⁵⁾ Leakage rate of the fire damper system tested at 300 Pa and 500 Pa negative pressure.

Product sticker

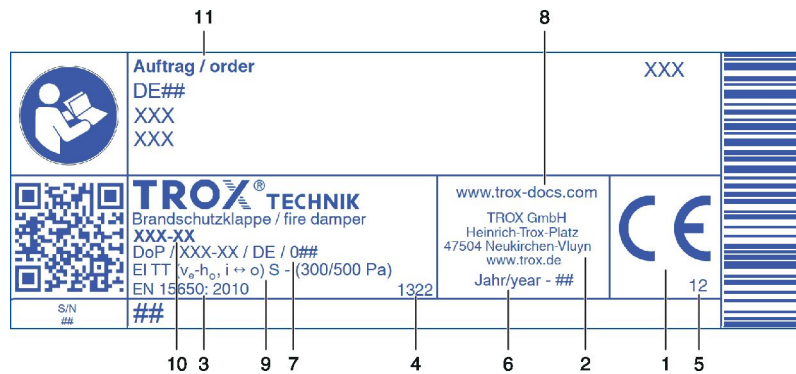


Fig. 1: Product sticker (example)

- | | | | |
|---|---|----|---|
| 1 | CE mark | 7 | No. of the declaration of performance |
| 2 | Manufacturer's address | 8 | Website from which the DoP can be downloaded |
| 3 | Number of the European standard and year of its publication | 9 | Regulated characteristics; the fire resistance class depends on the application and may vary
↳ <i>Chapter 4.1 'Overview of installation situations' on page 18</i> |
| 4 | Notified body | 10 | Type |
| 5 | The last two digits of the year in which the CE marking was affixed | 11 | Order number |
| 6 | Year of manufacture | | |

2.2 FKRS-EU with fusible link

Dimensions and weight

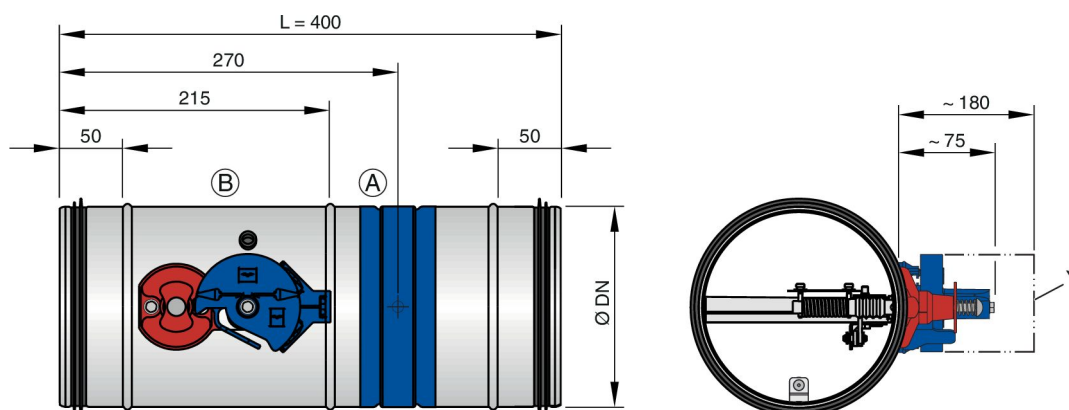


Fig. 2: FKRS-EU with fusible link

Y Keep clear to provide access for operation

A Installation side

B Operating side

Limit switch

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]

Nominal size [mm]	100	125	150	160	180	200	224	250	280	315
ØDN [mm]	99	124	149	159	179	199	223	249	279	314
FKRS-EU with fusible link	1.3	1.6	1.8	2.0	2.3	2.5	2.7	3.3	3.8	4.4
... and installation block ER	5.7	8.6	7.6	7.3	11.0	9.8	13.5	12.1	16.0	15.0
... and installation kit TQ2	5.4	6.1	7.0	7.9	8.8	9.7	10.6	12.0	13.7	15.8
... and installation kit WA2	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6
... and installation kit WE2	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6
... and installation kit GL2	4.4	5.2	6.1	6.6	7.4	8.2	9.0	10.2	11.7	13.6

2.3 FKRS-EU with spring return actuator

Dimensions and weight

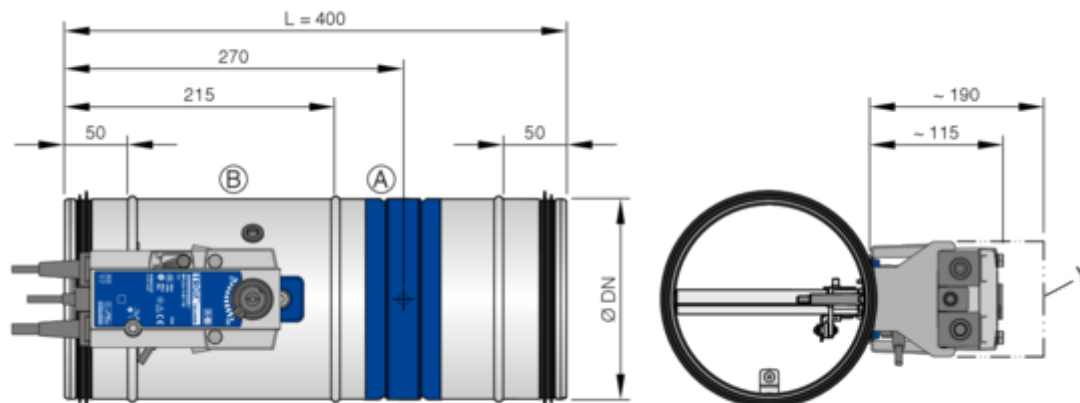


Fig. 3: FKRS-EU with Belimo spring return actuator

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

- Weight of FKRS-EU with fusible link + approx. 1 kg, 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
Run 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)	

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

Dimensions and weight

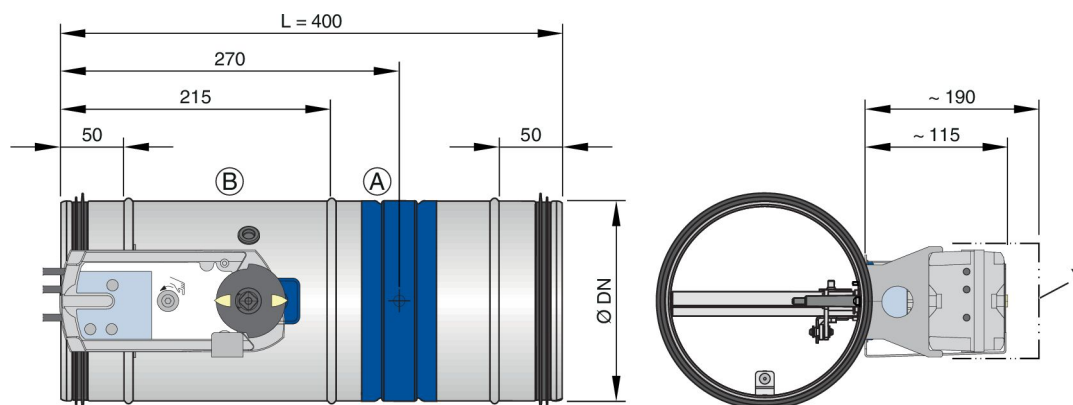


Fig. 4: FKRS-EU with Siemens spring return actuator

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

- Weight of FKRS-EU with fusible link + approx. 1 kg, 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
Run time	Actuator / spring return	90 s / 15 s	
Limit switch	Type of contact	2 changeover contact	
	Switching voltage	24 – 230 V AC / 12 – 30 V DC	
	Switching current	AC: 6 A (inductive 2 A) / DC: 2 A	
IEC protection class / IP protection		II / IP 42 or IP 54*	III / IP 42 or IP 54*
Storage temperature / ambient temperature		-20 to 50 °C / -20 to 50 °C	
Ambient humidity		< 95% rh, no condensation	
Connecting cable	Actuator / limit switch	0.9 m, 2 × 0.75 mm ² / 0.9 m, 6 × 0.75 mm ² (free of halogens)	

*Connecting cable at the bottom

FKRS-EU with Schischek explosion-proof spring return actuator

The FKRS-EU can also be supplied with Schischek explosion-proof spring return actuator on request:

- ExMax-15-BF-TR
- RedMax-15-BF-TR

For further information, see "Supplementary operating manual for explosion-proof fire dampers Type FKRS-EU".

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

Dimensions and weight

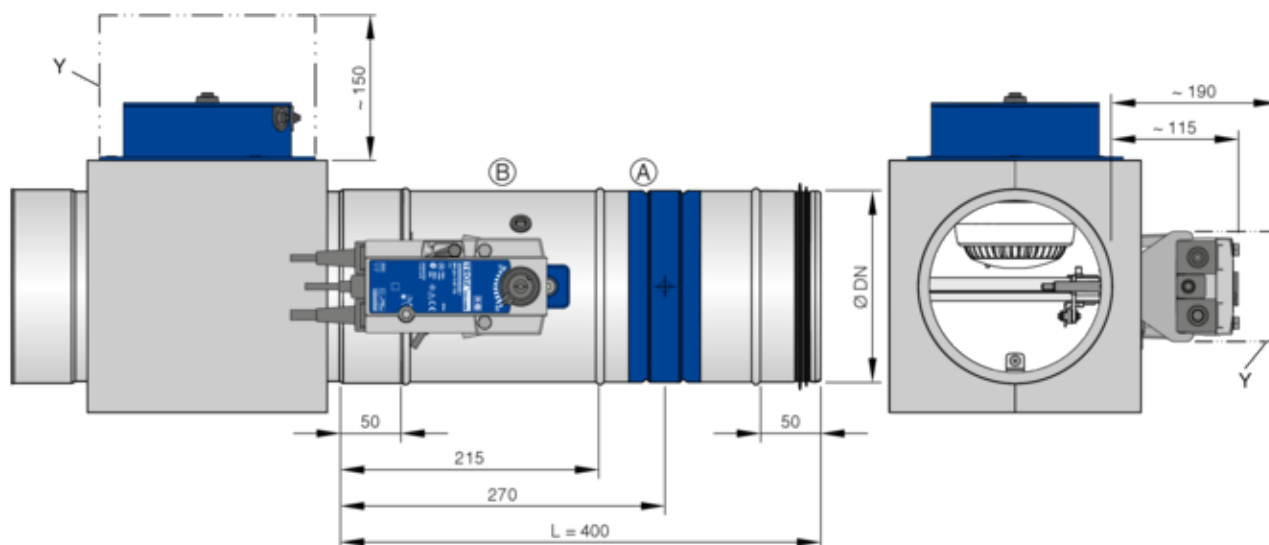


Fig. 5: FKRS-EU with Belimo spring return actuator and duct smoke detector, drawn in a square air duct (on-site)

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

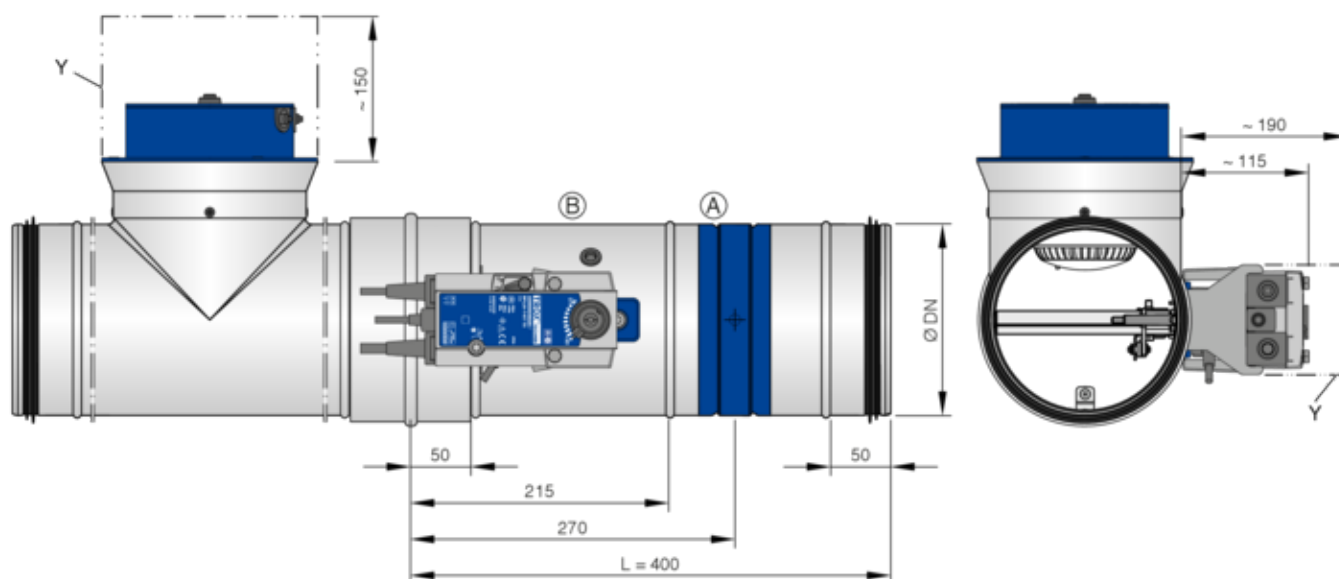


Fig. 6: FKRS-EU with Belimo spring return actuator and duct smoke detector, drawn in a round air duct (on-site)

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

- Technical data for spring return actuator, see table ↗ on page 11
- The duct smoke detector type RM-O-3-D is to be arranged in a square air duct on the top or alternatively in a round air duct in a T-piece on the top. For technical details of the duct smoke detector see the RM-O-3-D operating and installation manual.

2.5 FKRS-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit

Dimensions and weight

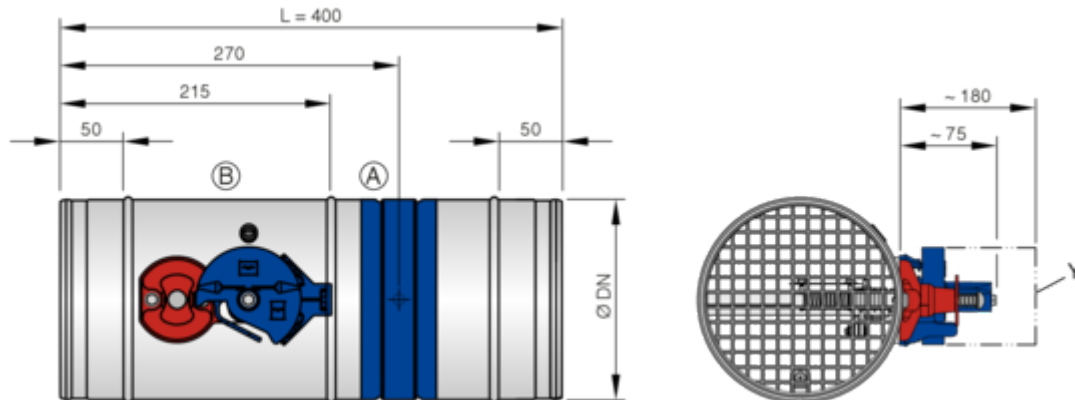


Fig. 7: FKRS-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit

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

Note: Air transfer units may require a building inspectorate licence. This must be checked and applied for by the client.

For installation in Germany please note:

If a fire damper with only a mechanical shut-off element is to be used as an air transfer unit, the local building regulations apply. Such air transfer units are usually only used for pressure differential systems.

2.6 FKRS-EU with spring return actuator and duct smoke detector used as an air transfer damper

Dimensions and weight

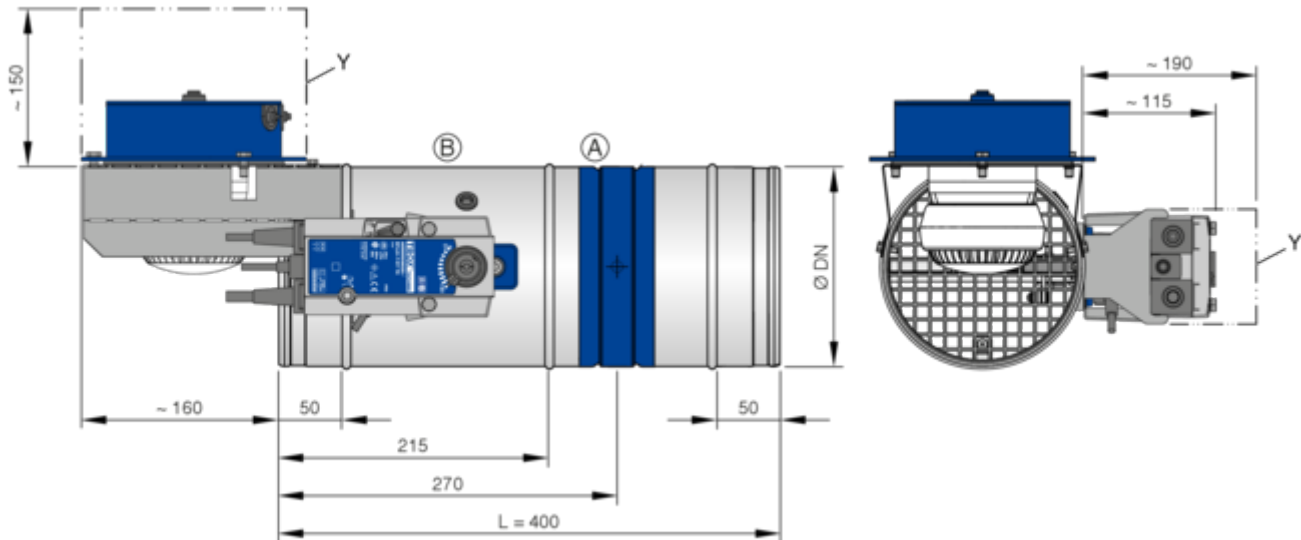


Fig. 8: FKRS-EU with spring return actuator and duct smoke detector used as an air transfer damper

Y Keep clear to provide access for operation

A Installation side

B Operating side

- Weight of FKRS-EU with fusible link + approx. 2.5 kg, see table 10.
- Technical data for spring return actuator, see table on page 11
- The duct smoke detector type RM-O-3-D is to be placed on top of a console (scope of supply). For technical details of the duct smoke detector see the RM-O-3-D operating and installation manual.

Note: For more information on the installation and use of the fire damper as an air transfer damper in Germany see general type approval Z-6.50-2516.

3 Supply package, transport and storage

Scope of delivery

If attachments and accessories are supplied from the factory with the fire dampers, they are already taken into account in the order code.

Depending on the installation situation, supplementary materials for assembly and fixing may be needed to ensure proper installation, e.g. mortar, screws, mineral wool, etc.

Such materials are not usually included in the supply package (unless stated otherwise).

The selection of additional attachments or accessories as well as the identification and provision of materials for assembly and fixing is the responsibility of those involved in the building project and must be done taking into account the required classification.

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 (one per delivery)



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 product in its transport packaging up to the installation location.

Storage

For temporary storage please note:

- Remove any plastic wrapping.
- Protect the product from dust and contamination.
- Store the product in a dry place and remote from direct sunlight.
- Do not expose the unit to the effects of weather (not even in its packaging).
- Do not store the product below -40 °C or above 50 °C.

Packaging

Properly dispose of packaging material.

4 Installation

4.1 Overview of installation situations

i 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.

Overview of installation situations

Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v _e -h _o , i ↔ o) S up to	Installation type	Chapter
Solid walls	in	100	EI 120 S	N	☞ 47
		100	EI 90 S	N	☞ 47
	in, combined installation	100	EI 90 S	N	*
	in, multiple installation	100	EI 90 S	N	*
	in, partly with mineral wool	100	EI 120 S	N	*
	in, underneath flexible ceiling joint	100	EI 90 S	N	*
	in, installation block ER	100	EI 90 S	E	*
	in, installation kit TQ2	100	EI 120 S	E	*
	on the face of, installation kit WA2	100	EI 90 S	E	*
	remote from, wall attachment, installation kit WE2	100	EI 120 S	E	*
	remote from, wall penetration, installation kit WE2	100	EI 120 S	E	*
	remote from, mineral wool insulation	100	EI 60 S	T	*
	remote from, mineral wool insulation, fire batt	100	EI 60 S	T	*
	in, fire batt	100	EI 120 S	W ¹	
		100	EI 90 S	W ¹	*
	in, fire batt, multiple installation	100	EI 90 S	W ¹	*
	in, combined penetration seal	100	EI 90 S	W ¹	*
	in, fire protection block bulk-head	100	EI 90 S	T	*
Metal stud walls	in	94	EI 120 S	N ¹	*
		94	EI 90 S	N ¹	*

¹⁾ The class of performance depends on the installation details

²⁾ Thickness increased near the installation opening

³⁾ Depending on local conditions

* see the complete operating and installation manual at www.trox-docs.com

N = Mortar-based installation

E = Installation kit

W = Fire batt

E = Dry mortarless installation

Overview of installation situations						
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v _e -h _o , i ↔ o) S up to	Installation type	Chapter	
		80	EI 60 S	N ¹	*	
		75	EI 30 S	N ¹	*	
	in, combined installation	94	EI 90 S	N ¹	*	
	in, multiple installation	94	EI 90 S	N ¹	*	
	in, without installation kit	94	EI 60 S	T	*	
	in, installation kit TQ2		94	EI 120 S	E ¹	↳ 56
			94	EI 90 S	E ¹	↳ 56
			80	EI 60 S	E ¹	↳ 56
			75	EI 30 S	E	↳ 56
	remote from, wall penetration, installation kit WE2	94	EI 90 S	E	*	
	remote from, wall penetration, mineral wool insulation	94	EI 60 S	T	*	
	remote from, mineral wool insulation, fire batt	94	EI 60 S	T	*	
	in, direct installation, installation kit GL2	94	EI 90 S	T	*	
	in, flexible ceiling joint, installation kit GL2	100	EI 90 S	E	*	
	in, fire batt		94	EI 120 S	W ¹	↳ 61
			94	EI 90 S	W ¹	↳ 61
			80	EI 60 S	W ¹	↳ 61
			75	EI 30 S	W ¹	↳ 61
	in, fire batt, multiple installation	100	EI 90 S	W ¹	*	
	in, combined penetration seal	100	EI 90 S	W ¹	*	
in, fire protection block bulk-head	100 – 200	EI 90 S	T	*		
Timber stud walls	in	130	EI 120 S	N	*	
		130	EI 90 S	N	*	
		110	EI 60 S	N	*	
		105	EI 30 S	N	*	
	in, combined installation	130	EI 90 S	N	*	
	in, installation kit TQ2	130	EI 120 S	E	*	
		110	EI 60 S	E	*	

¹⁾ The class of performance depends on the installation details

²⁾ Thickness increased near the installation opening

³⁾ Depending on local conditions

* see the complete operating and installation manual at www.trox-docs.com

N = Mortar-based installation

E = Installation kit

W = Fire batt

E = Dry mortarless installation

Overview of installation situations						
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v _e -h _o , i ↔ o) S up to	Installation type	Chapter	
		105	EI 30 S	E	*	
	remote from, mineral wool insulation	130	EI 60 S	T	*	
	remote from, mineral wool insulation, fire batt	130	EI 60 S	T	*	
	in, fire batt		130	EI 120 S	W	*
			130	EI 90 S	W	*
			110	EI 60 S	W	*
			105	EI 30 S	W	*
	in, fire batt, multiple installation	130	EI 90 S	W ¹	*	
	in, combined penetration seal	130	EI 90 S	W ¹	*	
Half-timbered constructions	in	140	EI 120 S	N	*	
		140	EI 90 S	N	*	
		110	EI 30 S	N	*	
	in, combined installation	140	EI 90 S	N	*	
	in, installation kit TQ2	140	EI 120 S	E	*	
		140	EI 90 S	E	*	
		110	EI 30 S	E	*	
	remote from, mineral wool insulation	140	EI 60 S	T	*	
	remote from, mineral wool insulation, fire batt	140	EI 60 S	T	*	
	in, fire batt	140	EI 120 S	W	*	
		140	EI 90 S	W	*	
		110	EI 30 S	W	*	
in, fire batt, multiple installation	140	EI 90 S	W ¹	*		
Solid wood/CLT walls	in	95	EI 90 S	N	*	
	in, installation kit TQ2	95	EI 90 S	E	*	
	remote from, mineral wool insulation	100	EI 60 S	T	*	
	remote from, mineral wool insulation, fire batt	100	EI 60 S	T	*	
	in, fire batt	95	EI 90 S	W	*	

¹⁾ The class of performance depends on the installation details

²⁾ Thickness increased near the installation opening

³⁾ Depending on local conditions

* see the complete operating and installation manual at www.trox-docs.com

N = Mortar-based installation
 E = Installation kit
 W = Fire batt
 E = Dry mortarless installation

Overview of installation situations					
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v _e -h _o , i ↔ o) S up to	Installation type	Chapter
Shaft wall with metal support structure	in	90	EI 90 S	N	*
		90	EI 30 S	N	*
	in, combined installation	90	EI 90 S	N	*
	in, installation kit TQ2	90	EI 90 S	E	*
	on the face of, installation kit WA2	90	EI 90 S	E	*
	in, fire batt	90	EI 60 S	W	*
Shaft wall without metal support structure	in	90	EI 90 S	N	*
	in, installation kit TQ2	90	EI 90 S	E	*
	on the face of, installation kit WA2	90	EI 90 S	E	*
Sandwich panel walls	in, fire protection block bulk-head	100 – 200	EI 90 S	T	*
Solid ceiling slabs	in	100 (150) ²	EI 120 S	N	*
		100	EI 90 S	N	*
	in, combined installation	150	EI 90 S	N	*
	in, multiple installation	150	EI 90 S	N	*
	in, with concrete base	100	EI 120 S	N	*
	in, with concrete base, combined assembly	100	EI 90 S	N	*
	in, with concrete base, multiple mounting	100	EI 90 S	N	*
	in, hollow concrete block ceilings	150	EI 90 S	N	*
	in, hollow core slabs	150	EI 90 S	N	*
	in, ribbed ceilings	150 ²	EI 90 S	N	*
	in, composite ceilings	150	EI 90 S	N	*
	in, combined with wooden beam ceilings	150	EI 90 S	N	*
	in, combined with solid wood ceiling	150	EI 90 S	N	*
	in, combined lightweight ceiling, Cadoldo system	150	EI 120 S ¹	N	*
	in, combined lightweight ceiling, system ADK modular space	125	EI 90 S	N	*
		125	EI 90 S	E	*

¹ The class of performance depends on the installation details
² Thickness increased near the installation opening
³ Depending on local conditions

* see the complete operating and installation manual at www.trox-docs.com

N = Mortar-based installation
 E = Installation kit
 W = Fire batt
 E = Dry mortarless installation

Overview of installation situations						
Supporting construction	Installation location	Minimum thickness [mm]	Class of performance EI TT (v _e -h _o , i ↔ o) S up to	Installation type	Chapter	
	in, installation block ER	100 (150) ²	EI 90 S	E	*	
	underneath (horizontal duct), installation kit WE2	125	EI 90 S	E	*	
	above (horizontal duct), installation kit WE2	125	EI 90 S	E	*	
	in, fire batt		100 (150) ²	EI 120 S	W ¹	*
			100 (150) ²	EI 90 S	W ¹	*
Solid wood ceilings	in	140	EI 90 S	N	*	
		112.5	EI 90 S	N	*	
	in, installation kit TQ2	140	EI 90 S	E	*	
		112.5	EI 90 S	E	*	
Wooden beam ceilings	in	167.5	EI 90 S	N	*	
		155	EI 60 S	N	*	
		142.5	EI 30 S	N	*	
	in, installation kit TQ2	167.5	EI 90 S	E	*	
		155	EI 60 S	E	*	
		142.5	EI 30 S	E	*	
	in, historic wooden beam ceilings	– ³	EI 30 S	N	*	

¹⁾ The class of performance depends on the installation details

²⁾ Thickness increased near the installation opening

³⁾ Depending on local conditions

* see the complete operating and installation manual at www.trox-docs.com

N = Mortar-based installation

E = Installation kit

W = Fire batt

E = Dry mortarless installation

4.2 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.

4.3 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 ↪ 6 'Functional test' on page 73 .
 - Do NOT remove the product sticker or the adhesive tape in the installation opening.
 - 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.
 - When installing the FKRS-EU, the statics of the supporting construction (wall/ceiling) must be ensured by others, even in the event of a fire.
 - The following applies unless stated otherwise in the installation details:
 - Each fire damper is to be installed in its own installation opening. Distance between two fire dampers ≥ 200 mm.
 - the distance to load-bearing components, uncovered steel girders as well as wooden walls and ceilings is ≥ 75 mm.
 - No more than two fire dampers in the same installation opening.
 - With mortar-based installation, fire dampers can be installed at ≥ 40 mm from steel girders, wooden beams or wooden ceilings with fire-rated cladding. The fire-resistant cladding must be manufactured in accordance with a national or European certificate and must have full surface contact (no cavities) with the supporting structure.
 - 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 must be ensured by other, e.g., by switching off the fan or by mutual interlocking in the case of the construction with a spring return actuator.
 - As ducts may expand and exert forces, 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
 - Fire protection bricks
- The flexible connectors should be installed in such a way that they absorb both tension and compression. Flexible ducts can be used as an alternative.
- Ducting must be installed in such a way 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 and cleaning. For this purpose, Type FKRS-EU fire dampers have an inspection access that is closed with a rubber stopper. Depending on the installation configuration it may be necessary to provide additional inspection access points in the connecting ducts. As an alternative to the inspection access, we recommend connecting the duct using flexible connectors (fastened with hose clamp) or sliding connectors.
 - When mounting two fire dampers side by side and arranging the actuators between the fire dampers, provide sufficient clearance for inspection.
 - Load-bearing structures
This includes solid ceiling slabs, concrete beams and load-bearing solid walls.
 - Distance from fire-rated partitions
The minimum distances between a partition and other openings or installations, e.g. fire dampers, are usually given in the usability certificates of each partition. A partitioning panel must not be located in the direct installation area of the fire damper (installation in separate installation opening, exception: combined penetration seal and fire protection brick bulkhead).
- ### After installation
- Clean the fire damper.
 - Fire dampers of nominal size 315 mm and without installation block are shipped with a transport and installation protection. In case of mortar-based installation this protection must not be removed until the mortar has hardened. To remove the transport/installation protection, pull it out of the fire damper on the operating side.
 - Test the function of the fire damper.
 - Connect the ductwork.
 - Make electrical connections.
- ### Connecting duct and extension piece
- It is possible to insert screws near the spigot for fixing.

General installation information

Equipotential bonding

The equipotential bonding is fixed, for example, with suitable clamps. Alternatively, it is allowable for drilled holes to be made near the spigot.


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

Thermal insulation

As suitable insulating materials, especially for outdoor air or exhaust air components, you can use fully bonded panels made of elastomer foams (synthetic rubber), e.g. Armaflex Ultima from Armacell. Be sure to comply with the relevant national guidelines and regulations for combustible building materials and smoke development classes.

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.

For information on the use of elastomer foams see  'Additional provision for use in Germany:' on page 6 .

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.

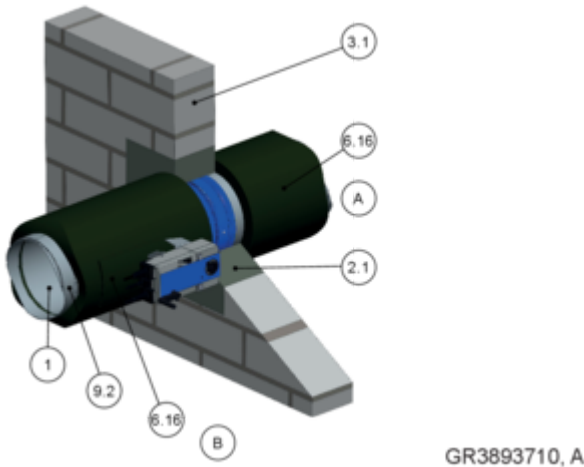


Fig. 9: Thermal insulation

- 1 FKRS-EU
- 2.1 Mortar
- 3.1 Solid wall
- 6.16 Perimeter insulation (elastomer foam, flame-resistant, non-dripping); actuator and release mechanism, inspection accesses and product sticker must be accessible
- 9.2 Air duct/extension piece

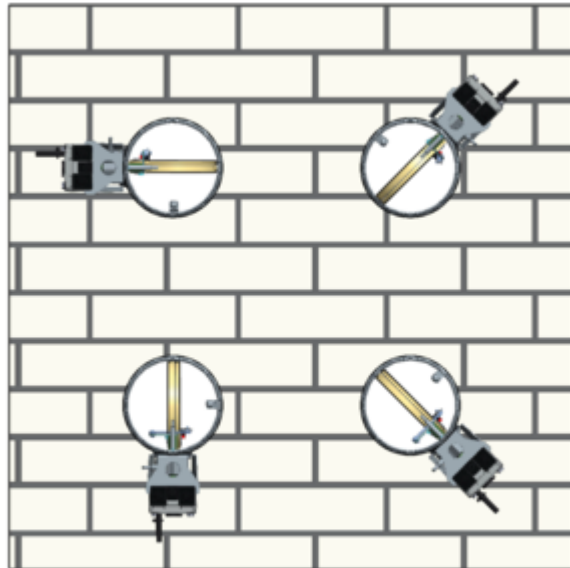
Note: The installation situation shown applies to all supporting constructions.

For installation in Germany please note:

In Germany, only insulation materials with a fire behaviour of at least C - s2, d0, may be used according to the specifications of the MVV TB (since 2019/1). This requirement is met by Armaflex Ultima insulation material from Armacell, for example. The applicable local building regulations have to be observed.

Installation positions

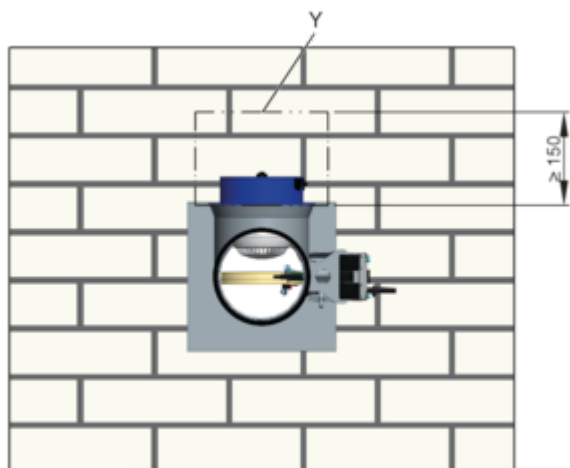
The fire damper can be installed with the damper blade shaft in any position (0 to 360°). The position of the release mechanism is not critical but the mechanism must remain accessible for maintenance.



GR3893730, A

Fig. 10: Installation positions

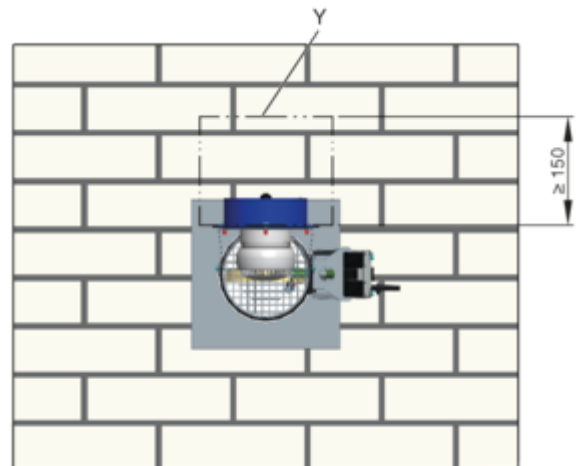
If a duct smoke detector is installed in the connected duct, it must be positioned at the top. You may choose a different arrangement as long as you comply with the general building inspectorate licence/ general type certification for the duct smoke detector.



GR3925254, A

Fig. 11: FKRS-EU with spring return actuator and duct smoke detector

Y Keep clear for operation and maintenance

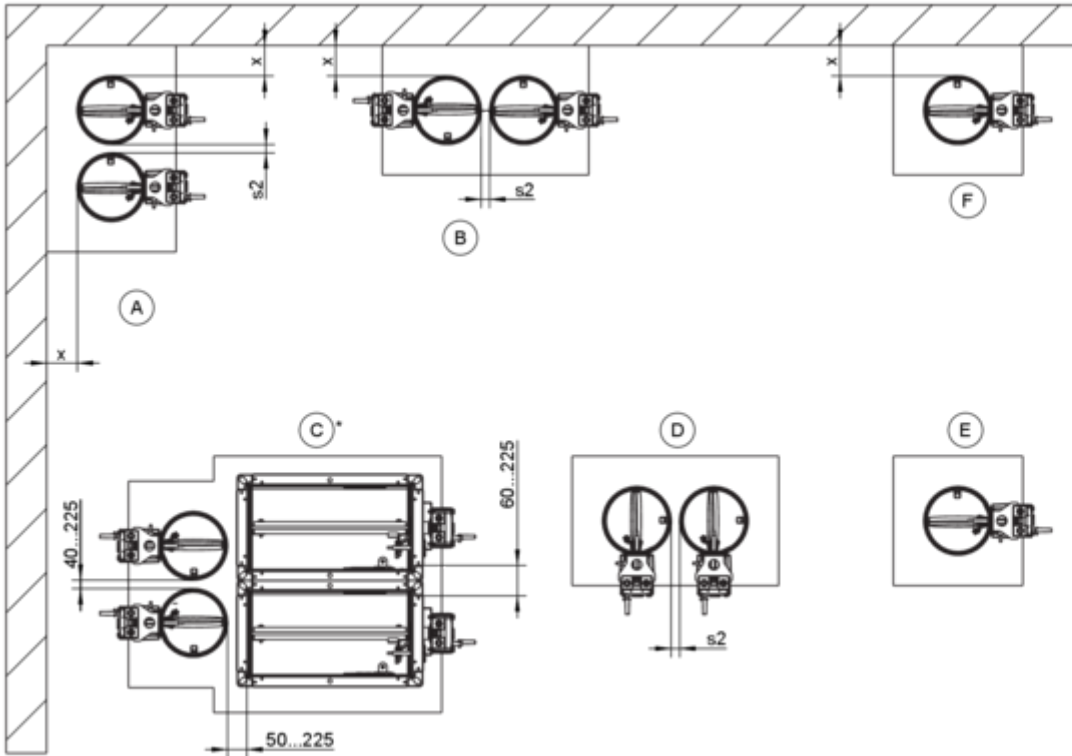


GR3905661, A

Fig. 12: FKRS-EU with spring return actuator and duct smoke detector used as an air transfer damper

Y Keep clear for operation and maintenance

Distances



GR3893796, A

Fig. 13: Overview of distances

* Combined installation with fire damper type FK2-EU

Distances (unless stated otherwise in the installation details)

Installation type	x [mm]	s2 [mm]
Mortar-based installation	40 – 225	10 ³ – 225
Mortar-based installation with partial mortaring ⁴	40 – 50	40 – 225
Dry mortarless installation with installation block ER ^{1, 2}	≥ 75 ⁶	≥ 200 ⁶
Dry mortarless installation with installation kit TQ2 ^{1, 2}	100/55 ⁵	≥ 200
Dry mortarless installation with installation kit WA2	≥ 75	≥ 200
Dry mortarless installation with fire batt	40 – 600	10 ³ – 600

¹ See "Installation openings" table under the respective installation details

² Installation into separate installation openings

³ Minimum distance depending on fire resistance duration and supporting construction.

Supporting construction, φ 'Installation orientation (see installation details for fire resistance)' on page 27

⁴ Solid wall only

⁵ With shortened cover plate

⁶ Distance between installation block(s)

Installation orientation (see installation details for fire resistance)

Supporting construction	Installation type		
	Mortar-based installation	Dry mortarless installation	Fire batt installation
Solid wall	A – F	E	A, B, D – F
Gypsum wallboard with W = 80 – < 100 mm	E, F		
Lightweight partition wall with metal support structure	A – F	E, F	A, B, D – F
Timber stud wall/half-timbered construction	A – F	E, F	A, B, D – F
Solid wood wall/CLT wall	A, B, D – F	E, F	E, F
Shaft wall with metal support structure	A – F	E, F	E, F
Shaft wall without metal support structure	E	E	
Sandwich panel wall		E *	
Solid ceiling slab	A – F	E	E
Hollow chamber ceiling, hollow concrete block ceiling, composite ceiling, ribbed ceiling	A, B, D – F		
Combined with a lightweight ceiling (Cadolto system)	A, B, D – F		
In combination with lightweight ceiling (ADK Modulraum system)	A, B, D – F	E	
In/combined with a solid wood ceiling	E/A, B, D – F	E/–	
In/combined with a wooden beam ceiling	E/A, B, D – F	E/–	
In historical wood beam ceilings	E		

* The following applies to Germany: Installation requires a project-related type approval.

General installation information

Mortar-based installation

- Cover all openings and control elements of the fire damper (e.g. with plastic) to protect them from contamination.
- Push the fire dampers into the installation opening in a centred manner and secure them. The distance from the spigot on the operating side to the wall/ceiling is 215 mm.
- If the wall thickness is >115 mm, extend the fire damper on the installation side with an extension piece or a spiral duct.
- In case of mortar-based installation, the open spaces between the fire damper casing and the wall or ceiling must be closed off with mortar. Entrapped air is to be avoided. The mortar bed depth should be equal to the thickness of the wall but must be at least 100 mm.
- The bond between the mortar and the supporting structure must be ensured on site. If necessary, create a positive connection, e.g., screws in the installation opening for mortar-based installation in wooden beam ceilings.
- If you install the fire damper as the solid wall or ceiling slab is being completed, perimeter gap s1 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.
- 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

- DIN 1053: Groups II, IIa, III, IIIa; fire protection mortar of groups II, III
- EN 998-2: Classes M 2.5 to M 20 or fire protection mortar of classes M 2.5 to M 20
- Fireproof mortar to BS 476: Part 20
- Mortar or fire protection mortar that has been verified via an ETA
- Equivalent mortars that meet the requirements of the above standards, gypsum mortar or concrete

Perimeter gap »s1«

- With mortar-based installation the perimeter gap s1 must not exceed 225 mm (wall and ceiling). The perimeter gap s must be large enough so that installation and filling with mortar are possible 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. In case of larger openings in solid ceiling slabs, the dampers can be concreted in as the ceiling is being constructed. The gap must be large enough so that mortar can be filled in. We recommend a gap of at least 20 mm (note the minimum installation opening size). Reinforcement should meet structural requirements.

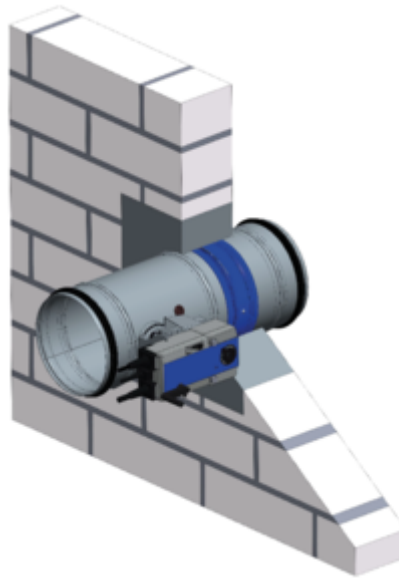


Fig. 14: Perimeter gap

- 1 FKRS-EU
- 2.1 Mortar
- s1 Perimeter gap

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.

Mineral wool as filling material

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

Installation with installation block/installation kit

- For installation without mortar-mix, installation blocks or installation kits can be used:
 - in walls and ceilings: ER, TQ2
 - on walls: WA2
 - remote from walls and ceilings: WE2
 - in lightweight partition walls with sliding ceiling connection: GL2

If required, the installation kits must be assembled by others in accordance with the planned use.

The installation kits are fixed according to the installation details. In lightweight partition walls, the fixing screws must always be screwed into the metal support structure/wood support structure.

Use dry wall screws that are long enough.

- **Installation block ER**

- Only installation in solid walls and ceilings without cavities. If cavities are present, they must be completely sealed with mortar all around to a depth of ≥ 100 mm.
- The installation block ER is factory-mounted on the fire damper, ↗ 4.4.2 'Installation block ER' on page 38 .
- The installation of the installation block is always centred in the installation opening.
- Circular installation opening ER: $\varnothing D1$, ↗ 4.4.1 'Overview of installation block and installation kits' on page 37 .

- **Installation kit TQ2**

- The installation kit TQ2 is mounted on the fire damper on site, ↗ 4.4.3 'Installation kit TQ2' on page 39 .
- Make square installation opening with nominal width + 110 mm.
- The installation of the TQ2 installation kit is always centred in the installation opening.
- If specified in the installation details, the cover plates of the installation kit TQ2 can be proficiently shortened on one side for installation near the ceiling and floor.
As a replacement for the upper fixings, fixing screws are to be provided at the top of the H-sides of the cover plate.

- **Installation kit WA2**

- The WA2 installation kit is mounted on the fire damper on site, ↗ 4.4.4 'Installation kit WA2' on page 40
- Installation is carried out on solid walls in front of a core drill hole nominal width + 10 - 30 mm.
- The installation is carried out on a mortared-in, wall-flush shortened air duct with additional reinforcing board made of calcium silicate, $d = 30 - 50$ mm or mineral wool, ≥ 1000 °C, ≥ 140 kg/m³, $d = 50$ mm.

- Installation is carried out on shaft walls with and without a metal support structure and cladding on one side with a round installation opening with nominal width + 5 mm, fastening of the installation kit by means of push-through mounting.

- **Installation kit WE2**

- The installation kit WE2 is mounted on the fire damper on site, ↗ 4.4.5 'Installation kit WE 2' on page 41 .
- Installation is carried out on sheet steel ducts without any openings, with fire-resistant cladding.
- The following materials are acceptable for the cladding of fire dampers and ducts:
 - Promatect® LS35 (d = 35 mm)
 - Promatect® L500 (d = 40 mm)
 - Promatect® AD40 (d = 40 mm)
- The wall/ceiling connections must be made in accordance with these instructions and the supplementary assembly instructions WE2.
- Enough clear space is required to mount the installation kit onto the fire damper.
- Fire dampers installed remote from walls and ceilings need to be suspended or fixed. Suspension systems with $L \geq 1.5$ m require fire-resistant insulation. Use cladding or mineral wool insulation according to the manufacturer's specifications.
- No installation remote from walls with flexible ceiling joint
- For more installation details and for components to be provided by others, see the supplementary installation manual WE2.



- **Installation kit GL2**

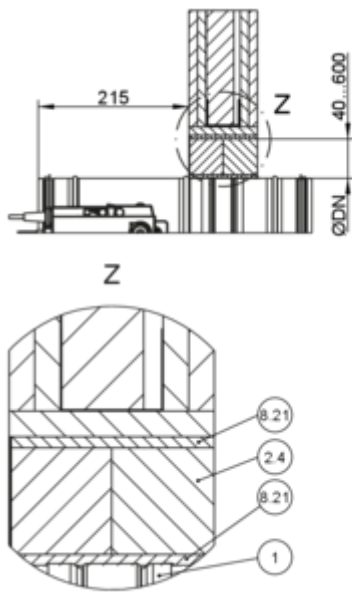
- The installation kit GL2 is mounted on the fire damper on site and adapted to the existing wall thickness, ↗ 4.4.6 'Installation kit GL2' on page 42 .
- The installation is carried out in metal stud walls clad on both sides.
- The installation is carried out near the ceiling under a solid ceiling slab and must be fixed to the ceiling with the supplied brackets.
- When installing with no ceiling fastening on the rear side, the steel angles Fig. 28 and the cover Fig. 29 must be made by the customer.
- For further installation details and components to be provided by the customer, see additional assembly instructions for the sliding ceiling connection.

Installation remote from walls with mineral wool

- Installation is carried out on sheet steel ducts without any openings, with fire-resistant cladding.
- The following materials are acceptable for the cladding of fire dampers and ducts:
 - PAROC HVAC Fire Mat 80BLC (80 kg/m³)
- The wall connections must be made in accordance with these instructions. Fittings must be configured according to PAROC specifications.
- When installing in conjunction with fire batt, use "PAROC Pyrotech Slab 140".

Installation in fire batt

- The distance from the operating side spigot to the wall/ceiling has to be 215 mm for installation into fire batt systems.
- Fire batt systems consist of two layers of mineral wool slabs, gross density ≥ 140 kg/m³.
- Apply fire-resistant sealant to the cut faces of the mineral wool slabs and fit them tightly into the installation opening. Seal any gaps between the mineral wool slabs and the installation opening, gaps between the cut faces of cut-to-size pieces, and gaps between slabs and the fire damper by applying fire-resistant sealant or coating. Use only sealant or coating that is suitable for the fire batt system.
- Apply ablative coating to the mineral wool slabs, joints, transitions and any imperfections on the coated mineral wool slabs; coating thickness ≥ 2.5 mm.
- Depending on the selected installation situation and fire resistance duration, the fire damper casings must be partially coated, thickness ≥ 2.5 mm. The drive and release unit as well as the product label must not be coated.
Permitted alternatives:
 - Mineral wool strips > 1000 °C, > 80 kg/m³, thickness = 20 mm
 - Sleeves (can be ordered separately)
 - Elastomer foam strips (flame-resistant, non-dripping)
The following applies in Germany: For notes on the use of elastomeric foams, see  6.
- Fix fire dampers on both sides of the wall/ceiling, see  67.
- If the wall/ceiling is fairly thick, you must use additional layers of mineral wool slabs on side A.
- Only installation in solid walls and ceilings without cavities. If cavities are present, they must be completely sealed with mortar all around to a depth of ≥ 100 mm.
- Fire batt systems are not suitable for use below flexible ceiling joints.



GR3894955, A

Fig. 15: Fire-resistant sealant

- 1 FKRS-EU
- 2.4 Fire batt with ablative coating
- 8.21 Firestop sealant

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
- Ablative coating Promastop®-I
- Ablative coating Intumex-CSP
- Ablative coating Intumex-AC

Hilti

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

HENSEL

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

SVT

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

OBO Bettermann

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

Würth

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

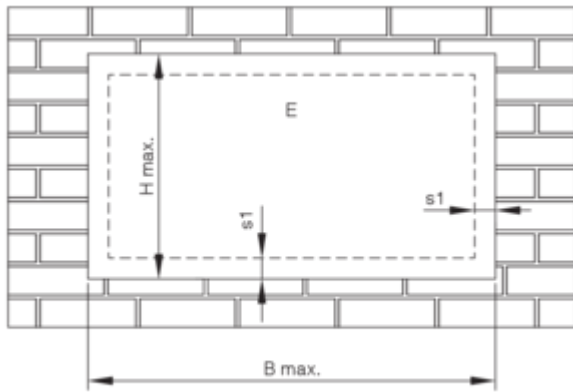
AGI

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

FLAMRO

- BML Fire protection coating ablative
- BMS Fire protection sealant ablative

Dimensions and distances for fire batt systems for wall installation



GR3420162, D

Fig. 16: Fire batt – installation in solid walls and ceilings, lightweight partition, timber stud wall, half-timbered construction and solid wood walls

E Installation area

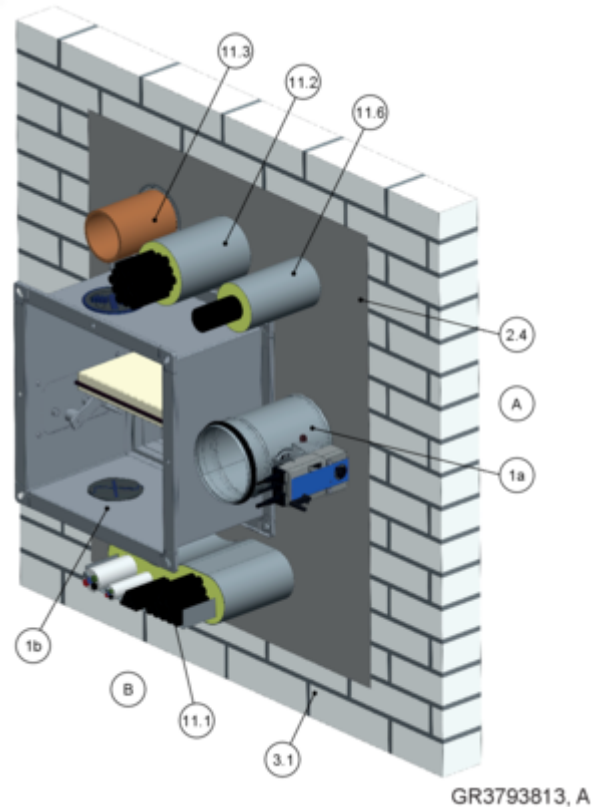
Coated board system	B max. [mm]	H max. [mm]
Promat®	≤ 3750	≤ 1840
Hilti	≤ 3000	≤ 2115
Hensel	≤ 1900	≤ 1400
SVT		
OBO Bettermann		
Würth		
AGI		
FLAMRO®		

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

Installation with combined penetration seal

Mixed ducts of fire dampers FKRS-EU and FK2-EU, together with cables and pipes in a Hilti fire batt system (CFS-CT, CP 670 and CP 673), are permitted in the Trox combined penetration seal. The positions of the fire dampers, pipes and cables in the combined penetration seal are irrelevant as long as the specified distances are kept. Bulkhead sizes up to B1 × H1 = 3000 × 2000 mm are possible.

Installation is permitted in solid walls as well as lightweight partition walls with metal or wooden framework.



GR3793813, A

Fig. 17: Combined penetration seal (drawn solid wall)

- 1a FKRS-EU
- 1b FK2-EU
- 2.4 Fire batt with ablative coating
- 3.1 Solid wall
- 11.1 Cable tray
- 11.2 Cable set
- 11.3 Pipe collar
- 11.6 Cable penetration

Additional provision for use in Germany:

- Use with a combined penetration seal in Germany requires official approval.

Note: For more information on the combined penetration seal refer to the installation and operating manual for the combined penetration seal.

Installation in fire protection block bulkhead

- Fire damper penetrations are permitted with fire protection blocks (CFS-BL) in solid walls, lightweight partition walls with metal support structures and sandwich panel walls.

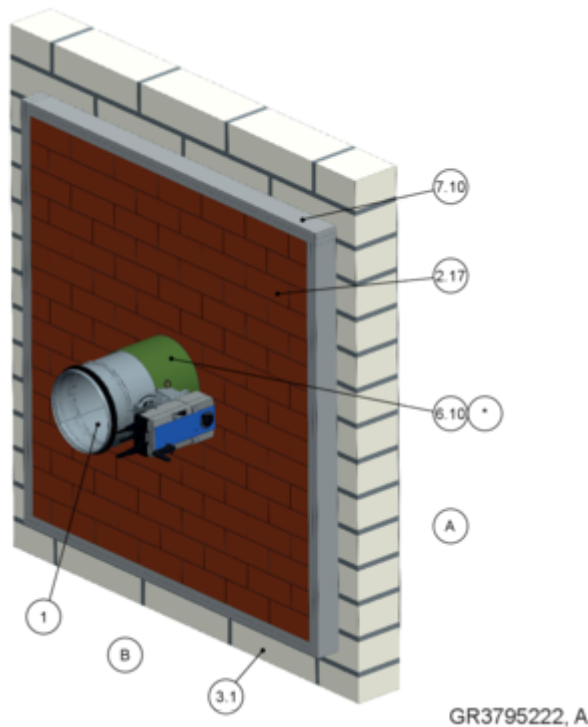


Fig. 18: Fire protection stone bulkhead (single penetration)

- 1 FKRS-EU
- 2.17 Fire protection block Hilti CFS-BL
- 3.1 Solid wall
- 6.10 Ablative coating around the perimeter, d = at least 2.5 mm
- 6.19 Mineral wool > 1000 °C, > 80 kg/m³, thickness = 20 mm, panel material around the perimeter, leave out the actuator and release mechanism; inspection openings must remain accessible
- 6.20 Sleeve (to be ordered separately)
- 6.24 Elastomeric foam (flame-resistant, non-dripping)
The following applies in Germany: For notes on the use of elastomeric foams ☞ 'Additional provision for use in Germany:' on page 6 .
- 7.10 Trim panels, fire-resistant, double-layered, required for wall thicknesses < 200 mm
- 8.21 Fire-resistant sealant CFS-S ACR CW
- 9.2 Air duct/extension piece
- * 6.19, 6.20 or 6.24 as an alternative

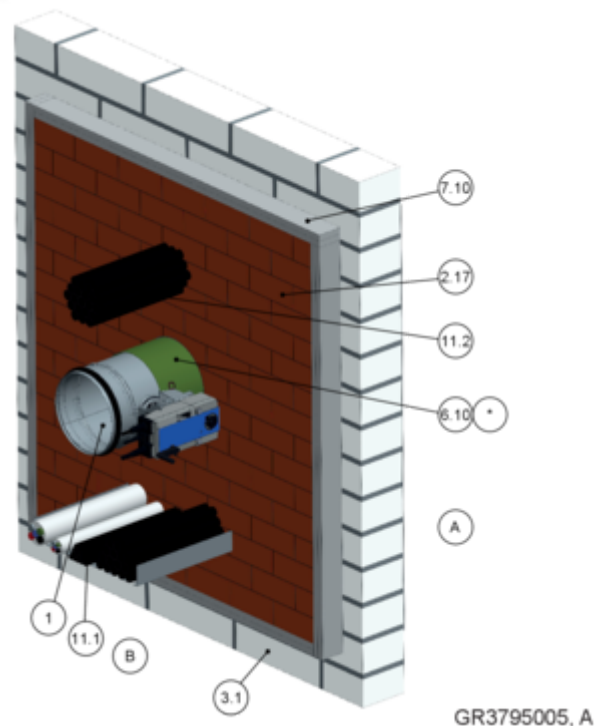


Fig. 19: Fire protection stone bulkhead (mixed execution)

- 1 FKRS-EU
 - 2.17 Fire protection block Hilti CFS-BL
 - 3.1 Solid wall
 - 6.10 Ablative coating around the perimeter, d = at least 2.5 mm
 - 6.19 Mineral wool > 1000 °C, > 80 kg/m³, thickness = 20 mm, panel material around the perimeter, leave out the actuator and release mechanism; inspection openings must remain accessible
 - 6.20 Sleeve (to be ordered separately)
 - 6.24 Elastomeric foam (flame-resistant, non-dripping)
The following applies in Germany: For notes on the use of elastomeric foams ☞ 'Additional provision for use in Germany:' on page 6 .
 - 7.10 Trim panels, fire-resistant, double-layered, required for wall thicknesses < 200 mm
 - 8.21 Fire-resistant sealant CFS-S ACR CW
 - 9.2 Air duct/extension piece
 - 11.1 Cable tray
 - 11.2 Cable set
 - * 6.19, 6.20 or 6.24 as an alternative
- Mixed penetrations of FKRS-EU fire dampers together with cable and cable trays are permitted with a Hilti fire protection brick system (CFS-BL).
 - The positions of the fire dampers, pipes and cables in the fire protection brick bulkhead are arbitrary, provided the specified minimum distances are observed.
Bulkhead sizes up to B1 × H1 = 1000 × 1000 mm are possible.
 - Distance between fire damper and penetration seal edge ≥ 50 mm

General installation information

- Distance to load-bearing structural elements ≥ 75 mm
- Distance between casings ≥ 200 mm (separate installation opening)
- Distances to cables, cable bundles, cable trays and empty conduits up to 16 mm see additional assembly instructions

Additional provision for use in Germany:

- Use in fire protection block bulkheads in Germany requires official approval by others.
- Hilti company provides additional information on the cable penetrations and the fire protection block CFS-BL.

Note: Further information on the fire protection brick bulkhead can be found in the additional assembly instructions for the fire protection brick bulkhead.

Requirements for wall and ceiling systems

FKRS-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 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.

The structural safety of the wall/ceiling must be ensured (by the customer). Compensation measures, especially with regard to large installation openings, must be determined on a case to case basis (by the customer).

Solid walls

- Solid walls or compartment walls made of, for example, concrete, aerated concrete, masonry or solid gypsum wallboard to EN 12859, (without cavities), gross density ≥ 350 kg/m³.
- Wall thickness $W \geq 100$ mm.
- Provide each installation opening and cut hole according to the local and structural conditions and with regard to the size of the fire damper.
- Cavities in the supporting structure as a consequence of creating wall penetrations or cutting holes, must be filled before the installation of the fire damper at least 100 mm deep so that the fire resistance of the supporting structure is restored.

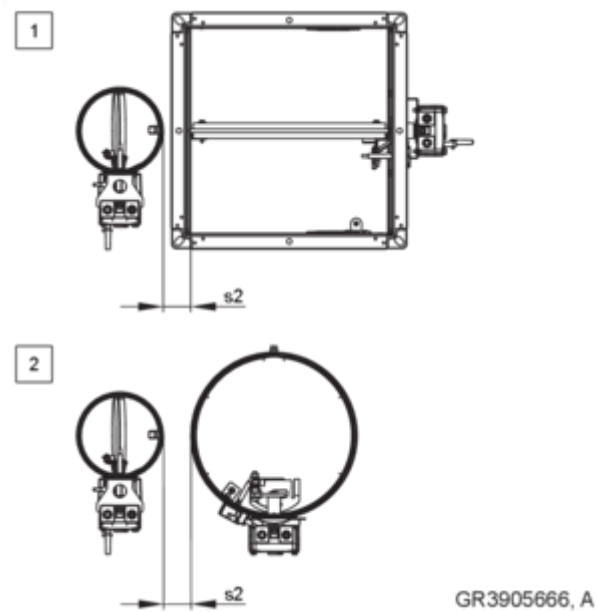


Fig. 20: Distance from the FKRS-EU to other TROX fire dampers in mortar-based installation

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

No.	Damper combination up to EI 90 S	s2 [mm]
1	FKRS-EU – FK2-EU	≥ 50
2	FKRS-EU – FKR-EU	≥ 40

Gypsum wallboard

- Gypsum wallboard according to EN 12859 (without cavities).
- Wall slab thickness $W \geq 80$ mm.
- Provide each installation opening according to the local and structural conditions and with regard to the size of the fire damper.

Module systems

- Additional assembly instructions for manufacturers' room modules:
ADK module room and Cadolto
- In dry mortarless installation, fire dampers can be installed without a minimum distance under modular ceiling designs with proven fire resistance duration.
- In mortar-based installation, when using installation kits for ceiling installation, the cover plate of the installation kit must be professionally shortened on one side. As a replacement for the upper fixings, fixing screws are to be provided at the top of the H-sides of the cover plate. Pre-drill the screw holes with $\varnothing 4$ mm.

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 $W \geq 94$ mm.
- Distance between metal studs ≤ 625 mm; distance between metal studs for compartment walls ≤ 312.5 mm.
- Constructions as fire or safety partition walls can contain sheet steel inserts.
- 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.
- If reinforcing boards are required, screw-fix them to the metal support structure at intervals of approx. 100 mm.
- Installation only in non-load-bearing walls (load-bearing wall constructions on request).

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.
- ≤ 625 mm distance between timber studs; half-timbered constructions ≤ 1000 mm
- Cladding on both sides made of gypsum bonded or cement bonded panel materials, fibre-reinforced gypsum or fire-rated calcium silicate boards.
- Timber support structure, wall thickness $W \geq 130$ mm ($W \geq 110$ with F60, $W \geq 105$ with F30); half-timbered construction, wall thickness $W \geq 140$ mm ($W \geq 110$ with F30).
- Erect the timber stud wall or half-timbered construction according to the manufacturer's instructions.
- Additional layers of cladding (if stated in the usability certificate for the wall) and double stud constructions are approved.
- Create an opening in the timber support structure with studs and trimmers.
- Trim panels and reinforcing boards have to be made of cladding material and have to be fixed to the frame.

Solid wood walls

- Fire-resistant solid wood walls or cross laminated timber walls with European or national certificate.
- Wall thickness $W \geq 95$ mm (with a reinforcing board in the installation area on the operating or installation side to $W \geq 100$ mm).
- If required, additional gypsum bonded or cement bonded panel materials or fibre-reinforced gypsum board are permitted.

Shaft walls with metal support structure

- Shaft walls or additional leaves with metal support structure or steel support structure, 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/reinforcing boards 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
- The unit is mounted with the operating side (B) on the room end.
- If reinforcing boards are required, screw-fix them to the metal support structure at intervals of approx. 100 mm.

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.
- Shaft wall between two solid walls, without corners
- Wall thickness $W \geq 40$ mm.
- If reinforcing boards are required, screw-fix them to the metal support structure at intervals of approx. 100 mm.

Sandwich panel walls

- Sandwich panel wall consisting of self-supporting sandwich panels/sandwich boards
- Sheet steel ≥ 0.5 mm, both sides, mineral wool fill, ≥ 1000 °C, ≥ 115 kg/m³
- Wall thickness ≥ 100 mm – 200 mm

General installation information

Solid ceiling slabs

- Solid ceiling slabs without open spaces, made of concrete or aerated concrete, gross density $\geq 450 \text{ kg/m}^3$.
- Ceiling thickness $D \geq 100 \text{ mm}$, thickness increased to $D \geq 150 \text{ mm}$ where required (unless stated otherwise in the installation details).
- Partial solid ceiling slab $d \geq 150 \text{ mm}$ as a combination with fire-resistant wooden beam ceilings (also gluelam), solid wood ceilings and lightweight ceilings (only ceiling systems Cadolto and ADK Modulraum).
- Provide each installation opening and cut hole according to the local and structural conditions and with regard to the size of the fire damper.
- Other ceiling types:
 - Hollow concrete block ceilings, $D \geq 150 \text{ mm}$
 - Hollow core slabs, $D \geq 150 \text{ mm}$
 - Ribbed ceilings, thickness increased to $D \geq 150 \text{ mm}$
 - Composite ceilings, $D \geq 150 \text{ mm}$
- The structural properties of the ceiling and the connection of the mortar/concrete grout to the ceiling or any necessary reinforcement must be checked and taken into account by others.

Solid wood ceilings

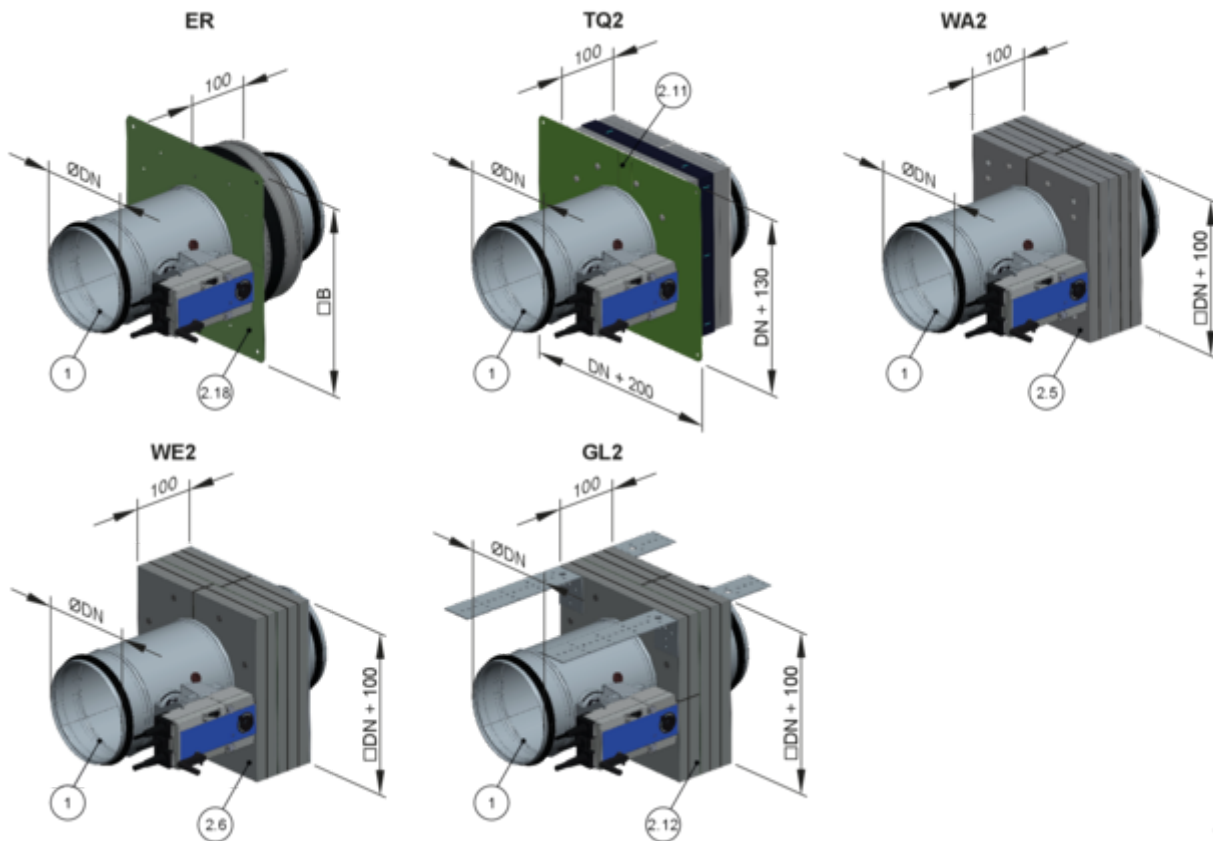
- Solid wood or cross-laminated timber ceilings.
- Ceiling thickness $D \geq 140 \text{ mm}$ or $D \geq 112.5 \text{ mm}$ with supplementary fire-resistant cladding.

Wooden beam ceilings

- Wooden beam or gluelam construction.
- Ceiling thickness $D \geq 142.5 \text{ mm}$ (ceiling-dependent) with supplementary fire-resistant cladding.
- Historic wooden beam ceilings structurally F30 or fire protection-technically F30-approved.

4.4 Installation kits

4.4.1 Overview of installation block and installation kits



GR3925788, A

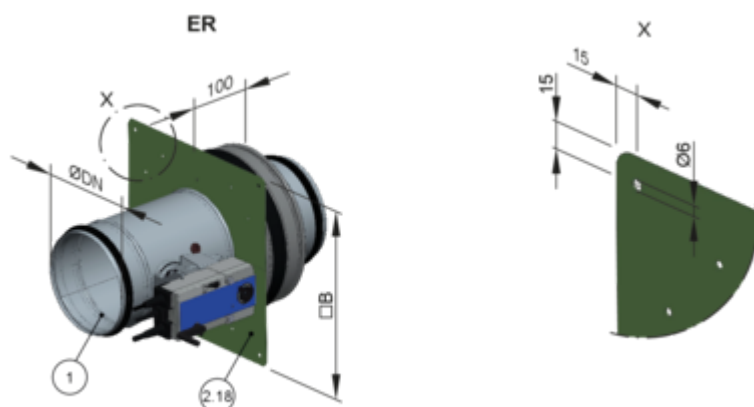
Fig. 21: Overview of installation block and installation kits

1	FKRS-EU	2.11	Installation kit TQ2
2.5	Installation kit WA2	2.12	Installation kit GL2
2.6	Installation kit WE 2	2.18	Installation block ER with cover plate

4.4.2 Installation block ER

Installation block ER for dry mortarless installation into cut holes in solid walls and ceilings

- The installation block ER is an integral component of the fire damper and must be ordered together with the damper.



GR3925788, A

Fig. 22: Supply package and installation of installation block ER for dry mortarless installation

- 1 FKRS-EU
- 2.18 Installation block ER with cover plate

Dimensions of installation opening/cover plate [mm]										
Nominal size	100	125	150	160	180	200	224	250	280	315
ØD1*	200	250	250	250	300	300	350	350	400	400
□B	250	300	300	300	350	350	400	400	450	450

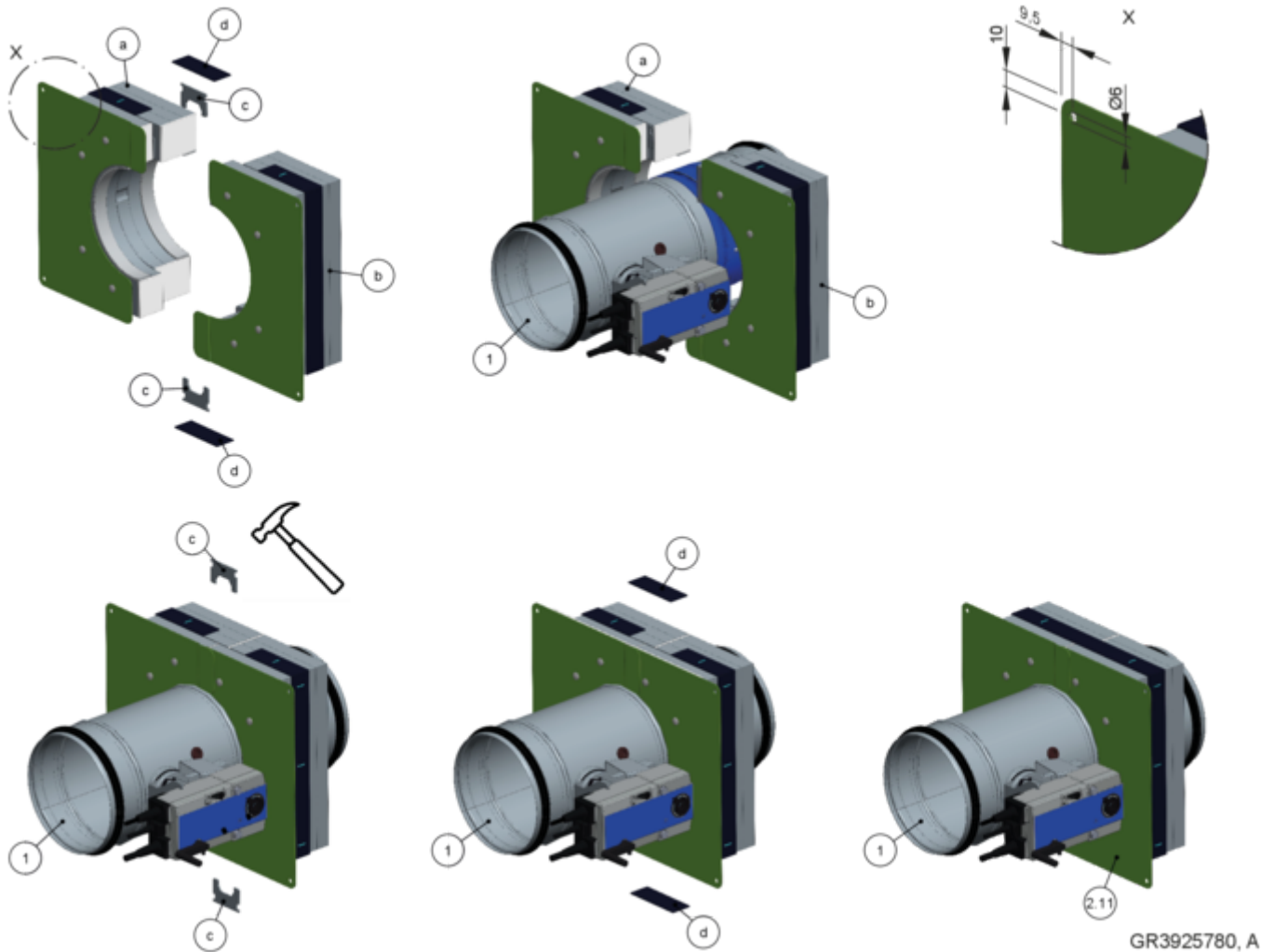
Installation opening tolerance ± 2 mm

* Diameter of the core drill hole in solid walls and ceilings

4.4.3 Installation kit TQ2

Installation kit TQ2 for dry mortarless installation into walls

- Installation kit TQ2 is supplied separately and has to be installed by others.
- The installation kit can also be ordered subsequently.



GR3925780, A

Fig. 23: Supply package and installation of installation kit TQ2 for dry mortarless installation

- | | | | |
|------|--------------------------------------|---|-----------------------------|
| 1 | FKRS-EU | b | Half shell 2 |
| 2.11 | Installation kit TQ2, consisting of: | c | Connecting clamp (2 ×) |
| a | Half shell 1 | d | Intumescent seal (2 strips) |

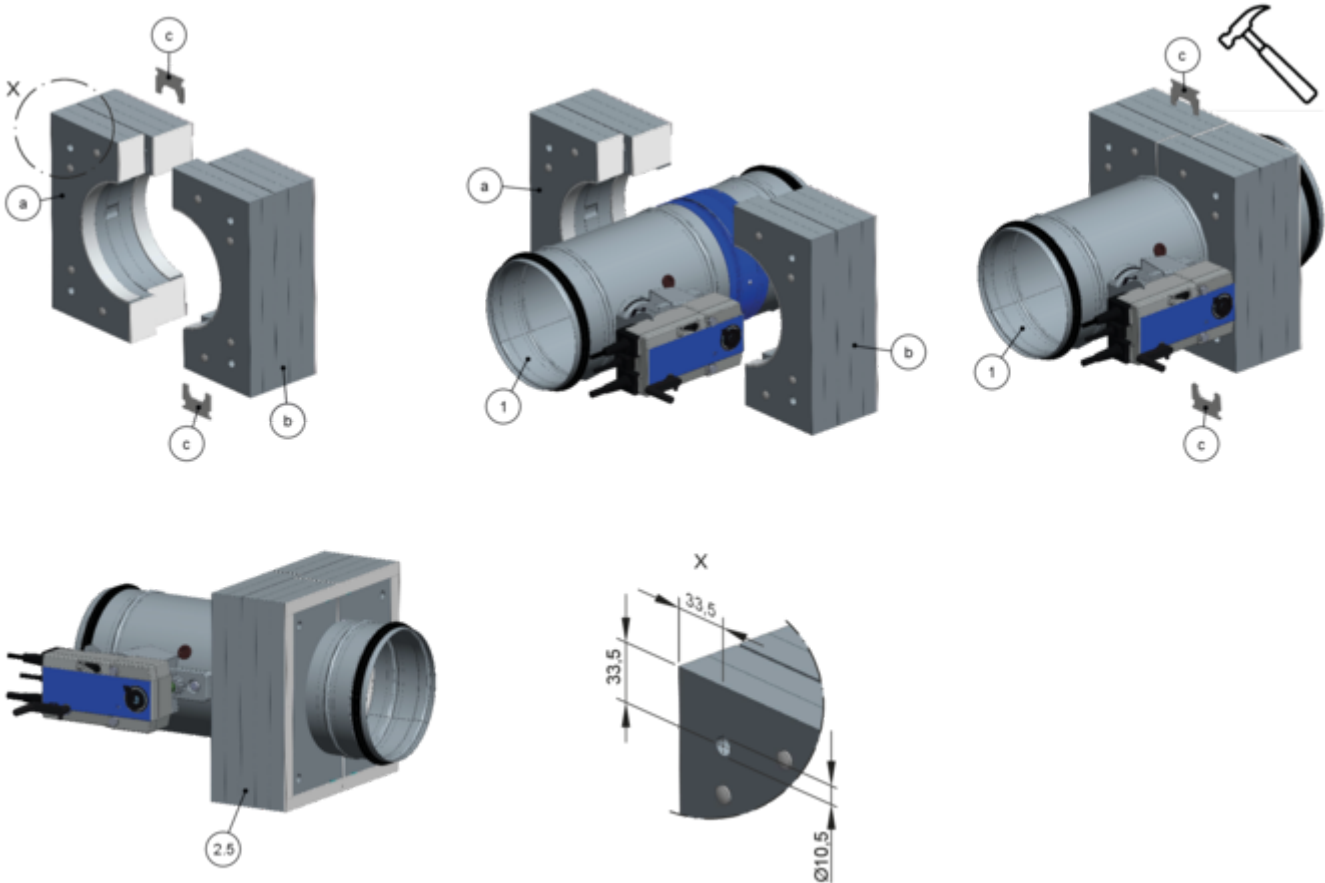
Installation of installation kit TQ2

- ▶ Place half shells (2.11a) and (2.11b) of the installation kit (2.11) around the FKRS-EU so that the cover plate is flush with the bead. Fix the installation kit with two connecting clamps (2.11c) (any installation position of the FKRS-EU). Carefully drive in the connecting clamps bit by bit using a hammer, turning the fire damper with installation kit several times if necessary.
- ▶ Affix intumescent seal (2.11d).

4.4.4 Installation kit WA2

Installation kit WA2 for dry mortarless installation on solid walls

- The installation kit WA2 is supplied separately and must be installed by the customer.
- The installation kit can also be ordered subsequently.



GR3924467, A

Fig. 24: Supply package and installation of installation kit WA2 for dry mortarless installation

- | | | | |
|-----|--|---|--|
| 1 | FKRS-EU | b | Half-shell 2 with Kerafix sealing tape |
| 2.5 | Installation kit WA2, consisting of: | c | Connecting clamp (2 ×) |
| a | Half-shell 1 with Kerafix sealing tape | | |

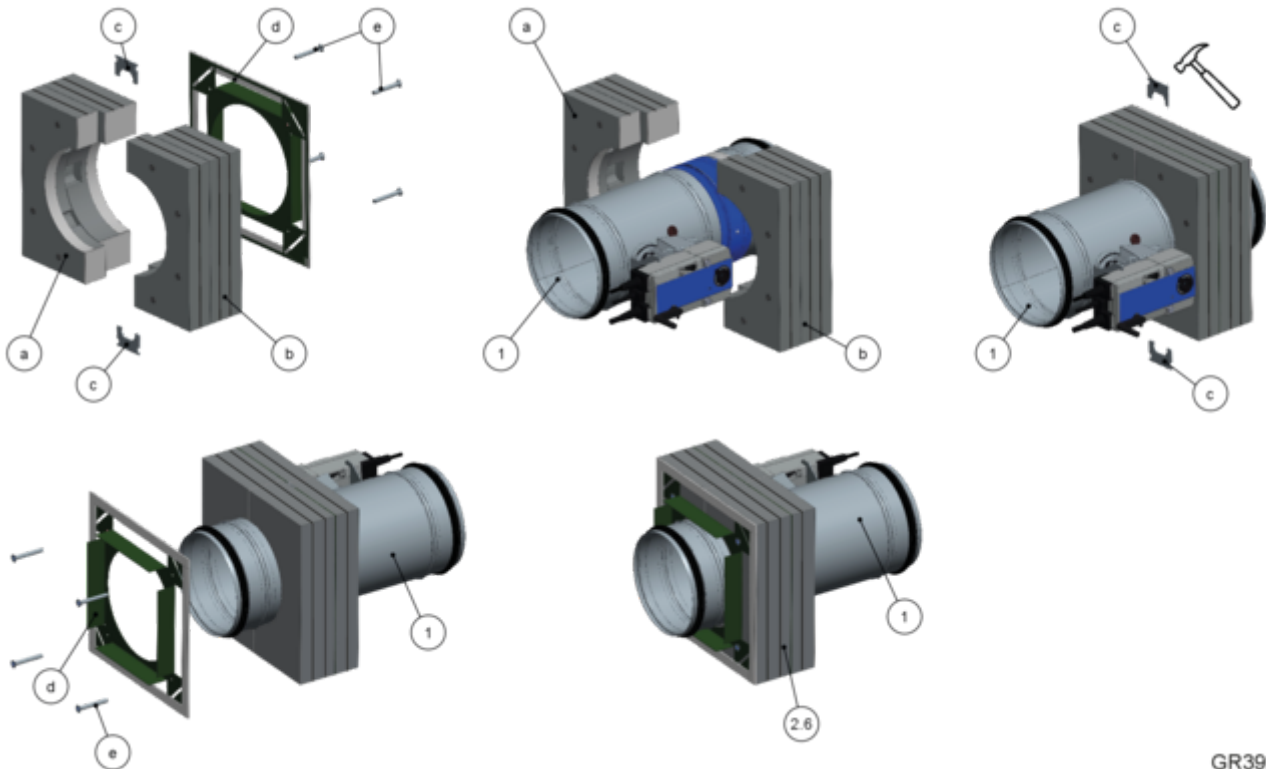
Installation of installation kit WA2

- ▶ Place half shells (2.5a) and (2.5b) of the installation kit (2.5) around the FKRS-EU so that it is flush with the bead. Fix the installation kit with two connecting clamps (2.5c) (any installation position of the FKRS-EU). Carefully drive in the connecting clamps bit by bit using a hammer, turning the fire damper with installation kit several times if necessary.

4.4.5 Installation kit WE 2

Installation kit WE2 for installation remote from solid walls and ceilings as well as remote from lightweight partition walls

- The installation kit WE2 is supplied separately and must be installed by the customer.
- The installation kit can also be ordered subsequently.



GR3926425, A

Fig. 25: Scope of supply and assembly Installation kit WE2 for dry mortarless installation

- | | | | |
|-----|--------------------------------------|---|---|
| 1 | FKRS-EU | c | Connecting clamp (2 ×) |
| 2.6 | Installation kit WE2, consisting of: | d | Sheet metal cover plate with Kerafix sealing tape |
| a | Half shell 1 | e | Dry wall screw |
| b | Half shell 2 | | |

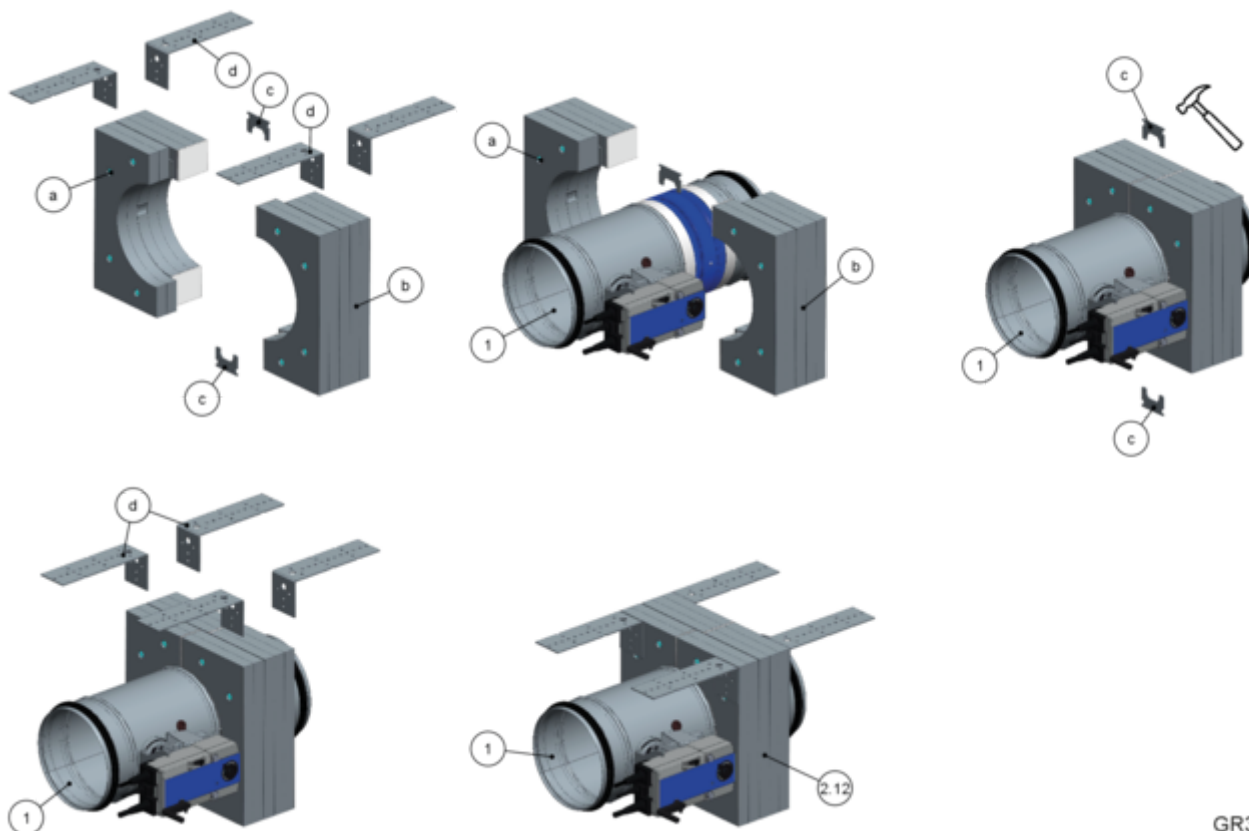
Mounting installation kit WE2

- ▶ Place half shells (2.6a) and (2.6b) of the installation kit (2.6) around the FKRS-EU so that it is flush with the bead. Fix the installation kit with two connecting clamps (2.6c) (any installation position of the FKRS-EU). Carefully drive in the connecting clamps bit by bit using a hammer, turning the fire damper with installation kit several times if necessary.
- ▶ On the rear of the installation kit (2.6), fix the sheet metal cover plate (2.6d) with 4 dry wall screws (2.6e).

4.4.6 Installation kit GL2

Installation kit GL2 for installation in conjunction with a flexible ceiling joint for metal stud walls with cladding on both sides

- The installation kit GL2 is supplied separately and must be installed on site.
- The installation kit can also be ordered subsequently.



GR3902361, A

Fig. 26: Supply package and installation of installation kit GL2 for dry mortarless installation

- | | | | |
|------|--------------------------------------|---|------------------------|
| 1 | FKRS-EU | b | Half shell 2 |
| 2.12 | Installation kit GL2, consisting of: | c | Connecting clamp (2 ×) |
| a | Half shell 1 | d | Bracket |

Installation kit GL2 for installation in conjunction with a sliding ceiling connection in metal stud walls with cladding on both sides and no rear ceiling attachment

- The installation kit GL2 is supplied separately and must be installed on site.
- The installation kit can also be ordered subsequently.

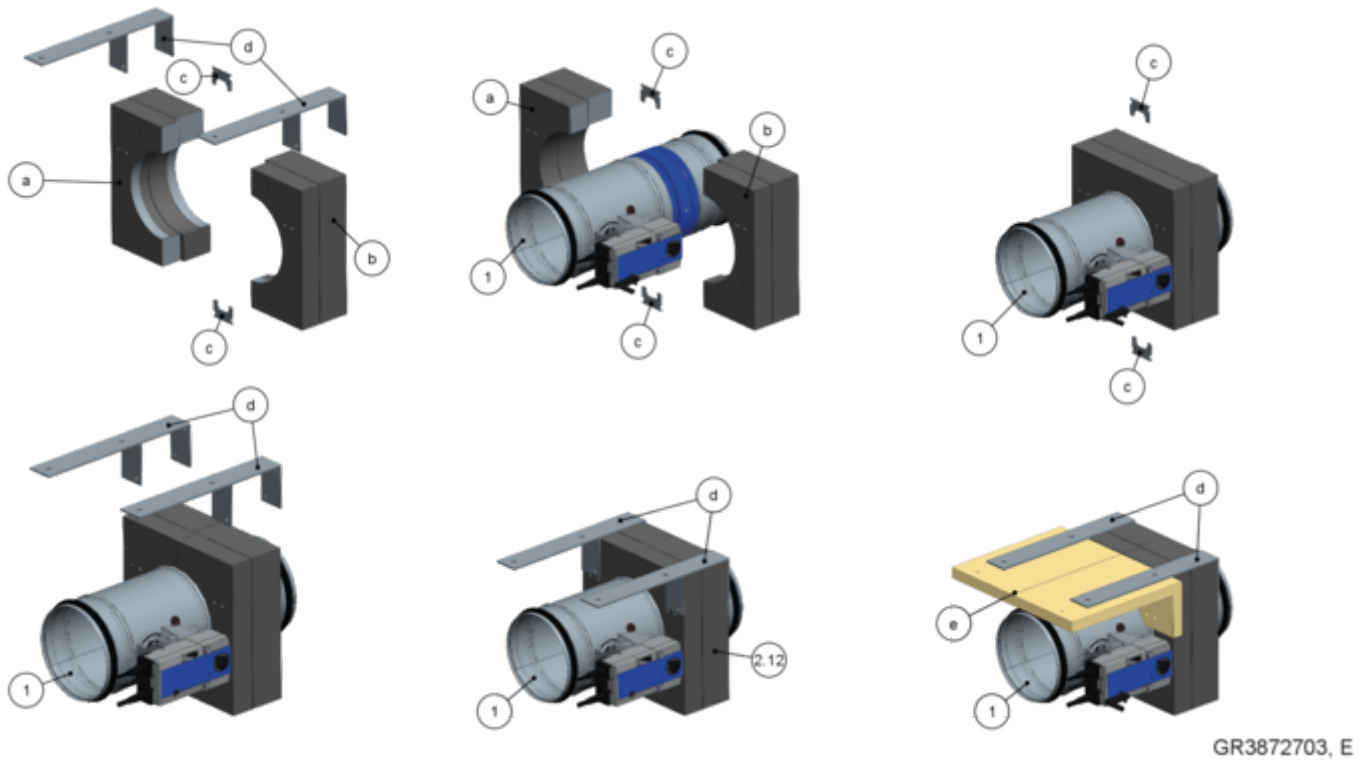


Fig. 27: Scope of supply and installation of installation kit GL2 (steel bracket and cover to be provided by customer) for dry mortarless installation if there is no ceiling fixing on the rear side

- | | | | |
|------|--------------------------------------|---|--------------------------------------|
| 1 | FKRS-EU | c | Connecting clamp (2 ×) |
| 2.12 | Installation kit GL2, consisting of: | d | Steel bracket (supplied by customer) |
| a | Half shell 1 | e | Cover (supplied by customer) |
| b | Half shell 2 | | |

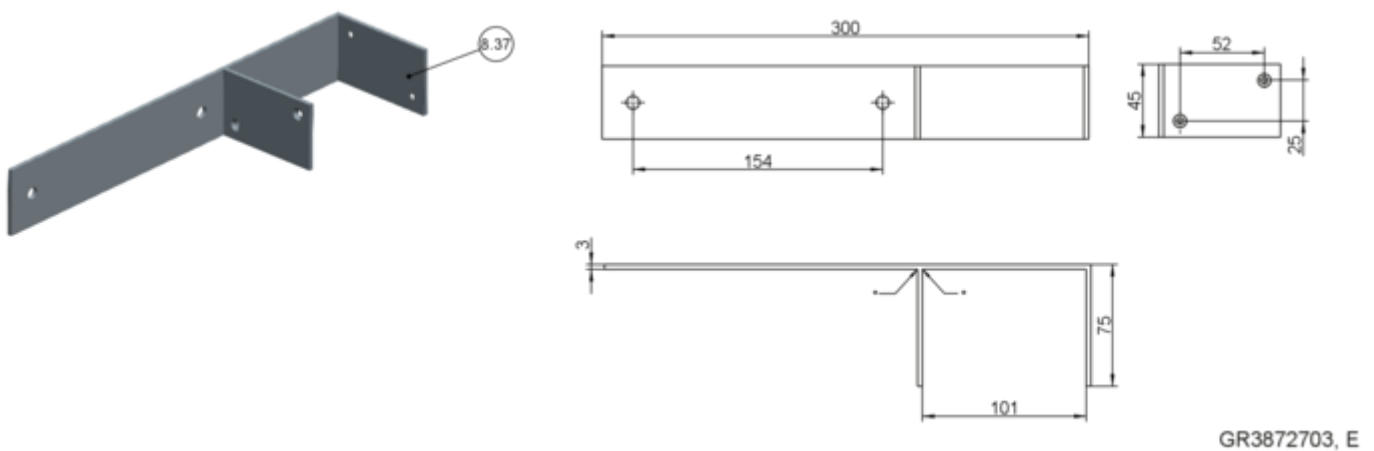
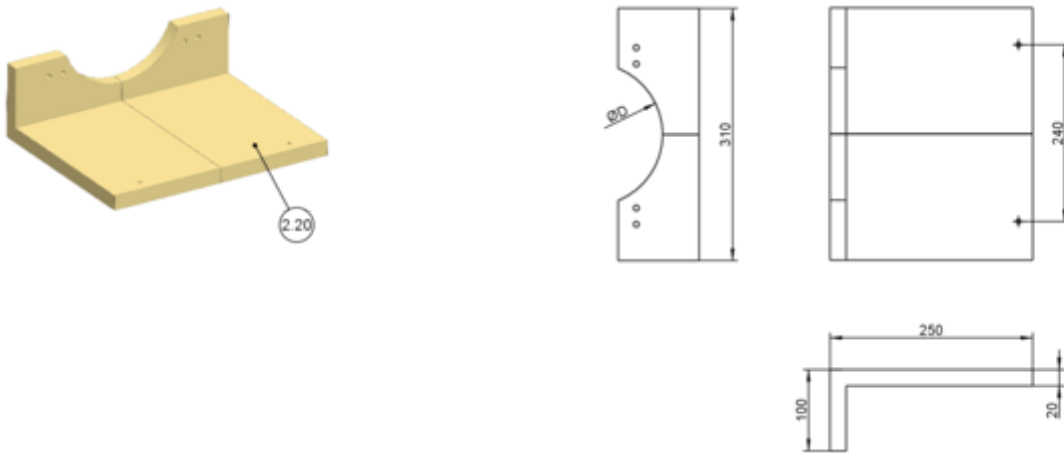


Fig. 28: Steel angle for dry mortarless installation with installation kit GL2 in lightweight partition wall if there is no rear fastening possibility

- 8.37 Steel bracket, supplied by customer
 * Welded seam



GR3872703, E

Fig. 29: Cover for dry mortarless installation with installation kit GL2 in lightweight partition wall if there is no rear fixing option

2.20 Cover (one part or two parts) Rigips Glasroc F20, supplied by customer

Cover dimensions [mm]										
Nominal size	100	125	150	160	180	200	224	250	280	315
ØD	115	140	165	175	195	215	240	265	295	330
L	250	275	300	310	330	350	375	400	430	465

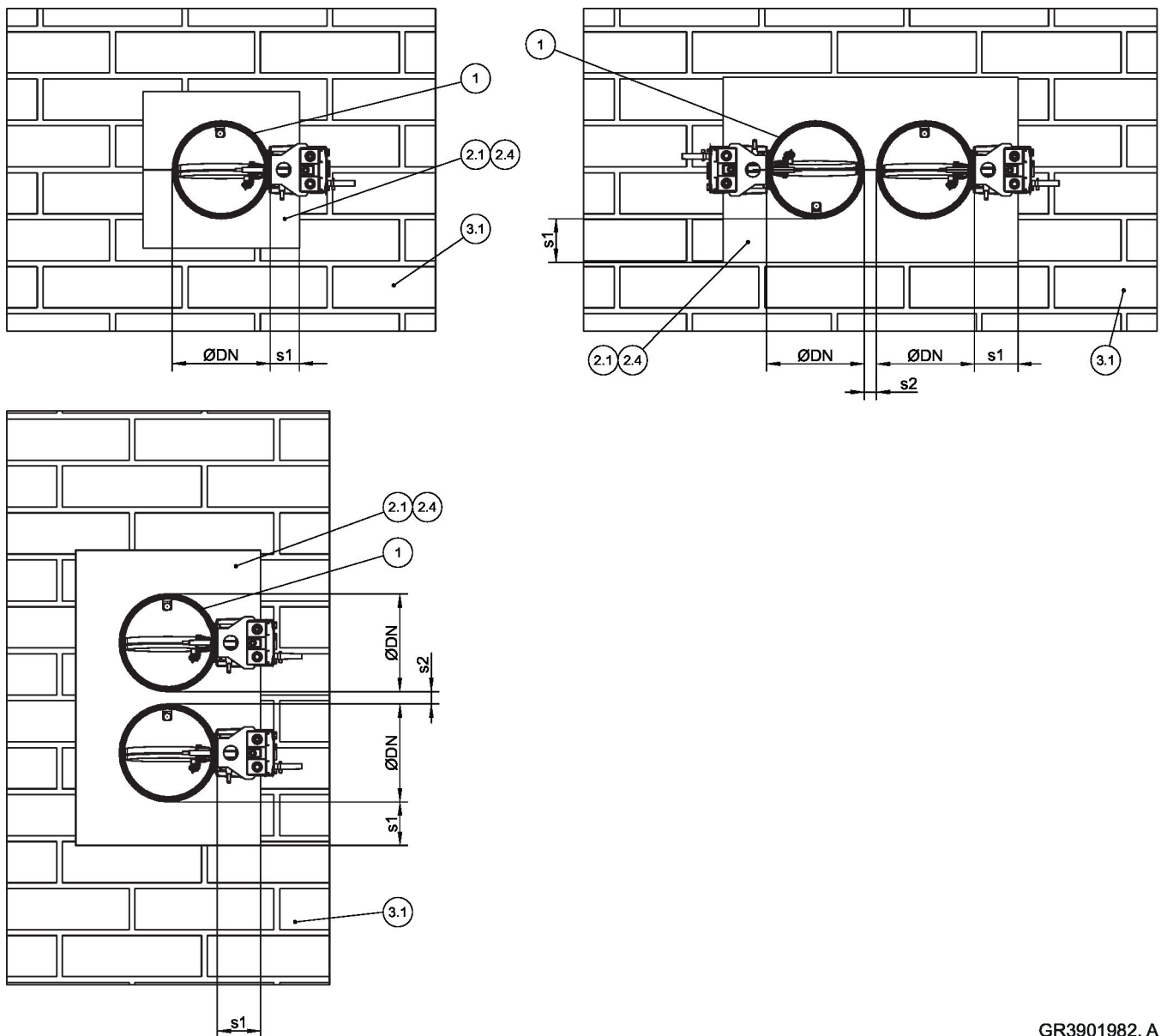
Installation of installation kit GL2

1. ▶ Place half shells (2.12a) and (2.12b) of the installation kit (2.12) around the FKRS-EU so that it is flush with the bead. Fix the installation kit with two connecting clamps (2.12c) (any installation position of the FKRS-EU). Carefully drive in the connecting clamps bit by bit using a hammer, turning the fire damper with installation kit several times if necessary.
2. ▶ Fix each bracket (2.12d) to the installation kit with at least two dry wall screws 3.9 × 35 mm.

Alternative fixing by means of on-site steel angles and cover made of Rigips Glasroc F20 see

4.5 Solid walls

4.5.1 General information



GR3901982, A

Fig. 30: Solid walls – arrangement/distances

- | | | | |
|-----|---------------------------------|-----|---|
| 1 | FKRS-EU | 3.1 | Solid wall |
| 2.1 | Mortar | s1 | Perimeter gap, |
| 2.4 | Fire batt with ablative coating | s2 | Distance between the fire dampers, ☞ 'Distances' on page 26 |

Installation type	Installation opening [mm]	Distance [mm]	
		s1	s2
Mortar-based installation	\varnothing nominal width + max. 450	≤ 225	$10/40^2 - 225$
Dry mortarless installation with ER	☞ 4.4.2 'Installation block ER' on page 38	central installation	$\geq 200^3$
Dry mortarless installation with TQ2	$\square A = \varnothing$ nominal width + 110 ⁴	central installation	≥ 200
Dry mortarless installation with fire batt ¹	$\square A = \varnothing$ nominal width + max. 1200	40 – 600	$10/40^2 - 600$

¹) Note the maximum size for the fire batt

²) Depending on fire resistance duration

³) Distance between the installation blocks

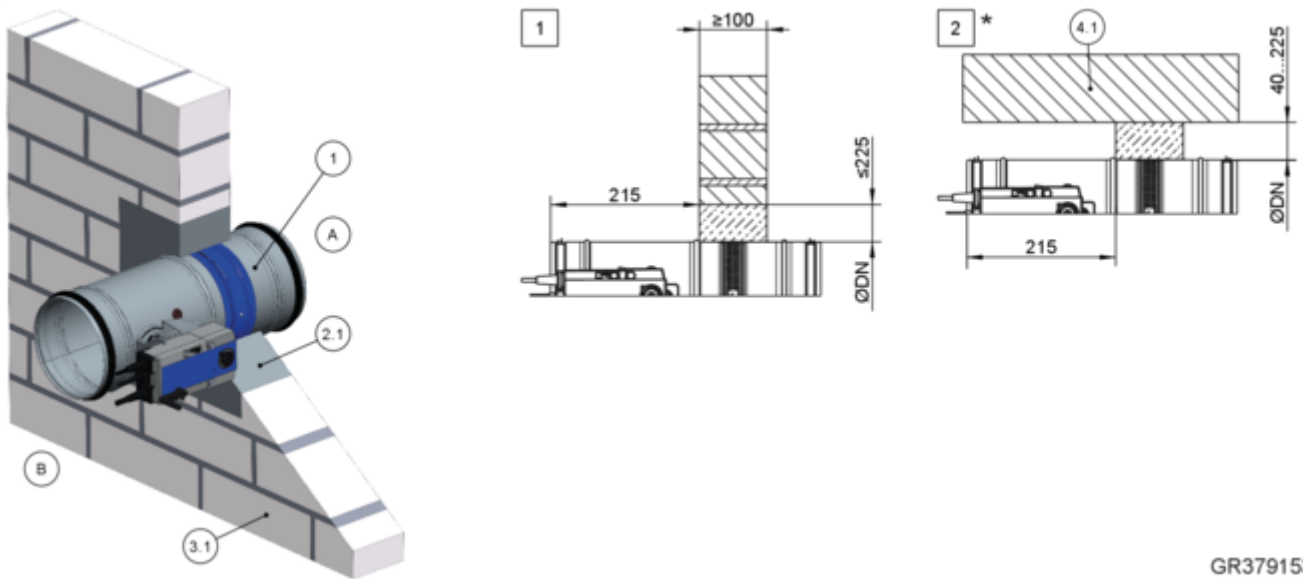
⁴) Installation opening tolerance ± 2 mm

Additional requirements: solid walls

- Solid wall, ☞ on page 34
- Distances and installation orientation, ☞ 'Distances' on page 26

4.5.2 Mortar-based installation

Mortar-based installation into a solid wall



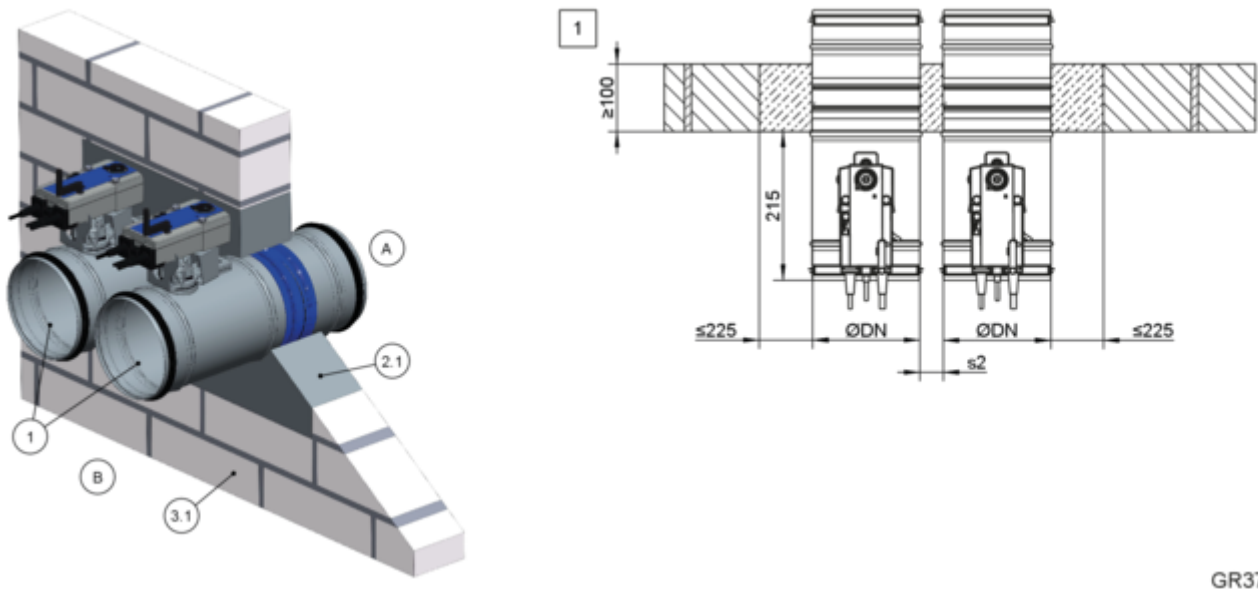
GR3791532, A

Fig. 31: Mortar-based installation into a solid wall

- 1 FKRS-EU
- 2.1 Mortar
- 3.1 Solid wall

- 4.1 Solid ceiling slab/solid floor
- * Installation near the floor as in **2**
- 1 2** Up to EI 120 S

Mortar-based installation into a solid wall, flange to flange



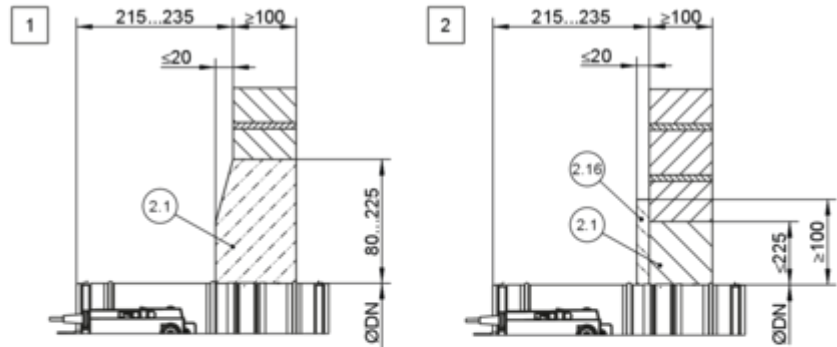
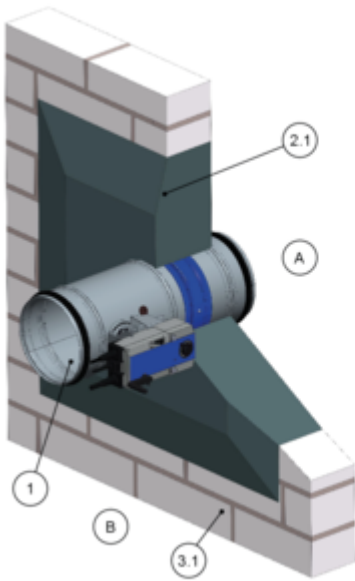
GR3791725, A

Fig. 32: 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 FKRS-EU
- 2.1 Mortar
- 3.1 Solid wall

- 1** Up to EI 120 S for s2 = 40 – 225 mm
- Up to EI 90 S for s2 = 10 – 225 mm

Mortar-based installation in solid wall - installation not flush with wall

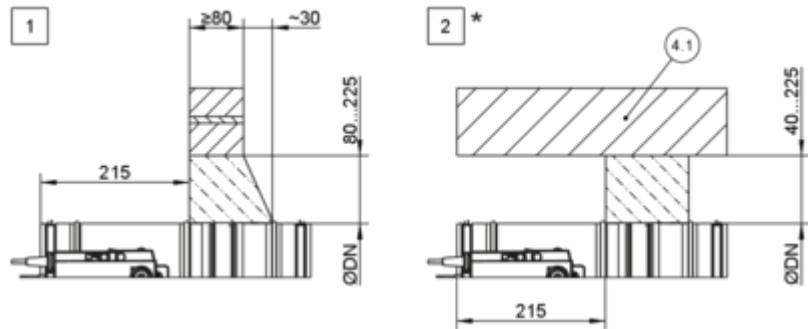
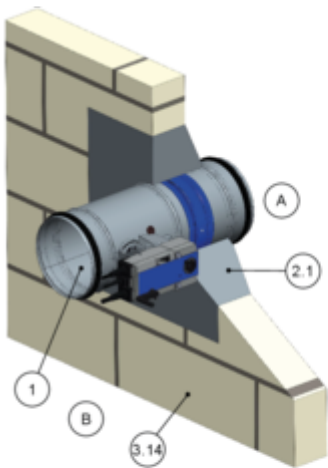


GR3882576, F

Fig. 33: Mortar-based installation in solid wall - installation not flush with wall

- | | | | |
|------|-----------------------------------|------------|----------------|
| 1 | FKRS-EU | 3.1 | Solid wall |
| 2.1 | Mortar with sloping smooth screed | 1 2 | Up to EI 120 S |
| 2.16 | Cement plaster | | |

Mortar-based installation into gypsum wallboard



GR3882994, C

Fig. 34: Mortar-based installation into gypsum wallboard

- | | | | |
|------|---|------------|--|
| 1 | FKRS-EU | 4.1 | Solid ceiling slab |
| 2.1 | Mortar | * | Installation near the floor as in 2 |
| 3.14 | Solid wall made of gypsum wallboard EN 12859 (formerly DIN 18163) | 1 2 | Up to EI 120 S |

Note for installation in gypsum wallboards with $W = 80$ to < 100 mm:

- Distance between two fire dampers ≥ 200 mm in separate installation openings
- at $W \geq 100$ mm, distances Fig. 31 to Fig. 33

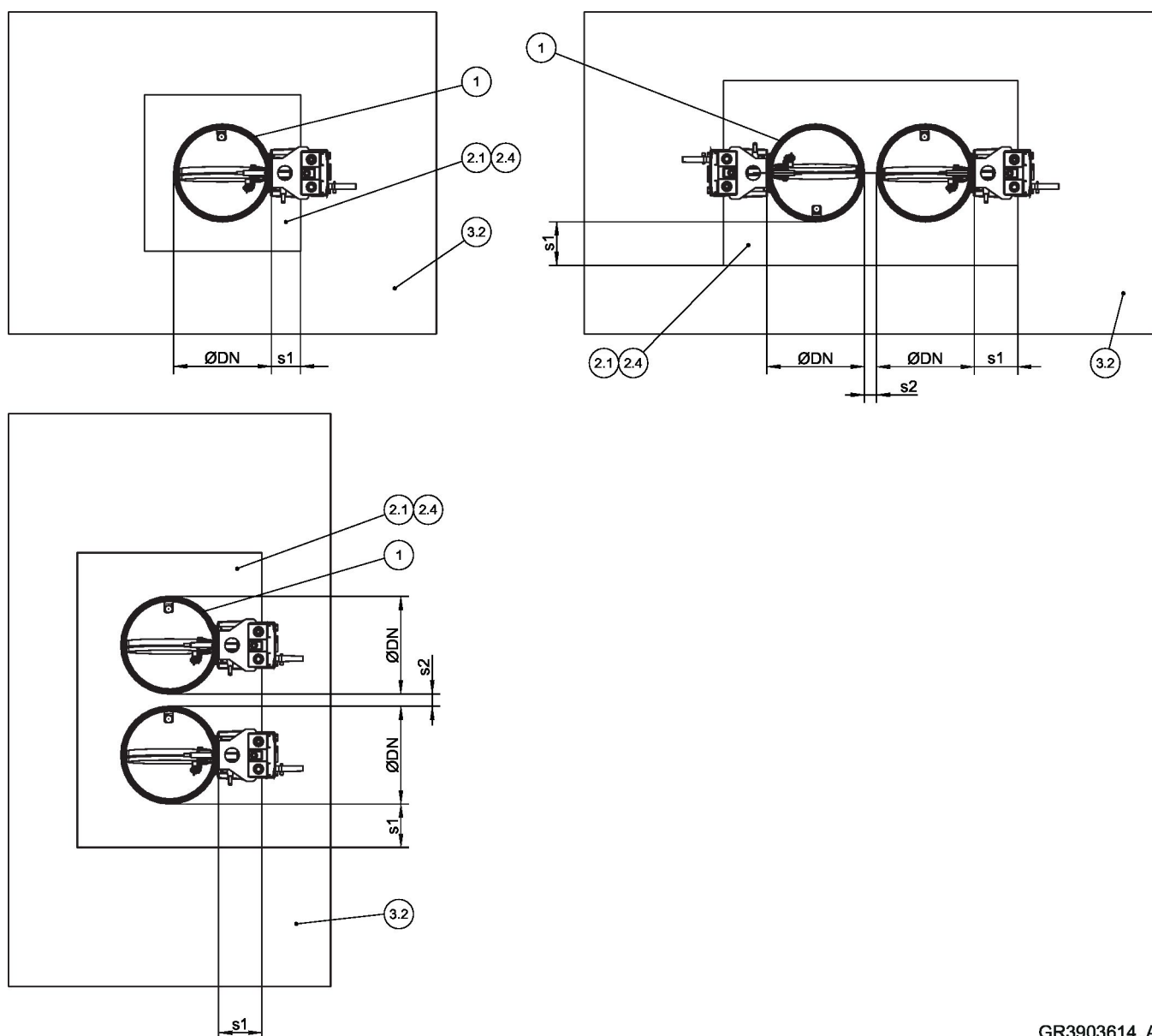
Mortar-based installation into a solid wall, combined, FKRS-EU and FK2-EU

Additional requirements: mortar-based installation into solid walls

- Solid wall, ↪ *on page 34*
- Mortar-based installation in opening or cut hole
- General installation information, ↪ 4.3 'General installation information' *on page 22 ff*
- General information on mortar-based installation, ↪ '**Mortar-based installation**' *on page 28*

4.6 Lightweight partition walls

4.6.1 General information



GR3903614, A

Fig. 35: Lightweight partition walls with metal support structure – arrangement/distances

- | | | | |
|-----|---------------------------------|-----|---|
| 1 | FKRS-EU | 3.2 | Lightweight partition wall, cladding on both sides |
| 2.1 | Mortar | s1 | Perimeter gap, |
| 2.4 | Fire batt with ablative coating | s2 | Distance between the fire dampers, ↗ 'Distances' on page 26 |

Installation type	Installation opening [mm]	Distance [mm]	
		s1	s2
Mortar-based installation	\varnothing nominal width + max. 450	≤ 225	$10/40^2 - 225$
Dry mortarless installation with TQ2	$\square A = \varnothing$ nominal width + 110 ³	central installation	$\geq 200^4$
Dry mortarless installation with fire batt ¹	$\square A = \varnothing$ nominal width + max. 1200	40 – 600	$10/40^2 - 600$

¹) Note the maximum size for the fire batt

²) Depending on fire resistance duration

³) Installation opening tolerance ± 2 mm

⁴) Installation into separate installation openings

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

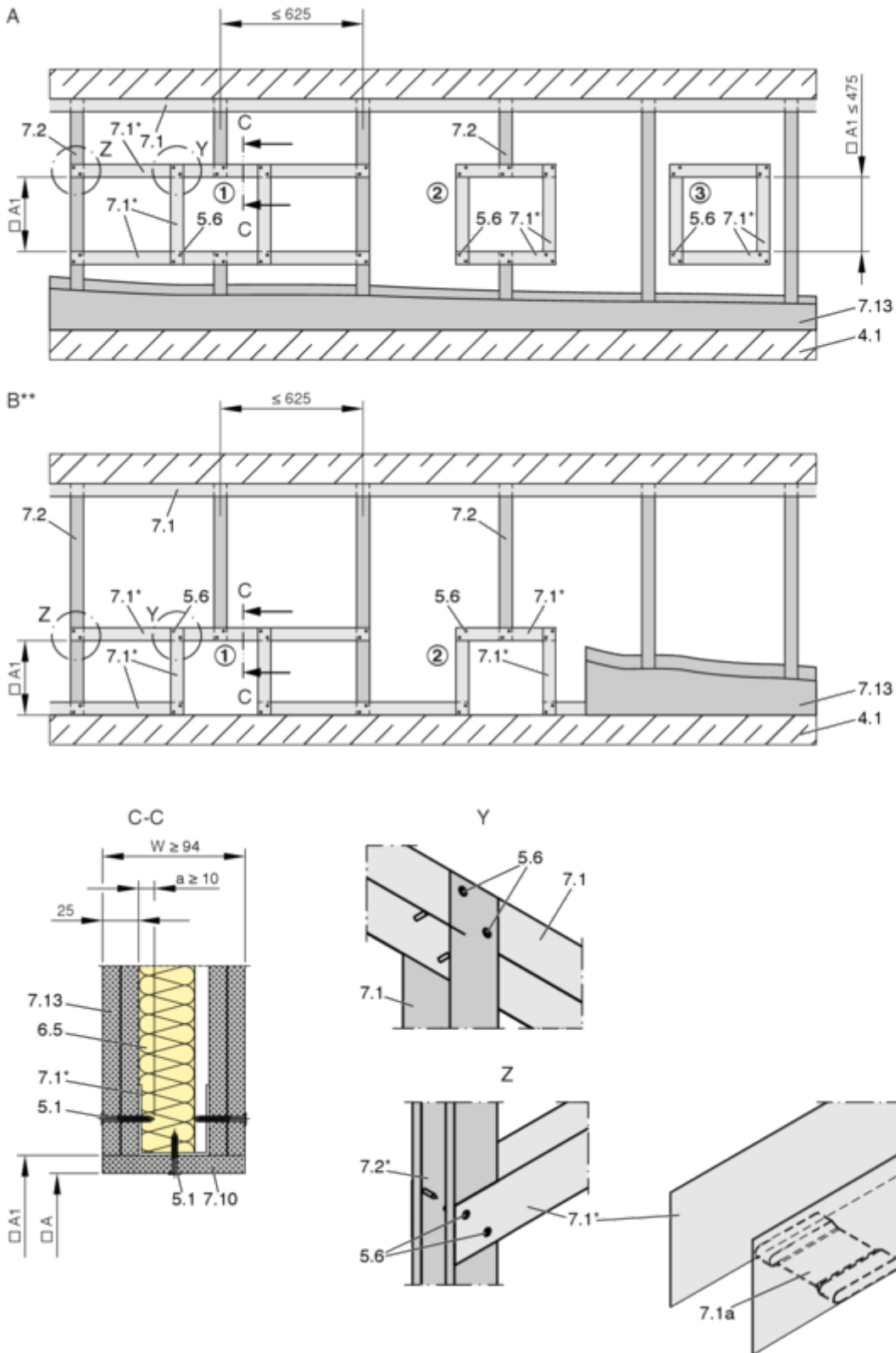


Fig. 36: Lightweight partition wall with metal support structure and cladding on both sides, explanation see Fig. 37

Compartment wall with metal support structure and cladding on both sides

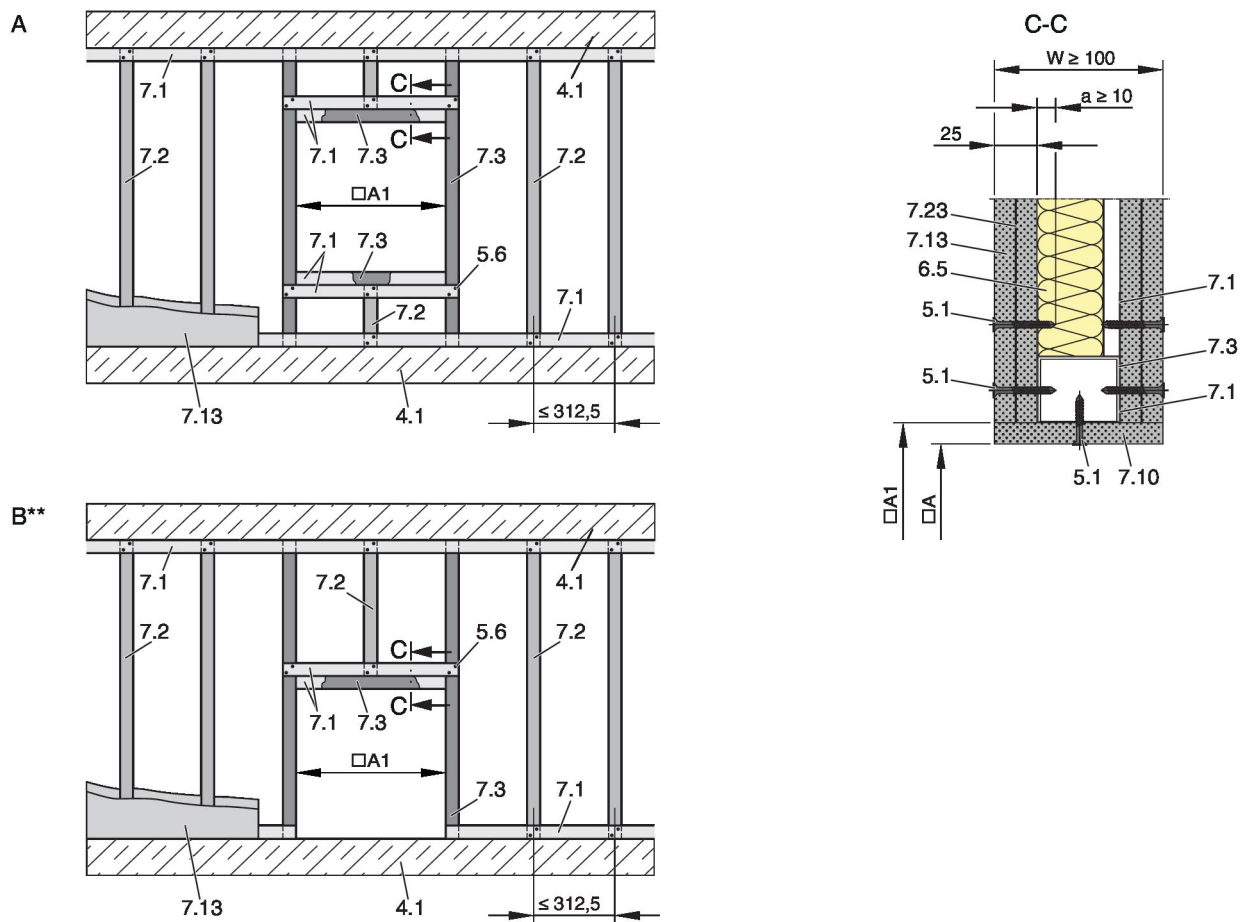


Fig. 37: Compartment wall with metal support structure and cladding on both sides

A	Lightweight partition wall/compartment wall/ safety partition wall	7.3	UA section
B	Lightweight partition wall/compartment wall/ safety partition wall, installation near the floor	7.10	Trim panels according to installation details
4.1	Solid ceiling slab/solid floor	7.13	Cladding
5.1	Dry wall screw	7.23	Sheet steel insert (if any, depends on wall manufacturer)
5.6	Screw or steel rivet	*	Closed side of metal section must face the installation opening
6.5	Mineral wool (depending on wall construction)	**	Installation near the ceiling analogous to B
7.1	UW section	□A	Installation opening
7.1a	UW section, either cut in and bent or cut off	□A1	Opening in the metal support structure (without trim panels: □A = □A1)
7.2	CW section		

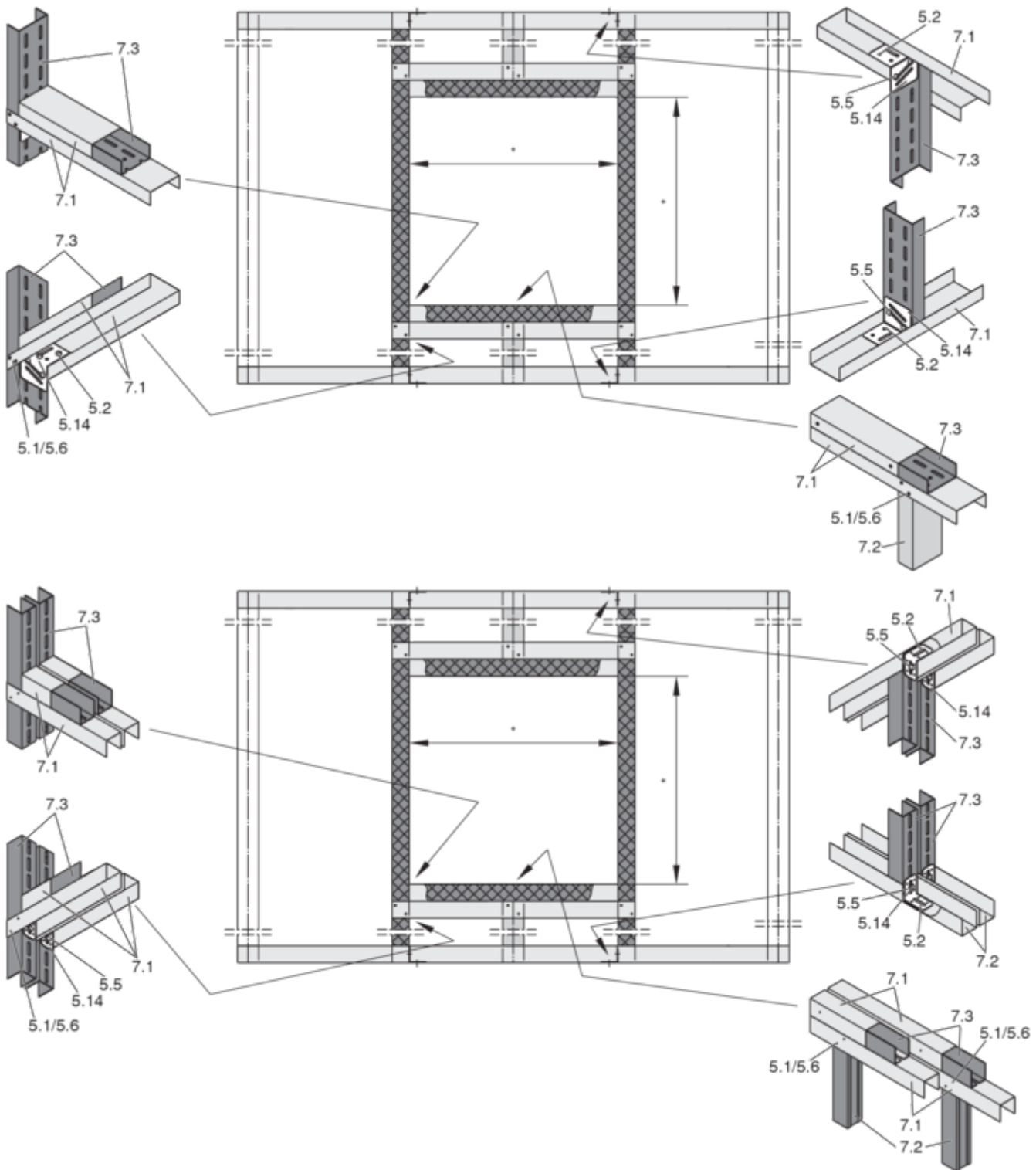


Fig. 38: Metal support structure for a compartment wall, single stud system and double stud system

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 washer and nut	7.3	UA section
5.6	Steel rivet	*	Installation opening according to installation details
5.14	Angle bracket		

Additional requirements: lightweight partition walls and compartment walls with metal support structure

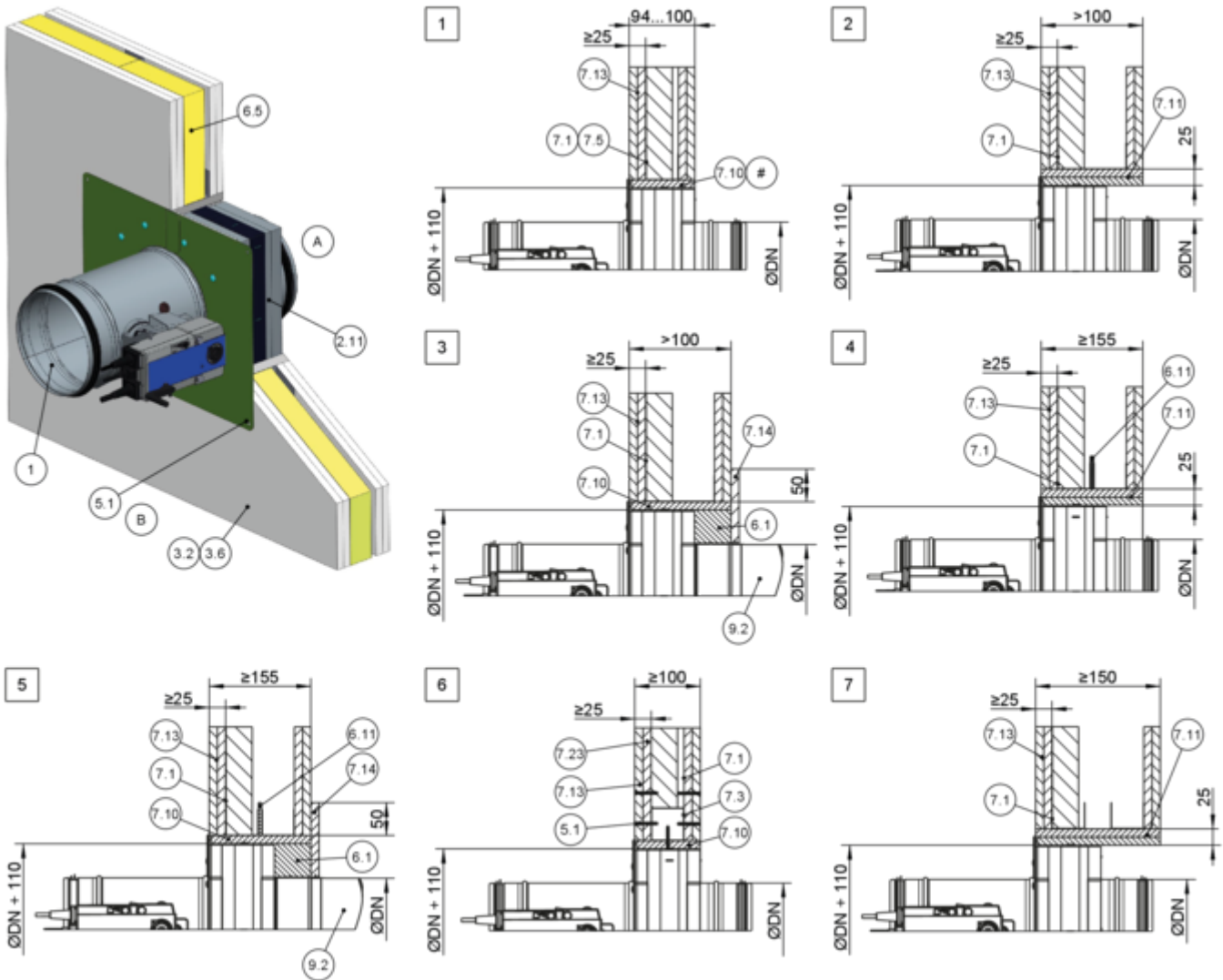
- Lightweight partition wall or compartment wall,
↳ on page 35

Erecting a wall and creating an installation opening

- Erect the lightweight partition wall according to the manufacturer's instructions and create an installation opening, ↳ 4.6.1 'General information' on page 50 ff
 - Variant 1: Provide the installation opening in the metal support structure with suitable metal sections, then clad the wall.
 - Variant 2: Create installation opening in the metal stud frame with surrounding metal sections. If a regulation stand is cut, it must be connected to the profiles of the installation opening.
 - Option 3: After cladding the wall, create a square wall opening (clear installation opening ≤ 475 mm) between the regular studs and brace it with a perimeter metal section. Screw metal sections onto both sides over the cladding, spaced approx. 100 mm apart.

4.6.2 Dry mortarless installation into a lightweight partition wall, with installation kit TQ2

Dry mortarless installation into a lightweight partition wall, with installation kit TQ2

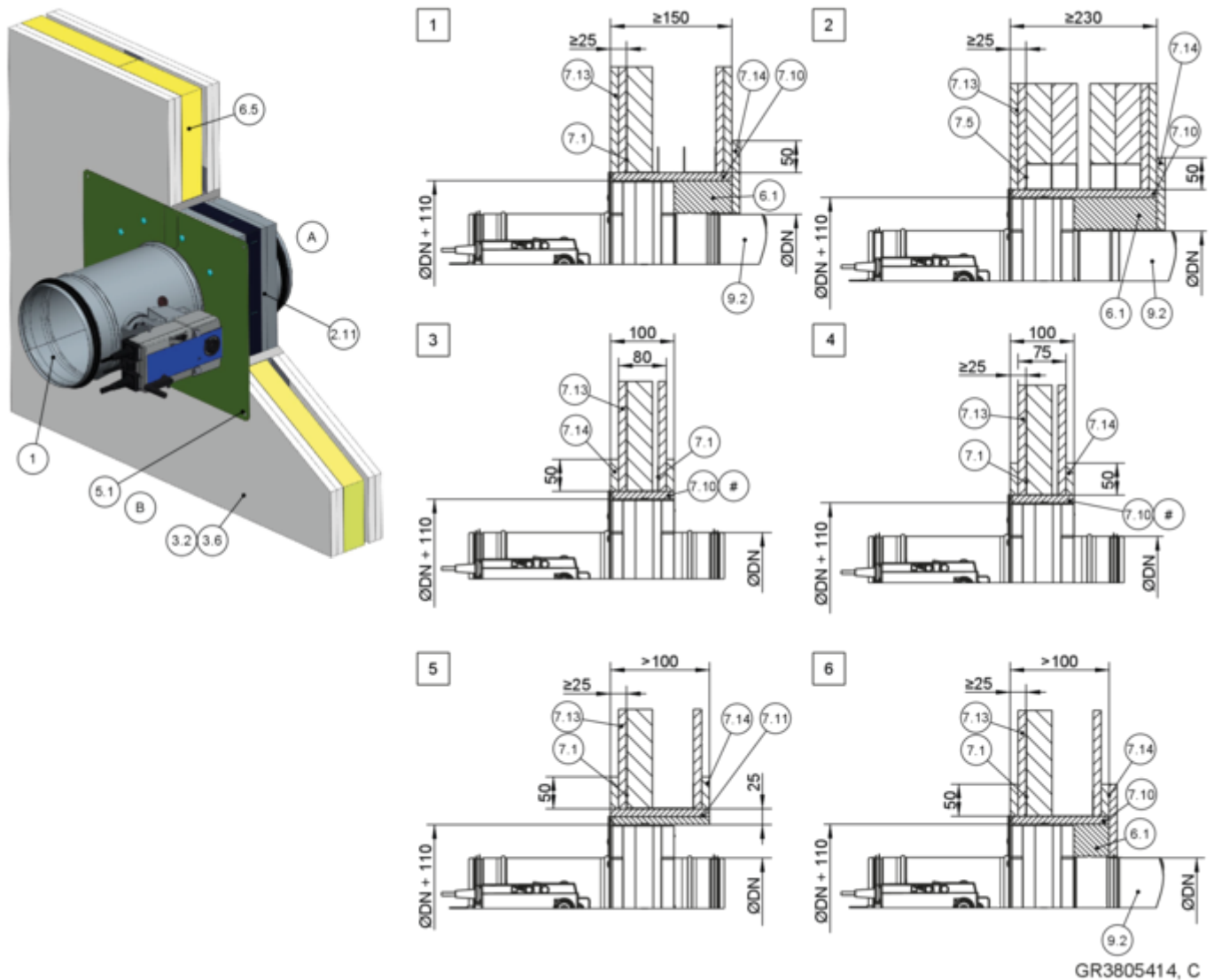


GR3805414, C

Fig. 39: Dry mortarless installation into a lightweight partition wall, with installation kit TQ2

1	FKRS-EU	7.5	Steel support structure (box section)
2.11	Installation kit TQ2 with cover plate	7.10	Trim panels (fire-resistant)
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	7.11	Fire-resistant trim panels, double
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.13	Cladding
5.1	Dry wall screw, min. 10 mm screwed into the metal stud frame	7.14	Reinforcing board of the same material as the wall
6.1	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 40\text{ kg/m}^3$	7.23	Sheet steel insert
6.5	Mineral wool (depending on wall construction)	9.2	Air duct/extension piece optional
6.11	Insulating strip (depending on wall construction)	#	Up to EI 120 S
7.1	UW section	1 – 7	
7.3	UA section		

Lightweight partition walls > Dry mortarless installation into a lightweight...

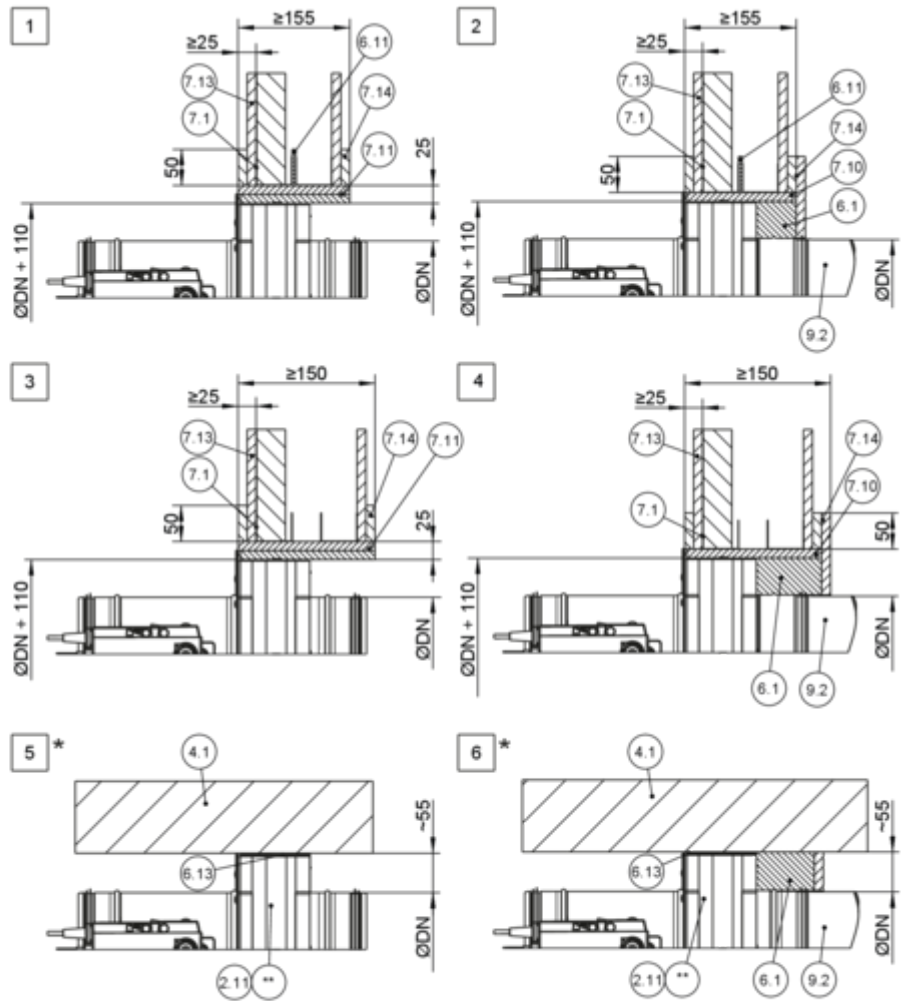
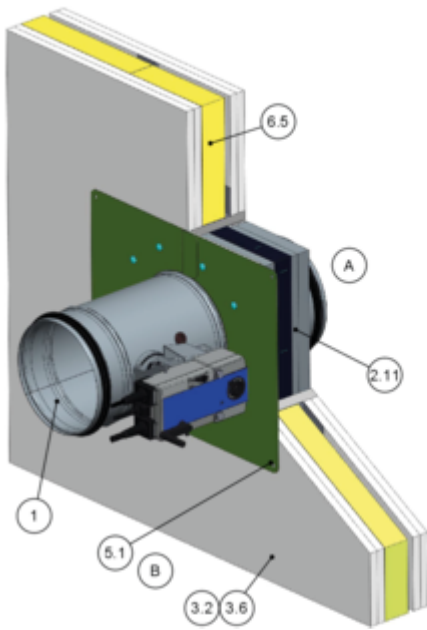


GR3805414, C

Fig. 40: Dry mortarless installation into a lightweight partition wall, with installation kit TQ2

1	FKRS-EU	7.10	Trim panels (fire-resistant)
2.11	Installation kit TQ2 with cover plate	7.11	Fire-resistant trim panels, double
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	7.13	Cladding, fire-resistant, also with sheet steel insert
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.14	Reinforcing board of the same material as the wall
5.1	Dry wall screw, min. 10 mm screwed into the metal stud frame	9.2	Air duct/extension piece
6.1	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 40\text{ kg/m}^3$	#	optional
6.5	Mineral wool (depending on wall construction)	1 2	Up to EI 120 S
7.1	UW section	3	Up to EI 60 S
7.5	Steel support structure (box section)	4 - 6	EI 30 S

Lightweight partition walls > Dry mortarless installation into a lightweight...

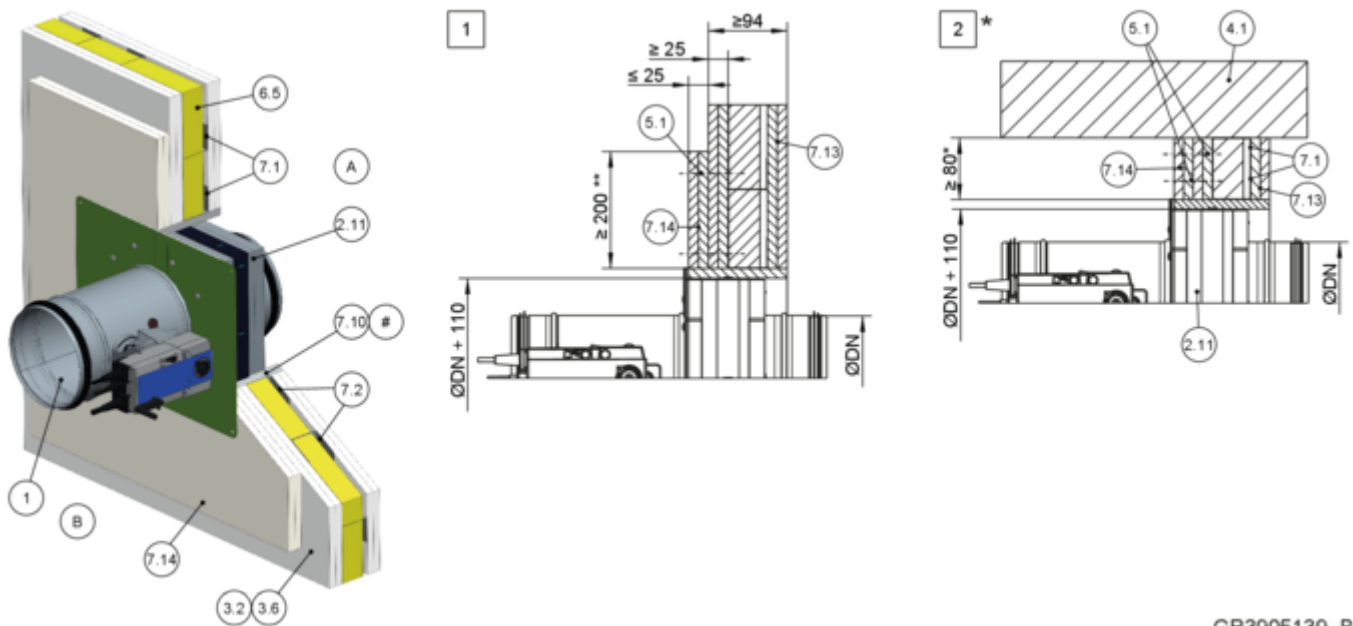


GR3805414, C

Fig. 41: Dry mortarless installation into a lightweight partition wall, with installation kit TQ2

1	FKRS-EU	7.10	Trim panels (fire-resistant)
2.11	Installation kit TQ2 with cover plate	7.11	Fire-resistant trim panels, double
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	7.13	Cladding, fire-resistant, also with sheet steel insert
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.14	Reinforcing board of the same material as the wall
4.1	Solid ceiling slab/solid floor	9.2	Air duct/extension piece
5.1	Dry wall screw, min. 10 mm screwed into the metal stud frame	#	optional
6.1	Mineral wool, $\geq 1000\text{ }^{\circ}\text{C}$, $\geq 40\text{ kg/m}^3$	*	Installation near the floor analogous to 5 and 6
6.5	Mineral wool (depending on wall construction)	**	Cover plate shortened by others
6.11	Insulating strip (depending on wall construction)	1 - 4	EI 30 S
6.13	Mineral wool strips A1, alternatively gypsum mortar	5 6	EI 30 S – EI 120 S
7.1	UW section		

Dry mortarless installation in lightweight partition wall with installation kit TQ2 - installation not flush with wall



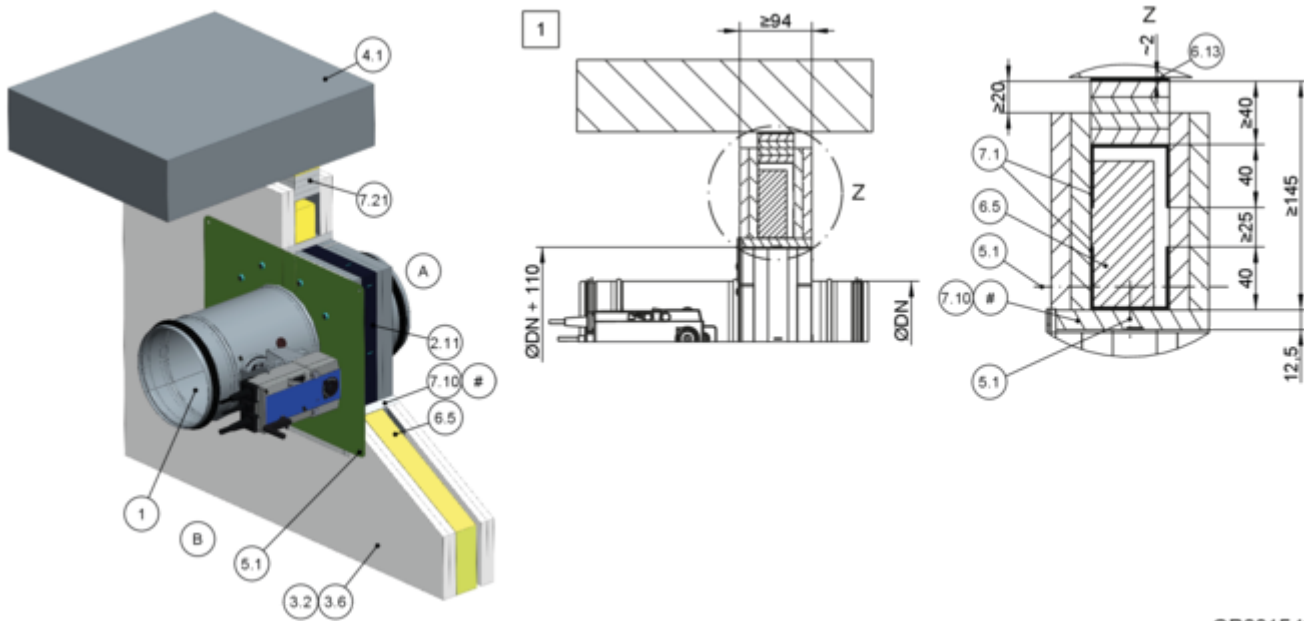
GR3905139, B

Fig. 42: Dry mortarless installation in lightweight partition wall with installation kit TQ2 - installation not flush with wall

1	FKRS-EU	7.2	CW section
2.11	Installation kit TQ2 with cover plate	7.10	Trim panels
3.2	Lightweight partition wall with metal support structure, cladding on both sides	7.13	Cladding, fire-resistant, also with sheet steel insert
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.14	Reinforcing board of the same material as the wall
4.1	Solid ceiling slab	#	optional/depending on wall construction
5.1	Dry wall screw, min. 10 mm screwed into the metal stud frame	*	Installation near the floor as in 2
6.5	Mineral wool (depending on wall construction)	**	Fastening to at least two metal post profiles
7.1	UW section	1 2	Up to EI 120 S

Lightweight partition walls > Dry mortarless installation into a lightweight...

Dry mortarless installation with installation kit TQ2 into a lightweight partition wall, below a flexible ceiling joint



GR3815466, C

Fig. 43: Dry mortarless installation with installation kit TQ2 into a lightweight partition wall, below a flexible ceiling joint

1	FKRS-EU	6.13	Mineral wool strips A1, if required, alternatively gypsum mortar
2.11	Installation kit TQ2 with cover plate	7.1	UW section
3.2	Lightweight partition wall with metal support structure, cladding on both sides	7.10	Trim panels
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.21	Ceiling joint strips (e.g. $4 \times \geq 10$ mm)
4.1	Solid ceiling slab	#	according to installation details Fig. 39 to Fig. 41
5.1	Dry wall screw, min. 10 mm screwed into the metal stud frame	1	Up to EI 120 S
6.5	Mineral wool (depending on wall construction)		

Note: Illustration is an example. The distance from the ceiling depends on the flexible ceiling joint, the expected ceiling subsidence and the specifications of the wall manufacturer.

Additional requirements: dry mortarless installation with installation kit TQ2 into lightweight partition walls

- Lightweight partition wall or compartment wall, ↪ on page 35
- Installation kit TQ2, ↪ 4.4.3 'Installation kit TQ2' on page 39
- ≥ 200 mm distance between two fire dampers in separate installation openings
- General installation information, ↪ 4.3 'General installation information' on page 22 ff
- General information on installation with installation kit TQ2, ↪ on page 29

4.6.3 Dry mortarless installation with fire batt

Dry mortarless installation into a lightweight partition wall, with a fire batt

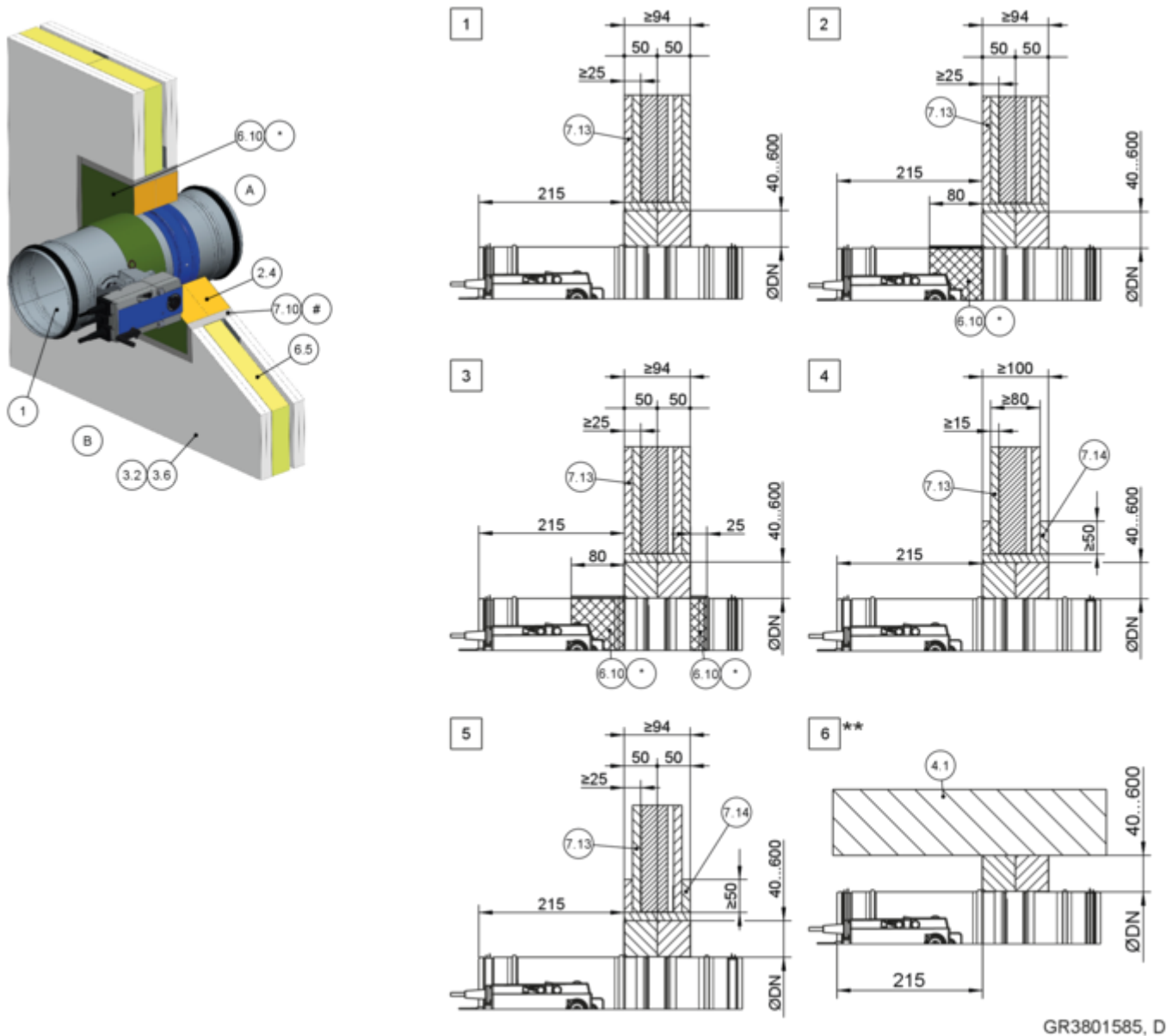


Fig. 44: Dry mortarless installation into a lightweight partition wall, with a fire batt

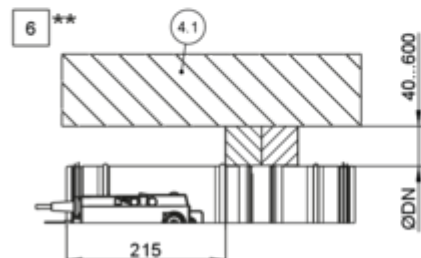
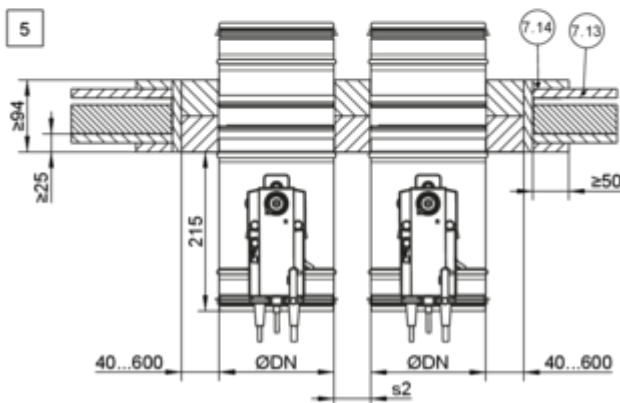
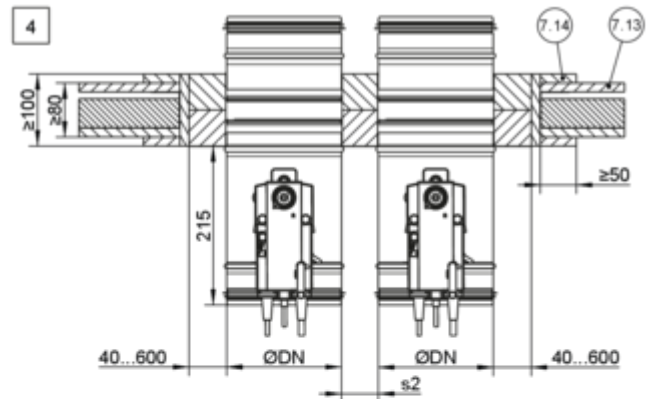
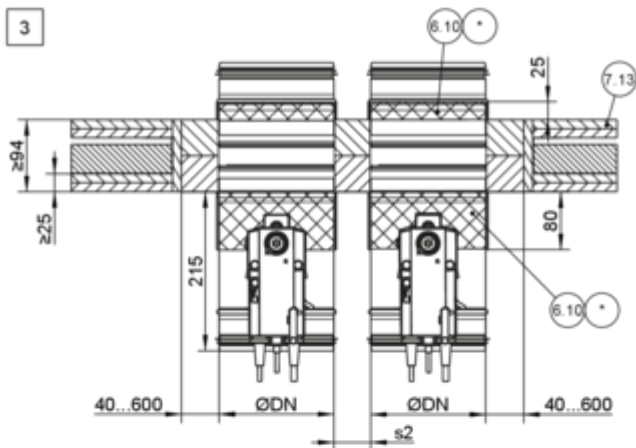
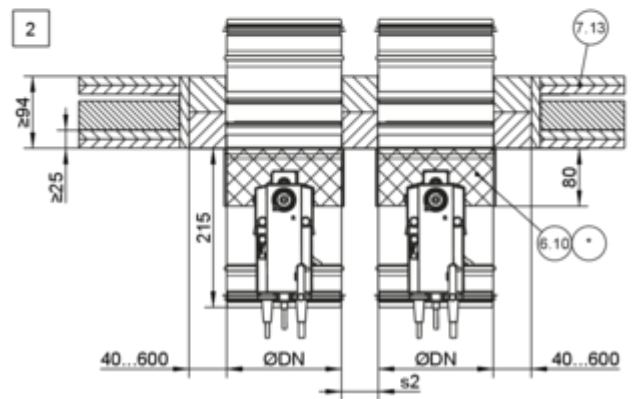
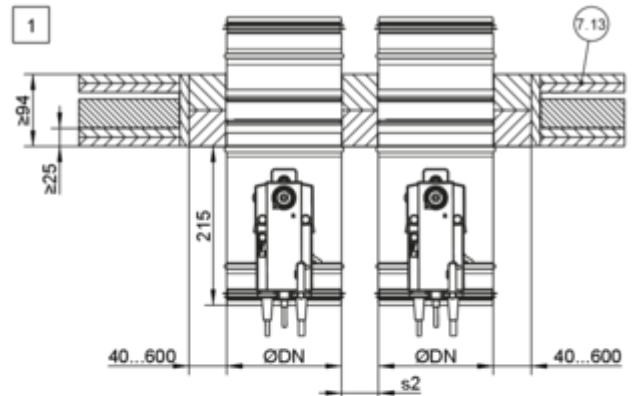
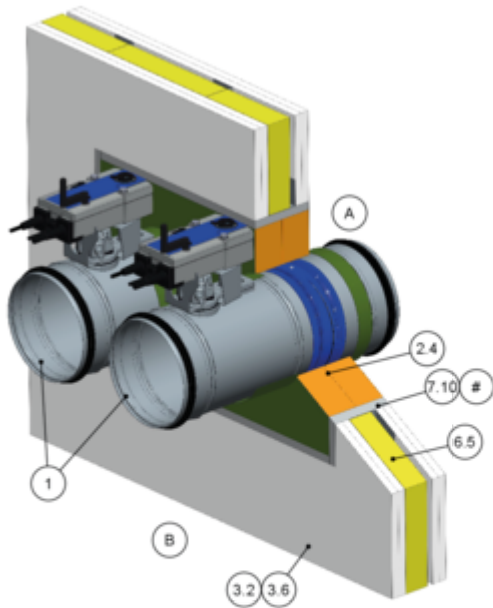
1	FKRS-EU	6.24	Elastomeric foam (flame-resistant, non-dripping)
2.4	Fire batt with ablative coating	The following applies in Germany: For notes on the use of elastomeric foams	
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides	☞ 'Additional provision for use in Germany:' on page 6 .	
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.10	Trim panels
4.1	Solid ceiling slab/solid floor	7.13	Cladding, fire-resistant, also with sheet steel insert
6.5	Mineral wool (depending on wall construction)	7.14	Reinforcing board of the same material as the wall
6.10	Ablative coating around the perimeter, d = at least 2.5 mm	#	at W ≤ 100 mm optional,
6.19	Mineral wool > 1000 °C, > 80 kg/m ³ , thickness = 20 mm, leave out the actuator and release mechanism; inspection openings must remain accessible	*	at W > 100 mm double-layered (2 × 12.5 mm)
6.20	Sleeve (to be ordered separately)	**	Installation near the floor as in [6]
		[1] – [6]	See table ☞ 62

Note: The fire resistance properties of [6] depend on the nominal width and 6.10*.

Lightweight partition walls > Dry mortarless installation with fire batt

Solid wall				
NW [mm]	Fire resistance properties to	Coating		Detail
		Installation side A	Operating side B	
100 – 200	EI 90 S	–	–	1 , 6
224 – 315	EI 90 S	–	x	2 , 6
100 – 200	EI 120 S	–	x	2 , 6
224 – 315	EI 120 S	x	x	3 , 6
100 – 315	EI 60 S	–	–	4 , 6
100 – 315	EI 30 S	–	–	5 , 6

Dry mortarless installation with fire batt in lightweight partition wall, "flange to flange"



GR3803034, C

Fig. 45: 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 | FKRS-EU | 6.24 | Elastomeric foam (flame-resistant, non-dripping) |
| 2.4 | Fire batt with ablative coating | | |

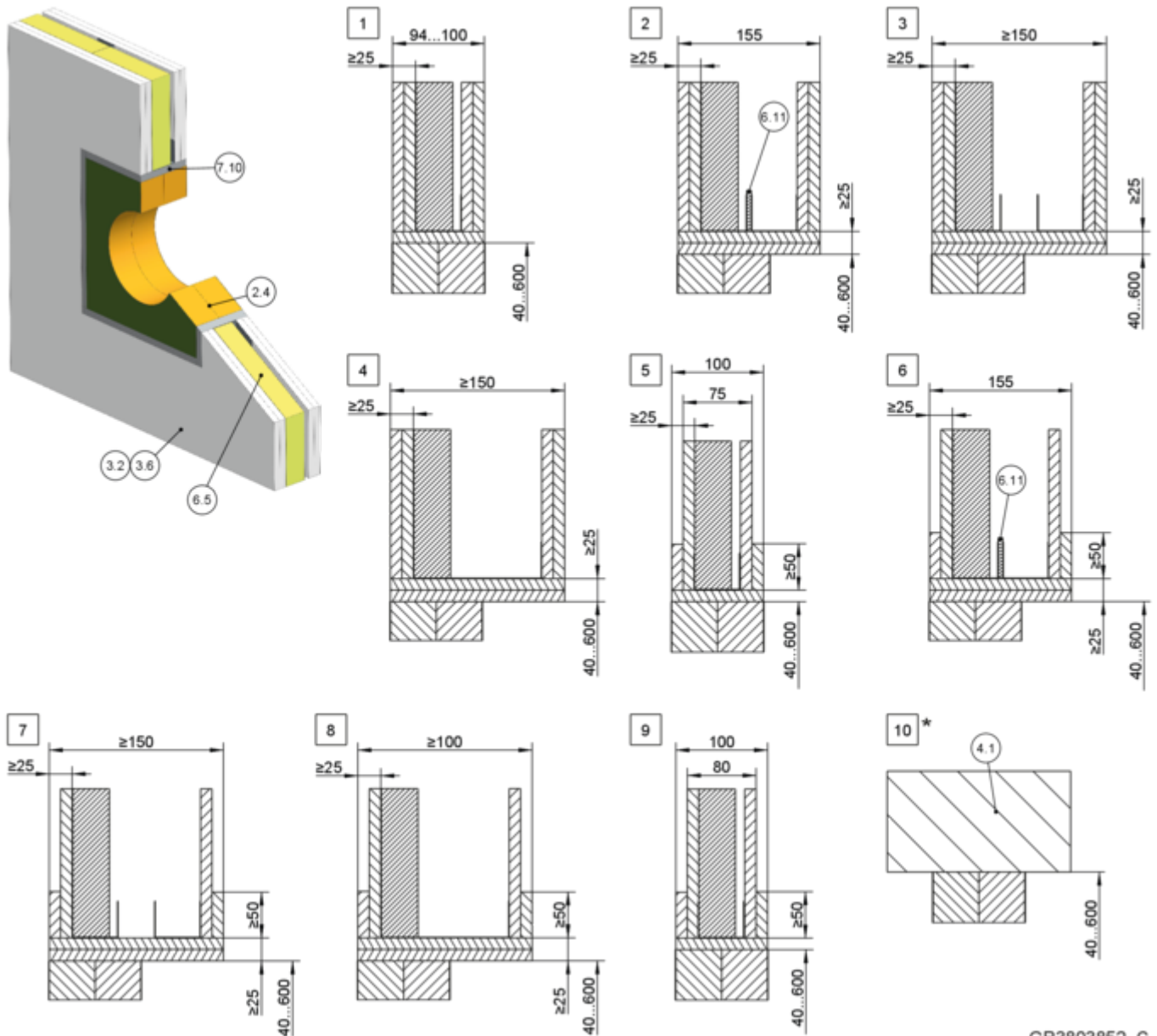
3.2	Lightweight partition wall with metal support structure or steel support structure, cladding on both sides			The following applies in Germany: For notes on the use of elastomeric foams ↪ 'Additional provision for use in Germany:' on page 6 .
3.6	Compartment wall or safety partition wall with metal support structure, cladding on both sides	7.10		Trim panels
4.1	Solid ceiling slab/solid floor	7.13		Cladding, fire-resistant, also with sheet steel insert
6.5	Mineral wool (depending on wall construction)			
6.10	Ablative coating around the perimeter, d = at least 2.5 mm	7.14		Reinforcing board of the same material as the wall
6.19	Mineral wool > 1000 °C, > 80 kg/m ³ , thickness = 20 mm, leave out the actuator and release mechanism; inspection openings must remain accessible	#		at W ≤ 100 mm optional, at W > 100 mm double-layered (2 × 12.5 mm)
		*		6.19, 6.20 or 6.24 as an alternative
		**		Installation near the floor as in 6
6.20	Sleeve (to be ordered separately)	1 – 6		See table ↪ 64

Note: The fire resistance properties of **3** depend on the nominal width and 6.10*.

Lightweight partition wall					
NW [mm]	Fire resistance properties to	Coating		s2 [mm]	Detail
		Installation side A	Operating side B		
100 – 200	EI 90 S	–	–	10* – 600	1 , 6
224 – 315	EI 90 S	–	x	10* – 600	2 , 6
100 – 200	EI 120 S	–	x	40 – 600	2 , 6
224 – 315	EI 120 S	x	x	40 – 600	3 , 6
100 – 315	EI 60 S	–	–	10 – 600	4 , 6
100 – 315	EI 30 S	–	–	10 – 600	5 , 6

* For a distance of 10 mm, mineral wool ≥ 1000 °C, ≥ 80 kg/m³ with d = 10 mm and width nominal width/2 shall be provided between the fire dampers.

Approved combinations for thicker walls



GR3803852, C

Fig. 46: Dry mortarless installation into a lightweight partition wall, with a fire batt, approved combinations for thicker walls

- | | | | |
|------|--|---------------------|--|
| 2.4 | Fire batt with ablative coating | 7.10 | Trim panels (optional with $W \leq 100$ mm, from $W > 100$ mm double-layered and required) |
| 3.2 | Lightweight partition wall with metal support structure or steel support structure, cladding on both sides | * | Installation near the floor as in 10 |
| 3.6 | Compartment wall or safety partition wall with metal support structure, cladding on both sides | 1 – 4 | F 120 |
| 4.1 | Solid ceiling slab/solid floor | 5 – 8 | F 30 |
| 6.5 | Mineral wool (depending on wall construction) | 9 | F 60 |
| 6.11 | Insulating strip | 10 | F 30 – F 120 |

Additional requirements: dry mortarless installation into lightweight partition walls, with fire batt

- Lightweight partition wall or compartment wall,
↳ *on page 35*
- Fire batt systems, installation details, distances/dimensions, ↳ *on page 30 f*
- Suspension and fixing, ↳ *Chapter 4.7 'Fixing the fire damper' on page 67*
- General installation information, ↳ *4.3 'General installation information' on page 22 ff*
- General information on installation with fire batt,
↳ *on page 30*

4.7 Fixing the fire damper

4.7.1 General information

Fire dampers are suspended with threaded steel rods:

- remote from walls and ceiling slabs
- Installation in fire batt
- Installation with fire protection block bulkhead

The threaded rods must be fixed to solid ceiling slabs in accordance with the required fire resistance duration. Use only fire-rated wall plugs with suitability certificate depending on the ceiling construction.

Instead of wall plugs, you can use threaded rods and secure them using nuts and washers. Secure the threaded rods above the ceiling using steel nuts and washers.

Threaded rods up to 1.50 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.

Weight [kg]: ↪ Chapter 2.2 'FKRS-EU with fusible link' on page 10 ↪ Chapter 2.3 'FKRS-EU with spring return actuator' on page 11 ↪ Chapter 2.4 'FKRS-EU with spring return actuator and duct smoke detector' on page 14 ↪ Chapter 2.5 'FKRS-EU with fusible link and cover grille on both sides as an upstream shutter for the air transfer unit' on page 15 ↪ Chapter 2.6 'FKRS-EU with spring return actuator and duct smoke detector used as an air transfer damper' on page 16 .

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

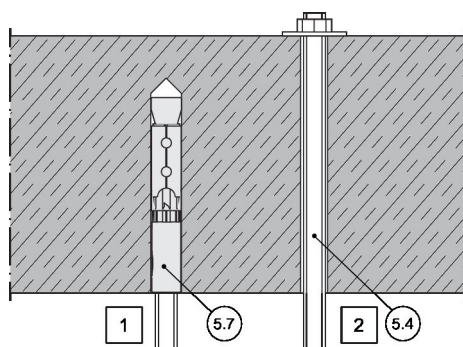
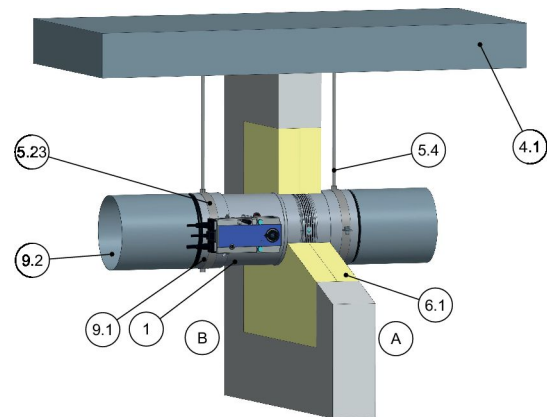


Fig. 47: Fixing to the ceiling

- 5.4 Threaded rod
- 5.7 Fire-rated wall plug (with suitability certificate)
- 1 Fixing with fire-rated wall plug with suitability certificate
- 2 Fixing with threaded rod (push through)

4.7.2 Fixing in conjunction with fire batt/ fire protection block bulkhead

4.7.2.1 Horizontal duct



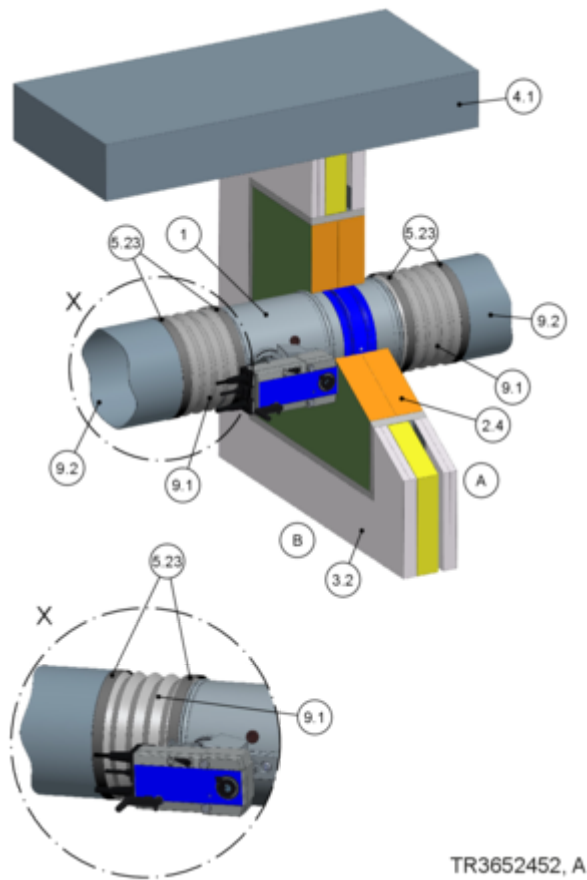
TR3652452, A

Fig. 48: Suspension system, horizontal duct

- 1 FKRS-EU
- 4.1 Solid ceiling slab
- 5.4 Threaded rod, at least M8, galvanised steel. Fixing to the ceiling . Suspension systems longer than > 1.5 m require fire-resistant insulation.
- 5.23 Pipe clamp
- 6.1 Mineral wool
- 9.1 Flexible connector
- 9.2 Air duct/extension piece

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

Fixing the fire damper > Fixing in conjunction with fire batt/fire prot...



TR3652452, A

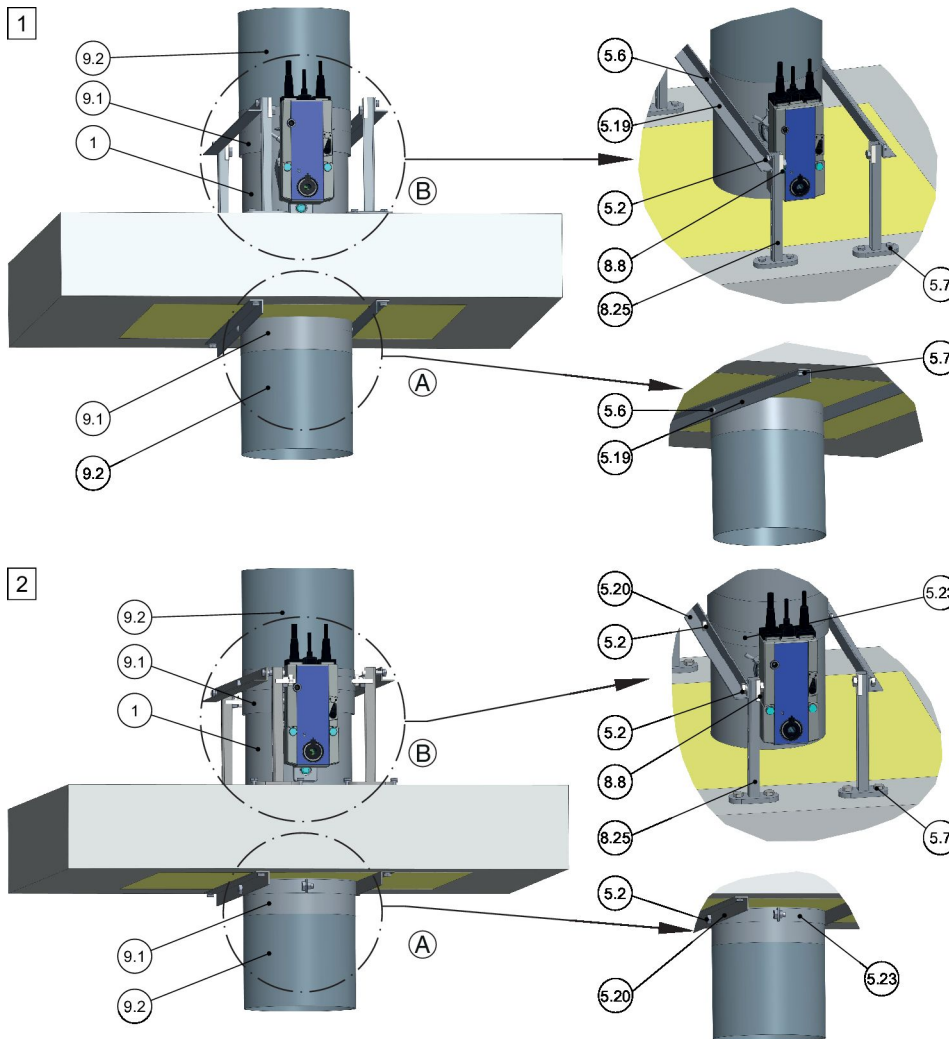
Fig. 49: Horizontal duct

- 1 FKRS-EU
- 2.4 Fire batt with ablative coating
- 3.2 Lightweight partition wall with metal support structure, cladding on both sides
- 4.1 Solid ceiling slab
- 5.23 Pipe clamp
- 9.1 Flexible connector
- 9.2 Air duct/extension piece

For wall installation in fire batts, suspensions/fastenings can be dispensed with if the distance from the ceiling to the lower edge of the fire damper does not exceed 1.5 m. The fire dampers must then be connected on both sides with elastic spigots (length of elastic area ≥ 100 mm when installed), which are installed in such a way that shear and tensile forces can be absorbed.

4.7.2.2 Vertical duct

Upright installation of the fire damper



TR3653265, A

Fig. 50: Upright installation variants for fire dampers

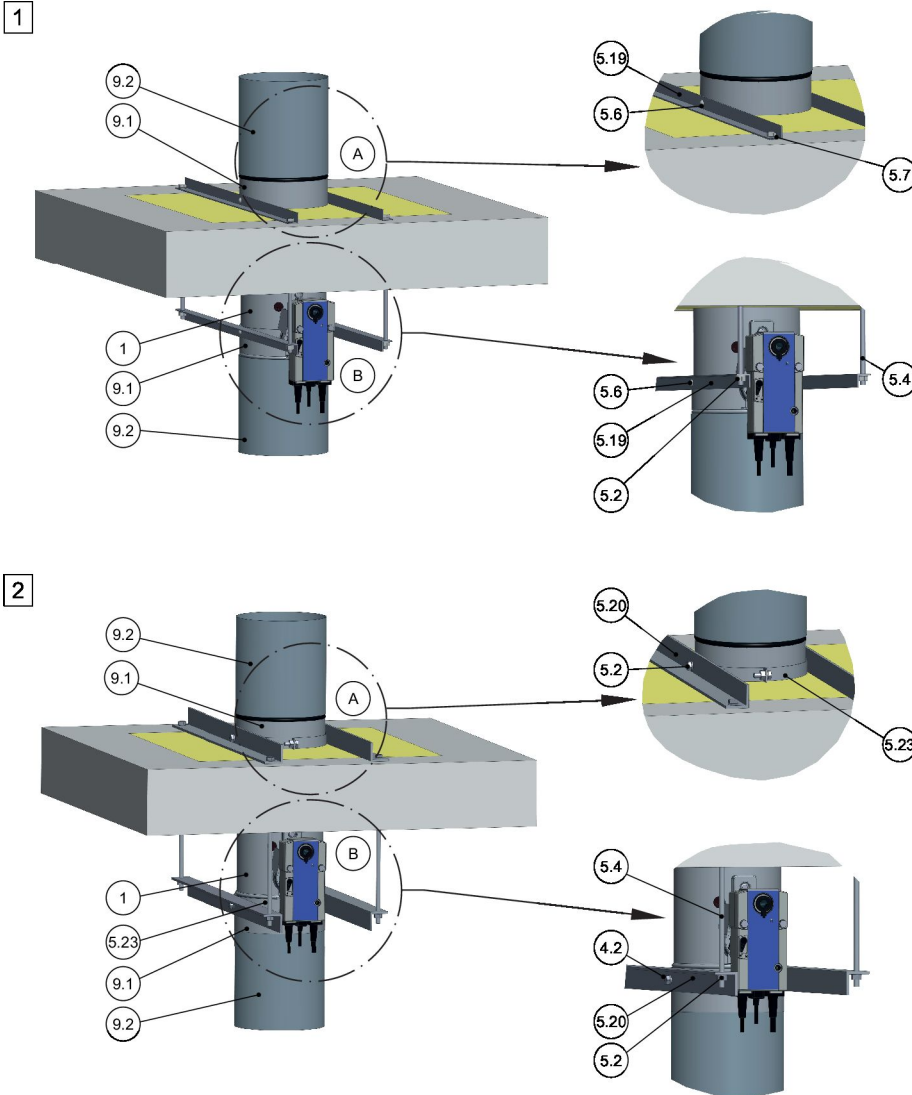
- | | | | |
|------|---|------|--|
| 1 | FKRS-EU | 8.8 | Fixing bracket, Varifix or Müpro MPC or equivalent |
| 5.2 | 4 screw fixings (M8 screw with 2 washers and nut), suitable for the bracket or screw fixing matching the clamp | 8.25 | Bracket, e.g. Hilti MM-B-30 or equivalent |
| 5.6 | 4 steel rivets \varnothing 6.4 mm, clamping range 2 – 20 mm, e.g. cap blind rivets or high strength rivets; the riveted connection must be air-tight. | 9.1 | Flexible connector (if required) |
| 5.7 | Anchor bolt Hilti® HUS-6 or equivalent | 9.2 | Air duct/extension piece |
| 5.19 | L-bracket according to EN 10056-1, 20 × 20 × 3 mm galvanised, painted or similar. | 1 | Fixing above and below the ceiling with rivets |
| 5.20 | L-bracket according to EN 10056-1, 35 × 35 × 4 mm galvanised, painted or similar. | 2 | Fixing above and below the ceiling with heavy duty clamp |
| 5.23 | Pipe clamp, e.g., Hilti MP-MX, Valraven BIS HD 500 or equivalent | | |

! 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.

Suspended installation of the fire damper

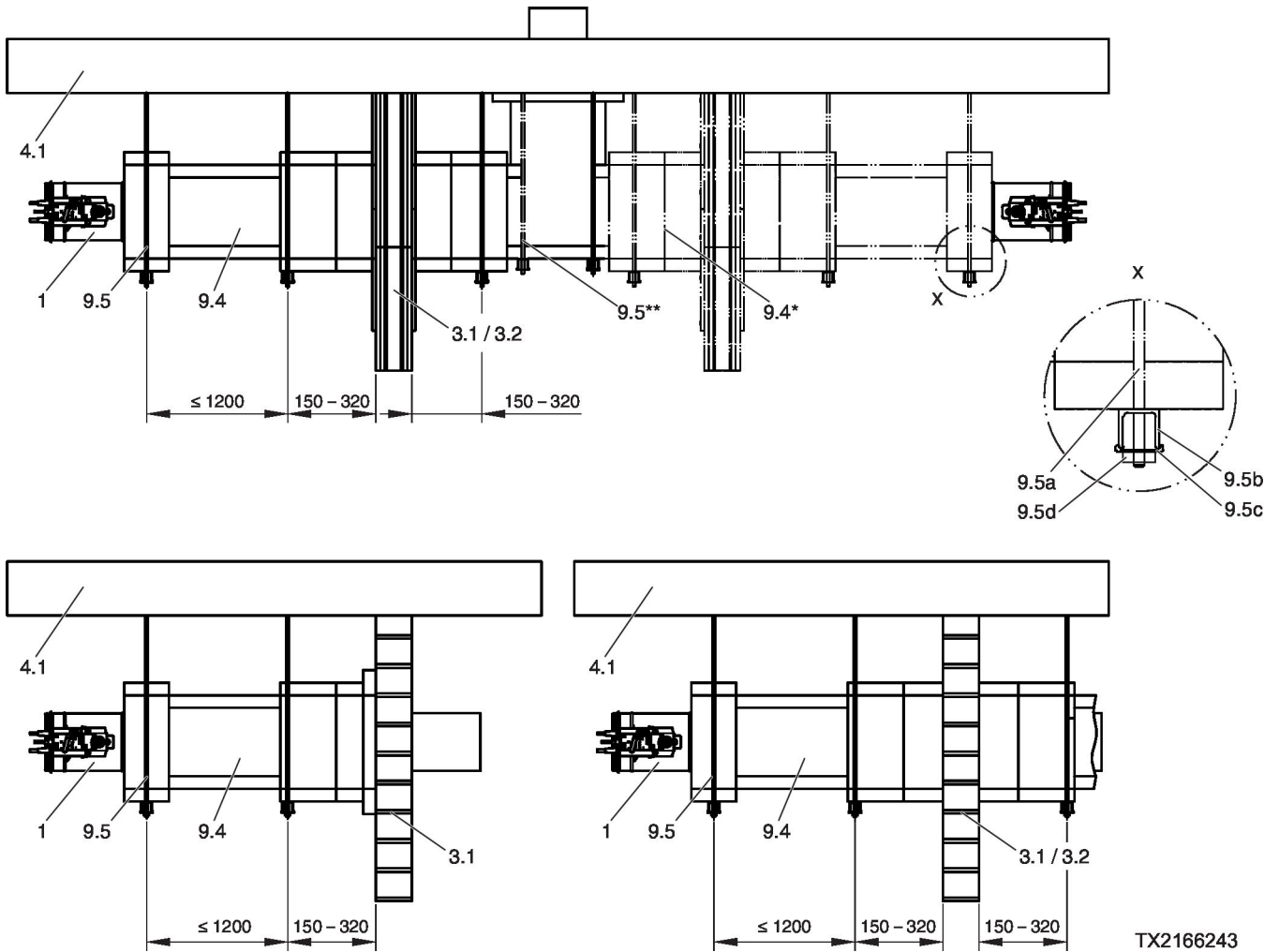


TR3654447, A

Fig. 51: Suspended installation variants for fire dampers

- | | | | |
|------|--|----------|--|
| 1 | FKRS-EU | 5.23 | Pipe clamp, e.g., Hilti MP-MX, Valraven BIS HD 500 or equivalent |
| 5.2 | Washer, nut appropriate for the threaded rod or screw fixing suitable for the clamp | 9.1 | Flexible connector |
| 5.4 | Threaded rod, at least M8, galvanised steel | 9.2 | Air duct/extension piece |
| 5.6 | 4 steel rivets \varnothing 6.4 mm clamping range 2 – 20 mm, e.g. cap blind rivets or high strength rivets; the riveted connection must be air-tight. | 1 | Fixing above and below the ceiling with rivets |
| 5.7 | Anchor bolt Hilti® HUS-6 or equivalent | 2 | Fixing above and below the ceiling with heavy duty clamp |
| 5.19 | L-bracket according to EN 10056-1, 20 × 20 × 3 mm galvanised, painted or similar. | | |
| 5.20 | L-bracket according to EN 10056-1, 35 × 35 × 4 mm galvanised, painted or similar. | | |

4.7.3 Fire damper remote from walls and ceilings



TX2166243

Fig. 52: FKRS-EU in a cladded duct

- 1 FKRS-EU
- 3.1 Solid wall
- 3.2 Lightweight partition wall with metal support structure, cladding on both sides
- 4.1 Solid ceiling slab
- 9.4 Sheet steel duct with fire-rated cladding
The cladding of the air duct and the suspensions are carried out in accordance with these instructions, the additional assembly instructions for the installation kit WE2 and the specifications of the panel manufacturer
- 9.5 Suspension system (by others) consisting of:
 - a Threaded rod M10
 - b Hilti® mounting rail MQ 41 × 3 mm or equivalent
 - c Hilti® drilled plate MQZ L13 or equivalent
 - d Hexagon nut M10 with washer
 - * Additional ducting can be used
 - ** Suspension is required in connection with 9.4*

5 Electrical connection

5.1 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.

The dimensioning of the connection cables is done on site depending on the supply voltage (230 V or 24 V), the cable length as well as the power consumption and number of actuators.

5.2 Limit switches (fire dampers with fusible link)

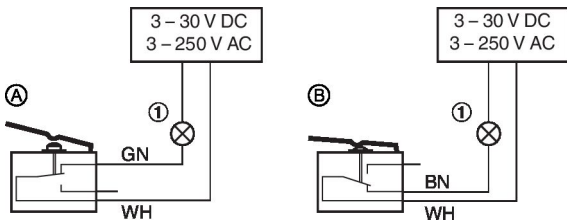


Fig. 53: Wiring of limit switches, example

- Indicator light or relay, to be provided by others
- A Type of connection normally closed
B Type of connection normally open
- The limit switches must be connected according to the wiring example Fig. 53
 - Indicator lights or relays may be connected as long as the performance specifications are taken into consideration.
 - Connection boxes must be fixed to the adjoining structure (wall or ceiling slab). They must not be fixed to the fire damper.

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

Note: For wiring explosion-proof limit switch, see "Supplementary operating manual for explosion-proof fire dampers Type FKRS-EU".

5.3 Spring return actuator

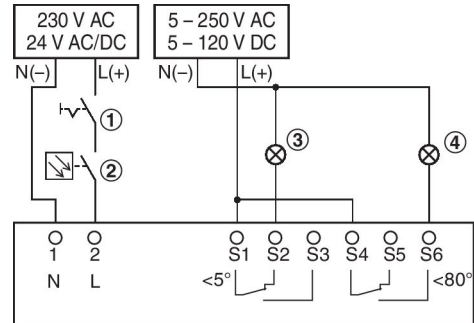


Fig. 54: Actuator connection, example

- Switch for opening and closing, to be provided by others
 - Optional release mechanism, e.g. TROX duct smoke detector Type RM-O-3-D or RM-O-VS-D
 - Indicator light for CLOSED position, to be provided by others
 - 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 wiring explosion-proof spring return actuator see "Supplementary operating manual for explosion-proof fire dampers Type FKRS-EU".

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.

5.4 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

6 Functional test

6.1 General Information

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

 **CAUTION!**

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

6.2 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 run 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).

6.3 Fire damper with fusible link

Close the fire damper

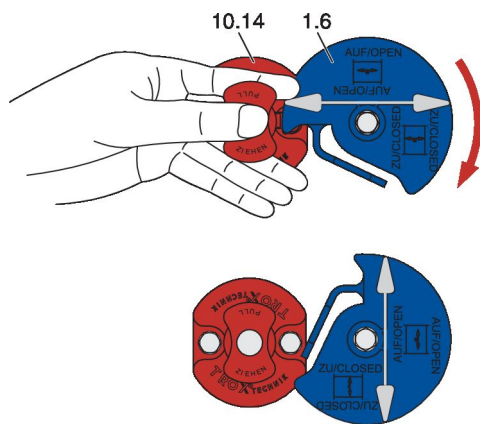


Fig. 55: Close the fire damper

- 1.6 Handle/damper blade position indicator
- 10.14 Thermal release device with fusible link

CAUTION!

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

Requirement

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

Opening the damper blade

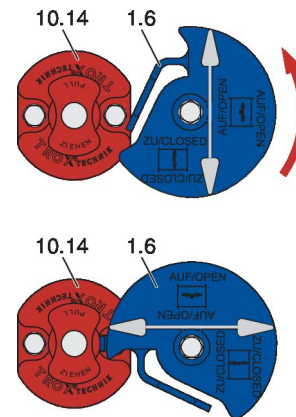


Fig. 56: Opening the damper blade

- 1.6 Handle/damper blade position indicator

Requirement

- The damper blade is CLOSED
- 1. ▶ Turn the handle (1.6) anti-clockwise (see arrow) until
- 2. ▶ the handle (1.6) locks into place (10.14).
- 3. ▶ The damper blade is open and
- 4. ▶ the handle (1.6) indicates that the damper blade is open.

Damper blade position indicator

The position of the damper blade is indicated by the position of the handle.

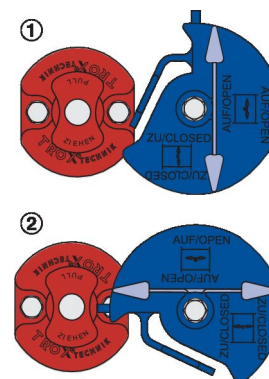


Fig. 57: Damper blade position indicator

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

6.4 Fire damper with spring return actuator

Status indicator

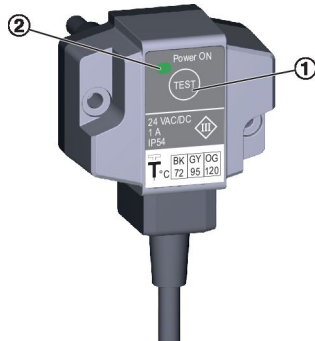


Fig. 58: Thermoelectric release mechanism BAT

- 1 Push button for functional test
- 2 Indicator light

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

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

Damper blade position indicator

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

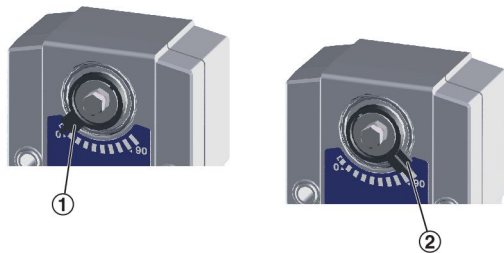


Fig. 59: Damper blade position indicator

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

Closing/opening the damper blade with spring return actuator

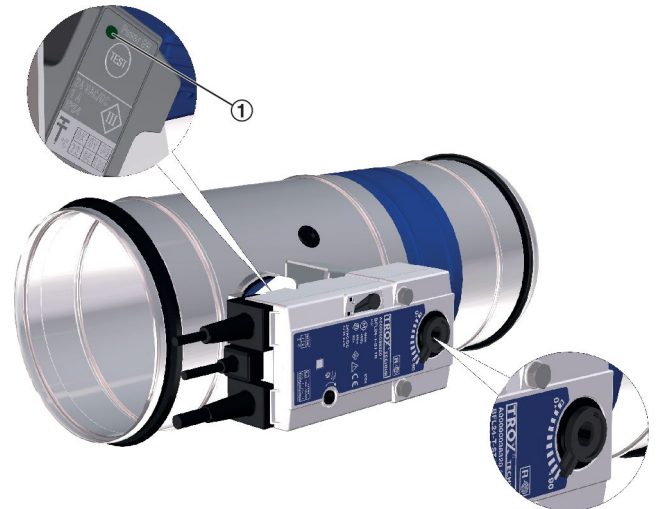


Fig. 60: Functional test

- 1 Push button for functional test

⚠ CAUTION!

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

Requirement

- Power is being supplied
1. ▶ Push the 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 run time.
 3. ▶ Release the button (1).
 - ⇒ Power is supplied again, and the damper blade opens.
 4. ▶ Check if the damper blade is OPEN, check run time.

Opening the damper blade using the crank handle



Fig. 61: Functional test (without power supply)

- 1 Crank handle
- 2 Direction of arrow
- 3 Locking lever

DANGER!

Danger due to malfunction of the fire damper.

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

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

Requirement

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

Close the damper blade



Fig. 62: Functional test (without power supply)

- 3 Locking lever

CAUTION!

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

Requirement

- The damper blade is OPEN
 - ▶ Set the interlock (3) to "Lock opened "
 - ⇒ The damper blade is released and closes. Check if the CLOSED position is reached on the damper blade position indicator.

7 Commissioning

Before commissioning

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

The inspection work to be carried out is listed in the complete instructions, see installation and operating manual FKRS-EU.

Operation

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

If the temperature in the duct ($\geq 72\text{ °C}/\geq 95\text{ °C}$ in warm air ventilation systems) or the ambient temperature ($\geq 72\text{ °C}$) rises in the event of a fire, the thermal release mechanism is triggered. This action closes the damper blade.



CLOSED fire dampers

Fire dampers which close while the ventilation system is running must be inspected before they are opened again in order to ensure their correct function.

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