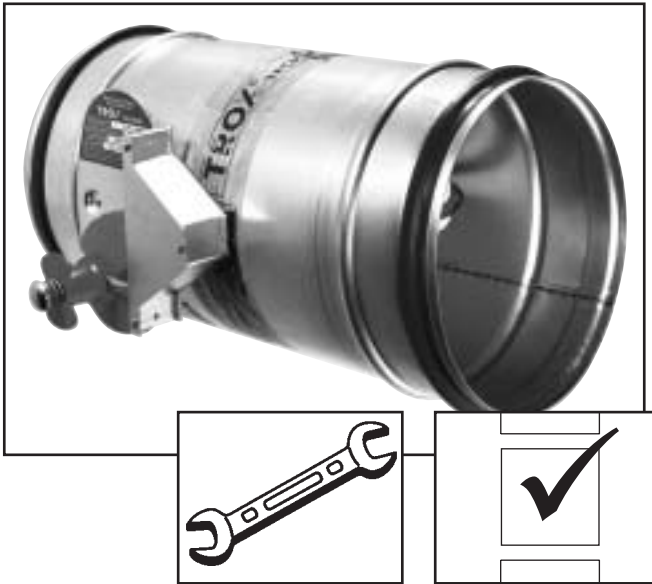


Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

MI-4/10/EN/5



Assembly, commissioning and maintenance instructions MI-4/10/EN/5 for the installation of fire dampers of the type FKRS-02-K90 with approval no. Z-41.3-604

- in solid walls and ceilings
- in gypsum wallboards
- in lightweight partition walls with metal supports
- in lightweight partition walls without metal supports
- in sides of L90 ventilation ducting

Fire dampers are components that require approval. A General Building Inspectorate Licence is needed for submission to the building owner.

Attention!

- The functional reliability must be guaranteed by the owner or operator.**
The functional reliability of the fire dampers must be checked during and after commissioning at regular intervals. If two successive tests after an interval of 6 months show no defects that are detrimental to the function the tests need only be performed annually. The general maintenance guidelines required by DIN 31051 must be complied with.
- Wall and ceiling installations must be according to standards and/or the manufacturer's specifications and the data in the General Building Inspectorate Licence.
- Before installation:
 - check the fire damper for damage incurred during transport
 - check the correct functioning
 - check the approval nos: and comply the assembly, commissioning and maintenance instructions
- After installation:
 - remove transportation lock / installation protection
- Work may only be carried out by qualified employees.
- Observe the general safety and accident prevention regulations.
- Release mechanism and electrical actuator must be accessible.
- Access panels may have to be provided in the adjacent ventilation ducting for maintenance work depending on the location.
- Spare parts according to spare parts list EP/4/8/EN/...



Do not reach into the marked area ■ when the fire damper (FD) is in use since there is a risk of injury.

Table of contents:

Assembly instructions

- Installation and assembly sequence for installation in solid walls and ceilings Page 2
- Installation and assembly sequence for installation in gypsum wallboards Page 4
- Circular installation block Page 5
- Installation and assembly sequence for installation in lightweight partition walls with and without metal supports and L90-duct sides Page 6
- Square installation block Page 8
- Transportation lock / installation protection Page 9
- Connection of ventilation ducting and cover grilles Page 10

Instructions for inspection, maintenance and repairs

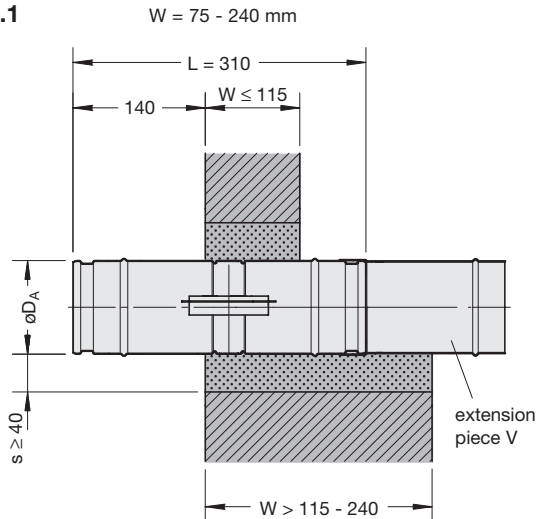
- I. Basic construction with fusible link Page 11
- II. Electrical actuation Page 12

Commissioning and maintenance report (available on request) Enclosure

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90


MI-4/10/EN/5

Fig. 1.1



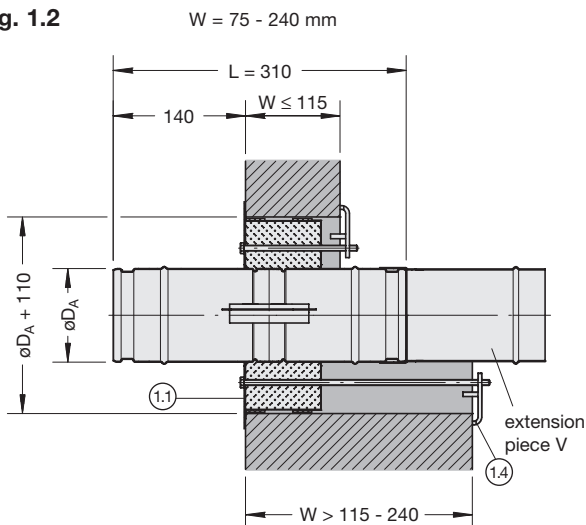
Installation in solid walls and ceilings

Installation – also with vertical damper blade and casing in any orientation from 0° to 360° – in concrete or aerated concrete walls and ceilings with a minimum thickness of 100 mm and masonry walls with a minimum thickness of 115 mm, in aerated concrete walls according to Table 38 of DIN 4102, Part 4 (March 1994 issue), with resistance class F60-A, with a minimum thickness of 75 mm and also in light-weight concrete walls with a minimum thickness of 75 mm.

 = Mortar, concrete, approved fireproof mortar or gypsum mortar

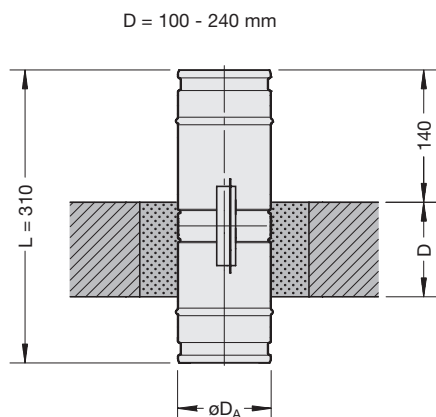
If $W < 100$ mm the ventilation ducting can only be connected using flexible connectors or using flexible ventilation ducting.

Fig. 1.2



- ①.1 Installation block
- ①.4 Clamping jaw

Fig. 1.3



If $D > 115$ mm if necessary extension piece should be provided as shown in Fig. 1.1.

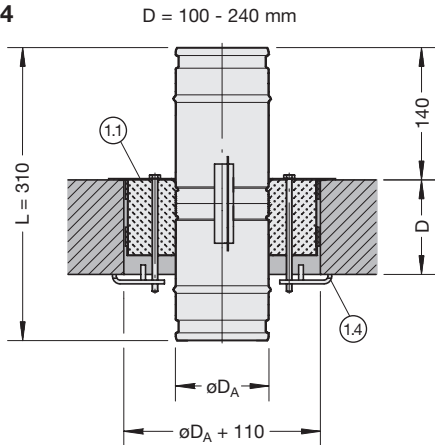
Wall installation · Ceiling installation

- Fig. 1.1 Wall thicknesses $W = 75 - 240$ mm
Wet installation
- Fig. 1.2 Wall thicknesses $W = 75 - 240$ mm
Dry installation with circular installation block
- Fig. 1.3 vertical in ceiling,
ceiling thicknesses $D = 100 - 240$ mm
Wet installation
- Fig. 1.4 vertical in ceiling,
ceiling thicknesses $D = 100 - 240$ mm
Dry installation with circular installation block
- Fig. 1.5 suspended in ceilings,
ceiling thicknesses $D = 100 - 240$ mm
Wet installation
- Fig. 1.6 suspended in ceilings,
ceiling thicknesses $D = 100 - 240$ mm
Dry installation with circular installation block

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

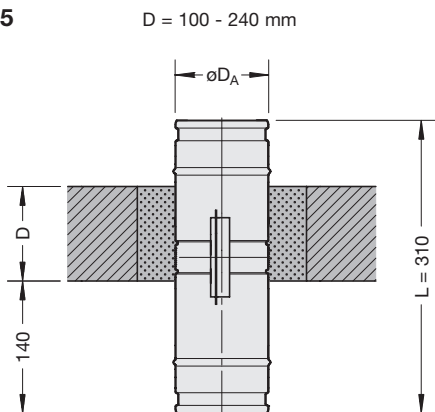
MI-4/10/EN/5

Fig. 1.4



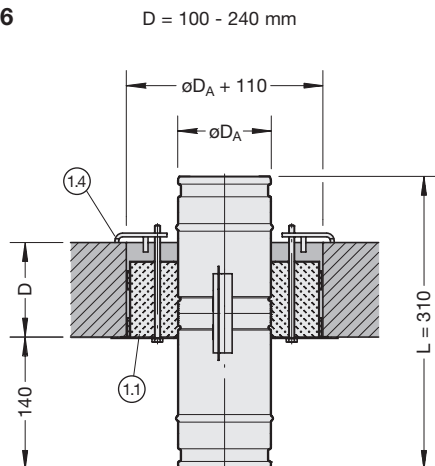
If $D > 115$ mm if necessary extension piece should be provided as shown in Fig. 1.2.

Fig. 1.5



If $D > 115$ mm if necessary extension piece should be provided as shown in Fig. 1.1.

Fig. 1.6



If $D > 115$ mm if necessary extension piece should be provided as shown in Fig. 1.2.

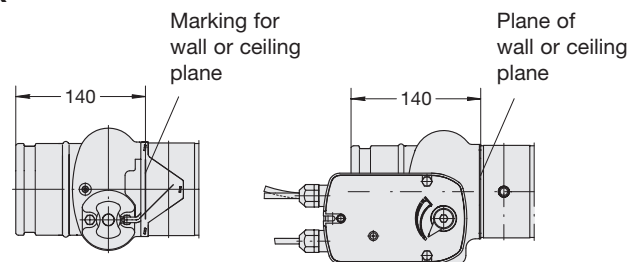
Assembly sequence for wet installation in solid walls and ceilings

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Slide FD into the wall or ceiling opening, see Detail X
- If no ventilation ducting is to be fitted before bricking in the customer may have to provide an extension piece V if $W > 115$ mm and/or $D > 115$ mm
- Fill gap "s" with mortar from Group II or III, DIN 1053, with concrete, with approved fireproof mortar or gypsum based mortar
 - Gap "s" can be omitted if the FD is installed in the wall or ceiling when it is built
 - To guarantee an adequate filling the gap "s" should be ≥ 40 mm
- Remove installation protection (not for constructions with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

Assembly sequence for dry installation with circular installation block in solid walls and ceilings

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Remove transportation lock, see Fig. 7.1
- Slide FD into the wall or ceiling opening
- Adjust the gap between the clamping jaw Pos. (1.4) and installation block Pos. (1.1) so that this is 5 mm larger than the wall or ceiling thickness, see Fig. 3.1
- Tighten clamping jaws Pos. (1.4)
- Remove installation protection (not for constructions with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

X



Installation in gypsum wallboards

Installation – also with vertical damper blade and casing in any orientation from 0° to 360° – in gypsum wallboards according to DIN 18163, Part 1, gross density $\geq 0.6 \text{ kg/dm}^3$ with a minimum thickness of 100 mm.

The ventilation ducting can only be connected using flexible connectors or using flexible ventilation ducting.

Fig. 2.1

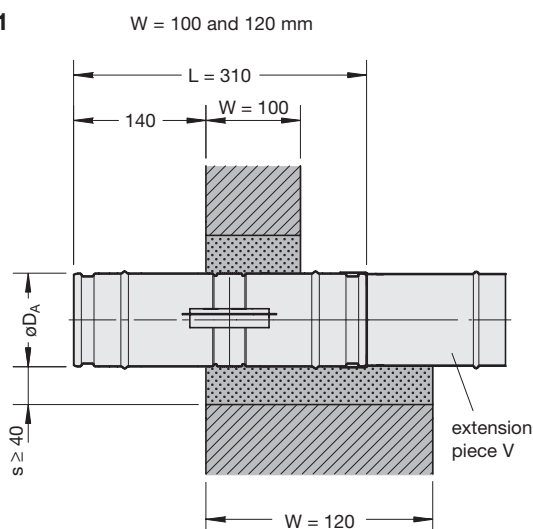
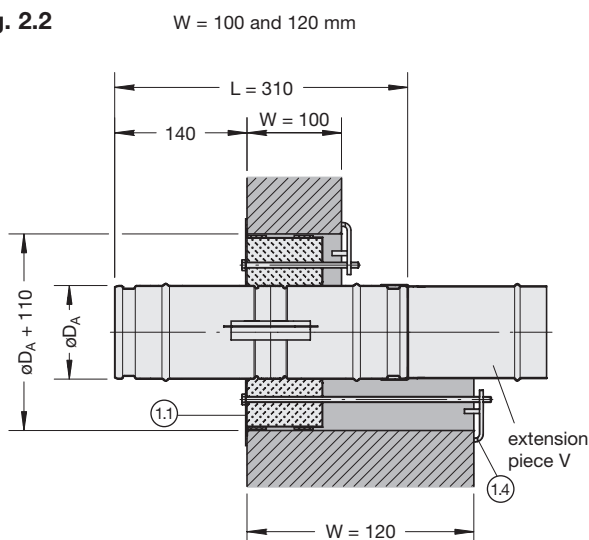


Fig. 2.2



Assembly sequence for wet installation in gypsum wallboards

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Build wall according to DIN 18163, Part 1
- Slide FD into the wall opening, see Detail X on Page 3
- If no ventilation ducting is to be fitted before bricking in the customer may have to provide an extension piece V if $W = 120 \text{ mm}$
- Fill gap "s" with mortar from Group II or III, DIN 3, with concrete, with approved fireproof mortar or gypsum based mortar
 - Gap "s" can be omitted if the FD is installed in the wall when it is built
 - To guarantee an adequate filling the gap "s" should be $\geq 40 \text{ mm}$
- Remove installation protection (not for constructions with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

Assembly sequence for dry installation with circular installation block in gypsum wallboards

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Build wall according to DIN 18163, Part 1
- Remove transportation lock, see Fig. 7.1
- Slide FD into the wall opening
- Adjust the gap between the clamping jaw Pos. (1.4) and installation block Pos. (1.1) so that this is 5 mm larger than the wall thickness, see Fig. 3.1
- Tighten clamping jaws Pos. (1.4)
- Remove installation protection (not for constructions with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

- (1.1) Installation block
- (1.4) Clamping jaw

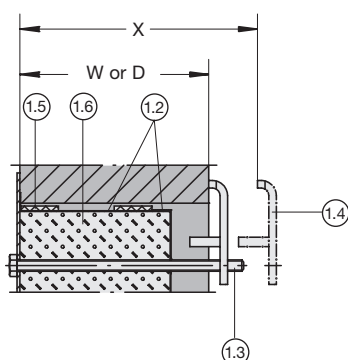
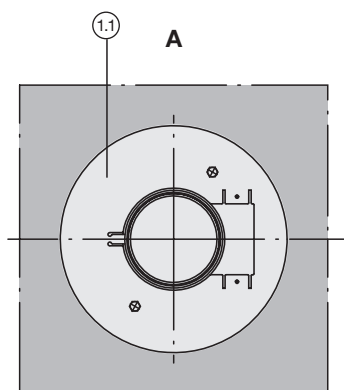
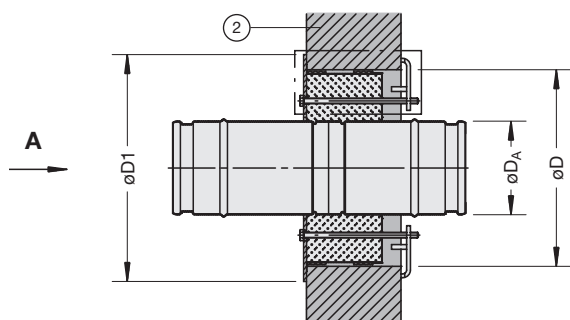
Fig. 2.1 Installation in gypsum wallboards
Wet installation

Fig. 2.2 Installation in gypsum wallboards
Dry installation with circular installation block

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

MI-4/10/EN/5

Fig. 3.1



$$X = (W \text{ or } D) + 5 \text{ mm}$$

Shown without damper blade and release mechanism

Circular installation block

- ① Installation block, consisting of:
 - ①.1 Panel
 - ①.2 Block cover sheet
 - ①.3 Clamping arm
 - ①.4 Clamping jaw
 - ①.5 Seal
 - ①.6 Precast block
- ② Solid wall or ceiling or gypsum wallboards

NW	øDA in mm	øD in mm	øD1 in mm	approx. weight in kg*
100	99	209	240	1 / 7
125	124	234	265	1.3 / 8
160	159	269	300	1.7 / 10
200	199	309	340	2.2 / 13

Nominal size "NW" acc. to DIN

* Weight without / with installation block for release mechanisms Z42 and Z44
Table values + 2 kg

øD Opening size for circular installation block (only for installation in solid walls and ceilings and in gypsum wallboards)

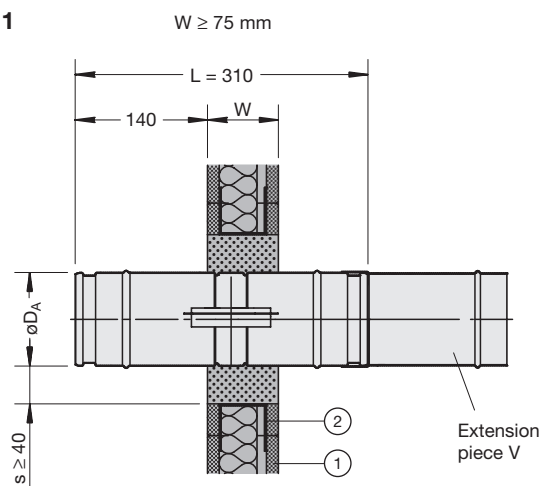
øD1 Cover plate for circular installation block

Fig. 3.1 Circular installation block

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

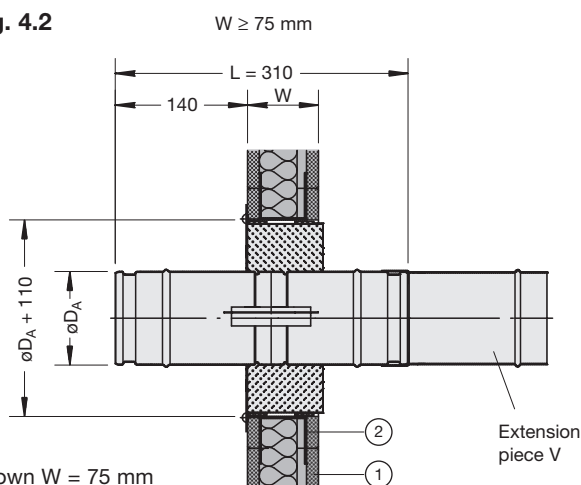
MI-4/10/EN/5

Fig. 4.1



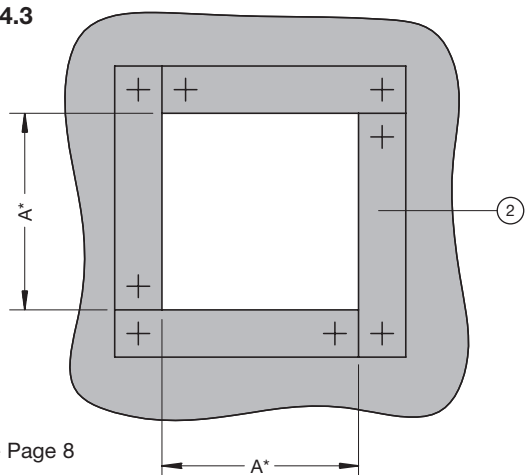
shown $W = 75 \text{ mm}$

Fig. 4.2



shown $W = 75 \text{ mm}$

Fig. 4.3



* see Page 8

Installation in lightweight partition walls with metal supports

Installation – also with vertical damper blade and casing in any orientation from 0° to 360° – in lightweight partition walls with metal supports according to the test certificate, the Building Inspectorate Usage Certificate or approvals.

The ventilation ducting can only be connected using flexible connectors or using flexible ventilation ducting.

- ① Partition walls / shaft walls (wall construction according to manufacturer's specifications)
- ② Stiffening details (according to wall construction)

Fig. 4.1 Wall thickness $W \geq 75 \text{ mm}$
Wet installation

Fig. 4.2 Wall thickness $W \geq 75 \text{ mm}$
Dry installation with square installation block

Fig. 4.3 Stiffening details layout

Installation in lightweight partition walls without metal supports and L90 surfaces

Installation – also with vertical damper blade and casing in any orientation from 0° to 360° – in at least 40 mm thick fire rated partition walls of calcium silicate boards without metal supports and sides of L90-ducting according to test certificate.

The ventilation ducting can only be connected using flexible connectors or using flexible ventilation ducting.

- ① Fire rated partition wall (wall construction according to manufacturer's specifications) or L90-surface
- ② Perimeter strip (according to wall construction)
- ③ Coarse thread screw, steel, $L \geq 60 \text{ mm}$

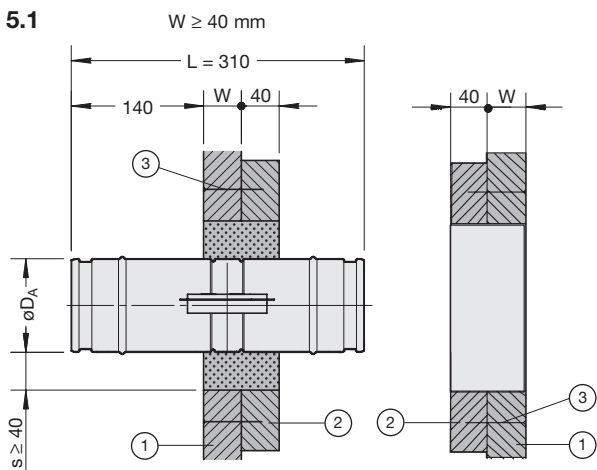
Fig. 5.1 Wall thickness $W \geq 40 \text{ mm}$
Wet installation

Fig. 5.2 Wall thickness $W \geq 40 \text{ mm}$
Dry installation with square installation block

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

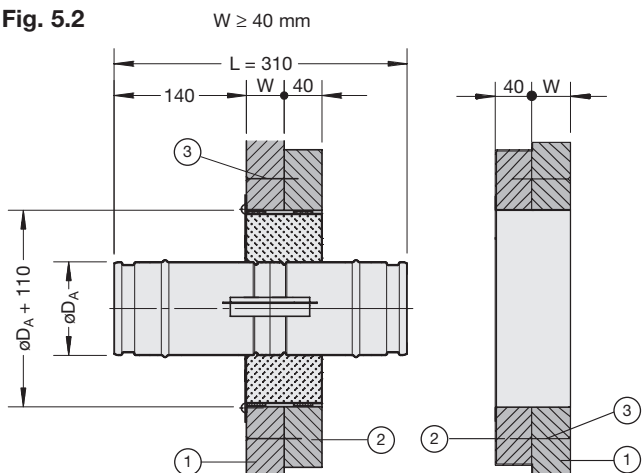
MI-4/10/EN/5

Fig. 5.1



shown W = 40 mm

Fig. 5.2



shown W = 40 mm

Assembly sequence for wet installation in lightweight partition walls with or without metal supports and L90-surfaces

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Build wall according to instructions on Page 6; with lightweight partition walls with metal supports the stiffening details in the area of the FD must be located as shown in Fig. 4.3
- Slide FD into the wall opening, see Detail X on Page 3
- If no ventilation ducting is to be fitted before bricking in the customer may have to provide an extension piece V for lightweight partition walls with metal supports and $W > 115$ mm
- Fill gap "s" with mortar from Group II or III, DIN 1053, with concrete, with approved fireproof mortar or gypsum based mortar
 - To guarantee an adequate filling the gap "s" should be ≥ 40 mm
- Remove installation protection (not for construction with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

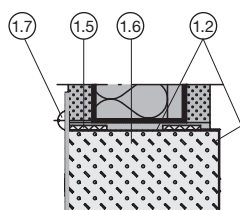
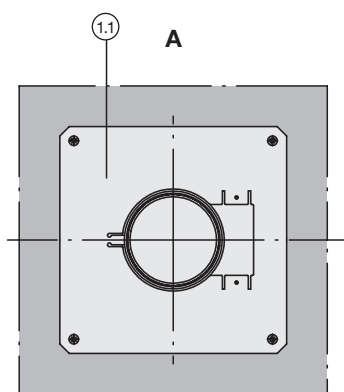
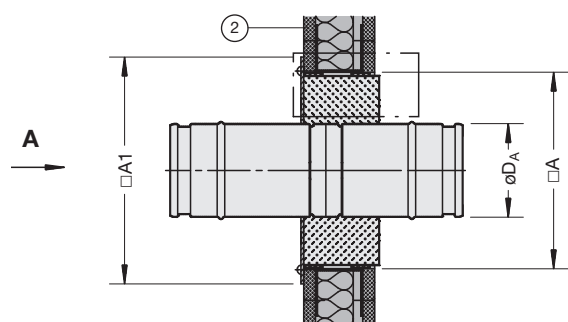
Assembly sequence for dry installation with square installation block in lightweight partition walls with and without metal supports and L90-surfaces

- Attention! Avoid deformation of the casing and contamination of the associated components during installation**
- Build wall according to instructions on Page 6; with lightweight partition walls with metal supports the stiffening details in the area of the FD must be located as shown in Fig. 4.3
- Slide FD into the wall opening
- Tighten particle board screws Pos. ①⑦, see Fig. 6.1
- Remove installation protection (not for constructions with electrical actuation), see Fig. 7.2
- Carry out inspection of the FD as described on Pages 11 – 13

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

MI-4/10/EN/5

Fig. 6.1



Square installation block

- ① Installation block, consisting of:
 - ①.1 Panel
 - ①.2 Block cover sheet
 - ①.5 Seal
 - ①.6 Precast block
 - ①.7 Particle board screw
- ② Lightweight partition wall

NW	$\varnothing D_A$ in mm	$\square A$ in mm	$\square A1$ in mm	approx. weight in kg*
100	99	209	240	1 / 7
125	124	234	265	1.3 / 8
160	159	269	300	1.7 / 10
200	199	309	340	2.2 / 13

Nominal size "NW" acc. to DIN

* Weight without / with installation block for release mechanisms Z42 and Z44
Table values + 2 kg

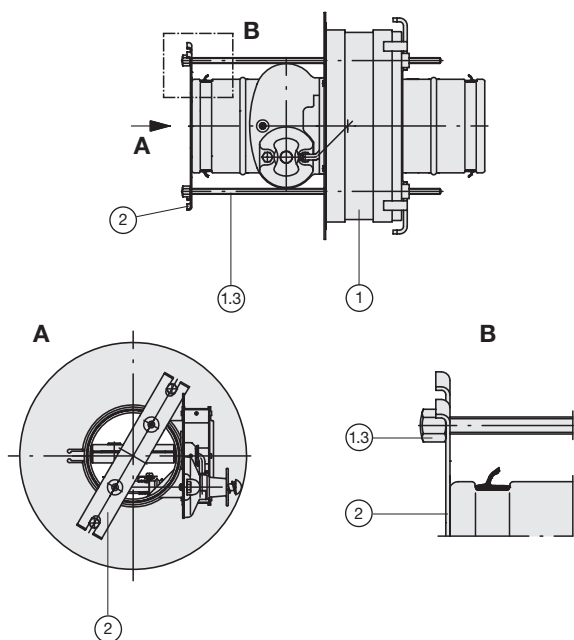
$\square A$ Opening size for square installation block

$\square A1$ Cover plate for square installation block

shown without damper blade and release mechanism

Fig. 6.1 Square installation block

Fig. 7.1



shown FKRS-02-K90 in **OPEN** position (basic construction)

Transportation lock

Release clamping rods Pos. ①.3 and remove transportation lock as shown in Fig. 7.1.

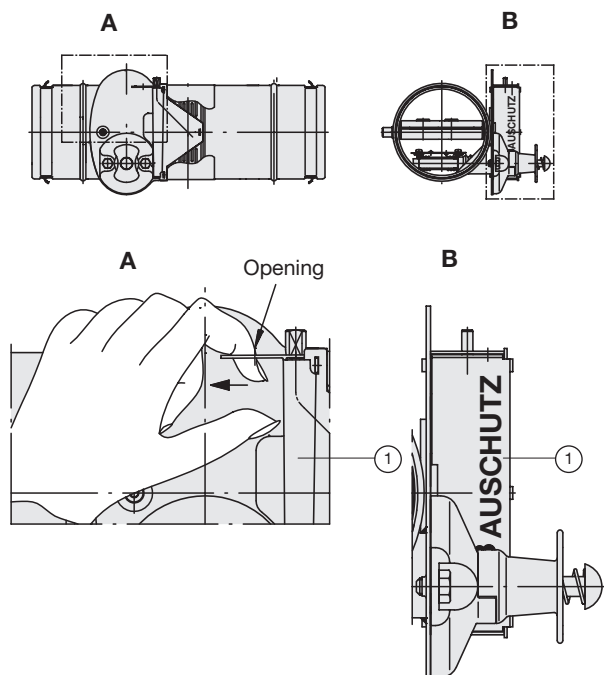
- ① Circular installation block
- ①.3 Clamping rod
- ② Transportation lock

Installation protection

Remove installation protection Pos. ① as shown in Fig 7.2

- ① Installation protection

Fig. 7.2



shown FKRS-02-K90 in **CLOSED** position (basic construction)

Fig. 7.1 Transportation lock

Fig. 7.2 Installation protection

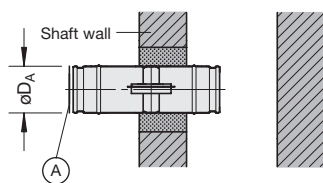
Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

MI-4/10/EN/5

Fig. 8.1

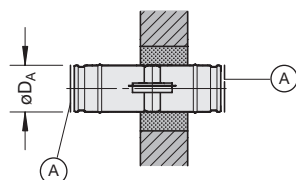
No. 1 *

- in shaft walls; cover grille on the drive end



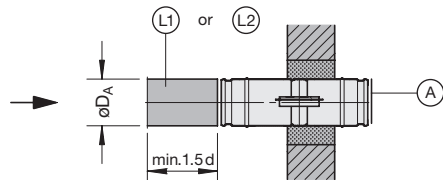
No. 2 *

- both ends with cover grilles



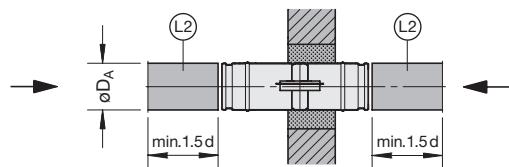
No. 3 *

- with non-combustible ventilation ducting and cover grille on one end



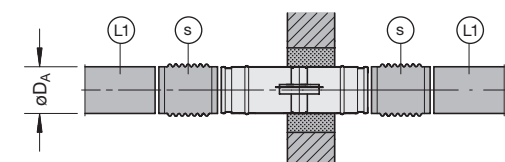
No. 4 *

- both ends with flexible, non-combustible ventilation ducting



No. 5 *

- both ends with flexible connectors and non-combustible ventilation ducting



Connection of ventilation ducting or cover grilles

According to the General Building Inspectorate Licence fire dampers may only be connected to ventilation ducts that are unable to exert any significant force on the fire damper or wall or ceiling on account of duct construction layout – particularly when ducts heat up in the event of fire. If this is not possible flexible connectors of a non-flammable or normal flammable building material according to Fig. 8.1, no. 5 must be provided during installation as shown in Figs. 1.1 to 1.6.

With an installation according to Figs. 1.1 and 1.2 and a wall thickness of <math>< 100\text{ mm}</math> and with an installation according to Figs. 2.1, 2.2 and 4.1 to 5.2 ventilation ducting may only be fitted with flexible connectors which are non-flammable or normal flammable building materials according to Fig. 8.1, No. 5.

When using L2-ventilation ducting, flexible connectors are not required.

- (A) Cover grille
- (L1) Ventilation ducting made of non-combustible materials
- (L2) Flexible, non-combustible ventilation ducting (ducts of steel or aluminium)
- (S) Flexible connector of non-flammable or normal flammable building materials (Material class B1 or B2 acc. to DIN 4102 or flexible aluminium ducting acc. to DIN 24146-1), flexible length $\geq 100\text{ mm}$ when fitted

„d“ corresponds to the largest diameter

* Fire resistance class K90 in walls or ceilings with a min. fire resistance class of F90

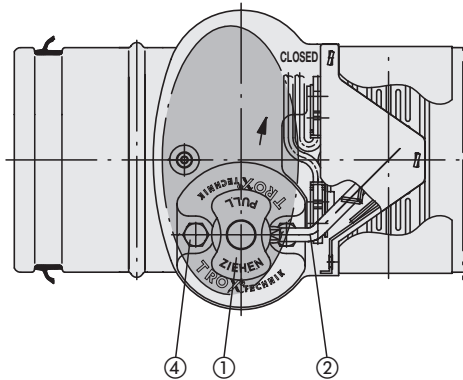
➔ Connection of combustible ventilation ducting allowed (after min. 1.5 d)

Fig. 8.1 Connection of ventilation ducting or cover grilles

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

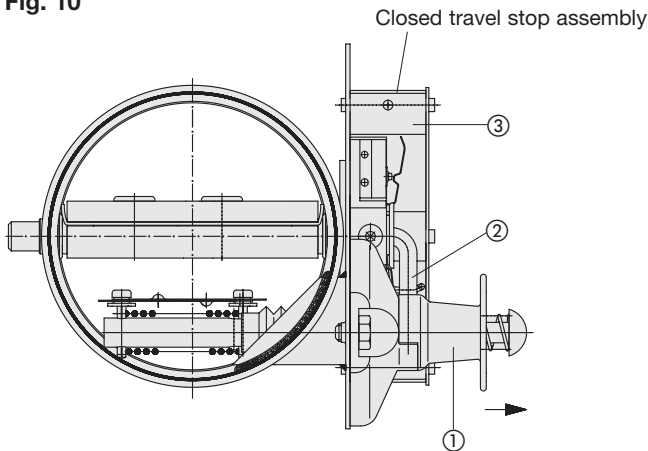
MI-4/10/EN/5

Fig. 9



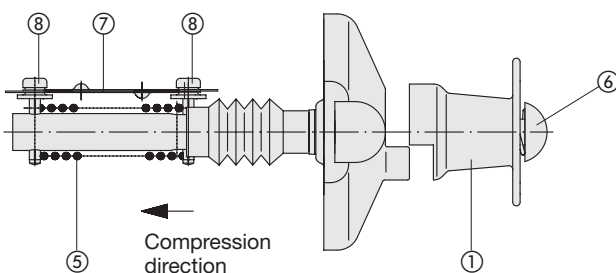
Damper blade shown in **OPEN** position

Fig. 10



Damper blade shown in **OPEN** position

Fig. 11



I Basic construction with fusible link

Inspection before and after commissioning

- Check fire damper for damage
- Operate manual release – damper blade
 - Pull manual knob Pos. ①; Drive arm Pos. ② is released for rotation
 - Damper blade must close automatically
 - Drive arm Pos. ② must rest against the closed travel stop Pos. ③ in the **CLOSED** position
- Check the release mechanism
 - Remove locking screws (2 pieces) Pos. ④ and pull out release mechanism from the front
 - Compress the coil spring Pos. ⑤ by pushing the ram Pos. ⑥ as shown in Fig. 11 until the fusible link Pos. ⑦ can be removed
 - When released the coil spring must move the manual knob easily so that this can rotate around its axis on the ram
 - Check the fusible link and mount on the insulated sleeve Pos. ⑧ after the coil spring is compressed
 - Mount the release mechanism
 - Open the damper blade

Maintenance

- Remove any contaminations discovered during the inspection

Overhaul

- Replace fusible link
- Replace release mechanism
- Replace limit switch
- Other repair work may only be carried out after consulting the manufacturer

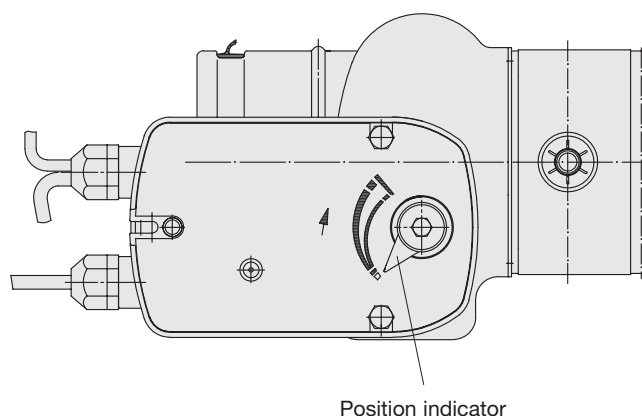
- ① Manual knob
- ② Drive arm
- ③ Closed travel stop
- ④ Locking screw
- ⑤ Coil spring
- ⑥ Ram
- ⑦ Fusible link
- ⑧ Insulating sleeve

Fig. 9 FD basic construction, side view damper blade shown in **OPEN** position

Fig. 10 FD basic construction, front view damper blade shown in **OPEN** position

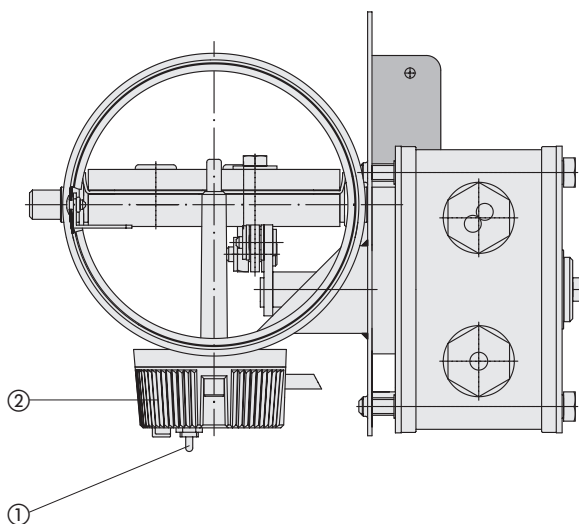
Fig. 11 Release mechanism

Fig. 12



Damper blade shown in **CLOSED** position

Fig. 13



Damper blade shown in **OPEN** position

II Electrical actuator

Inspection during commissioning

- Check fire damper for damage
- Operate manual release – damper blade
- Operate the toggle switch Pos. ① of the thermoelectric release mechanism Pos. ②
- Electric circuit for the electrical actuator is interrupted
- Damper blade must close automatically; the position must be shown by the position indicator of the electrical actuator

Maintenance during commissioning

- Remove any contamination discovered during the inspection

Inspection after commissioning (semi-annually or annually)

- Interrupt the electric circuit for electrical actuator with the electrical switch (see Pos. ① Page 13)
- Damper blade must close automatically; the limit switch integrated in the motor signals when the **CLOSED** position is reached
- Electric circuit for the electric actuator is made
- Damper blade must open automatically; the limit switch integrated in the motor signals when the **OPEN** position is reached

Maintenance after commissioning (intervals depend on the facility engineering and operating conditions)

- Remove any contamination that could affect functioning, e.g. in the thermal release mechanism

Overhaul

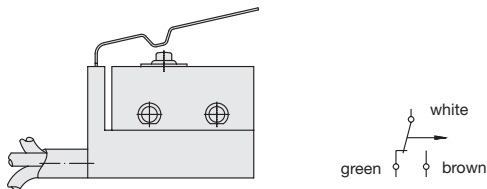
- Replace electrical actuator
- Replace thermoelectric release mechanism
- Other repair work may only be carried out after consulting the manufacturer

- ① Toggle switch
- ② Thermoelectric release mechanism

Assembly, commissioning and maintenance instructions for fire dampers of the type FKRS-02-K90

MI-4/10/EN/5

Fig. 14



Notes on electrical wiring

Electrical connections may only be made by qualified trades people.
Comply with the VDE Guidelines.

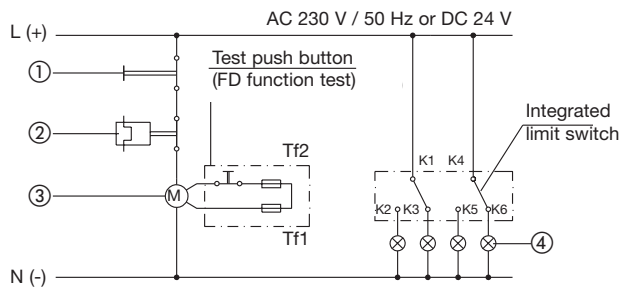
Wiring the limit switch

- Limit switch wired according to the required indication
- Limit switch shown inactive

Wiring the electrical actuator

- Compare supply voltage with the data specified for the electrical actuator
- Wiring according to the circuit diagram opposite
- Circuit diagram shows the damper blade in the **OPEN** position

Fig. 15



Damper blade shown in **OPEN** position

Type BLF230-T TR:

To isolate from main power supply, the system must incorporate a device which disconnects the phase conductors (with at least a 3 mm contact gap)

BUS systems, e.g. pre-wired control devices from TroxNetCom can as an option be used to rationalise the necessary functions.

- ① Electrical limit switch, by others (close and open FD)
- ② Sensor, by others (close FD); for release mechanisms based on power on to operate, e.g. Trox smoke release mechanism type RM-O/2 or RM-O-VS-D
- ③ Electric spring return actuator with integrated limit switch and thermoelectric release mechanism (TF1 = external duct temperature 72°C and TF2 = internal duct temperature 72°C)
- ④ Consumer electrical components supplied by others (e.g. control light for position indication)

Fig. 14 Limit switch

Fig. 15 Electrical actuator (closed circuit operation)

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Commissioning and maintenance report

for fire dampers, fire protection valves
 and smoke extraction dampers

No.: 1

Damper or valve no. : FD ...
 Approval no. : Z-41.3-604
 General Building Inspectorate Licence : February 10, 2004 / February 25, 2009
 from / applicable to : FKRS-02-K90
 Type : Basic construction I
 Release mechanism :

The following inspection, maintenance and repair work has been performed in accordance with TROX assembly, commissioning and maintenance instructions MI- <u>4/10/EN/5</u> , article no. <u>E016KS1</u>		Commissioning work carried out on: March 9, 2004	(6 months after commissioning) 1st Maintenance date: September 9, 2004	Next maintenance date: March 9, 2005	Next maintenance date: March 9, 2006
During commissioning	Inspection	✍			
	Maintenance	<i>not required</i>			
After commissioning	Inspection		✍	✍	
	Maintenance (see reverse for measures)		<i>required</i>	<i>not required</i>	
	Repairs (see reverse for measures)		<i>not required</i>	<i>not required</i>	

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Commissioning
and maintenance report
for fire dampers, fire protection valves
and smoke extraction dampers

No.: 1

Maintenance / overhaul, carried out on: September 9, 2004

Type of maintenance :

Contaminations removed.



Maintenance / overhaul, carried out on: _____

Type of _____:

Maintenance / overhaul, carried out on: _____

Type of _____:

Maintenance / overhaul, carried out on: _____

Type of _____:

Example