

EN 15650:2010-09

MANDÍK[®]

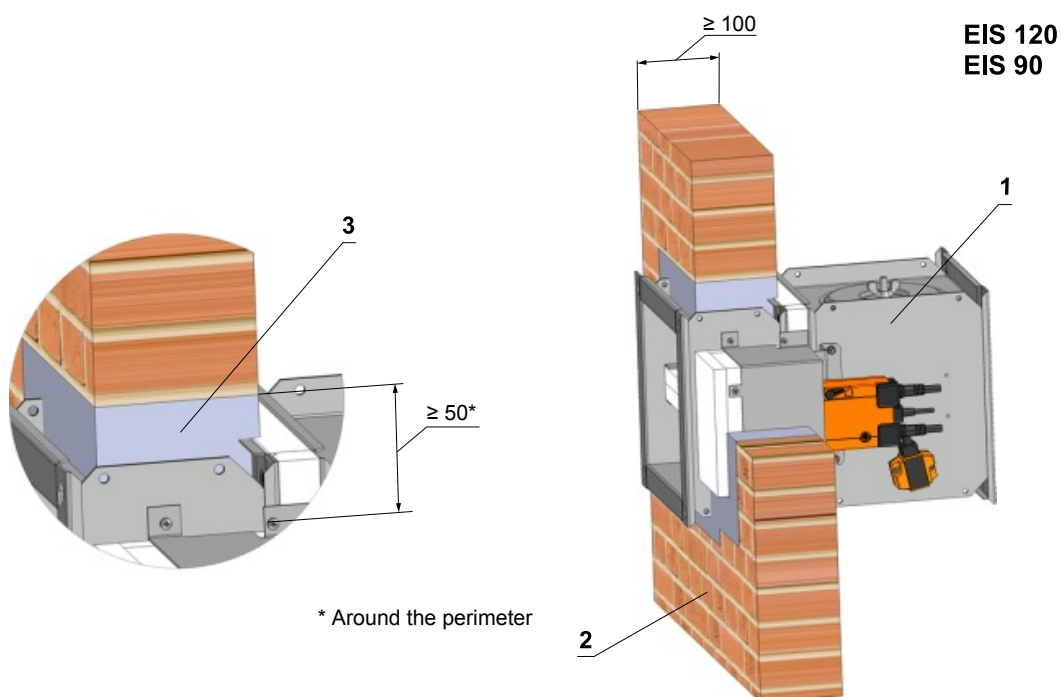
INSTALLATION INSTRUCTIONS

FIRE DAMPER FDMA



Installation in solid wall construction

Solid wall construction - mortar or gypsum



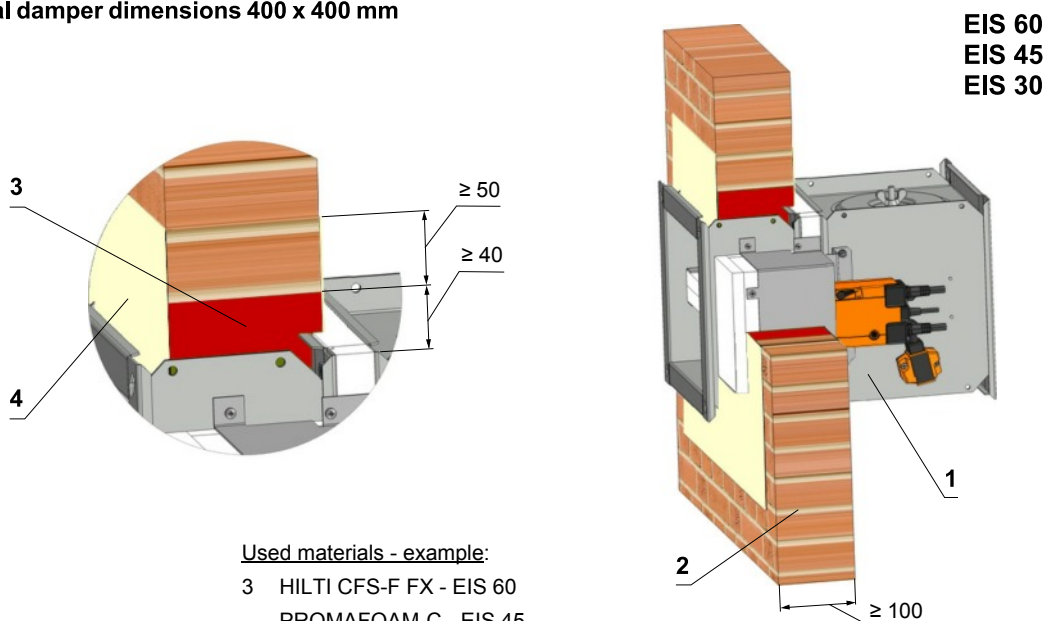
Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Mortar or gypsum

Shown schemes of incorporation and damper are illustrative only !

Solid wall construction - fire protection foam with stucco plaster

Maximal damper dimensions 400 x 400 mm



Used materials - example:

- 3 HILTI CFS-F FX - EIS 60
- PROMAFOAM-C - EIS 45
- SOUDAL, Soudafoam FR-B1 - EIS 30
- DenBraven, Fire protection foam - EIS 30

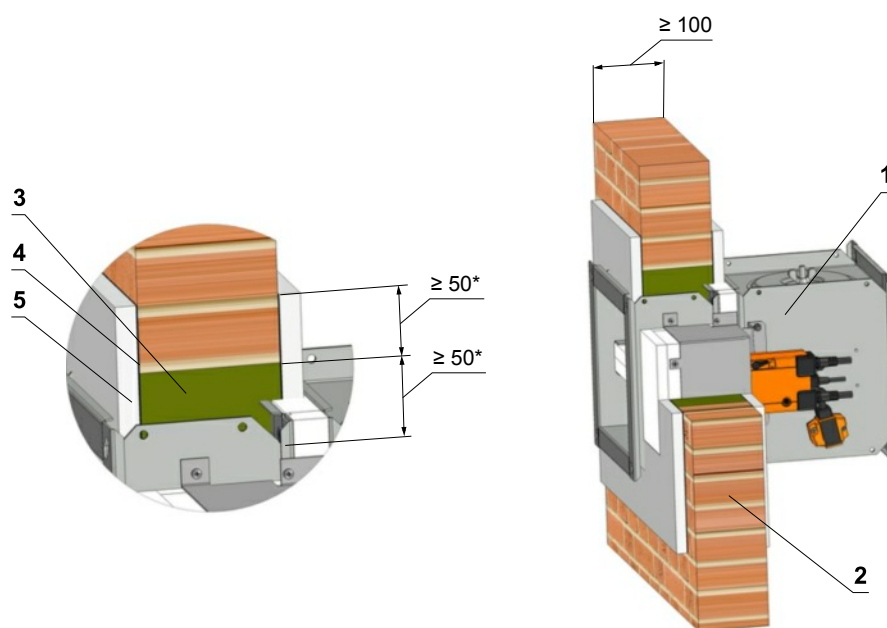
Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Fire protection foam
- 4 Stucco plaster

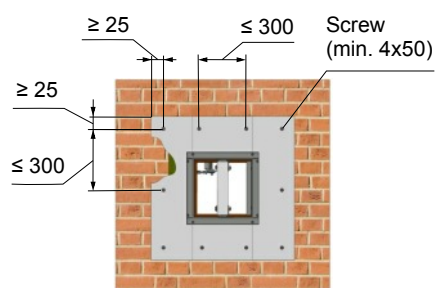
The damper must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !

Solid wall construction - stuffing box, fire protection mastic and cement lime plate

EIS 90



* Around the perimeter



Screws has to be fixed in wall/ceiling construction.
(If it is needed use steel bracket).

Used materials - example:**

- 3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 4 Promastop - P, K, Hilti CFS-CT
- 5 Promatect - H

Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Mineral stone wool min. density 140 kg/m³
- 4 Fire protection mastic min. thickness 1 mm
- 5 Cement lime plate min. thickness 15 mm min. density 870 kg/m³

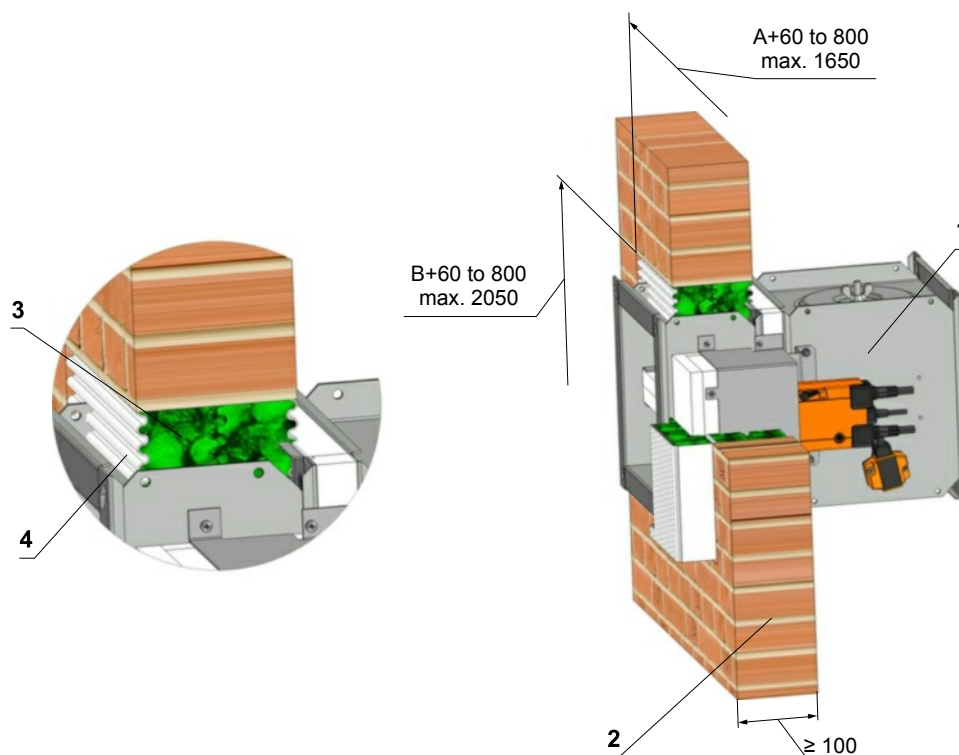
** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

The damper must be anchored to the fire wall construction !

Shown schemes of incorporation and damper are illustrative only !

Solid wall construction - Weichschott

EIS 90



Used materials - example:*

- 3 Hilti CFS-CT B 1S 140/50
- 4 Hilti CFS-CT

Position:

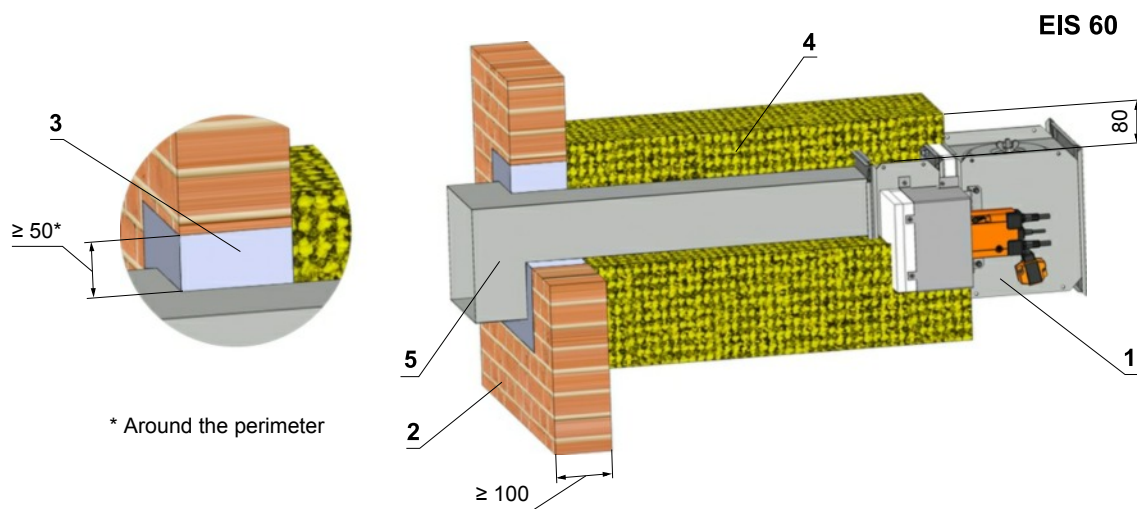
- 1 Fire damper
- 2 Solid wall construction
- 3 Fire resistant board
- 4 Fire stop coating thickness 1 mm

* Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

Shown schemes of incorporation and damper are illustrative only !

Installation outside solid wall construction

Outside solid wall construction - mineral wool - mortar or gypsum



Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Mortar or gypsum
- 4 Stone wool with wired mat on one side, density 66 kg/m³
- 5 Duct

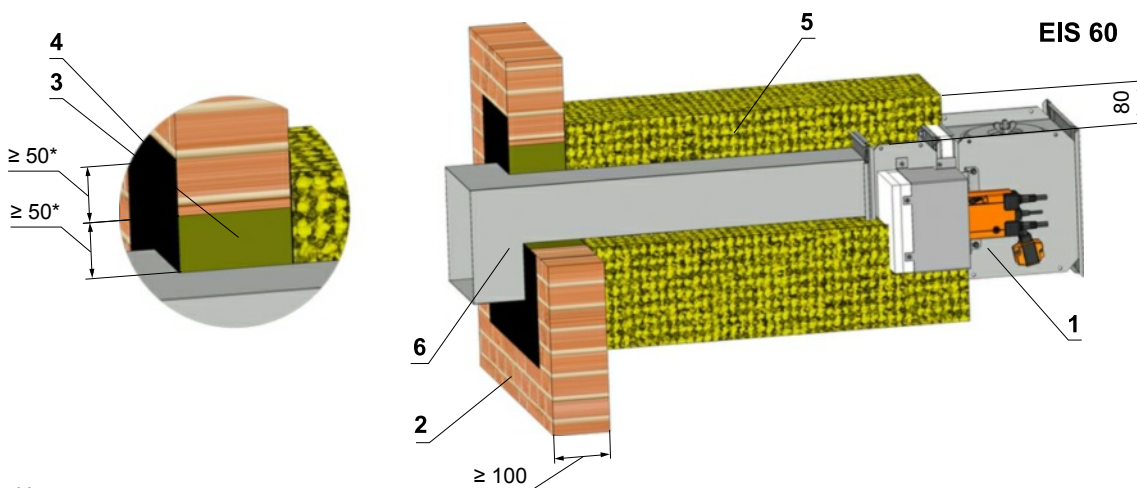
Used materials - example:**

- 4 Isover Ultimate Protect SLAB 4.0, th. 80 mm ALU1

** The materials for stuffing box, fire protection mastic, lining and insulation materials can be replaced by another approved fire sealing system with equivalent properties.
The maximum distance of the fire damper from the structure is not limited and according to EN 15882-2, the required number of suspensions acc. to EN 1366-1:2014 must be used.

**The duct at the point of penetration can be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Outside solid wall construction - mineral wool - stuffing box and fire protection mastic



Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Stuffing box (mineral stone wool min. density 150 kg/m³)
- 4 Fire protection mastic min. thickness 1 mm
- 5 Stone wool with wired mat on one side, density 66 kg/m³
- 6 Duct

Used materials - example:**

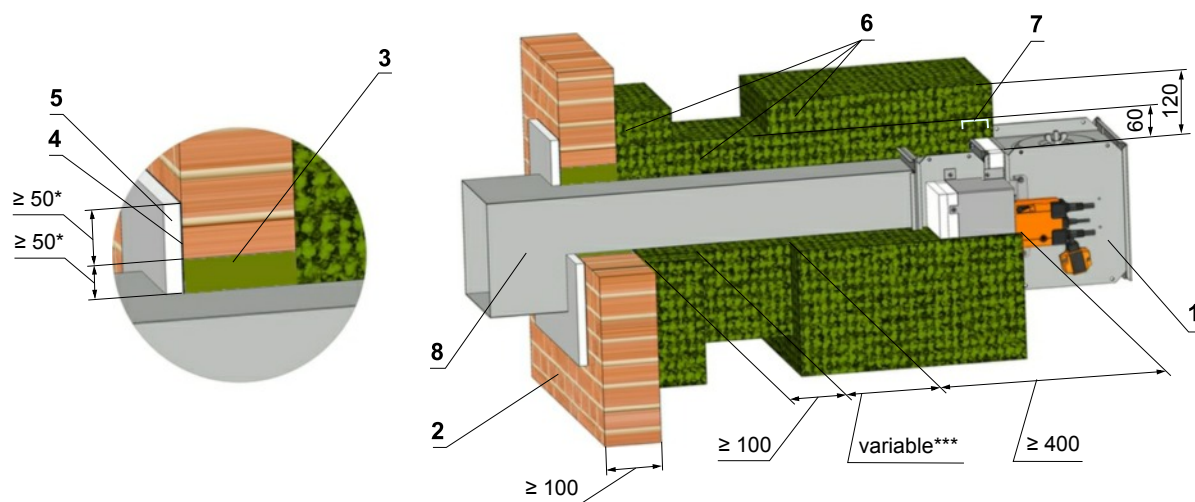
- 3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 4 Promastop - P, K, Hilti CFS-CT
- 5 Isover Ultimate Protect SLAB 4.0, th. 80 mm ALU1

** The materials for stuffing box, fire protection mastic, lining and insulation materials can be replaced by another approved fire sealing system with equivalent properties.
The maximum distance of the fire damper from the structure is not limited and according to EN 15882-2, the required number of suspensions acc. to EN 1366-1:2014 must be used.

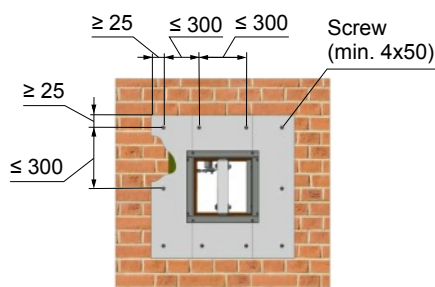
**The duct at the point of penetration must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Outside solid wall construction - mineral wool, stuffing box, fire protection mastic and cement lime plate

EIS 90



* Around the perimeter



Screws has to be fixed in wall/ceiling construction.
(If it is needed use steel bracket).

Used materials - example:**

- 3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 4 Promastop - P, K, Hilti CFS-CT
- 5 Promatect - H
- 6 Rockwool Wired Mat 105 th. 60 mm

Position:

- 1 Fire damper
- 2 Solid wall construction
- 3 Mineral stone wool min. density 140 kg/m³
- 4 Fire protection mastic min. thickness 1 mm
- 5 Cement lime plate min. thickness 15 mm (min. density 870 kg/m³)
- 6 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m³ and min. thickness 60 mm
- 7 Profil U25x40x25 ****
- 8 Duct

** Stuffing box, fire protection mastic, cement lime plate and insulation materials can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

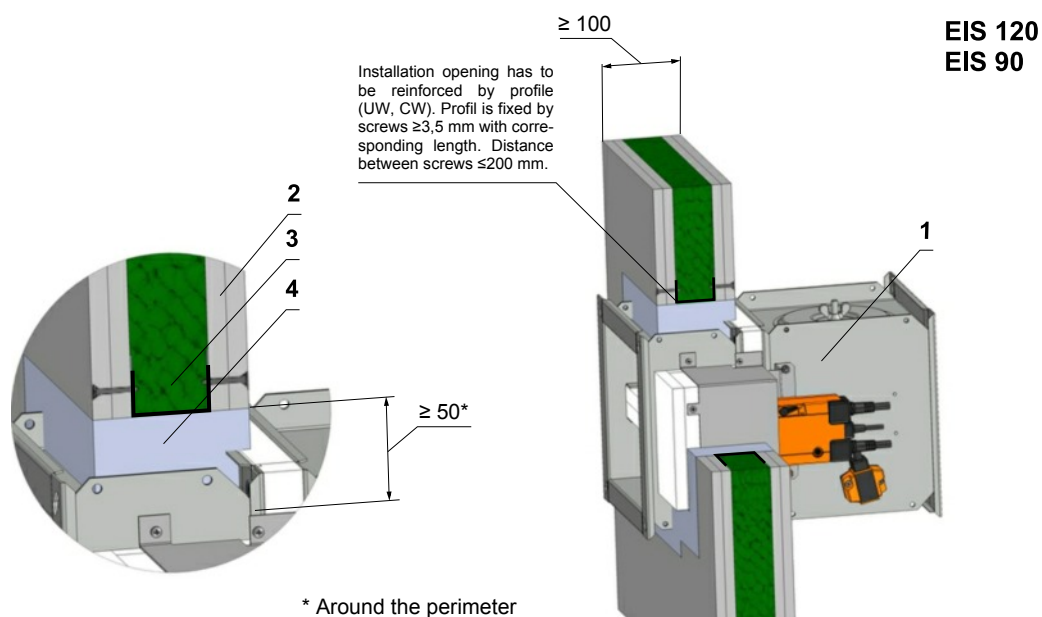
*** Depends on the distance of the flap from the construction, when the maximum distance from the construct is not limited and according to EN 15882-2 must use the required number of hinges according to EN 13366-1:2014.

**** Installation of profile U25x40x25

**The duct at the point of penetration must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Installation in gypsum wall construction

Gypsum wall construction - mortar or gypsum



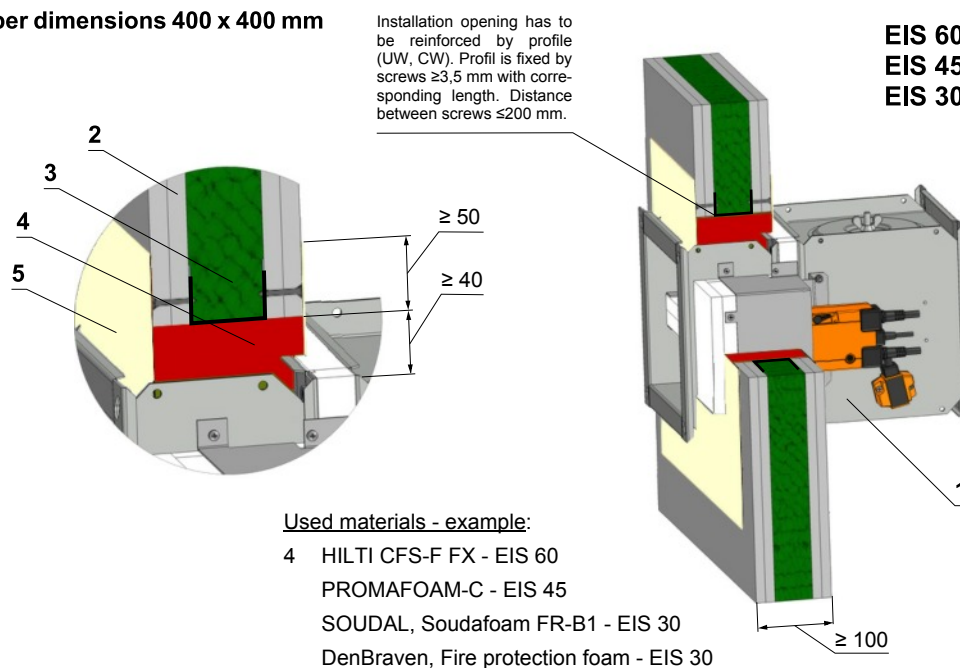
Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Mortar or gypsum

Shown schemes of incorporation and damper are illustrative only !

Gypsum wall construction - fire protection foam with stucco plaster

Maximal damper dimensions 400 x 400 mm



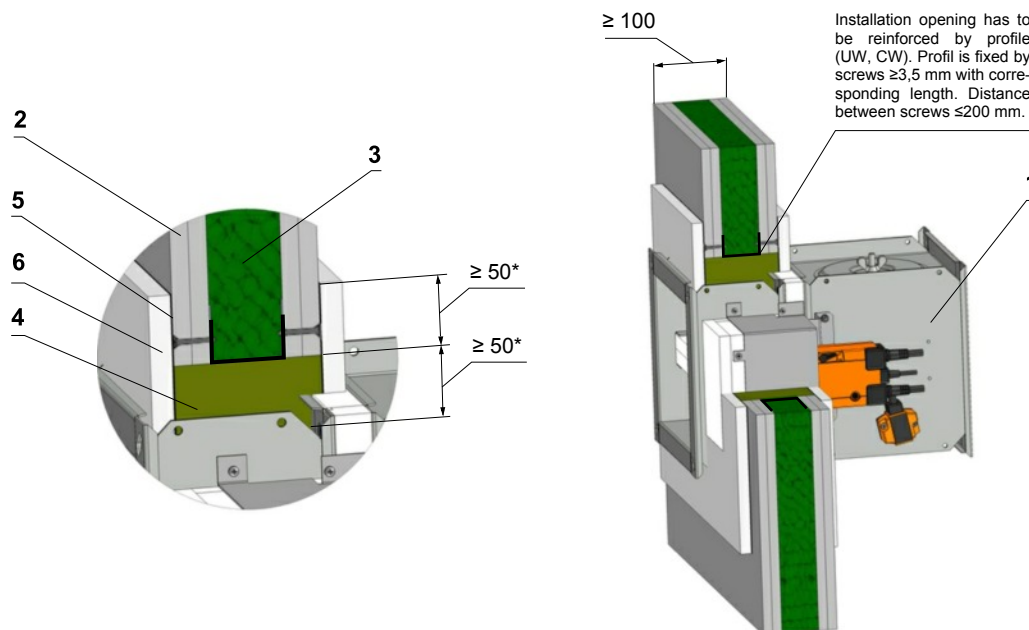
Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Fire protection foam
- 5 Stucco plaster

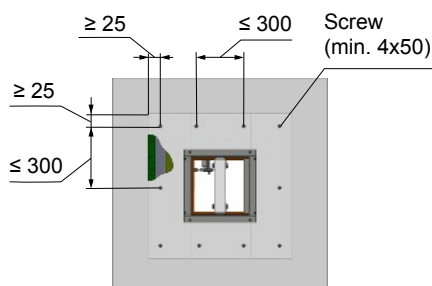
The damper must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !

Gypsum wall construction - stuffing box, fire protection mastic and cement lime plate

EIS 90



* Around the perimeter



Screws has to be fixed in wall/ceiling construction.
(If it is needed use steel bracket).

Used materials - example:**

Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Mineral stone wool min. density 140 kg/m³
- 5 Fire protection mastic min. thickness 1 mm
- 6 Cement lime plate min. thickness 15 mm (min. density 870 kg/m³)

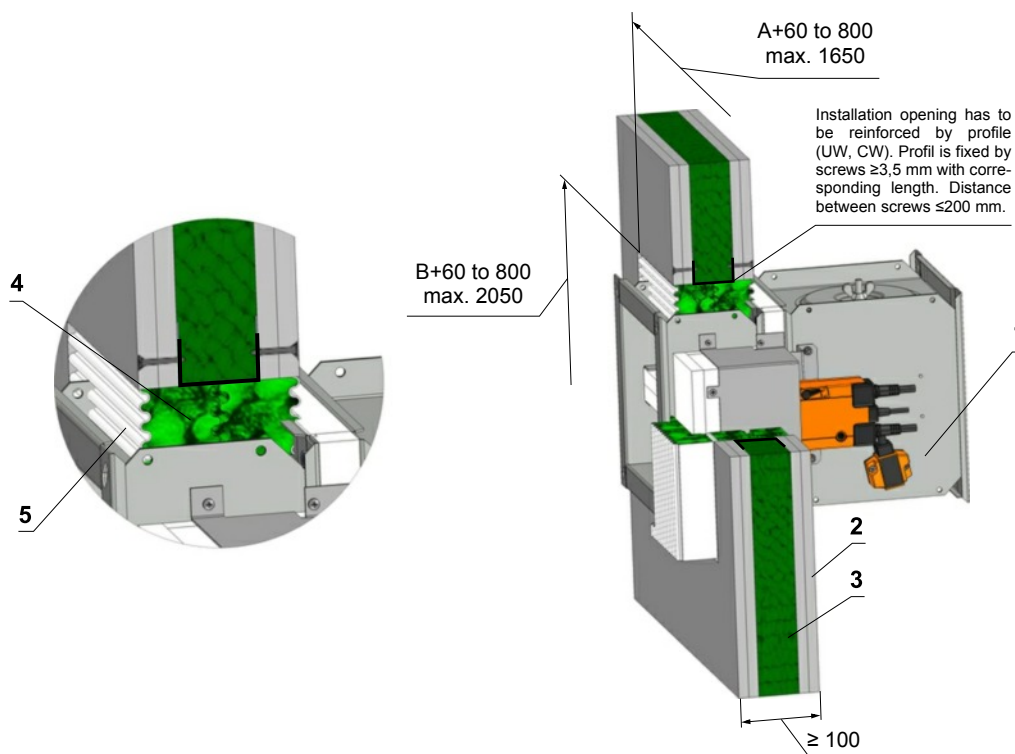
- 4 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 5 Promastop - P, K, Hilti CFS-CT
- 6 Promatect - H

** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

**The damper must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Gypsum wall construction - Weichschott

EIS 90

Used materials - example:*

3 Hilti CFS-CT B 1S 140/50

4 Hilti CFS-CT

Position:

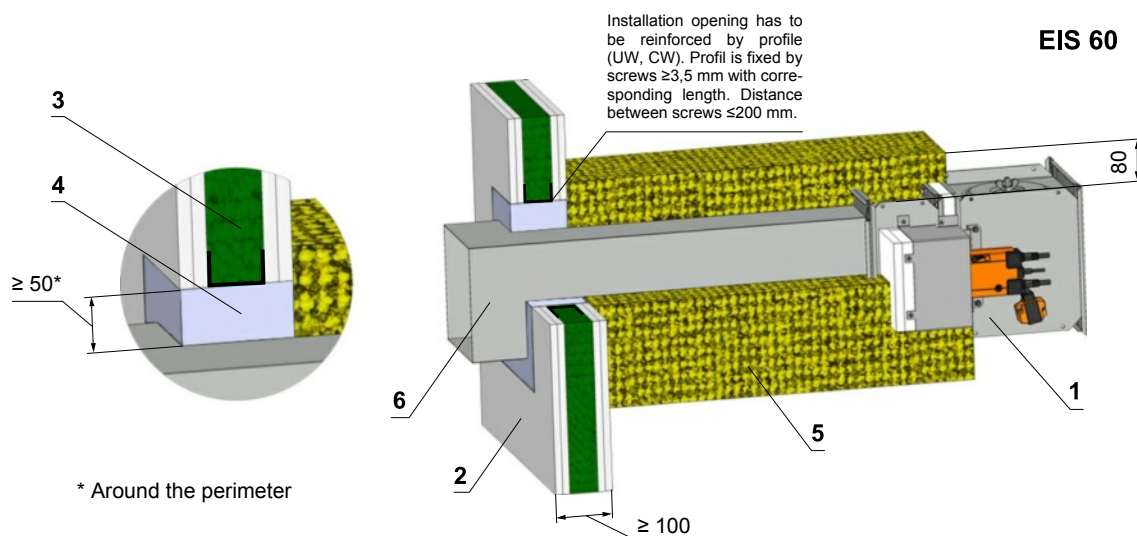
- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Fire resistant board
- 5 Fire stop coating thickness 1 mm

* Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

Shown schemes of incorporation and damper are illustrative only !

Installation outside gypsum wall construction

Outside gypsum wall construction - mineral wool - mortar or gypsum



* Around the perimeter

Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Mortar or gypsum
- 5 Stone wool with wired mat on one side, density 66 kg/m³
- 6 Duct

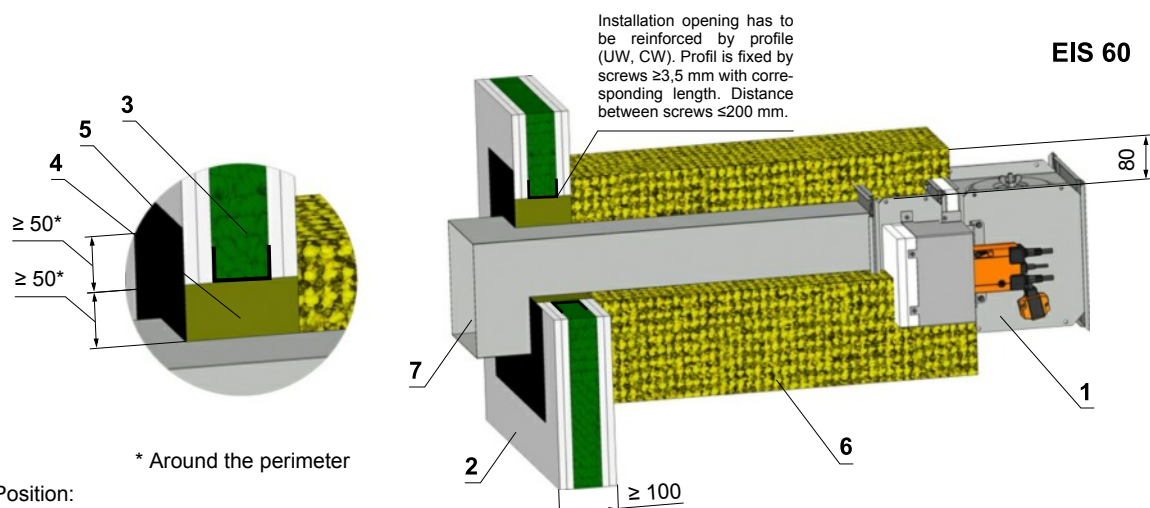
Used materials - example:**

- 5 Isover Ultimate Protect SLAB 4.0, th. 80 mm ALU1

** The materials for stuffing box, fire protection mastic, lining and insulation materials can be replaced by another approved fire sealing system with equivalent properties. The maximum distance of the fire damper from the structure is not limited and according to EN 15882-2, the required number of suspensions acc. to EN 1366-1:2014 must be used.

**The duct at the point of penetration can be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Outside gypsum wall construction - mineral wool - stuffing box and fire protection mastic



* Around the perimeter

Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Stuffing box (mineral stone wool min. density 150 kg/m³)
- 5 Fire protection mastic min. thickness 1 mm
- 6 Stone wool with wired mat on one side, density 66 kg/m³
- 7 Duct

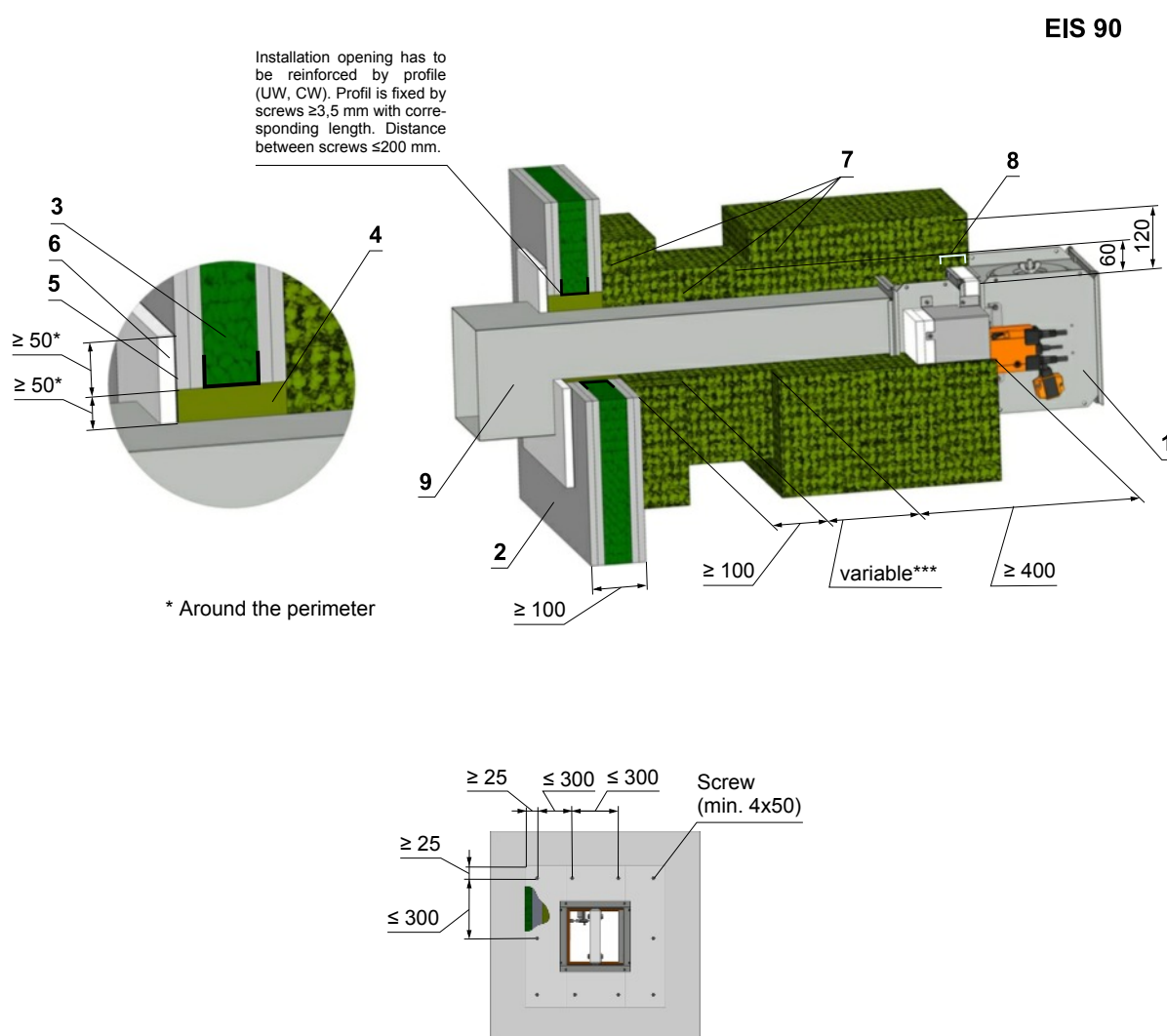
Used materials - example:**

- 4 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 5 Promastop - P, K, Hilti CFS-CT
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**The duct at the point of penetration must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !**

Outside gypsum wall construction - mineral wool



Screws has to be fixed in wall/ceiling construction.
(If it is needed use steel bracket).

Position:

- 1 Fire damper
- 2 Gypsum plate
- 3 Mineral wool (type depending on the type of construction)
- 4 Mineral stone wool min. density 140 kg/m³
- 5 Fire protection mastic min. thickness 1 mm
- 6 Cement lime plate min. thickness 15 mm (min. density 870 kg/m³)
- 7 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m³ and min. thickness 60 mm
- 8 Profil U25x40x25 ****
- 9 Duct

Used materials - example:**

- 4 Promapyr. Rockwool Steprock HD. Hilti CFS-CT C 1S 140/50
- 5 Promastop - P, K, Hilti CFS-CT
- 6 Promatect - H
- 7 Rockwool Wired Mat 105 th. 60 mm

** Stuffing box, fire protection mastic, cement lime plate and insulation materials can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

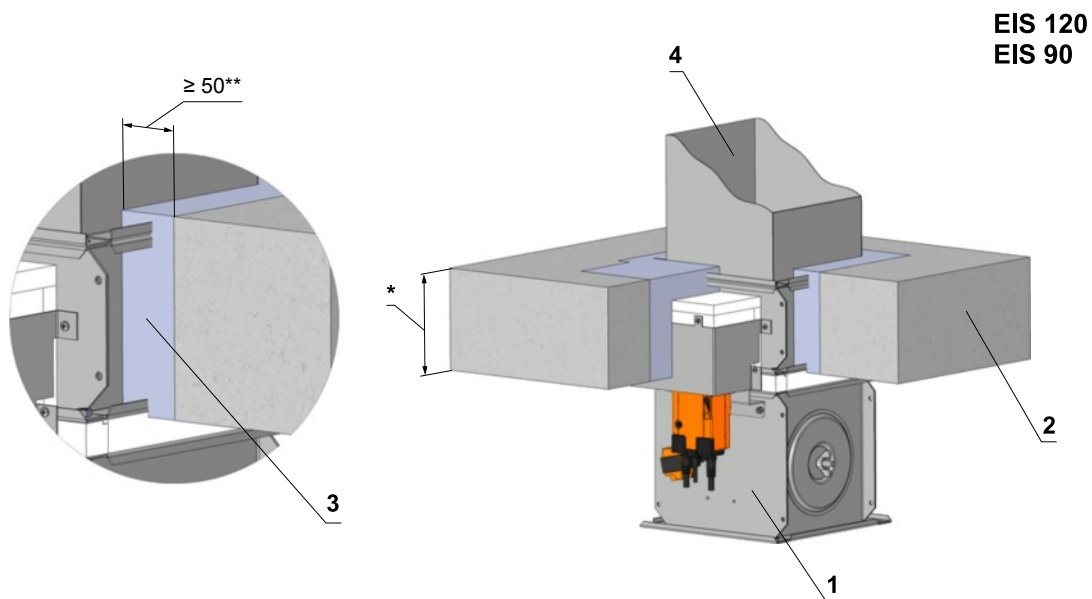
*** Depends on the distance of the flap from the construction, when the maximum distance from the construct is not limited and according to EN 15882-2 must use the required number of hinges according to EN 13366-1:2014.

**** Installation of profile U25x40x25

The duct at the point of penetration must be anchored to the fire wall construction !
Shown schemes of incorporation and damper are illustrative only !

Installation in solid ceiling construction

Solid ceiling construction - mortar or gypsum



Position:

- 1 Fire damper
- 2 Solid ceiling construction
- 3 Mortar or gypsum
- 4 Duct

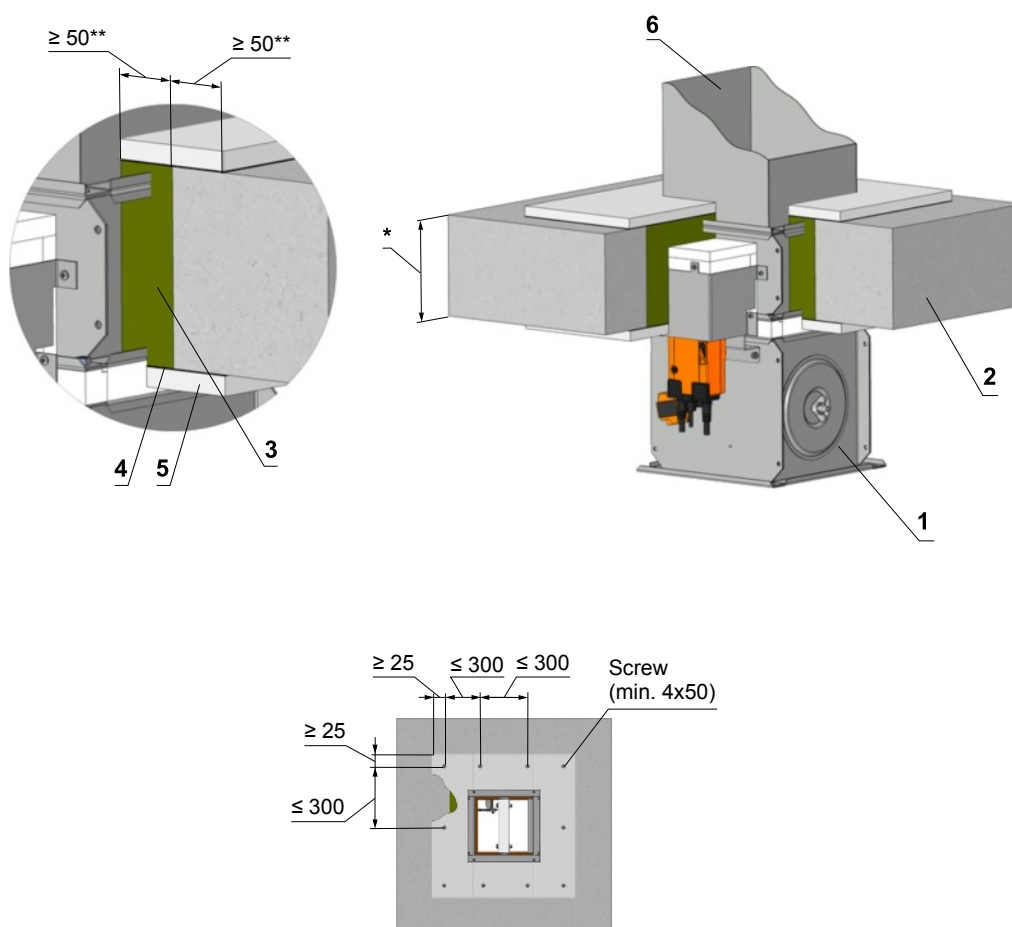
* min. 110 - Concrete/ min. 125 - Aerated concrete

** Around the perimeter

Shown schemes of incorporation and damper are illustrative only !

Solid ceiling construction - stuffing box, fire protection mastic and cement lime plate

EIS 90



Screws has to be fixed in wall/ceiling construction.
(If it is needed use steel bracket).

* min. 110 - Concrete/ min. 125 - Aerated concrete

** Around the perimeter

Used materials - example:***

- 3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
- 4 Promastop - P, K, Hilti CFS-CT
- 5 Promatect - H

Position:

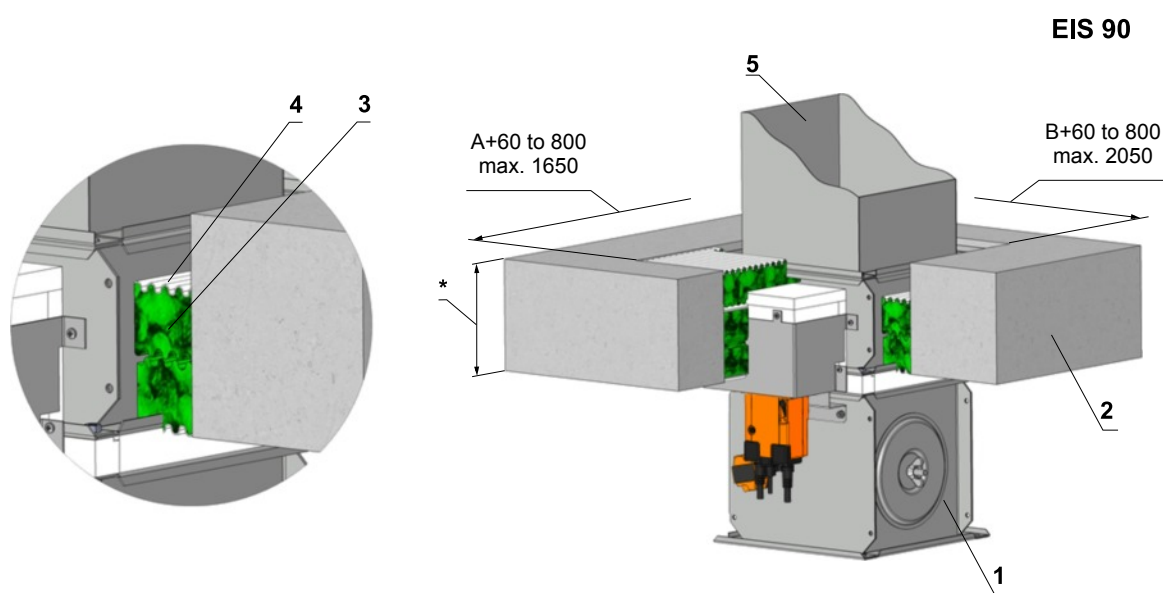
- 1 Fire damper
- 2 Solid ceiling construction
- 3 Stuffing box (mineral stone wool min. density 140 kg/m³)
- 4 Fire protection mastic min. thickness 1 mm
- 5 Cement lime plate min. thickness 15 mm, min. density 870 kg/m³
- 6 Duct

*** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

The damper must be anchored to the fire ceiling construction !

Shown schemes of incorporation and damper are illustrative only !

Solid ceiling construction - Weichschott



Position:

- 1 Fire damper
- 2 Solid ceiling construction
- 3 Fire resistant board
- 4 Fire stop coating thickness 1 mm
- 5 Duct

* min. 110 - Concrete/ min. 125 - Aerated concrete

Used materials - example:**

- 3 Hilti CFS-CT B 1S 140/50
- 4 Hilti CFS-CT

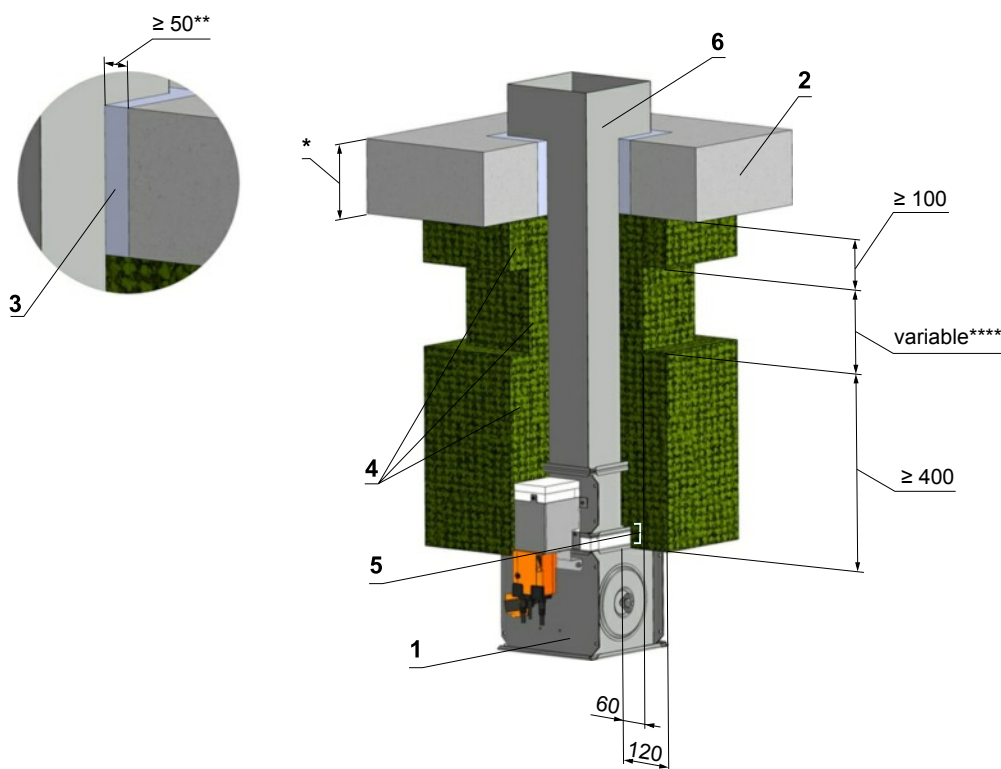
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Shown schemes of incorporation and damper are illustrative only !

Installation outside solid ceiling construction

Outside solid ceiling construction - mineral wool - mortar or gypsum

EIS 90



* min. 110 - Concrete/ min. 125 - Aerated concrete

** Around the perimeter

Used materials - example:***

4 Rockwool Wired Mat 105 th. 60 mm

*** Stuffing box, fire protection mastic, cement lime plate and insulation materials can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

**** Depends on the distance of the flap from the construction, when the maximum distance from the construct is not limited and according to EN 15882-2 must use the required number of hinges according to EN 13366-1:2014..

***** Installation of profile U25x40x25

Position:

- 1 Fire damper
- 2 Solid ceiling construction
- 3 Mortar or gypsum
- 4 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m³ and min. thickness 60 mm
- 5 Profil U25x40x25 *****
- 6 Duct

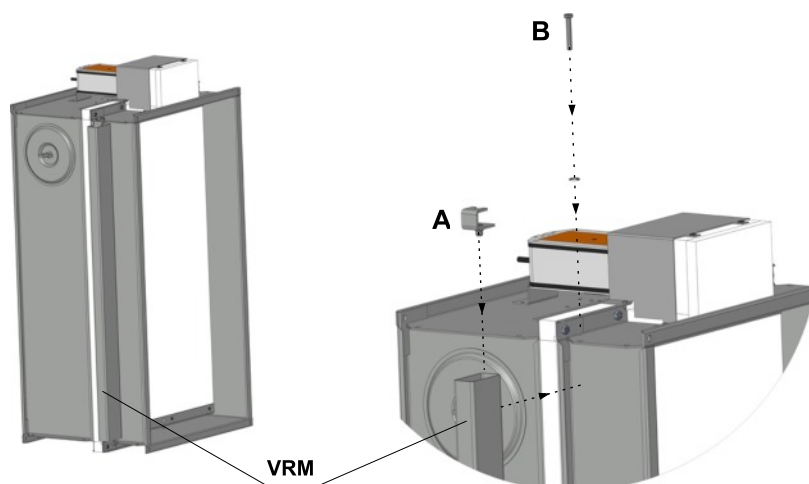
**The duct at the point of penetration can be anchored to the fire ceiling construction !
Shown schemes of incorporation and damper are illustrative only !**

VRM reinforcing frame

For dampers with $A \geq 800$ and damper placement outside wall construction is necessary to use reinforcement VRM.

Fixing of reinforcement to damper body

Important: For lower fire resistance than EI90 the reinforcement VRM is not necessary !!!

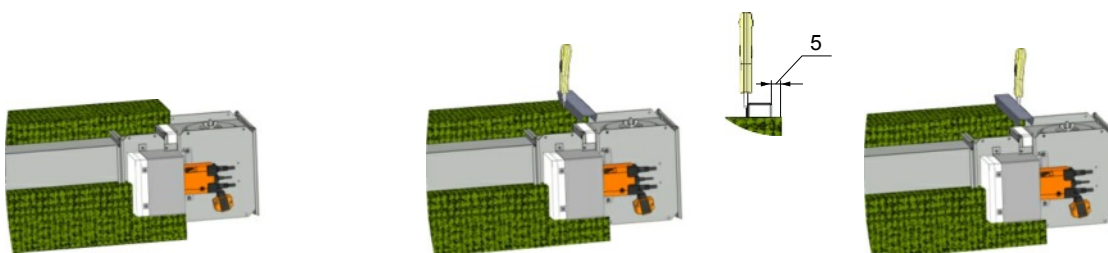


- 1.) Insert part A into reinforcement VRM
- 2.) Set up nut of the part A under correct hole
- 3.) Lock screw B
- 4.) It has to be done on each side of VRM

Shown dampers are illustrative only !

Installation procedure

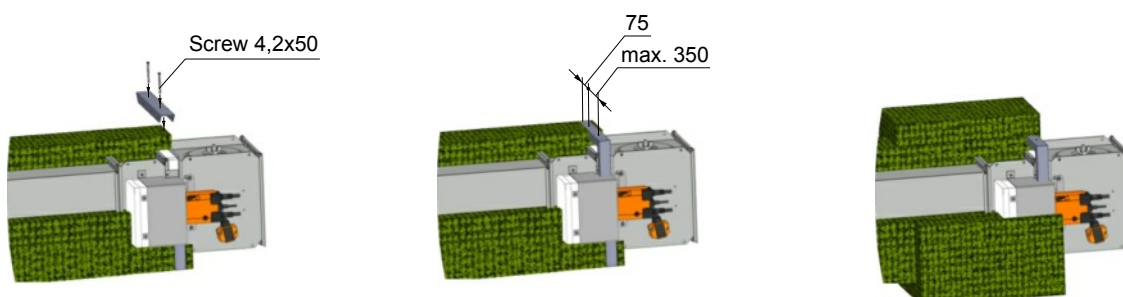
1) Cut the groove for profil U25x40x25



2) Insert profile into groove

3) Fix profile

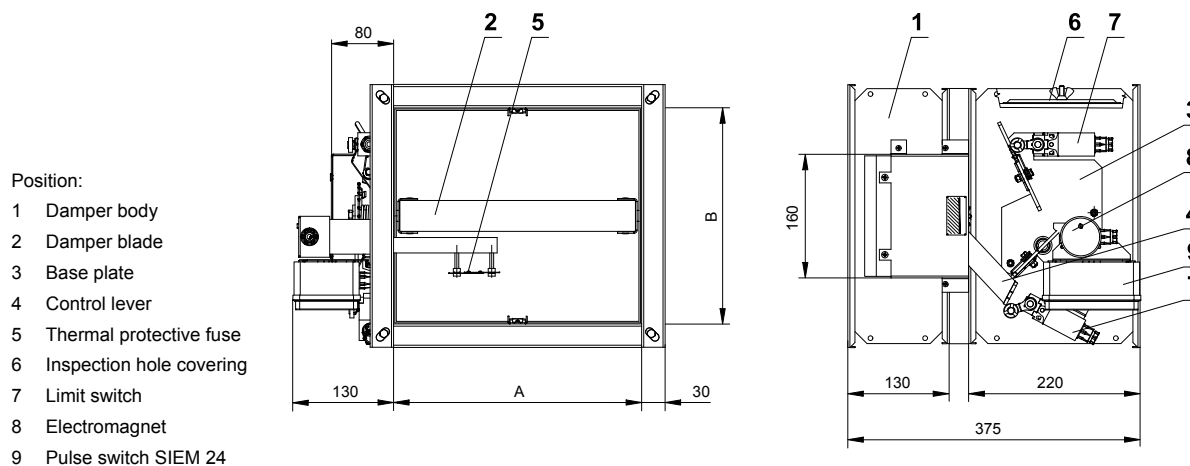
4) Fix second layer of insulation



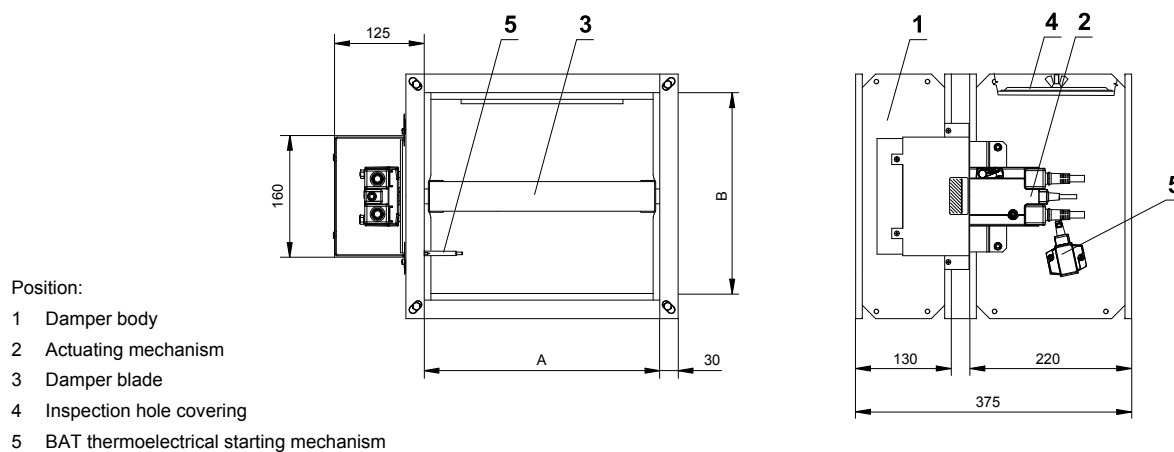
Shown schemes of incorporation and damper are illustrative only !

Dimensions

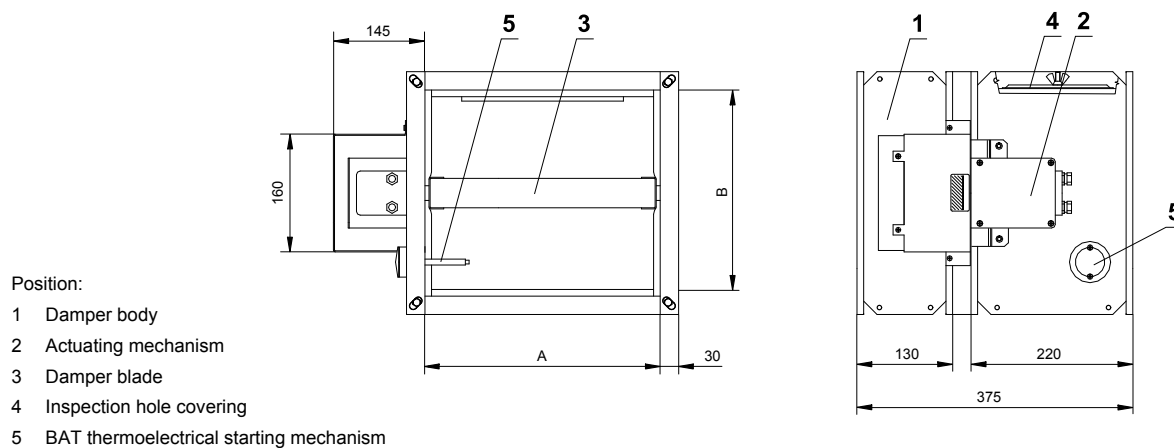
Design manual and thermal



Design with actuating mechanism



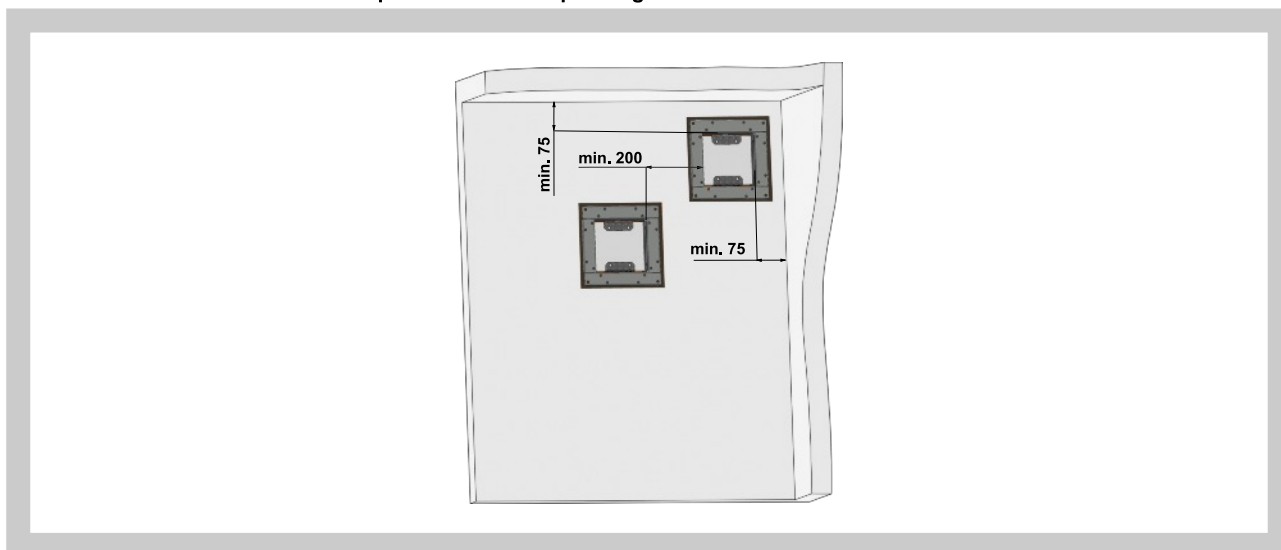
Design with actuating mechanism (ZONE 1,2)



Installation instructions

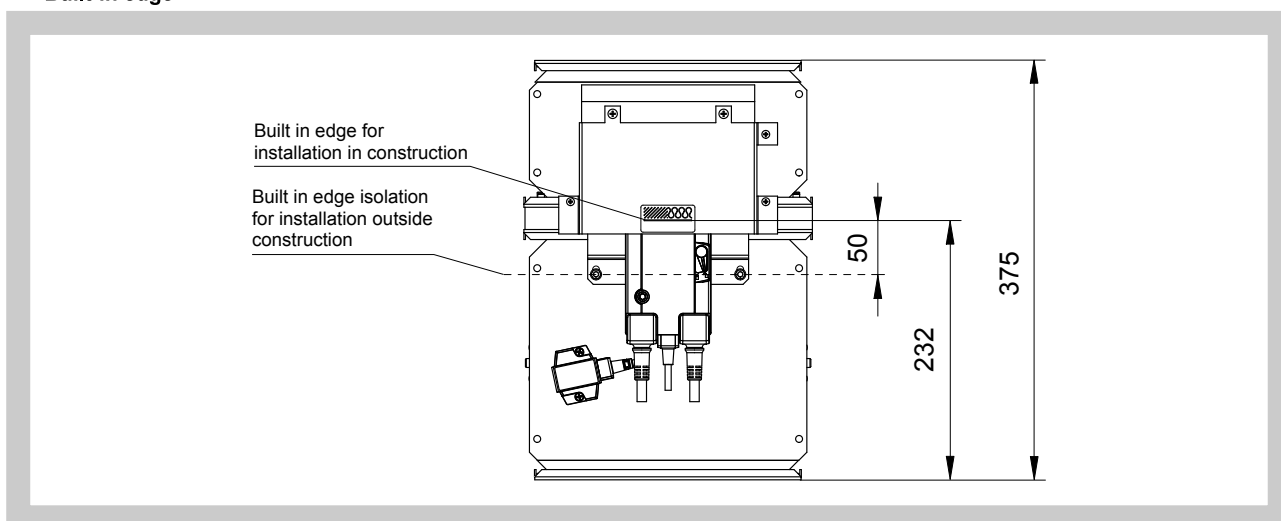
1. During the installation process, the blade position must be "CLOSED".
2. During the installation process, the control mechanism must be protected against pollution and damage.
3. Fire dampers are suitable for installation in any position in vertical and horizontal passages of fire separating structures.
4. The gap between the installed damper and structure must be completely filled with approved material.
5. The distance between the fire damper and structure (wall, ceiling) must be at least 75 mm. If two or more dampers are to be installed in one fire separating structure, the distance between the adjacent dampers must be at least 200 mm.

Installation of two and more dampers in one fire separating structure

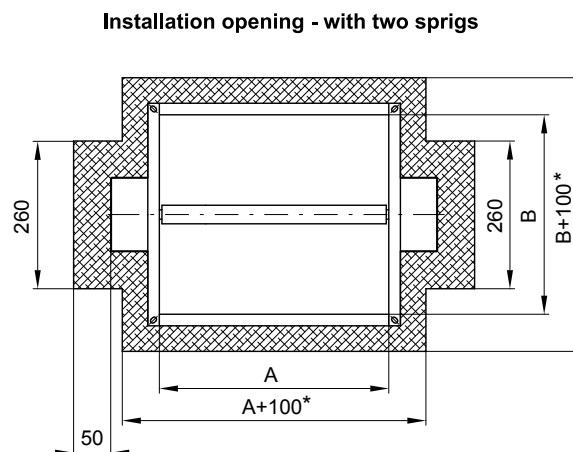
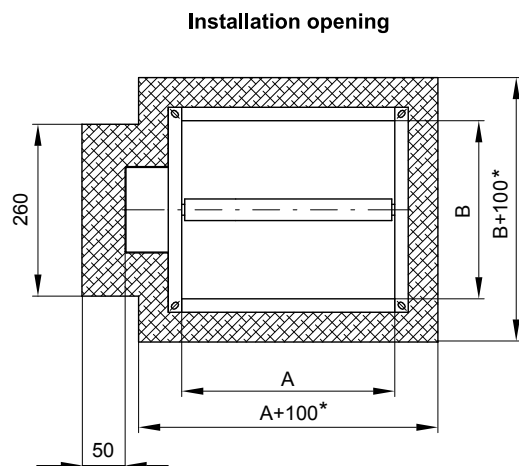
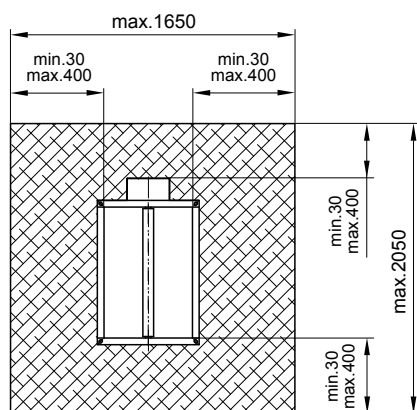


6. The damper blade (in its closed position) must be inside of the fire separating structure. The fire damper may also be installed outside the wall structure. The piping and damper part between the wall structure and damper blade (marked with the BUILT-IN EDGE label on the damper body) must be protected by fire insulation.

Built-in edge



"Wall edge sticker" indicates the recommended edge of installation of fire damper into the fire partition structure (wall). The damper must be installed so that the entire damper blade - in the closed position - is located inside the fire separating structure (wall) and at the same time the control mechanism and inspection openings are freely accessible.

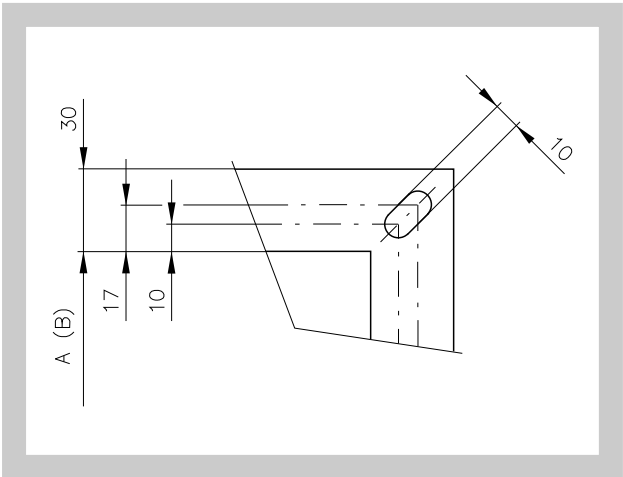
Installation opening**Installation opening - Weichschott system**

* The recommended dimension of the installation opening is from 25 mm to 50 mm on the both sides (it means from A+50 to A+100 or B+50 to B+100)

7. The damper body must not get deformed during its installation process. Once the damper is built installed, its blade must not grind on the damper body during its opening or closing.
8. To provide needed access space to the control device, all the other objects must be situated at least 350 mm away from the damper control parts. At least one inspection hole must be accessible.

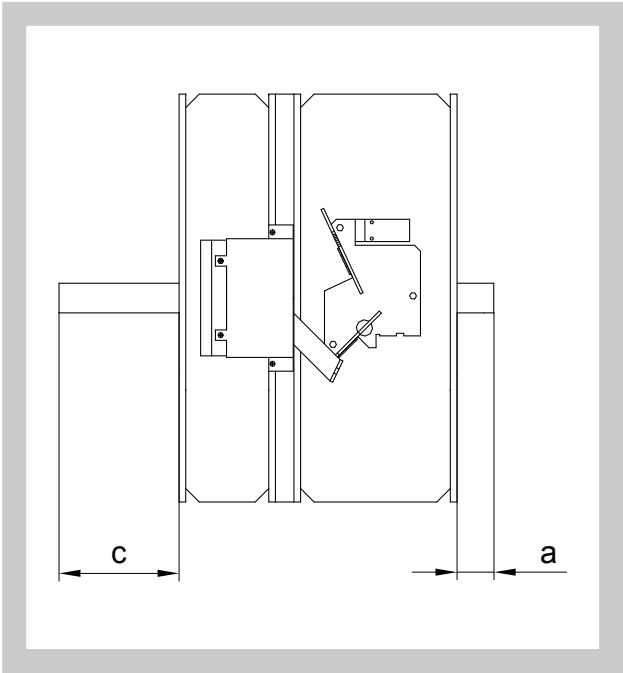
9. Flanges of rectangular fire dampers are 30 mm wide with oval hole

Flange of Damper



10. Damper blade overlaps

Damper blade overlaps



Damper blade overlaps

AxB	a [mm]	c [mm]	AxB	a [mm]	c [mm]
Ax180	-	-	Ax550	10	155
Ax200	-	-	Ax560	15	160
Ax225	-	-	Ax600	35	180
Ax250	-	5	Ax630	50	195
Ax280	-	20	Ax650	60	205
Ax300	-	30	Ax700	85	230
Ax315	-	37	Ax710	90	235
Ax355	-	57	Ax750	110	255
Ax400	-	80	Ax800	135	280
Ax450	-	105	Ax900	185	330
Ax500	-	130	Ax1000	235	380

11. Wiring diagrams

Actuator BELIMO BFL, BFN 230-T

AC230 V

Actuator BELIMO BFL, BFN 24-T(-ST)

AC/DC 24

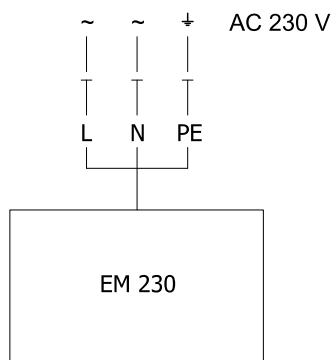
Actuator BELIMO BF 24-TN(-ST), BF 230-TN

AC 24 V
DC 24 V
AC230 V

Limit switch XCKN2118G-11

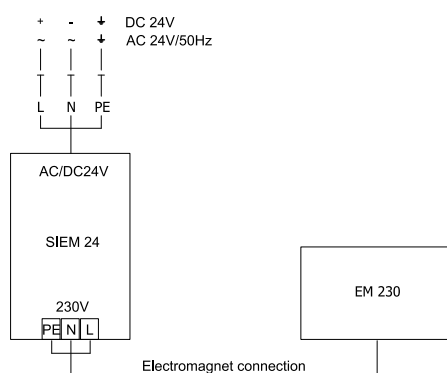
Nominal voltage and max. current	AC 240 V; 3 A DC 250 V; 0,1 A
Degree of protection	IP 65
Ambient temperature	-15°C ... +70°C

Electromagnet EM230



Nominal voltage	AC 230 V / 50 Hz
Attraction current	1,2 A
Degree of protection	IP 40
Ambient temperature	-10°C ... +40°C
Connection	cable 1m, 3x0,75mm²

Electromagnet EM230 with pulse switch SIEM24



Nominal voltage	AC 24 V / 50 Hz DC 24 V
Attraction current	1 A
Degree of protection	IP 40
Ambient temperature	-10°C ... +40°C
Switching frequency	max. 1x per minute
Connection	cable 1m, 3x0,75mm²

12. Before commissioning the dampers and during their subsequent operational checks, it is necessary to check and functionally test all the designs, including the operation of any electronic elements. Upon commissioning, these operational checks must be completed at least twice a year. If no defect is found during two consecutive operational checks, then operational checks may be completed once a year.

13. Prior to the commissioning of the dampers and subsequent operational checks, the following checks must be completed with all the designs:

Visual inspection for proper damper installation, damper interior, damper blade, blade seating surfaces, and silicone seal.

Removing the inspection opening cover: Turn the wing nut to loosen the cover and move the cover left or right to release it from the locking bracket. Then tilt the lid back from its original position.

14. For dampers with mechanical control the following checks must be completed:

Check of the closing mechanism and thermal protective fuse

The mechanism operation is verified as follows:

The damper blade is turned to its "CLOSED" position as follows:

Exert pressure on double arm initiation lever with a spring to release the control lever and check its displacement into the "CLOSED" position. Closing must be smart and the control lever must be firmly locked with a pawl. In case that the closing is not smart enough and the control lever is not locked with the pawl in the "CLOSED" position, higher pre-stretch of the closing spring must be set using a ratchet wheel.

The damper blade is turned to its "OPEN" position as follows:

Release the pawl exerting pressure and return the control lever into the second outlying position where the lever is hold by the initiation lever.

The thermal fuse function and status get checked as follows:

Proper function of the thermal fuse can be checked when the fuse is removed from the starting mechanism. The initiation lever must be turned over and control lever is moved to position "CLOSED". If this is not possible, then the starting mechanism spring must be checked or the base plate must be replaced. The base plate is attached to the damper body with M5 screws.

15. The actuator design must be checked as follows:

The blade turn to its breakdown "CLOSED" position may be checked upon cutting off the actuator power supply (e.g. by pressing the RESET button at the thermoelectric starting mechanism BAT or by cutting off the fire alarm power supply). The blade turn back to its "OPEN" operating position may be checked upon restoration of power supply (e.g. by releasing the RESET button or restoration of the fire alarm power supply).

16. In case of the flap valve with an electromagnet check the control lever displacement into the "CLOSED" position after connecting to power supply.

17. Actuator control without electric voltage:

A special lever (part of the actuator) may be used to manually set the dampers to any position. When the lever is turned in the direction of the arrow, the damper blade turns to its open position. To stop the damper blade in any position, the actuator gets locked per the actuator instructions. Unlocking is done manually per the actuator instructions or by supply voltage restoration.

WARNING!

If the actuator is manually locked, the damper blade will not close in the event of a fire after the activation of the BAT thermoelectric trigger. To restore correct damper operation, the actuator must be unlocked (manually or by applying power supply)

18. Installation, maintenance, and operational checks of the dampers may only be completed by persons qualified for these activities, i.e. "AUTHORIZED PERSONS: trained by the manufacturer.

The dampers must be installed in compliance with all the applicable safety standards and regulations.

19. Actuator reset after the fuses activation:

If the thermal protection fuse Tf1 (for the temperature around the fire damper) is burned, it is necessary to replace the actuator, including the thermoelectric trigger.

If the thermal protection fuse Tf2 (for the temperature inside the piping) is burned, separate spare part ZBAT72 or ZBAT95 may be replaced (according to the starting temperature).

Material and Surface Finish

- The damper bodies are normally supplied in their galvanized sheet steel design (alternatively stainless steel) without any additional surface finish.
- The damper blades are made of asbestos-free fire-resistant mineral fibre boards.
- The damper control devices are made of galvanized materials (alternatively of stainless steel) without any additional surface finish.
- The springs are galvanized (alternatively made of stainless steel).
- The thermal protection fuses are made of brass sheet 0.5 mm thick.
- The connecting material is galvanized (alternatively made of stainless steel).

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