

MANDÍK[®]

INSTALLATION INSTRUCTIONS

FIRE DAMPER FDMA PM



FIRE damper type FDMA PM, is in all variants classified:
 as **EI 120 ve, ho (i→o) S** or **EI 90 ve, ho (i→o) S** acc. EN 13501-3 and tested acc. EN 1366-2 and acc. EN 15650.

Examples of installation Round fire dampers (damper blade inside fire separating construction)

Installation in a solid wall construction

EIS 120
EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Solid wall construction
- 3 Mortar or gypsum
- 4 Duct

Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

Installation in a solid wall construction

EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Solid wall 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
- 6 Duct

Installation in a solid wall construction (Weichschott system)

EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Solid wall construction
- 3 Fire protection plate of mineral wool
- 4 Fire protection mastic min. thickness 1 mm
- 5 Duct

Example materials used:

- 3 Hilti CP673 PF
- 4 Hilti CP673

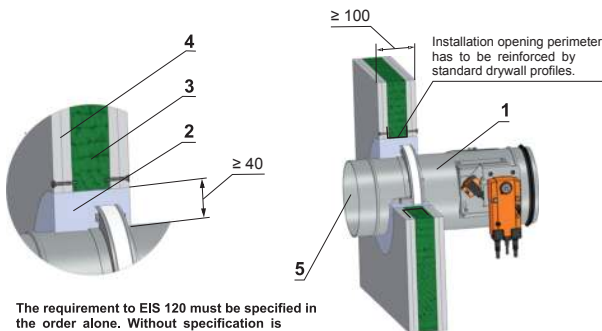
Installation in a gypsum wall construction

EIS 120
EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Mortar or gypsum
- 3 Fire protection plate of mineral wool
- 4 Gypsum wall construction
- 5 Duct

Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

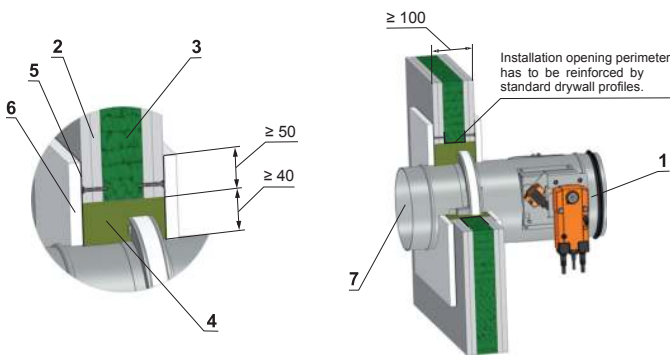


Installation in a gypsum wall construction

EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Gypsum wall construction
- 3 Fire protection plate of mineral wool
- 4 Stuffing box (mineral stone wool min. density 140 kg/m³)
- 5 Fire protection mastic min. thickness 1 mm
- 6 Cement lime plate min. thickness 15 mm
- 7 Duct



Installation in a gypsum wall construction (Weichschott system)

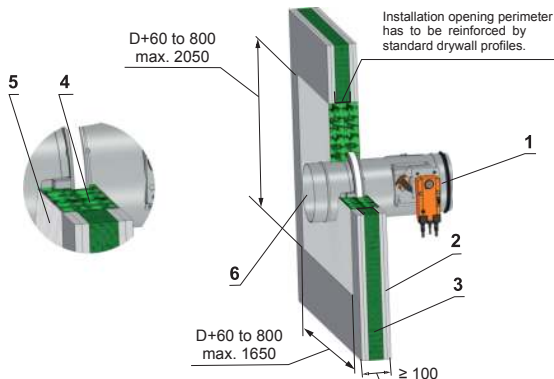
EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Gypsum wall construction
- 3 Fire resistant board
- 4 Fire protection plate of mineral wool
- 5 Fire protection mastic min. thickness 1 mm
- 6 Duct

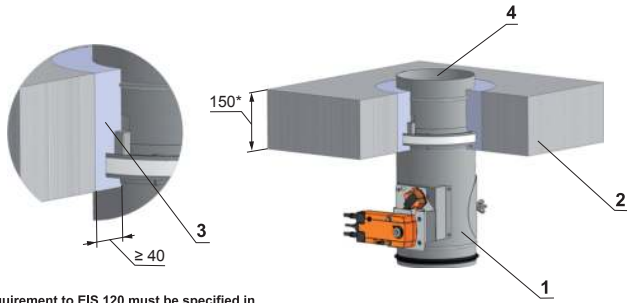
Example materials used:

- 3 Hilti CP673 PF
- 4 Hilti CP673



Installation in a solid ceiling construction

EIS 120 EIS 90



Legend:

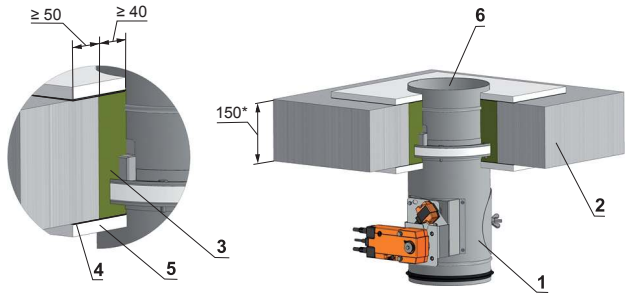
- 1 Fire damper FDMA PM
- 2 Solid ceiling construction
- 3 Mortar or gypsum
- 4 Duct

Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

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

Installation in a solid ceiling construction

EIS 90



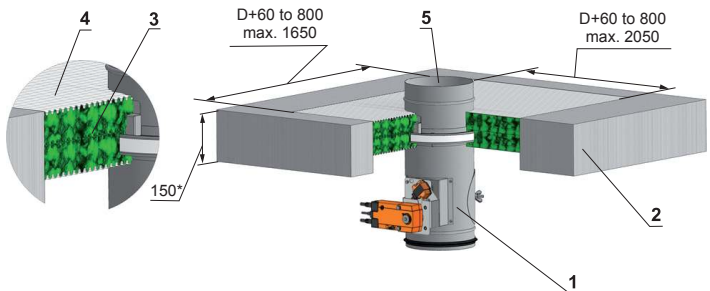
Legend:

- 1 Fire damper FDMA PM
- 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
- 6 Duct

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

Installation in a solid ceiling construction (Weichschott system)

EIS 90



Legend:

- 1 Fire damper FDMA PM
- 2 Solid ceiling construction
- 3 Fire protection plate of mineral wool
- 4 Fire protection mastic min. thickness 1 mm
- 5 Duct

Example materials used:

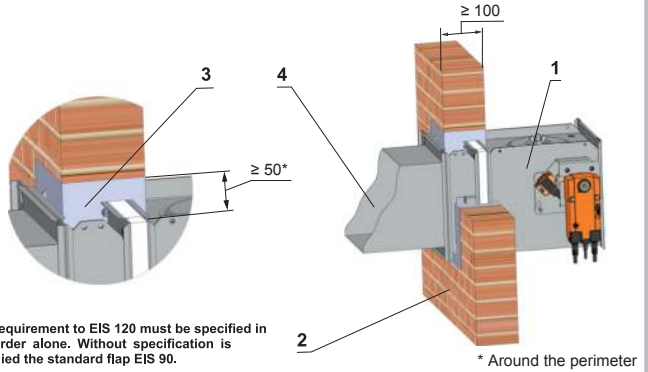
- 3 Hilti CP673 PF
- 4 Hilti CP673

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

Examples of installation square fire dampers (damper blade inside fire separating construction)

Installation in a solid wall construction

EIS 120 EIS 90



Legend:

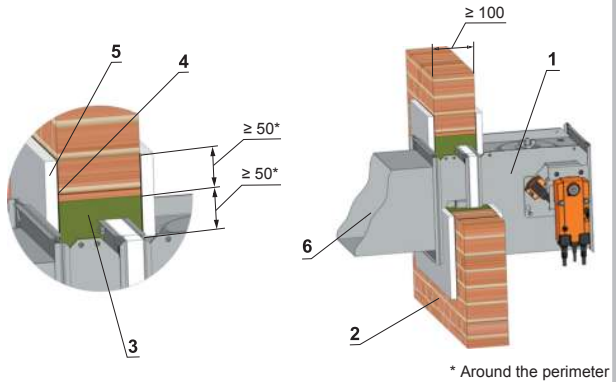
- 1 Fire damper FDMA PM
- 2 Solid wall construction
- 3 Mortar or gypsum
- 4 Duct

Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

* Around the perimeter

Installation in a solid wall construction

EIS 90



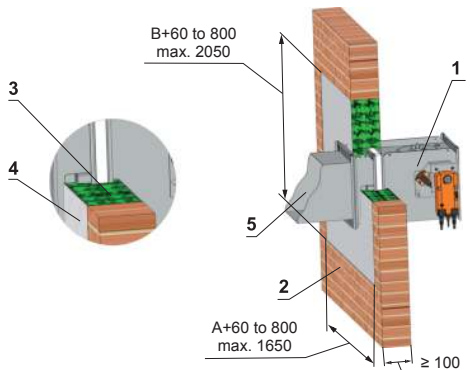
Legend:

- 1 Fire damper FDMA PM
- 2 Solid wall 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
- 6 Duct

* Around the perimeter

Installation in a solid wall construction (Weichschott system)

EIS 90



Legend:

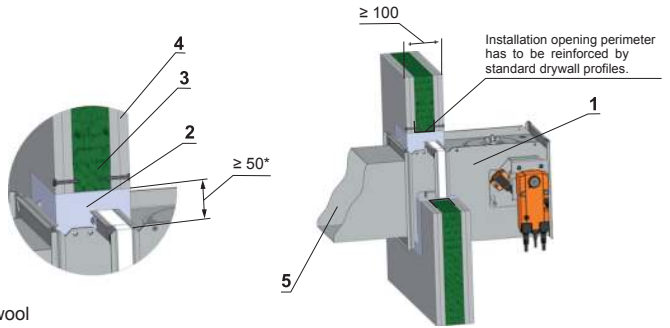
- 1 Fire damper FDMA PM
- 2 Solid wall construction
- 3 Fire protection plate of mineral wool
- 4 Fire protection mastic min. thickness 1 mm
- 5 Duct

Example materials used:

- 3 Hilti CP673 PF
- 4 Hilti CP673

Installation in a gypsum wall construction

EIS 120 EIS 90



Legend:

- 1 Fire damper FDMA PM
- 2 Mortar or gypsum
- 3 Fire protection plate of mineral wool
- 4 Gypsum wall construction
- 5 Duct

Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

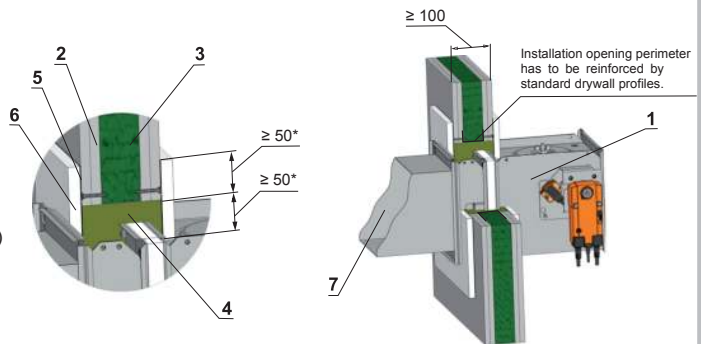
* Around the perimeter

Installation in a gypsum wall construction

EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Gypsum wall construction
- 3 Fire protection plate of mineral wool
- 4 Stuffing box (mineral stone wool min. density 140 kg/m³)
- 5 Fire protection mastic min. thickness 1 mm
- 6 Cement lime plate min. thickness 15 mm
- 7 Duct



* Around the perimeter

Installation in a gypsum wall construction (Weichschott system)

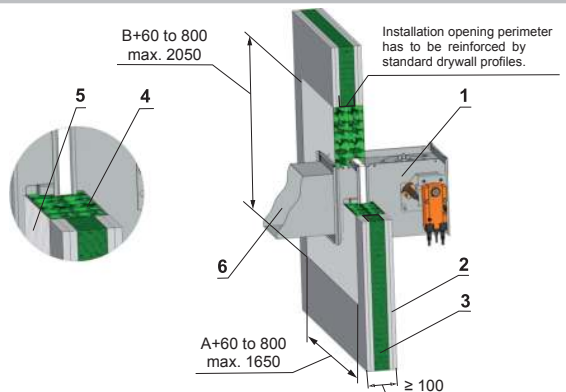
EIS 90

Legend:

- 1 Fire damper FDMA PM
- 2 Gypsum wall construction
- 3 Fire resistant board
- 4 Fire protection plate of mineral wool
- 5 Fire protection mastic min. thickness 1 mm
- 6 Duct

Example materials used:

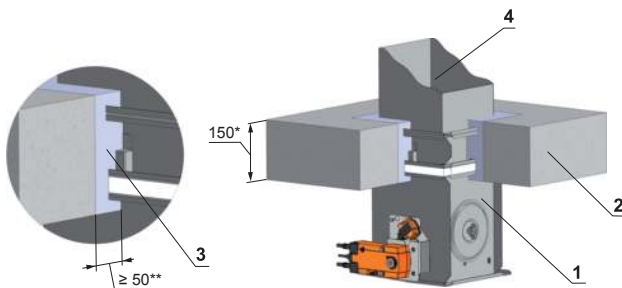
- 3 Hilti CP673 PF
- 4 Hilti CP673



Installation in a solid ceiling construction

EIS 120
EIS 90**Legend:**

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



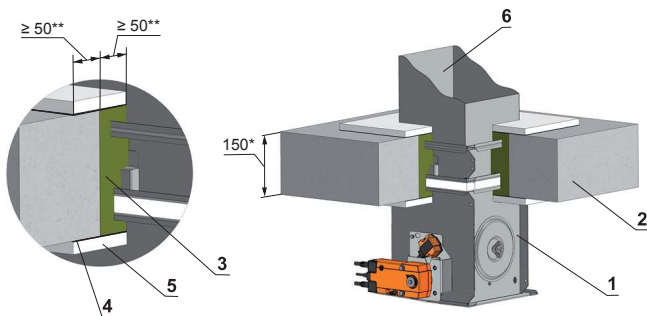
Notice: The requirement to EIS 120 must be specified in the order alone. Without specification is supplied the standard flap EIS 90.

* min. 110 - Concrete/ min. 125 - Aerated Concrete ** Around the perimeter

Installation in a solid ceiling construction

EIS 90**Legend:**

- 1 Fire damper FDMA PM
- 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
- 6 Duct

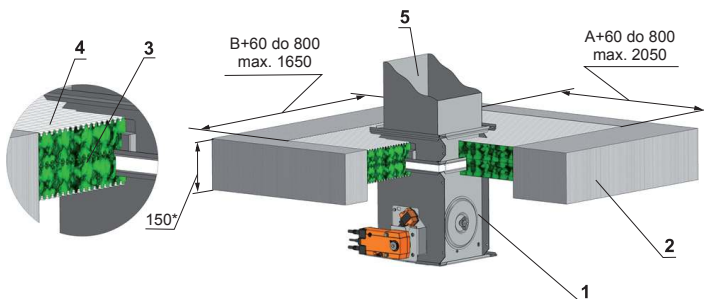


* min. 110 - Concrete/ min. 125 - Aerated Concrete ** Around the perimeter

Installation in a solid ceiling construction (Weichschott system)

EIS 90**Legend:**

- 1 Fire damper FDMA PM
- 2 Solid ceiling construction
- 3 Fire protection plate of mineral wool
- 4 Fire protection mastic min. thickness 1 mm
- 5 Duct



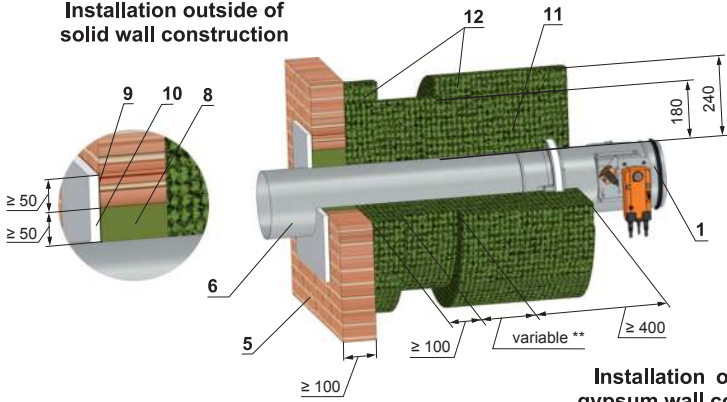
* min. 110 - Concrete/ min. 125 - Aerated Concrete

Another methods of installation of fire dampers are available in TPM 075/09.

**Examples of installation Round fire dampers
(damper blade outside fire separating construction)**

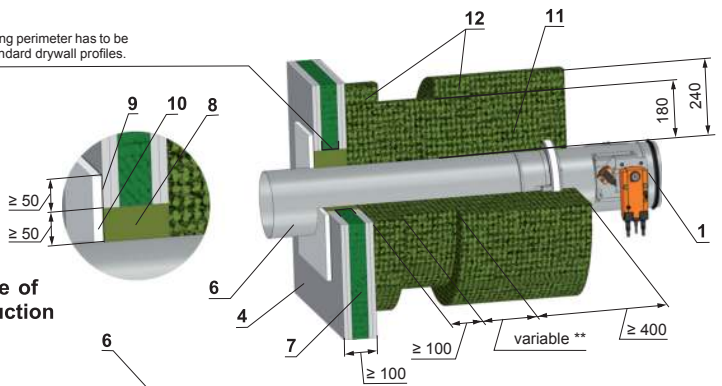
EIS 90

**Installation outside of
solid wall construction**

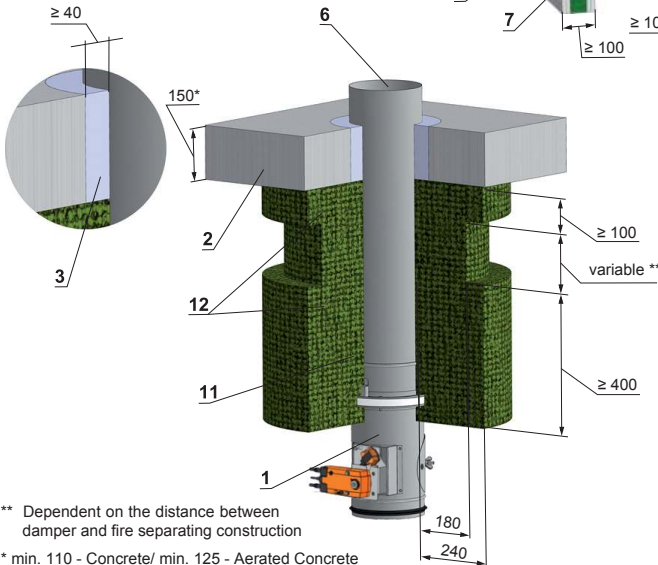


**Installation outside of
gypsum wall construction**

Installation opening perimeter has to be reinforced by standard drywall profiles.



**Installation outside of
solid ceiling construction**



Legend:

- 1 Fire damper FDMA PM
- 2 Solid ceiling construction
- 3 Mortar or gypsum
- 4 Gypsum wall construction
- 5 Solid wall construction
- 6 Duct
- 7 Fire protection plate of mineral wool
- 8 Mineral stone wool
- 9 Fire protection mastic min. thickness 1 mm
- 10 Cement lime plate min. thickness 15 mm
- 11 Stone wool with one side stitched on wire Grids, bulk density 105 kg/m³ thick. 180 mm (e.g., three layers thick. 60 mm)
- 12 Stone wool with one side stitched on wire Grids, bulk density 105 kg/m³ thick. 60 mm

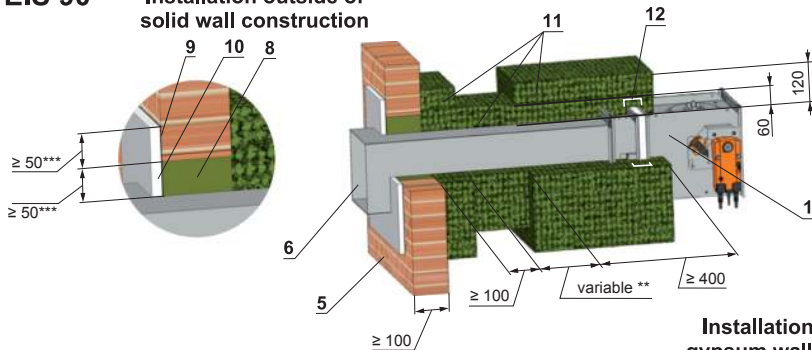
** Dependent on the distance between damper and fire separating construction

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

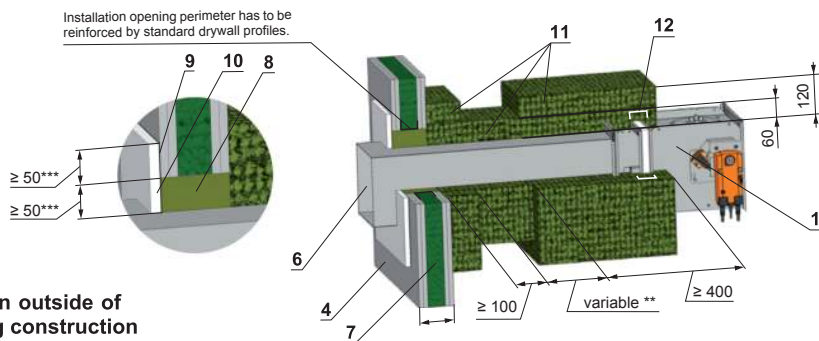
Examples of installation Square fire dampers (damper blade outside fire separating construction)

EIS 90

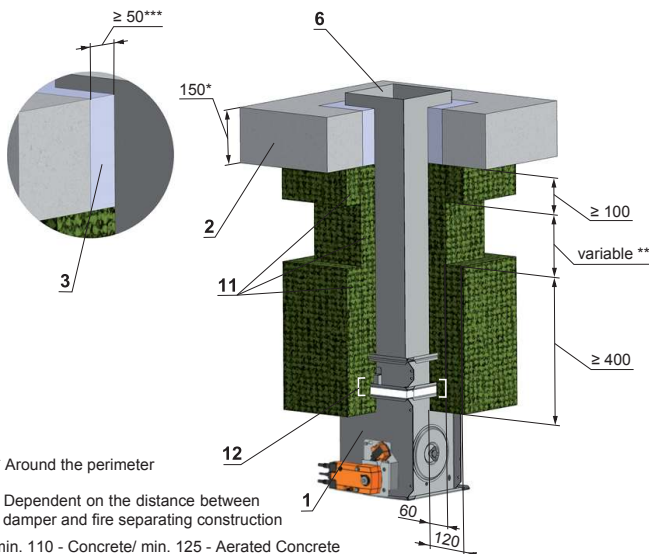
Installation outside of solid wall construction



Installation outside of gypsum wall construction



Installation outside of solid ceiling construction



Legend:

- 1 Fire damper FDMA PM
- 2 Solid ceiling construction
- 3 Mortar or gypsum
- 4 Gypsum wall construction
- 5 Solid wall construction
- 6 Duct
- 7 Fire protection plate of mineral wool
- 8 Mineral stone wool
- 9 Fire protection mastic min. thickness 1 mm
- 10 Cement lime plate min. thickness 15 mm
- 11 Stone wool resin bonded containing toxic rubble as refrigerants, fire resistance EIS 90 min. density 300 kg/m³ th. 60 mm and 120 mm
- 12 Sheet metal a stiffener U25x40x25

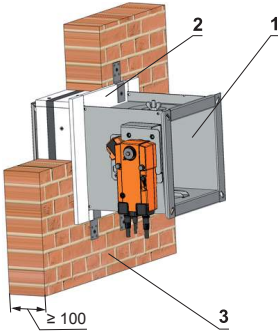
*** Around the perimeter

** Dependent on the distance between damper and fire separating construction

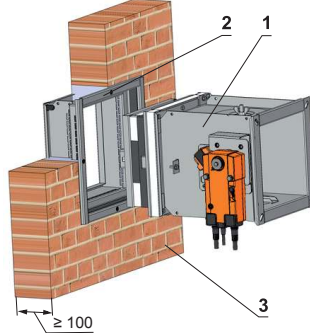
* min. 110 - Concrete/ min. 125 - Aerated Concrete

Examples of installation fire dampers in to the mounting frame in a solid wall construction

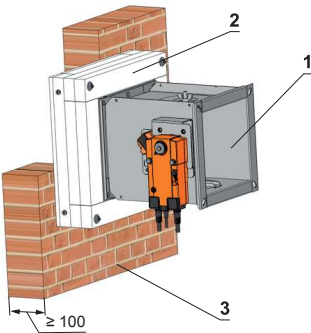
Installation frame E1



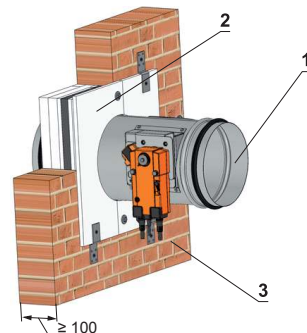
Installation frame E2



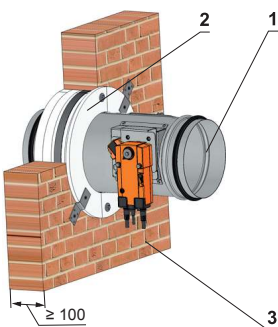
Installation frame E4



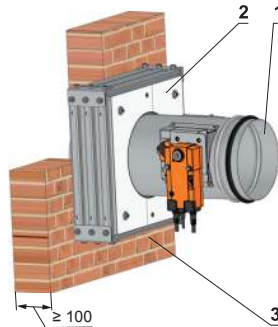
Installation frame R1, R2



Installation frame R3, R4



Installation frame R5



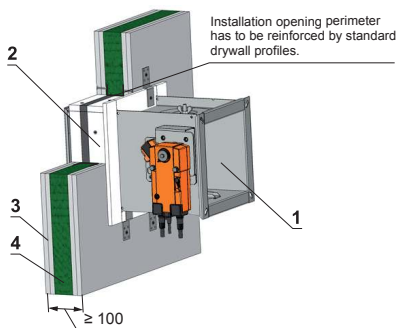
Legend:

- 1 Fire damper FDMA PM
- 2 Installation frame
- 3 Solid wall construction

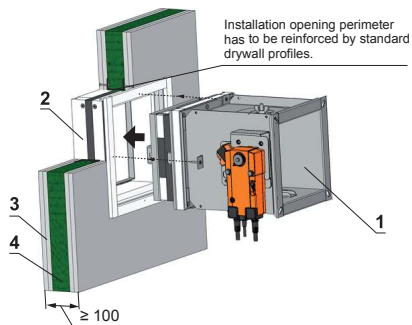
Detailed description of installation using Installation frame is available in TPM 103/14.

Examples of installation fire dampers in to the mounting frame in a gypsum wall construction

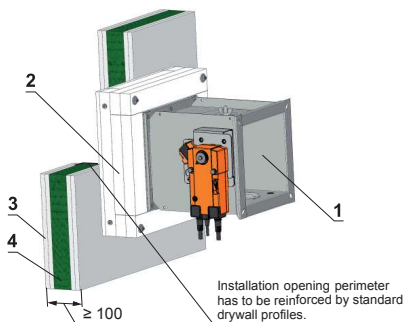
Installation frame E1



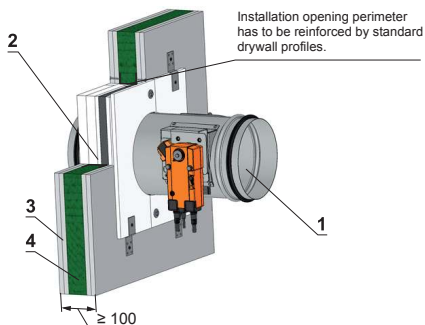
Installation frame E3



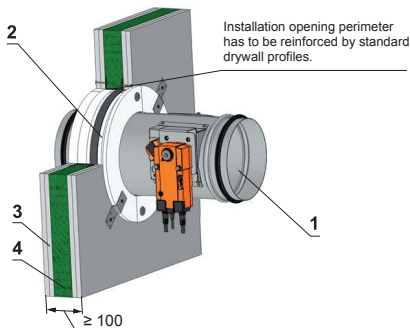
Installation frame E4



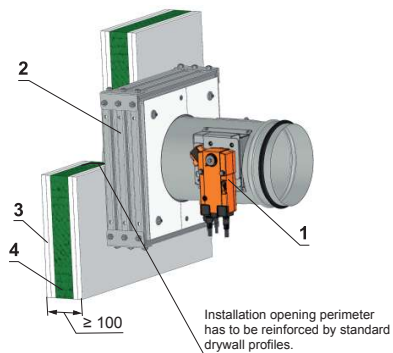
Installation frame R1, R2



Installation frame R3, R4



Installation frame R5



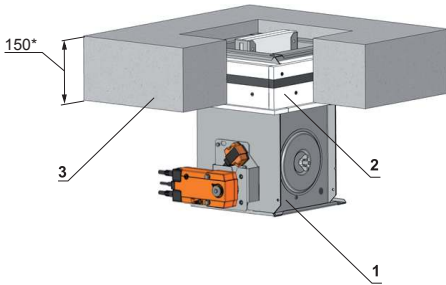
Legend:

- 1 Fire damper FDMA PM
- 2 Installation frame
- 3 Gypsum wall construction
- 4 Fire protection plate of mineral wool

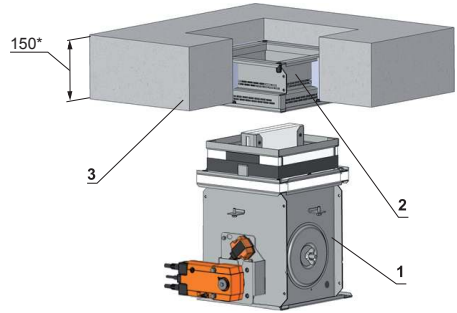
Detailed description of installation using Installation frame is available in TPM 103/14.

Examples of installation fire dampers in to the mounting frame in a solid ceiling construction

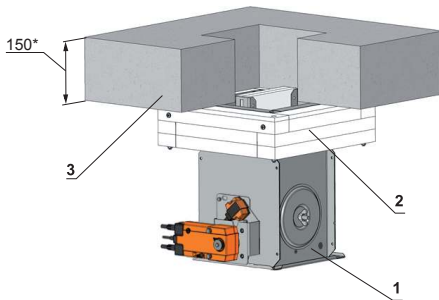
Installation frame E1



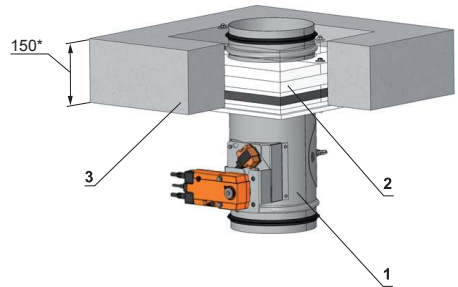
Installation frame E2



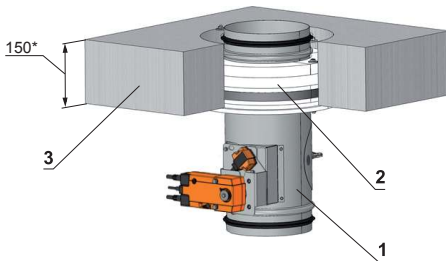
Installation frame E4



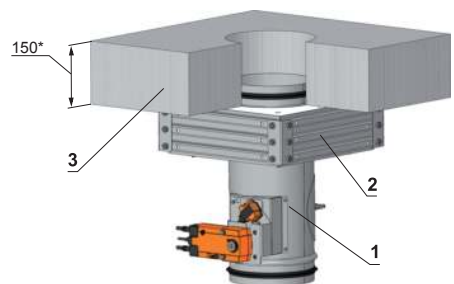
Installation frame R1, R2



Installation frame R3, R4



Installation frame R5



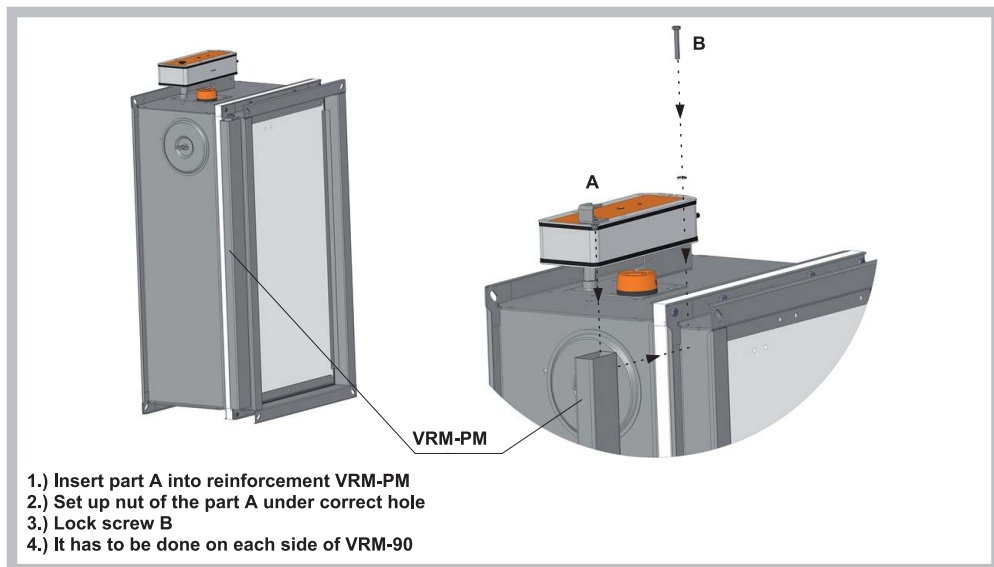
Legend:

- 1 Fire damper FDMA PM
- 2 Installation frame
- 3 Solid ceiling construction

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

Detailed description of installation using Installation frame is available in TPM 103/14..

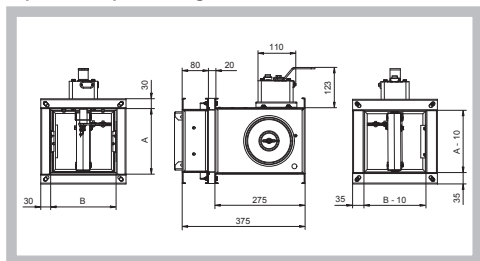
Reinforcement VRM-PM fixing



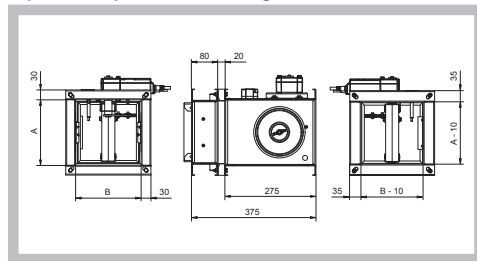
NOTICE: For dampers with $A \geq 800$ and damper placement outside wall construction is necessary to use reinforcement VRM-PM.

Damper dimensions

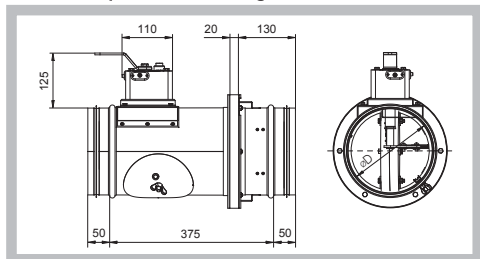
Square damper - design manual and thermal



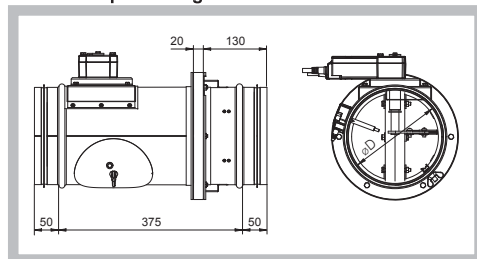
Square damper with actuating mechanism



Round damper with actuating mechanism



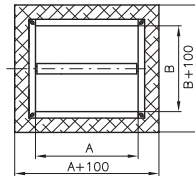
Round damper - design manual and thermal



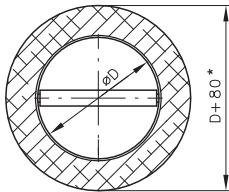
Installation instructions

1. All fire dampers has to be closed during installation process.
2. The control mechanism has to be protected (covered) against damage and pollution during installation process.
3. Min. gap for installation (installation opening) is 50 mm (circular dimension $\varnothing D + 160$ mm or square dimension $A \times B + 100$ mm).
4. Installation gap must be filled by approved material perfectly in all the installation space volume (installation gap).
5. The distance between the fire damper and the construction (wall, ceiling) must be minimum 75 mm according to EN 1366-2. In case that two or more dampers are supposed to be installed in one fire separating construction, the distance between the adjacent dampers must be at least 200 mm according to EN 1366-2 paragraph 13.5.
6. Installation openings

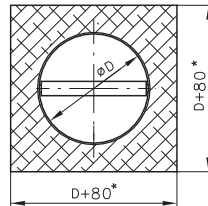
Installation opening - square damper with actuating mechanism or manual and thermal



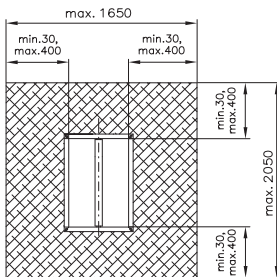
Installation opening - round damper with actuating mechanism or manual and thermal



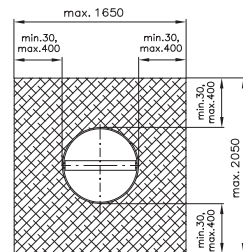
Installation opening - round damper with actuating mechanism or manual and thermal



Installation opening - square damper with actuating mechanism or manual and thermal (Weichschott system)



Installation opening - round damper with actuating mechanism or manual and thermal (Weichschott system)

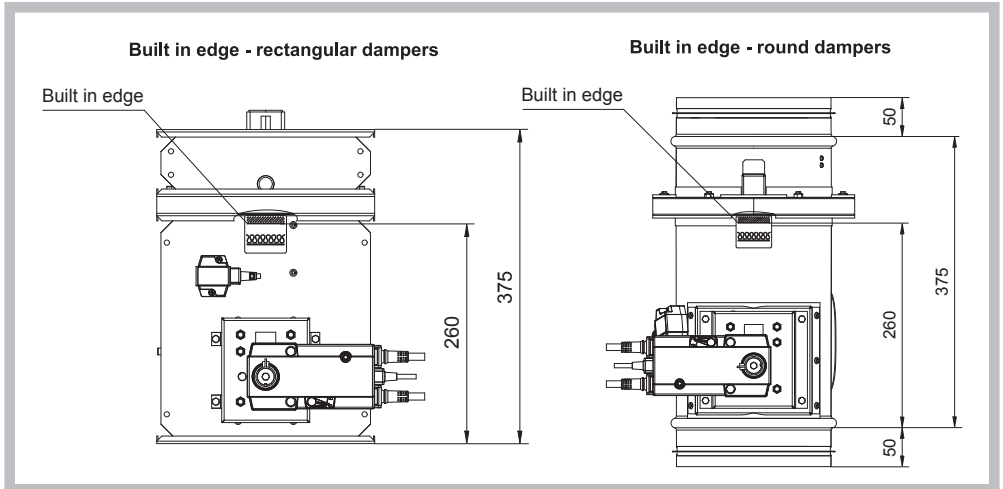


* For damper with flange is the dimension $D + 160$ mm

Notice

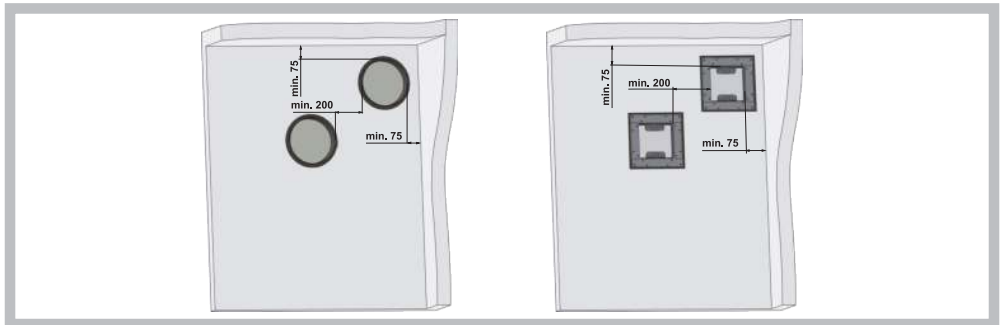
Fire dampers are suitable for installation in arbitrary position in vertical and horizontal passages of fire separating constructions. Damper assembly procedures must be done so as all load transfer from the fire separating constructions to the damper body is absolutely excluded. Back-to-back air-conditioning piping must be hung or supported so as all load transfer from the back-to-back piping to the damper is absolutely excluded.

7. The fire damper can be integrated into a solid or gypsum wall construction or into solid ceiling construction. Damper blade has to be inside of construction (labelled BUILD IN EDGE on the damper body). The fire damper can also be integrated outside the wall construction. Duct and the damper part between the wall construction and the damper blade (labelled BUILD IN EDGE on the damper body) must be protected with fire-fighting insulation.



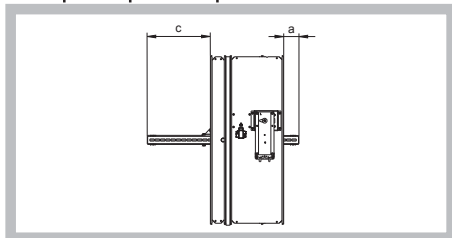
8. All fire dampers has to be closed during installation process. The damper body should not be deformed in the course of bricking in. Once the damper is built in, its blade should not grind on the damper body during opening or closing.
9. To provide needed access space to the control device, all other objects must be situated at least 350 mm from the control parts of the damper. Inspection hole must be accessible.

Placement of the openings in the wall

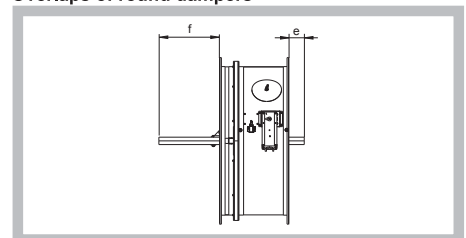


10. Damper blade overlaps

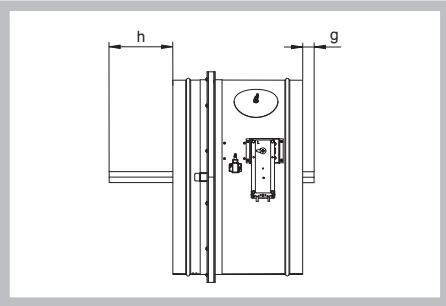
Overlaps of square dampers



Overlaps of round dampers



Overlaps of SPIRO dampers



Notice:

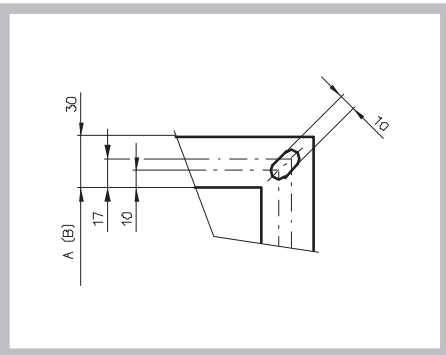
For square and round fire dampers the open damper blade overlaps the damper body by the value "a" and "c" for round fire damper for SPIRO ducts the open damper blade overlaps the damper body by the value "f" or "e". Values "a" and "c" or "e" and "f" have to be respected when projecting related air-conditioning ducts.

AxB	a	c
Ax180	-	13
Ax200	-	23
Ax225	-	36
Ax250	-	48
Ax280	-	63
Ax300	-	73
Ax315	-	80,5
Ax350	-	95,5
Ax400	-	123
Ax450	-	148
Ax500	-	173
Ax550	-	198
Ax560	-	203
Ax630	-	238
Ax650	3	248
Ax710	33	278
Ax750	53	298
Ax800	78	323

DN	e	f
180	-	-
200	-	-
225	-	1,5
250	-	16,5
280	-	34
315	-	54
355	-	76,5
400	-	101,5
450	-	126,5
500	-	156,5
560	-	191,5
630	-	231,5
800	34,5	276,5
900	84,5	326,5
1000	134,5	376,5

11. Flanges and Bracket

Flange of square damper



12. Electrical components, wiring diagrams

Actuating mechanism BELIMO BFL, BFN 230-T

AC230 V

The wiring diagram shows an AC230V supply with lines N (Neutral) and L1 (Line). The L1 line passes through a switch to terminals 1 and 2. Terminal 1 is connected to a common terminal of a relay assembly. The relay assembly has six terminals labeled S1 through S6. S1 and S2 are connected to a common terminal, and S3 and S4 are connected to another common terminal. The angle between the common terminals is marked as <math><5^\circ</math>. S5 and S6 are connected to a common terminal, with an angle of <math><80^\circ</math> between the common terminals. The relay assembly is connected to a battery (BAT) through two thermal fuses (TF) and an LED indicator.

A photograph of the BELIMO BFL/BFN 230-T actuating mechanism. It is an orange rectangular device with a black cable and a red plug. The device has a circular opening on the front and a small window on the side.

Actuating mechanism BELIMO BFL, BFN 24-T(-ST)

AC/DC 24
+ ~
- +
1 2
S1 S2 S3 S4 S5 S6
<5° <80°
BAT

Actuating mechanism BELIMO BF 24-TN(-ST), BF 230-TN

+ ~ AC 24 V
- + DC 24 V
N L1 AC230 V
1 2
S1 S2 S3 S4 S5 S6
<5° <80°
BAT

Actuating mechanism BELIMO BF 24TL-TN-ST

Varianta 1 Varianta 2
AC230 V AC230 V
Error Open Closed
PC Test PC Test
BAT
BKN230-24MP BKN230-24LN

Limit switch G905-300E03W1

COM NC NO

1(COM) - black wire
2(NC) - gray wire
4(NO) - blue wire

Nominal voltage and maximal current	AC 230V / 5A
Class of protection	IP 67
Working temperature	-25°C ... +120°C

This limit switch is possible to connect in following two versions:
 a) **CUT-OFF** if the arm is moving ... connect wire 1+2
 b) **SWITCH-ON** if the arm is moving ... connect wire 1+4

13. Before entering the dampers into operation after assembly and after sequential revisions, checks and functionality tests of all designs including operation of the electrical components must be done. After entering into operation, these revisions must be done according to requirement set by national regulations.

14. Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out for all designs.

Visual inspection of proper damper integration, inside damper area, damper blade, contact surfaces and silicon sealing.

Inspection hole disassembly: release the covering lid by turning the wing nut and while turning the lid right or left release it from the security belt. Then tilt the lid and remove it from its original position.

15. Before entering the dampers with manual control into operation after their assembly and by sequential checks, checks according 14. and following checks must be carried out.

Check of thermal protective fuse and closing mechanism.

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.

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.

Displacing the damper blade into "OPEN" position is done the following way:

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

16. Before entering the dampers with actuating mechanism into operation after their assembly and by sequential checks, checks according 14. and following checks must be carried out.

Check of blade displacement into the breakdown position "CLOSED" can be done after cutting off the actuating mechanism supply (e.g. by pressing the RESET button at the thermoelectrical starting mechanism BAT or cutting off the supply from ELECTRICAL FIRE SIGNALISATION). Check of blade displacement back into the "OPEN" position can be done after restoration of power supply (e.g. By releasing the RESET button or restoration of supply from ELECTRICAL FIRE SIGNALISATION).

17. Manual operation

Without power supply, the damper can be operated manually and fixed in any required position. Release of the locking mechanism can be achieved manually or automatically by applying the supply voltage.

18. It is recommended to provide periodical checks, maintenance and service actions on Fire Equipment by Authorized persons schooled by Producer.

20. All effective safety standards and directives must be observed during fire damper assembly.

Material

1. Damper bodies are supplied in the standard design made of galvanized plate without any other surface finish.
2. Damper blades are made of fire resistant asbestos free boards made of mineral fibres.
3. Damper controls are made of galvanized materials with no other surface finish.
4. Springs are galvanized.
5. Thermal protective fuses are made of sheet brass, thickness = 0.5 mm.
6. Fasteners is galvanized.

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