NORDfire

FDMB Fire Damper

- Square dampers from 160×160 mm to 0,5 m2 (max. dimensions 1000×500 mm)
- CE certified acc. to EN15650
- Fire resistance up to EIS 120
- External Casig leakage class C, Internal leakage class 2 acc. to EN 1751
- Damper actuating mechanical, or electrical

ETS NORD

General information

1. Description

1.1 Fire dampers are shutters in ducts of air-conditioning devices that prevent spreading the fire and combustion products from one fire segment to the other one by means of closing the duct in the points of fire separating constructions.
Dampers blade automatically closes air duct using a shutting spring or an actuating mechanism back spring. The shutting spring is started by releasing an initiation lever. The impulse for releasing the lever can be either a manual one, a thermal one. The back spring of the actuating mechanism is started when the thermoelectrical starting mechanism BAT is activated, when a reset button on BAT is pushed or when a power supply of the actuating mechanism is stopped.
The damper is sealed with a silicon packing against smoke penetration after closing the blade. At the same time, the damper blade is bedded in a material which enlarges its capacity and air proofs the air duct.
Dampers have two inspection holes.

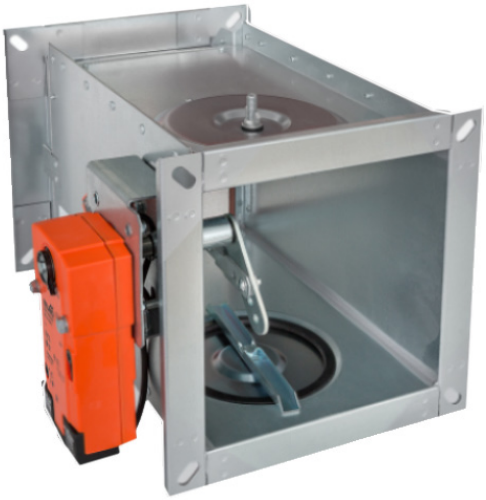


Fig.1 FDMB with actuating mechanism

Fig. 2 FDMB with mechanical control

1.2 Damper characteristics

- CE certified acc. to EN 15650
- Tested in accordance with EN 1366-2
- Classified acc. to EN 13501-3+A1
- Fire resistance EIS 120, EIS 90
- External Casing leakage class C, Internal leakage class 2 acc. to EN 1751
- Cycling test in class C 10000 acc. to EN 15650
- Corrosion resistant acc. to EN 15650
- ES Certificate of conformity No. 1391-CPR-0011/2014
- Declaration of Performance No. PM/FDMB/01/20/1
- Hygienic assessment of fire dampers - Report No. 1.6/pos/19/19b

1.3 Working conditions

Right damper function is secured under the following conditions:

a) Maximum air circulation speed: 12 m/s
Maximum pressure difference: 1200 Pa

b) The air circulation in the whole damper section must be secured as steady on whole surface.

Operation of the dampers does not depend on the direction of air circulation. The dampers can be located in an arbitrary position.
Dampers are suitable for systems without abrasive, chemical and adhesive particles.
Dampers are designed for macroclimatic areas with mild climate according to EN 60 721-3-3.
Temperature in the place of installation is permitted to range from -30°C to +50°C.

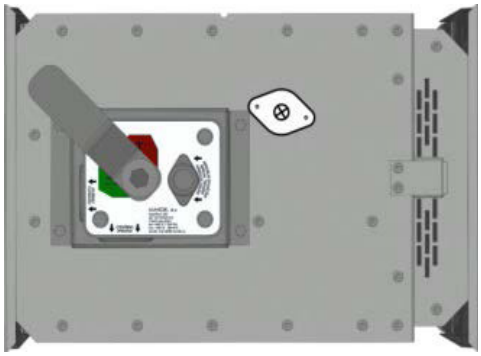
2. Design

2.1 Design with mechanical control

Design .01

Design with mechanical control with a thermal protective fuse which actuates the shutting device, after the nominal start temperature 72°C has been reached. Automatic initiation of the shutting device is not activated if the temperature does not exceed 70°C. In case that other start temperatures are required, thermal fuses with nominal start temperature +104°C or +147°C can be supplied (this requirement must be specified in the order).

Fig. 3 Design .01



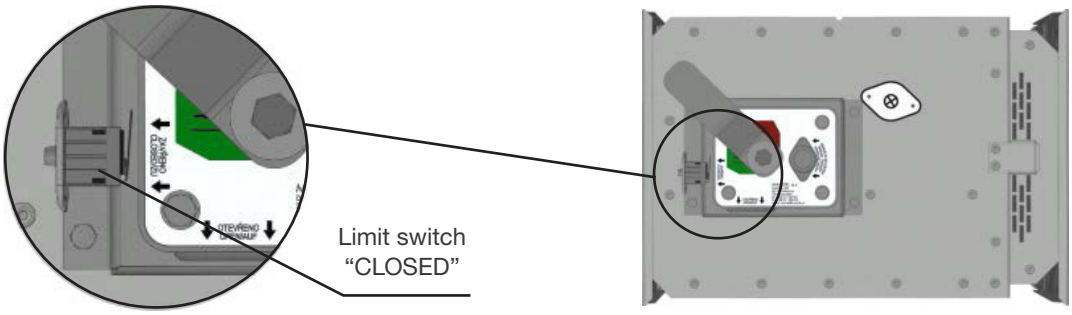
ATTENTION:

Mechanisms are produced in four designs **M1** to **M2** , difference is only in size of inner spring, which closes the fire damper. For the size of fire dampers is always assigned the size of mechanism - **Tab 4.2.1.** It is not recommended to use different size of mechanism, than given by the manufacturer, otherwise, there is a risk of fire damper destruction.

Design .11

Design .01 with mechanical control can be complemented with a limit switch signalling of the damper blade position "CLOSED". Cable is connected directly to limit switch.

Fig. 4 Design .11



Design .80

Design .01 with mechanical control can be complemented with a terminal switches signaling of the damper blade position “CLOSED” and “OPEN”. Limit switches are connected via damper casing, cables are connected directly to limit switches.

Fig. 5 Design .80

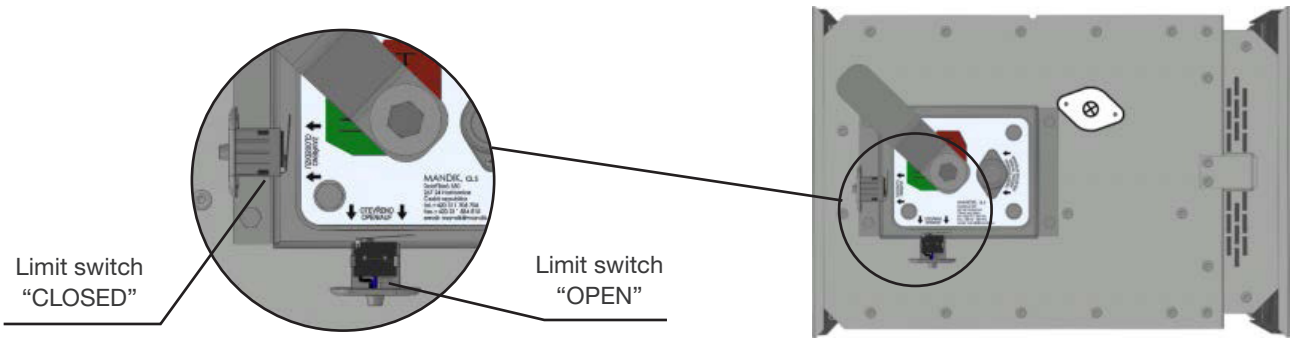
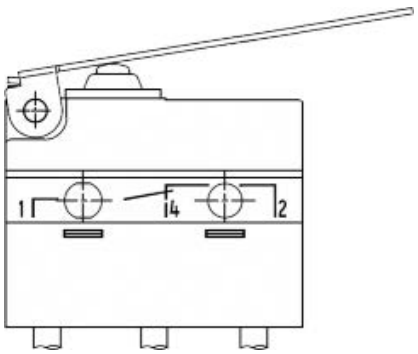
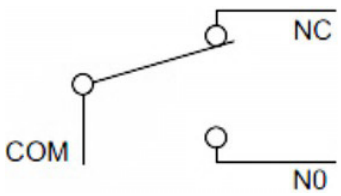


Fig. 6 Limit switch G905-300E03W1





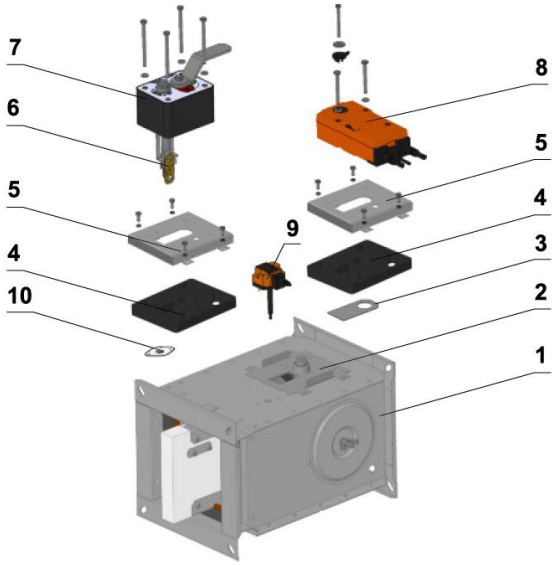
1- 1(COM) - **black wire**
2- 2(NC) - gray wire
3- 4(NO) - **blue wire**

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

This limit switch is possible to connect in following two versions:

a) if the arm is moving … connect wire 1+2
b) if the arm is moving … connect wire 1+4

Fig. 7 Change of mechanical design for the motorised one or vice versa



1- Damper
2- Mounting plate
3- Sealing cover
4- Seal plates
5- Mounting plate cover
6- Thermal fuse
7- Mechanics
8- Actuator
9- Temperature sensor
10- Sensor sticker

2.2 Design with actuating mechanism

Design .40, .50

The damper are equipped by Belimo actuators with spring return and thermoelectric activation device of BFL, BFN or BF depending on the damper size (furher mentioned as „actuators“). After being connected to power supply AC/DC 24V or 230V, the actuating mechanism displaces the damper blade into operation position ”OPEN” and at the same time it pre-stretches its back spring. When the actuating mechanism is under voltage, the damper blade is in the position ”OPEN” and the back spring is pre-stretched. Time needed for full opening of the flap blade from the position ”CLOSED” to the position ”OPEN” is maximum 120 sec. If the actuating power supply is cut off (due to loss of supply voltage, or pushing the reset button on the thermoelectrical starting mechanism BAT), the back spring displaces the damper blade into the breakdown position ”CLOSED”. The time of displacing the blade from the position ”OPEN” to the position ”CLOSED” takes maximum 20 sec. In case that the power supply is restored again (the blade can be in any position), the actuating mechanism starts to re-displace the damper blade into the position ”OPEN”.
A thermoelectrical starting mechanism BAT, which contains two thermal fuses Tf1 and Tf2, is a part of the actuating mechanism. These fuses are activated when temperature +72°C has been exceeded (the fuse Tf1 when the temperature around the damper and the fuses Tf2 when the temperature inside the air-conditioning piping has been exceeded). After the thermal fuse Tf1 or Tf2 has been activated, the power supply is permanently and irreversibly cut off and the actuating mechanism, by means of the pre-stretched spring, displaces the damper blade into the breakdown position ”CLOSED”.
Signalisation of damper blade position ”OPEN” a ”CLOSE” is provided by two limit switches.

Fig. 8 Design .40, .50

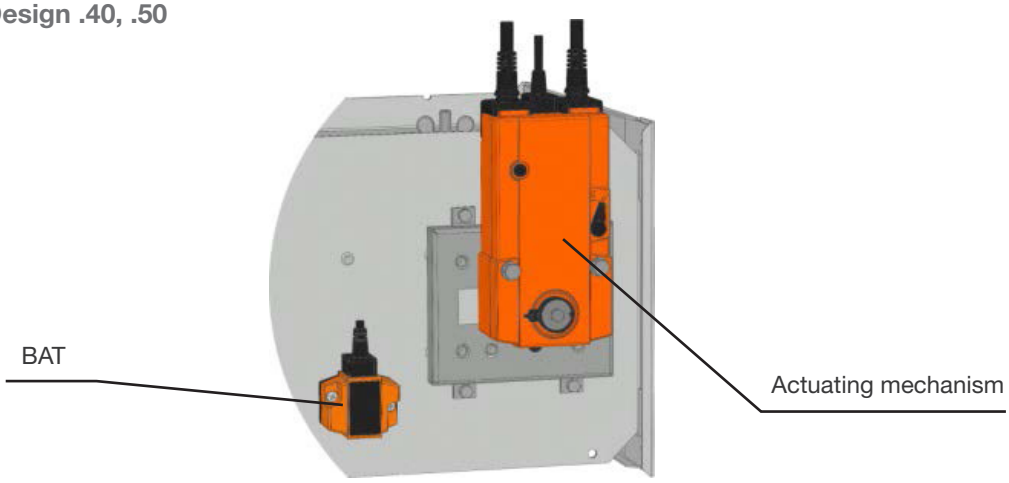
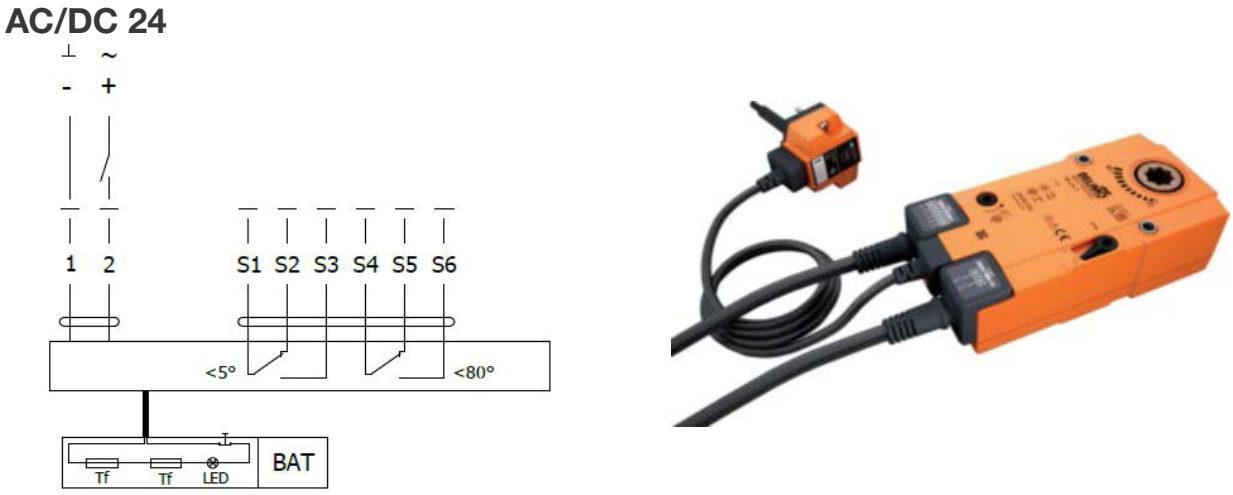


Fig. 9 Actuating mechanism BELIMO BFL BFL (BFN) 230-T

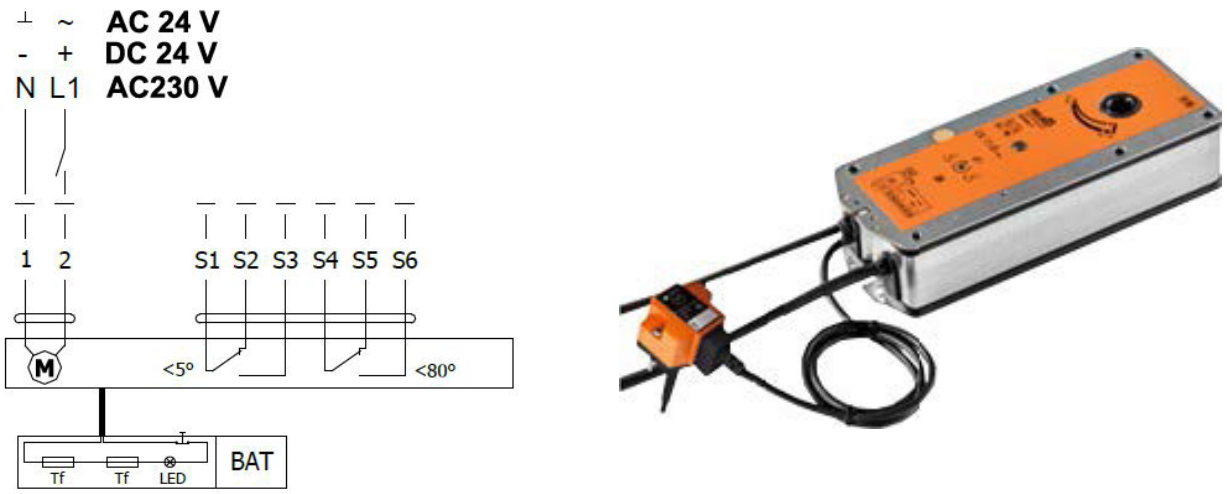
Fig. 10 Actuating mechanism BELIMO BFL BFL (BFN) 230-T



Tab 2.2.1. Actuating mechanism BELIMO BFL24-T(-ST), BFN 24-T(-ST), BFL 230-T a BFN 230-T

Actuating mechanism BELIMO	BFL, BFN 230-T	BFL, BFN 24-T(-ST)
Nominal voltage	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V
Power consumption - motoring - holding	3,5/5 W 1,1/2,1 W	2,5/4 W 0,8/1,4 W
Dimensioning	6,5/10 VA (Imax 4 A @ 5 ms)	4/6 VA (Imax 8,3 A @ 5 ms)
Protection class	II	III
Degree of protection	IP 54	
Running time - motor - spring return	<60 s ~ 20 s	
Ambient temperature - normal duty - safety duty - non-operating temperature	- 30°C … +55°C The safe position will be attained up to max. +75°C - 40°C … +55°C	
Connecting - motor - auxiliary switch	cable 1 m, 2 x 0,75 mm^2 (BFL/BFN 24-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm^2 (BFL/BFN 24-T-ST) with 6-pin plug-in connectors	
Thermal trips	duct outside temperature +72°C duct inside temperature +72°C	

Fig. 11 Actuating mechanism BELIMO BF 230-TN, BF 24-ST



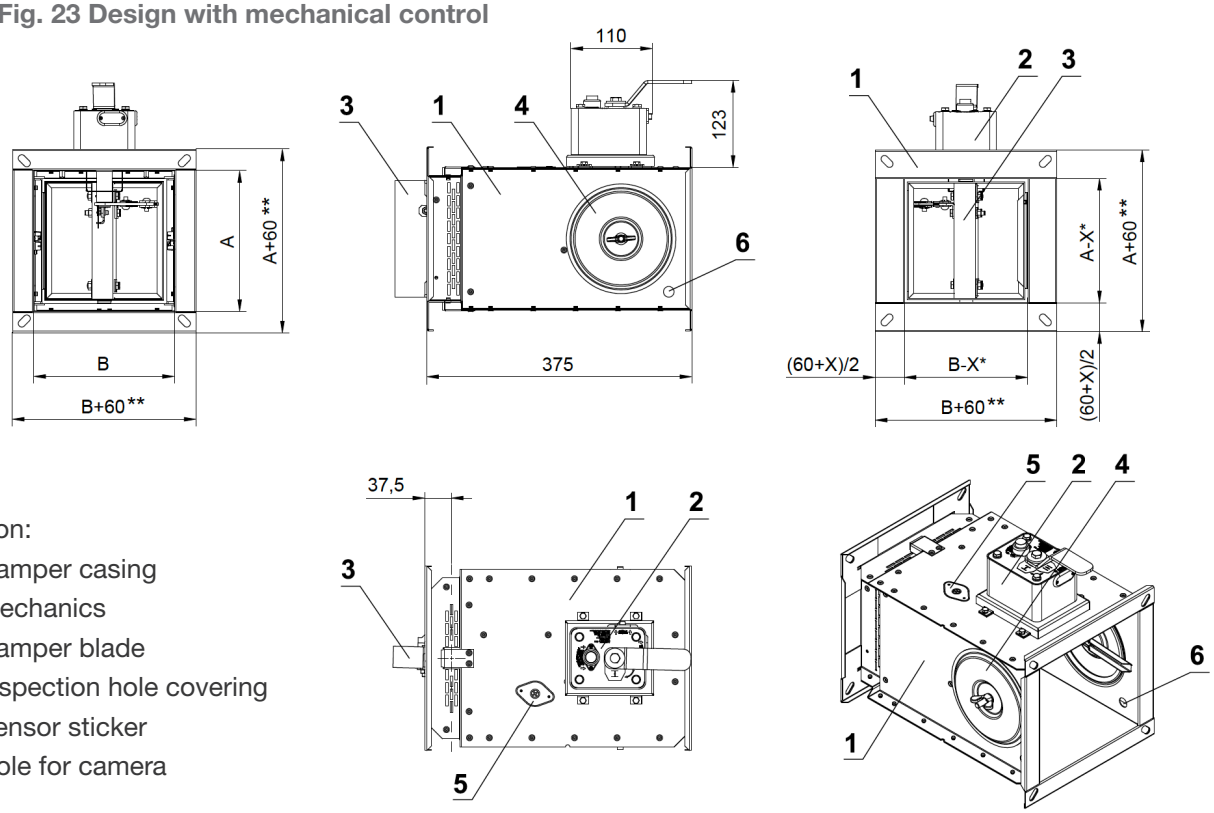
Tab 2.2.2. Actuating mechanism BELIMO BFL24-TN(-ST), BF 230-TN

Actuating mechanism BELIMO	BF 24-TN(-ST)	BF 230-TN
Nominal voltage	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
Power consumption - motoring - holding	7 W 2 W	8 W 3 W
Dimensioning	10 VA (Imax 8,3 A @ 5 ms)	12,5 VA (Imax 500 mA @ 5 ms)
Protection class	III	II
Degree of protection	IP 54	
Running time - motor - spring return	120 sec ~ 16 sec	
Ambient temperature - normal duty - safety duty - non-operating temperature	- 30°C … +55°C The safe position will be attained up to max. +75°C - 40°C … +55°C	
Connecting - motor - auxiliary switch	cable 1 m, 2 x 0,75 mm^2 cable 1 m, 6 x 0,75 mm^2 (BF 24-T-ST) with plug-in connectors	
Thermal trips	Tf1: duct outside temperature Duct +72°C Tf2/Tf3: duct intside temperature Duct +72°C	

3. Dimensions, weighs and effective area

3.1 Dimensions

Fig. 23 Design with mechanical control

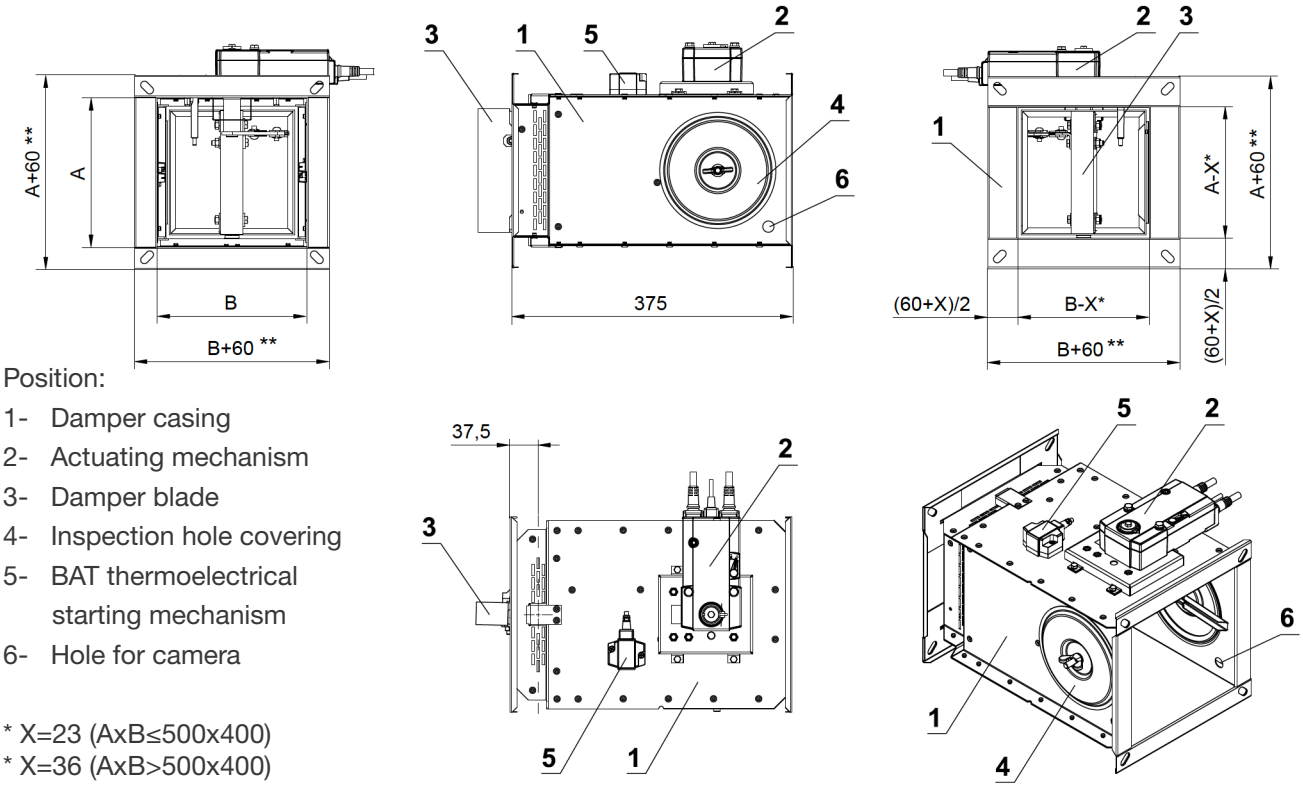


Position:

1- Damper casing
2- Mechanics
3- Damper blade
4- Inspection hole covering
5- Sensor sticker
6- Hole for camera

* X=23 (AxB≤500x400)
* X=36 (AxB>500x400)

Fig. 24 Design with actuating mechanism



Position:

1- Damper casing
2- Actuating mechanism
3- Damper blade
4- Inspection hole covering
5- BAT thermoelectrical starting mechanism
6- Hole for camera

* X=23 (AxB≤500x400)
* X=36 (AxB>500x400)

3.2 Dimensions, weights and effective area

Tab 3.2.1. Dimensions, weights and effective area

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
160 x 160	-	20	5,5	7,0	0,0113	BFL	M1
x 180	-	30	6,0	7,5	0,0137	BFL	M1
x 200	-	40	6,0	7,5	0,0161	BFL	M1
x 225	-	52,5	6,5	8,0	0,0191	BFL	M1
x 250	-	65	7,0	8,5	0,0222	BFL	M1
x 280	-	80	7,0	8,5	0,0258	BFL	M1
x 300	-	90,0	7,5	9,0	0,0282	BFL	M1
x 315	-	97,5	7,5	9,0	0,0300	BFL	M1
x 355	-	117,5	8,5	10,0	0,0349	BFL	M1
x 400	-	140	9,0	10,5	0,0403	BFL	M1
x 450	-	165	9,5	11,5	0,0392	BFL	M1
x 500	-	190	10,0	13,0	0,0446	BFL	M2
x 550	-	215	10,5	13,5	0,0500	BFL	M2
x 560	-	220	10,5	13,5	0,0511	BFL	M2
x 600	-	240	11,0	14,0	0,0554	BFL	M2
x 630	-	255	11,5	14,5	0,0586	BFL	M2
x 650	-	265	11,5	14,5	0,0608	BFL	M2
x 700	-	290	12,5	15,5	0,0662	BFL	M2
x 710	-	295	12,5	15,5	0,0673	BFL	M2
x 750	15	315	13,0	16,0	0,0716	BFN	M2
x 800	40	340	13,5	16,5	0,0770	BFN	M2
x 900	90	390	14,5	17,5	0,0878	BFN	M2
x 1000	140	440	20,0	23,0	0,0986	BFN	M2
180 x 160	-	20	6,0	7,5	0,0131	BFL	M1
x 180	-	30	6,0	7,5	0,0159	BFL	M1
x 200	-	40	6,5	8,0	0,0187	BFL	M1
x 225	-	52,5	6,5	8,0	0,0222	BFL	M1
x 250	-	65,0	7,0	8,5	0,0258	BFL	M1
x 280	-	80	7,5	9,0	0,0300	BFL	M1
x 300	-	90	7,5	9,0	0,0328	BFL	M1
x 315	-	97,5	8,0	9,5	0,0349	BFL	M1
x 355	-	117,5	8,5	10,5	0,0406	BFL	M1
x 400	-	140	9,0	11,0	0,0469	BFL	M1
x 450	-	165	10,0	13,0	0,0465	BFL	M1
x 500	-	190	10,5	13,5	0,0529	BFL	M2
x 550	-	215	11,0	14,0	0,0593	BFL	M2
x 560	-	220	11,0	14,0	0,0605	BFL	M2
x 600	-	240	11,5	14,5	0,0657	BFL	M2
x 630	-	255	12,0	15,0	0,0695	BFL	M2
x 650	-	265	12,0	15,0	0,0721	BFL	M2
x 700	-	290	13,0	16,0	0,0785	BFN	M2
x 710	-	295	13,0	16,0	0,0797	BFN	M2
x 750	15	315	13,5	16,5	0,0849	BFN	M2
x 800	40	340	14,0	17,0	0,0913	BFN	M2
x 900	90	390	15,0	18,0	0,1041	BFN	M2
x 1000	140	440	20,5	23,5	0,1169	BFN	M2
200 x 160	-	20,0	6,0	7,5	0,0149	BFL	M1
x 180	-	30,0	6,5	8,0	0,0181	BFL	M1
x 200	-	40	6,5	8,0	0,0213	BFL	M1
x 225	-	52,5	7,0	8,5	0,0253	BFL	M1
x 250	-	65	7,5	9,0	0,0294	BFL	M1
x 280	-	80	7,5	9,0	0,0342	BFL	M1
x 300	-	90	8,0	9,5	0,0374	BFL	M1

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
200 x 315	-	97,5	8,0	9,5	0,0398	BFL	M1
x 355	-	117,5	9,0	10,5	0,0463	BFL	M1
x 400	-	140	9,5	11,0	0,0535	BFL	M1
x 450	-	165	10,0	13,0	0,0537	BFL	M1
x 500	-	190	10,5	13,5	0,0611	BFL	M2
x 550	-	215	11,5	14,5	0,0685	BFL	M2
x 560	-	220	11,5	14,5	0,0700	BFL	M2
x 600	-	240	12,0	15,0	0,0759	BFL	M2
x 630	-	255	12,5	15,5	0,0804	BFL	M2
x 650	-	265	12,5	15,5	0,0833	BFL	M2
x 700	-	290	13,0	16,0	0,0907	BFN	M2
x 710	-	295	13,5	16,5	0,0922	BFN	M2
x 750	15	315	14,0	17,0	0,0981	BFN	M2
x 800	40	340	14,5	17,5	0,1055	BFN	M2
x 900	90	390	15,5	18,5	0,1203	BFN	M2
x 1000	140	440	17,0	20,0	0,1351	BFN	M2
225 x 160	-	20	6,5	8,0	0,0171	BFL	M1
x 180	-	30	7,0	8,5	0,0209	BFL	M1
x 200	-	40	7,5	9,0	0,0246	BFL	M1
x 225	-	52,5	8,0	9,5	0,0292	BFL	M1
x 250	-	65	8,5	10,0	0,0339	BFL	M1
x 280	-	80	9,0	10,5	0,0395	BFL	M1
x 300	-	90	9,5	11,0	0,0432	BFL	M1
x 315	-	97,5	9,5	11,0	0,0460	BFL	M1
x 355	-	117,5	10,0	11,0	0,0534	BFL	M1
x 400	-	140	10,5	11,5	0,0618	BFL	M1
x 450	-	165	11,5	12,0	0,0628	BFL	M1
x 500	-	190	12,5	13,0	0,0714	BFL	M2
x 550	-	215	13,5	14,0	0,0801	BFL	M2
x 560	-	220	13,5	15,0	0,0818	BFL	M2
x 600	-	240	14,0	15,5	0,0887	BFL	M2
x 630	-	255	14,5	16,0	0,0939	BFN	M2
x 650	-	265	15,0	16,5	0,0974	BFN	M2
x 700	-	290	16,0	17,5	0,1060	BFN	M2
x 710	-	295	16,0	17,5	0,1078	BFN	M2
x 750	15	315	16,5	18,0	0,1147	BFN	M2
x 800	40	340	17,5	19,0	0,1233	BFN	M2
x 900	90	390	19,0	22,0	0,1406	BFN	M3
x 1000	140	440	20,5	23,5	0,1579	BF	M3
250 x 160	-	20	6,5	8,0	0,0194	BFL	M1
x 180	-	30	7,0	8,5	0,0236	BFL	M1
x 200	-	40	7,0	8,5	0,0278	BFL	M1
x 225	-	52,5	7,5	9,0	0,0331	BFL	M1
x 250	-	65	8,0	9,5	0,0384	BFL	M1
x 280	-	80	8,5	10,0	0,0447	BFL	M1
x 300	-	90	8,5	10,0	0,0489	BFL	M1
x 315	-	97,5	9,0	10,5	0,0521	BFL	M1
x 355	-	117,5	9,5	11,5	0,0605	BFL	M1
x 400	-	140	10,5	12,0	0,0700	BFL	M1
x 450	-	165	11,0	14,0	0,0719	BFL	M1
x 500	-	190	11,5	14,5	0,0818	BFL	M2
x 550	-	215	12,5	15,5	0,0917	BFL	M2
x 560	-	220	12,5	15,5	0,0937	BFL	M2

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
250 x 600	-	240	13,0	16,0	0,1016	BFN	M2
x 630	-	255	13,5	16,5	0,1075	BFN	M2
x 650	-	265	13,5	16,5	0,1115	BFN	M2
x 700	-	290	14,5	17,5	0,1214	BFN	M2
x 710	-	295	14,5	17,5	0,1234	BFN	M2
x 750	15	315	15,0	18,0	0,1313	BFN	M3
x 800	40	340	15,5	18,5	0,1412	BFN	M3
x 900	90	390	17,0	20,0	0,1610	BFN	M3
x 1000	140	440	18,5	21,5	0,1808	BF	M3
280 x 160	-	20	7,0	8,5	0,0221	BFL	M1
x 180	-	30	7,0	9,0	0,0269	BFL	M1
x 200	-	40	7,5	9,0	0,0317	BFL	M1
x 225	-	52,5	8,0	9,5	0,0377	BFL	M1
x 250	-	65	8,5	10,0	0,0438	BFL	M1
x 280	-	80	8,5	10,5	0,0510	BFL	M1
x 300	-	90	9,0	10,5	0,0558	BFL	M1
x 315	-	97,5	9,0	11,0	0,0594	BFL	M1
x 355	-	117,5	10,0	12,0	0,0691	BFL	M1
x 400	-	140	11,0	12,5	0,0799	BFL	M1
x 450	-	165	11,5	14,5	0,0828	BFL	M1
x 500	-	190	12,0	15,0	0,0942	BFL	M2
x 550	-	215	13,0	16,0	0,1056	BFL	M2
x 560	-	220	13,0	16,0	0,1078	BFN	M2
x 600	-	240	13,5	16,5	0,1170	BFN	M2
x 630	-	255	14,0	17,0	0,1238	BFN	M2
x 650	-	265	14,5	17,5	0,1284	BFN	M2
x 700	-	290	15,0	18,0	0,1398	BFN	M2
x 710	-	295	15,0	18,0	0,1420	BFN	M3
x 750	15	315	15,5	18,5	0,1512	BFN	M3
x 800	40	340	16,5	19,5	0,1626	BFN	M3
x 900	90	390	18,0	21,0	0,1854	BF	M3
x 1000	140	440	23,5	26,5	0,2082	BF	M3
300 x 160	-	20	7,0	8,5	0,0239	BFL	M1
x 180	-	30	7,5	9,0	0,0291	BFL	M1
x 200	-	40	7,5	9,5	0,0343	BFL	M1
x 225	-	52,5	8,0	9,5	0,0408	BFL	M1
x 250	-	65	8,5	10,0	0,0474	BFL	M1
x 280	-	80	9,0	10,5	0,0552	BFL	M1
x 300	-	90	9,5	11,0	0,0604	BFL	M1
x 315	-	97,5	9,5	11,0	0,0643	BFL	M1
x 355	-	117,5	10,5	12,0	0,0748	BFL	M1
x 400	-	140	11,0	12,5	0,0865	BFL	M1
x 450	-	165	12,0	15,0	0,0900	BFL	M1
x 500	-	190	12,5	15,5	0,1024	BFL	M2
x 550	-	215	13,5	16,5	0,1148	BFN	M2
x 560	-	220	13,5	16,5	0,1173	BFN	M2
x 600	-	240	14,0	17,0	0,1272	BFN	M2
x 630	-	255	14,5	17,5	0,1347	BFN	M2
x 650	-	265	14,5	17,5	0,1396	BFN	M2
x 700	-	290	15,5	18,5	0,1520	BFN	M2
x 710	-	295	15,5	18,5	0,1545	BFN	M2
x 750	15	315	16,0	19,0	0,1644	BFN	M3
x 800	40	340	17,0	20,0	0,1768	BFN	M3
x 900	90	390	18,5	21,5	0,2016	BF	M3
x 1000	140	440	20,0	23,0	0,2264	BF	M3
315 x 160	-	20	8,5	10,5	0,0252	BFL	M1

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
315 x 180	-	30	9,0	10,5	0,0308	BFL	M1
x 200	-	40	9,5	11,0	0,0363	BFL	M1
x 225	-	52,5	9,5	11,5	0,0432	BFL	M1
x 250	-	65	10,0	12,0	0,0501	BFL	M1
x 280	-	80	10,5	12,0	0,0584	BFL	M1
x 300	-	90	11,0	12,5	0,0639	BFL	M1
x 315	-	97,5	11,5	13,0	0,0680	BFL	M1
x 355	-	117,5	12,0	13,5	0,0791	BFL	M1
x 400	-	140	13,0	14,5	0,0915	BFL	M1
x 450	-	165	13,5	16,5	0,0955	BFL	M1
x 500	-	190	14,5	17,5	0,1086	BFL	M1
x 550	-	215	15,0	18,0	0,1218	BFN	M2
x 560	-	220	15,0	18,0	0,1244	BFN	M2
x 600	-	240	15,5	18,5	0,1349	BFN	M2
x 630	-	255	16,0	19,0	0,1428	BFN	M2
x 650	-	265	16,5	19,5	0,1481	BFN	M2
x 700	-	290	17,5	20,5	0,1612	BFN	M2
x 710	-	295	17,5	20,5	0,1638	BFN	M2
x 750	15	315	18,0	21,0	0,1744	BFN	M3
x 800	40	340	18,5	21,5	0,1875	BFN	M3
x 900	90	390	20,0	23,0	0,2138	BF	M3
x 1000	140	440	21,5	24,5	0,2401	BF	M3
355 x 160	-	20	7,5	9,5	0,0288	BFL	M1
x 180	-	30	8,0	9,5	0,0352	BFL	M1
x 200	-	40	8,5	10,0	0,0415	BFL	M1
x 225	-	52,5	9,0	10,5	0,0494	BFL	M1
x 250	-	65	9,5	11,0	0,0573	BFL	M1
x 280	-	80	10,0	11,5	0,0668	BFL	M1
x 300	-	90	10,0	11,5	0,0731	BFL	M1
x 315	-	97,5	11,0	12,0	0,0778	BFL	M1
x 355	-	117,5	11,5	13,0	0,0905	BFL	M1
x 400	-	140	12,0	13,5	0,1047	BFL	M1
x 450	-	165	13,0	16,0	0,1100	BFL	M1
x 500	-	190	13,5	16,5	0,1251	BFN	M2
x 550	-	215	14,5	17,5	0,1403	BFN	M2
x 560	-	220	14,5	17,5	0,1433	BFN	M2
x 600	-	240	15,0	18,0	0,1554	BFN	M2
x 630	-	255	15,5	18,5	0,1645	BFN	M2
x 650	-	265	16,0	19,0	0,1706	BFN	M2
x 700	-	290	17,0	20,0	0,1857	BFN	M2
x 710	-	295	17,0	20,0	0,1888	BFN	M2
x 750	-	315	17,5	20,5	0,2009	BFN	M3
x 800	15	340	18,5	21,5	0,2160	BF	M3
x 900	40	390	20,0	23,0	0,2463	BF	M3
x 1000	90	440	21,5	24,5	0,2766	BF	M4
400 x 160	140	20	8,0	10,0	0,0329	BFL	M1
x 180	-	30	8,5	10,0	0,0401	BFL	M1
x 200	-	40	9,0	10,5	0,0473	BFL	M1
x 225	-	52,5	9,5	11,0	0,0563	BFL	M1
x 250	-	65	10,0	11,5	0,0654	BFL	M1
x 280	-	80	10,5	12,0	0,0762	BFL	M1
x 300	-	90	10,5	12,5	0,0834	BFL	M1
x 315	-	97,5	11,0	12,5	0,0888	BFL	M1
x 355	-	117,5	12,0	13,5	0,1033	BFL	M1
x 400	-	140	13,0	14,5	0,1195	BFL	M1
x 450	-	165	13,5	16,5	0,1263	BFL	M1

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
400 x 500	-	190	14,5	17,5	0,1437	BFL	M2
x 550	-	215	15,5	18,5	0,1611	BFL	M2
x 560	-	220	15,5	18,5	0,1646	BFL	M2
x 600	-	240	16,0	19,0	0,0685	BFL	M2
x 630	-	255	16,5	19,5	0,1785	BFL	M2
x 650	-	265	17,0	20,0	0,1890	BFL	M2
x 700	-	290	18,0	21,0	0,1959	BFL	M2
x 710	-	295	18,0	21,0	0,2133	BFL	M2
x 750	-	315	18,5	21,5	0,2168	BFN	M2
x 800	15	340	19,5	22,5	0,2307	BFN	M3
x 900	90	390	21,0	24,0	0,2481	BFN	M3
x 1000	140	440	23,0	26,0	0,3177	BFN	M4
450 x 160	-	20	9,0	10,5	0,0374	BFL	M1
x 180	-	30	9,0	10,5	0,0456	BFL	M1
x 200	-	40	9,5	11,0	0,0538	BFL	M1
x 225	-	52,5	10,0	11,5	0,0641	BFL	M1
x 250	-	65	10,5	12,0	0,0744	BFL	M1
x 280	-	80	11,0	12,5	0,0867	BFL	M1
x 300	-	90	11,5	13,0	0,0949	BFL	M1
x 315	-	97,5	11,5	13,5	0,1011	BFL	M1
x 355	-	117,5	13,0	14,5	0,1175	BFL	M1
x 400	-	140	13,5	15,0	0,1360	BFL	M1
x 450	-	165	14,5	17,5	0,1445	BFL	M1
x 500	-	190	15,5	18,5	0,1644	BFL	M2
x 550	-	215	16,5	19,5	0,1843	BFL	M2
x 560	-	220	16,5	19,5	0,1883	BFL	M2
x 600	-	240	17,0	20,0	0,2042	BFL	M2
x 630	-	255	17,5	20,5	0,2161	BFN	M2
x 650	-	265	18,0	21,0	0,2241	BFN	M2
x 700	-	290	19,0	22,0	0,2440	BFN	M2
x 710	-	295	19,0	22,0	0,2480	BFN	M2
x 750	15	315	20,5	23,0	0,2639	BFN	M2
x 800	40	340	22,5	23,5	0,2838	BFN	M2
x 900	90	390	22,5	25,5	0,3236	BFN	M3
x 1000	140	440	24,0	27,0	0,3634	BF	M3
500 x 160	-	20	9,5	11,0	0,0419	BFL	M1
x 180	-	30	9,5	11,5	0,0511	BFL	M1
x 200	-	40	10,0	11,5	0,0603	BFL	M1
x 225	-	52,5	10,5	12,5	0,0718	BFL	M1
x 250	-	65	11,0	13,0	0,0834	BFL	M1
x 280	-	80	11,5	13,5	0,0972	BFL	M1
x 300	-	90	12,0	13,5	0,1064	BFL	M1
x 315	-	97,5	12,5	14,0	0,1133	BFL	M1
x 355	-	117,5	13,5	15,0	0,1318	BFL	M1
x 400	-	140	14,5	16,0	0,1525	BFL	M1
x 450	-	165	15,5	18,5	0,1626	BFL	M1
x 500	-	190	16,5	19,5	0,1850	BFL	M2
x 550	-	215	17,0	20,0	0,2074	BFL	M2
x 560	-	220	17,5	20,5	0,2119	BFL	M2
x 600	-	240	18,0	21,0	0,2298	BFN	M2
x 630	-	255	19,0	22,0	0,2433	BFN	M2
x 650	-	265	19,0	22,0	0,2522	BF	M2
x 700	-	290	20,0	23,0	0,2746	BF	M2
x 710	-	295	20,5	23,5	0,2791	BF	M2

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
500 x 750	15	315	21,0	24,0	0,2970	BF	M3
x 800	40	340	22,0	25,0	0,3194	BF	M3
x 900	90	390	24,0	27,0	0,3642	BF	M3
x 1000	140	440	25,5	28,5	0,4090	BF	M4
550 x 160	-	20	10,0	13,0	0,0364	BFL	M1
x 180	-	30	10,5	13,5	0,0463	BFL	M1
x 200	-	40	10,5	13,5	0,0563	BFL	M1
x 225	-	52,5	11,0	14,0	0,0687	BFL	M1
x 250	-	65	12,0	15,0	0,0812	BFL	M1
x 280	-	80	12,5	15,5	0,0961	BFL	M1
x 300	-	90	13,0	16,0	0,1061	BFL	M1
x 315	-	97,5	13,0	17,5	0,1135	BFL	M1
x 355	-	117,5	14,5	18,0	0,1335	BFL	M1
x 400	-	140	15,0	19,0	0,1559	BFL	M1
x 450	-	165	16,0	20,0	0,1808	BFL	M1
x 500	-	190	17,0	21,0	0,2057	BFL	M2
x 550	-	215	18,0	21,5	0,2306	BFL	M2
x 560	-	220	18,5	21,0	0,2356	BFL	M2
x 600	-	240	19,0	22,0	0,2555	BFL	M2
x 630	-	255	20,0	23,0	0,2704	BFN	M2
x 650	-	265	20,0	23,0	0,2804	BFN	M2
x 700	-	290	21,5	24,5	0,3053	BFN	M2
x 710	-	295	21,5	24,5	0,3103	BFN	M2
x 750	15	315	22,0	25,0	0,3302	BFN	M2
x 800	40	340	23,0	26,0	0,3551	BFN	M2
x 900	90	390	25,0	28,0	0,4049	BFN	M3
560 x 160	-	20	10,0	13,0	0,0371	BFL	M1
x 180	-	30	9,5	11,5	0,0472	BFL	M1
x 200	-	40	10,0	11,5	0,0574	BFL	M1
x 225	-	52,5	10,5	12,5	0,0701	BFL	M1
x 250	-	65	11,0	13,0	0,0828	BFL	M1
x 280	-	80	11,5	13,5	0,0980	BFL	M1
x 300	-	90	12,0	13,5	0,1082	BFL	M1
x 315	-	97,5	12,5	14,0	0,1158	BFL	M1
x 355	-	117,5	13,5	15,0	0,1361	BFL	M1
x 400	-	140	14,5	16,0	0,1590	BFL	M1
x 450	-	165	15,5	18,5	0,1844	BFL	M1
x 500	-	190	16,5	19,5	0,2098	BFL	M2
x 550	-	215	17,0	20,0	0,2352	BFL	M2
x 560	-	220	17,5	20,5	0,2403	BFL	M2
x 600	-	240	18,0	21,0	0,2606	BFN	M2
x 630	-	255	19,0	22,0	0,2758	BFN	M2
x 650	-	265	19,0	22,0	0,2860	BF	M2
x 700	-	290	20,0	23,0	0,3114	BF	M2
x 710	-	295	20,5	23,5	0,3165	BF	M2
x 750	-	315	22,5	25,5	0,3368	BF	M3
x 800	15	340	23,5	26,5	0,3622	BF	M3
600 x 160	40	20	10,5	13,5	0,0400	BFL	M1
x 180	-	30	11,0	14,0	0,0510	BFL	M1
x 200	-	40	11,0	14,0	0,0619	BFL	M1
x 225	-	52,5	12,0	15,0	0,0756	BFL	M1
x 250	-	65	12,5	15,5	0,0893	BFL	M1
x 280	-	80	13,0	16,0	0,1058	BFL	M1
x 300	-	90	13,5	16,5	0,1167	BFL	M1

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
600 x 315	-	97,5	14,0	17,0	0,1249	BFL	M1
x 355	-	117,5	15,0	18,0	0,1469	BFL	M2
x 400	-	140	16,0	18,0	0,1715	BFN	M2
x 450	-	165	17,0	20,0	0,1989	BFN	M2
x 500	-	190	18,0	21,0	0,2263	BFN	M2
x 550		215	19,0	22,0	0,2537	BFN	M2
x 560	-	220	19,5	22,5	0,2592	BFN	M2
x 600	-	240	20,5	23,5	0,2811	BF	M2
x 630	-	255	21,0	24,0	0,2976	BF	M2
x 650	-	265	21,5	24,5	0,3085	BF	M2
x 700	-	290	22,5	25,5	0,3359	BF	M2
x 710	-	295	22,5	25,5	0,3414	BF	M2
x 750	15	315	23,5	26,5	0,3633	BF	M3
x 800	40	340	24,5	27,5	0,3907	BF	M3
630 x 160	-	20	10,5	13,5	0,0422	BFL	M1
x 180	-	30	11,0	14,0	0,0538	BFL	M1
x 200	-	40	11,5	14,5	0,0653	BFL	M1
x 225	-	52,5	12,0	15,0	0,0798	BFL	M1
x 250	-	65	13,0	16,0	0,0942	BFL	M1
x 280	-	80	13,5	16,5	0,1116	BFL	M1
x 300	-	90	14,0	17,0	0,1231	BFL	M1
x 315	-	97,5	14,0	17,0	0,1318	BFL	M1
x 355	-	117,5	15,5	18,5	0,1549	BFL	M2
x 400	-	140	16,5	19,5	0,1809	BFN	M2
x 450	-	165	17,5	20,5	0,2098	BFN	M2
x 500	-	190	18,5	21,5	0,2387	BFN	M2
x 550	-	215	20,0	23,0	0,2676	BFN	M2
x 560	-	220	20,0	23,0	0,2734	BFN	M2
x 600	-	240	21,0	24,0	0,2965	BF	M2
x 630	-	255	21,5	24,5	0,3139	BF	M2
x 650	-	265	22,0	25,0	0,3254	BF	M2
x 700	-	290	23,5	26,5	0,3543	BF	M2
x 710	-	295	23,5	26,5	0,3601	BF	M2
x 750	15	315	24,0	27,0	0,3832	BF	M3
650 x 160	-	20	11,0	14,0	0,0437	BFL	M1
x 180	-	30	11,5	14,5	0,0556	BFL	M1
x 200	-	40	12,0	15,0	0,0676	BFL	M1
x 225	-	52,5	12,5	15,5	0,0825	BFL	M1
x 250	-	65	13,0	16,0	0,0975	BFL	M1
x 280	-	80	14,0	17,0	0,1154	BFL	M1
x 300	-	90	14,0	17,0	0,1274	BFL	M1
x 315	-	97,5	14,5	17,5	0,1363	BFL	M2
x 355	-	117,5	16,0	19,0	0,1603	BFL	M2
x 400	-	140	17,0	20,0	0,1872	BFN	M2
x 450	-	165	18,0	21,0	0,2171	BFN	M2
x 500	-	190	19,0	22,0	0,2470	BFN	M2
x 550	-	215	20,0	23,0	0,2769	BFN	M2
x 560	-	220	20,5	23,5	0,2829	BF	M2
x 600	-	240	21,5	24,5	0,3068	BF	M2
x 630	-	255	22,0	25,0	0,3247	BF	M2
x 650	-	265	22,5	25,5	0,3367	BF	M2
x 700	-	290	23,5	26,5	0,3666	BF	M2
x 710	-	295	24,0	27,0	0,3726	BF	M2

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
650 x 750	15	315	24,5	27,5	0,3965	BF	M2
700 x 160	-	20	11,5	14,5	0,0473	BFL	M1
x 180	-	30	12,0	15,0	0,0603	BFL	M1
x 200	-	40	12,5	15,5	0,0732	BFL	M1
x 225	-	52,5	13,0	16,0	0,0894	BFL	M1
x 250	-	65	13,5	16,5	0,1056	BFL	M1
x 280	-	80	14,5	17,5	0,1251	BFL	M1
x 300	-	90	15,0	18,0	0,1380	BFL	M2
x 315	-	97,5	15,5	18,5	0,1477	BFL	M2
x 355	-	117,5	16,5	19,5	0,1737	BFN	M2
x 400	-	140	17,5	20,5	0,2028	BFN	M2
x 450	-	165	19,0	22,0	0,2352	BFN	M2
x 500	-	190	20,5	23,5	0,2676	BFN	M2
x 550	-	215	22,0	26,5	0,3000	BF	M2
x 600	-	220	22,5	27,0	0,3065	BF	M2
x 630	-	240	23,5	28,0	0,3324	BF	M2
x 650	-	255	24,5	29,0	0,3519	BF	M2
x 225	-	265	25,0	29,5	0,3648	BF	M2
x 700	-	290	26,5	31,0	0,3972	BF	M2
x 710	-	295	27,0	31,5	0,4037	BF	M2
710 x 160	-	20	11,5	15,5	0,0480	BFL	M1
x 180	-	30	12,0	16,0	0,0612	BFL	M1
x 200	-	40	12,5	15,5	0,0744	BFL	M1
x 225	-	52,5	13,0	16,0	0,0908	BFL	M1
x 250	-	65	14,0	17,0	0,1073	BFL	M1
x 280	-	80	14,5	17,5	0,1270	BFL	M1
x 300	-	90	15,0	18,0	0,1402	BFL	M2
x 315	-	97,5	15,5	18,5	0,1500	BFL	M2
x 355	-	117,5	17,0	20,0	0,1763	BFN	M2
x 400	-	140	18,0	21,0	0,2060	BFN	M2
x 450	-	165	19,0	22,0	0,2389	BFN	M2
x 500	-	190	20,0	23,0	0,2718	BFN	M2
x 550	-	215	21,5	24,5	0,3047	BF	M2
x 560	-	220	21,5	24,5	0,3112	BF	M2
x 600	-	240	22,5	25,5	0,3376	BF	M2
x 630	-	255	23,5	26,5	0,3573	BF	M2
x 650	-	265	23,5	26,5	0,3705	BF	M2
x 700	-	290	25,0	28,0	0,4034	BF	M2
750 x 160	-	20	12,0	15,0	0,0510	BF	M2
x 180	-	30	12,5	15,5	0,0649	BFL	M1
x 200	-	40	13,0	16,0	0,0649	BFL	M1
x 225	-	52,5	13,5	16,5	0,0963	BFL	M1
x 250	-	65	14,5	17,5	0,1138	BFL	M1
x 280	-	80	15,0	18,0	0,1347	BFL	M2
x 300	-	90	15,5	18,5	0,1487	BFL	M2
x 315	-	97,5	16,0	19,0	0,1591	BFN	M2
x 355	-	117,5	17,5	20,5	0,1871	BFN	M2
x 400	-	140	18,5	21,5	0,2185	BFN	M2
x 450	-	165	19,5	22,5	0,2534	BFN	M2
x 500	-	190	21,0	24,0	0,2883	BFN	M2
x 550	-	215	22,0	25,0	0,3232	BF	M2
x 560	-	220	22,5	25,5	0,3302	BF	M2
x 600	-	240	23,5	26,5	0,3581	BF	M2

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
750 x 630	15	255	24,0	27,0	0,3790	BF	M2
x 650	-	265	24,5	27,5	0,3930	BF	M2
800 x 160	-	20	12,5	15,5	0,0546	BFL	M1
x 180	-	30	13,0	16,0	0,0696	BFL	M1
x 200	-	40	13,5	16,5	0,0845	BFL	M1
x 225	-	52,5	14,5	17,5	0,1032	BFL	M1
x 250	-	65	15,0	18,0	0,1219	BFL	M2
x 280	-	80	16,0	19,0	0,1444	BFL	M2
x 300	-	90	16,5	19,5	0,1593	BFL	M2
x 315	-	97,5	16,5	19,5	0,1705	BFL	M2
x 355	-	117,5	18,0	21,0	0,2005	BFN	M2
x 400	-	140	19,5	22,5	0,2341	BFN	M2
x 450	-	165	20,5	23,5	0,2715	BFN	M2
x 500	-	190	22,0	25,0	0,3089	BFN	M2
x 550	-	215	23,0	26,0	0,3463	BF	M2
x 560	-	220	23,5	26,5	0,3538	BF	M2
x 600	-	240	24,5	27,5	0,3837	BF	M2
900 x 160	-	20	13,5	16,5	0,0619	BFL	M1
x 180	-	30	14,0	17,0	0,0789	BFL	M1
x 200	-	40	15,0	18,0	0,0958	BFL	M1
x 225	-	52,5	15,5	18,5	0,1170	BFL	M2

A x B [mm]	a [mm]	c [mm]	weight design		effect. area Sef. [m²]	Actu. mech.	Mech. contr.
			mech [kg]	servo [kg]			
900 x 250	-	65	16,5	19,5	0,1382	BFL	M2
x 280	-	80	17,0	20,0	0,1637	BFL	M2
x 300	-	90	17,5	20,5	0,1806	BFL	M2
x 315	-	97,5	18,0	21,0	0,1933	BFN	M2
x 355	-	117,5	19,5	22,5	0,2273	BFN	M2
x 400	-	140	21,0	24,0	0,2654	BFN	M2
x 450	-	165	22,5	25,5	0,3078	BFN	M2
x 500	-	190	23,5	26,5	0,3502	BF	M2
x 550	-	215	25,0	28,0	0,3926	BF	M2
1000 x 160	-	20	15,0	18,0	0,0692	BFL	M1
x 180	-	30	15,5	18,5	0,0882	BFL	M1
x 200	-	40	16,0	19,0	0,1071	BFL	M2
x 225	-	52,5	17,0	20,0	0,1308	BFL	M2
x 250	-	65	17,5	20,5	0,1545	BFL	M2
x 280	-	80	18,5	21,5	0,1830	BFL	M2
x 300	-	90	19,0	22,0	0,2019	BFN	M2
x 315	-	97,5	19,5	22,5	0,2161	BFN	M2
x 355	-	117,5	21,0	24,0	0,2541	BFN	M2
x 400	-	140	22,5	25,5	0,2967	BFN	M2
x 450	-	165	14,0	27,0	0,3441	BFN	M2
x 500	-	190	25,5	28,5	0,3915	BF	M2

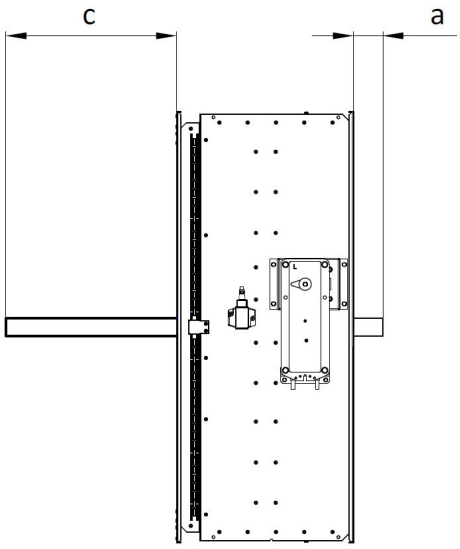
3.3 Blades overlaps

Tab 3.3.1. Blades overlaps

Blades overlaps		Dimension	Overlaps
Blades overlaps Fig.28	Act. mechanism side	”a”	Tab. 4.2.1
	Side without act. mechanism	”c”	Tab. 4.2.1

These values have to respected when projecting related air-conditioning

Fig. 25 Blades overlaps



3.4 For the design .60 (with BKN supply and communication device) add to weight of the damper with an actuating mechanism (from the Tab 4.2.1.) the weight of BKN…0,5 kg.

3.5 Dampers can be supplied on the customer´s demands in all subdimension of the above mentioned range.

3.6 Flanges of dampers (Fig. 22, 23).

Fig. 26 Flange of Damper- OPERATORS SIDE

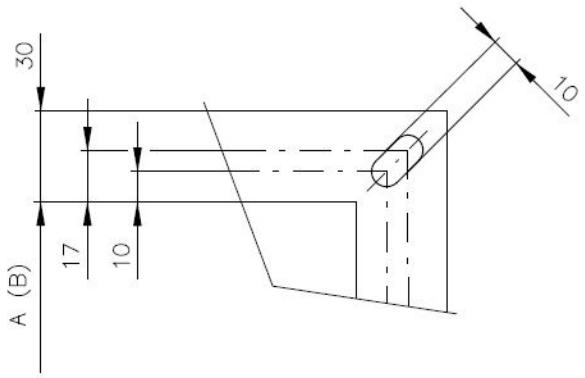
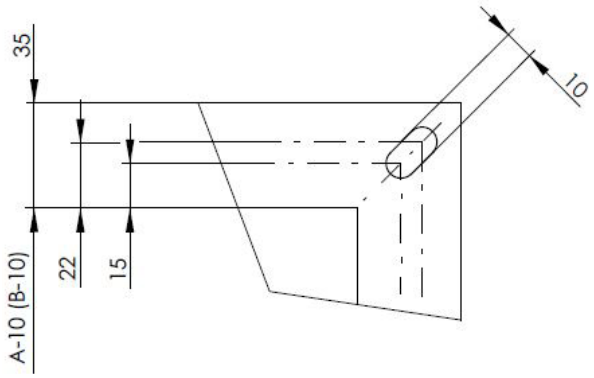


Fig. 27 Flange of Damper- INSTALLATIONS SIDE



4. Placement and Assembly

4.1 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. Installation gap must be filled by approved material perfectly in all the installation space volume (installation gap).

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.

Damper blade has to be inside of construction (labelled with BUILD IN EDGE on the damper body) after installation. The fire damper can also be installed outside the wall construction. Duct and the damper part between the wall construction and the damper blade (labelled with BUILD IN EDGE on the protective covering) must be protected with firefighting insulation.

The distance between the fire damper and the construction (wall, ceiling) must be minimum 75 mm. 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.

Exceptions are given in chapter 6.

Fig. 27 The distance between the fire damper and the construction

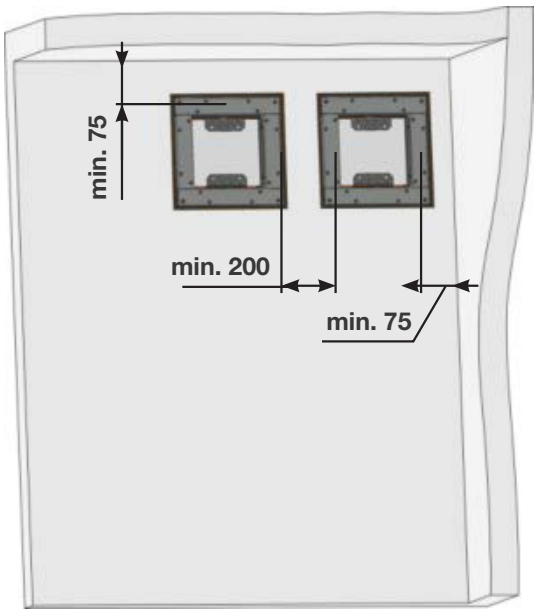
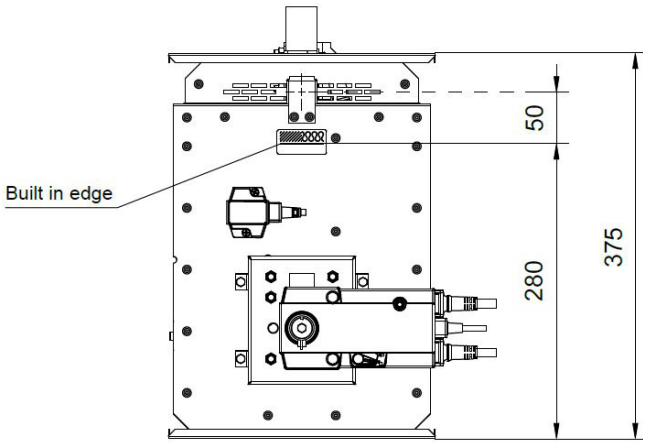


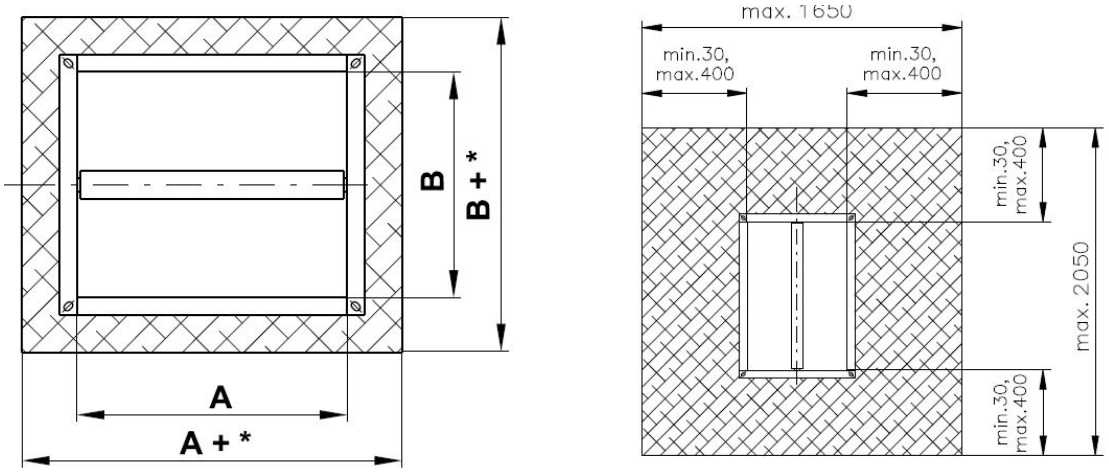
Fig. 28 Built in edge



"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.

4.2 The control mechanism has to be protected (covered) against damage and pollution during installation process. 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.

Fig. 29 Installation opening



1- * The recommended dimension of the installation opening is from 25 mm to
2- 50 mm on the both sides (it means from A+50 to A+100 or B+50 to B+100)

4.3 Examples of fire damper installing

The fire damper can be integrated into a solid wall construction made e.g. of normal concrete/ masonry, porous concrete with minimum thickness 100 mm or into solid ceiling construction made e.g. of normal concrete with minimum thickness 110 mm or porous concrete with minimum thickness 125 mm.

The fire damper can be integrated into a gypsum wall construction with fire classification EI 120 or EI 90.

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 with BUILD IN EDGE on the protective covering) must be protected with fire-fighting insulation.

If is damper installed outside a construction it is necessary to use reinforcement VRM.

5. Statement of installations

5.1 Installation method list

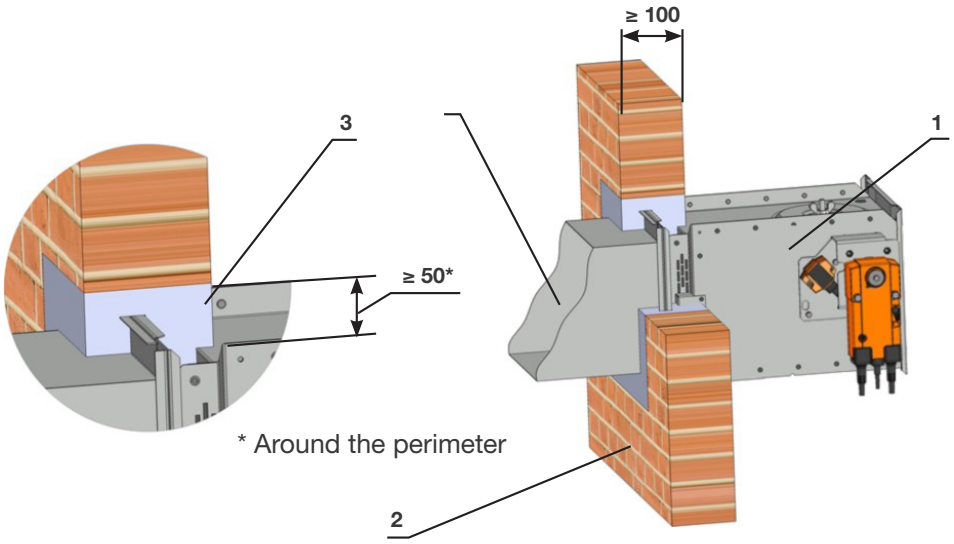
Tab 5.1.1.Installation method list

Fire separating constru.	Wall/Ceiling Min.thickness [mm]	Installation	Fire resist.	Page
Solid wall construction	100	Mortar or gypsum	EIS 120 EIS 90	22
	100	Stuffing box with fire protection mastic	EIS 60	22
	100	Fire protection foam with stucco plaster	EIS 60 EIS 45 EIS 30	23
	100	Battery - mortar or gypsum	EIS 90	24
	100	Installation next to wall - mortar or gypsum and mineral wool	EIS 90	25
	100	Stuffing box with fire protection mastic and cement lime plate	EIS 90	26
	100	Weichschott	EIS 90	27
Outside solid wall construction	100	Mineral wool - mortar or gypsum	EIS 60	28
	100	Mineral wool - stuffing box and fire protection mastic	EIS 60	29
	100	Mineral wool, stuffing box, fire protection mastic and cement lime plate	EIS 90 EIS 120	30
Gypsum wall construction	100	Mortar or gypsum	EIS 120 EIS 90	31
	100	Stuffing box with fire protection mastic EIS 60 40	EIS 60	32
	100	Fire protection foam with stucco plaster	EIS 60 EIS 45 EIS 30	33
	100	Battery - mortar or gypsum	EIS 90	34
	100	Installation next to wall - mortar or gypsum and mineral wool	EIS 90	35
	100	Stuffing box with fire protection mastic and cement lime plate	EIS 90	36
	100	Weichschott	EIS 90	37
Outside gypsum wall construction	100	Mineral wool - mortar or gypsum	EIS 60	38
	100	Mineral wool - stuffing box and fire protection mastic	EIS 60	39
	100	Mineral wool, stuffing box, fire protection mastic and cement lime plate	EIS 90 EIS 120	40
Solid ceiling construction	110 - Concrete 125 - Aerated concrete	Mortar or gypsum	EIS 120 EIS 90	42
		Stuffing box with fire protection mastic	EIS 60	43
		Battery - mortar or gypsum	EIS 90	44
		Stuffing box with fire protection mastic and cement lime plate	EIS 90	45
		Weichschott	EIS 90	46
Outside solid ceiling construction	110 - Concrete 125 - Aerated concrete	Mineral wool - mortar or gypsum	EIS 90 EIS 120	47
		Concrete	EIS 90	48

5.2 Installation in solid wall construction

Fig. 30 Solid wall construction- mortar or gypsum

EIS 120
EIS 90

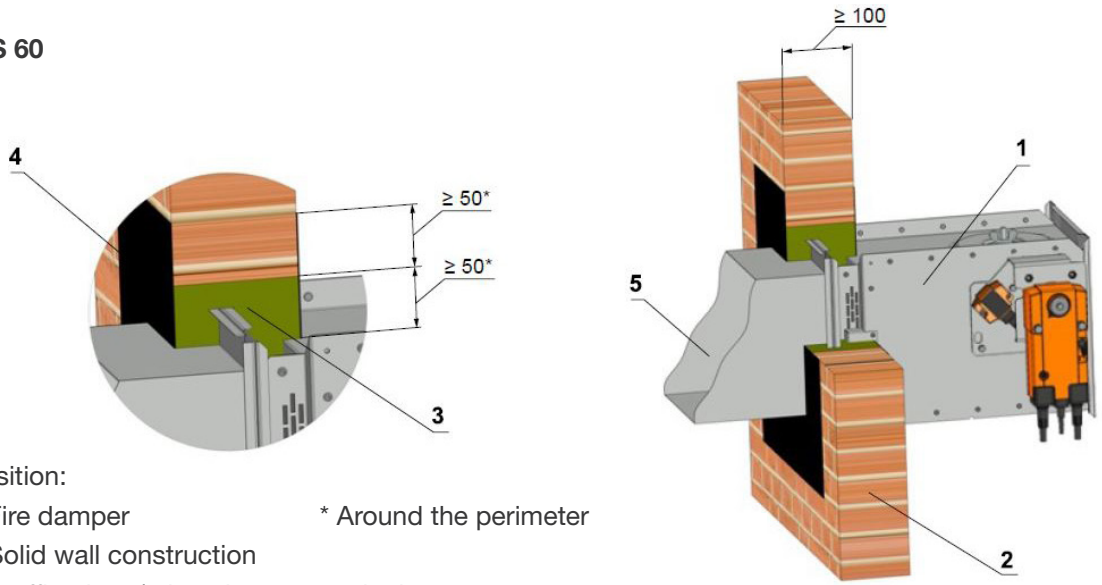


Position:
1 Fire damper
2 Solid wall construction
3 Mortar or gypsum
4 Duct

Shown schemes of incorporation and damper are illustrative only!

Fig. 31 Solid wall construction- stuffing box and fire protection mastic

EIS 60



Position:
1 Fire damper
2 Solid wall construction
3 Stuffing box (mineral stone wool min. density 140 kg/m^3)
4 Fire protection mastic min. thickness 1 mm
5 Duct

* 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

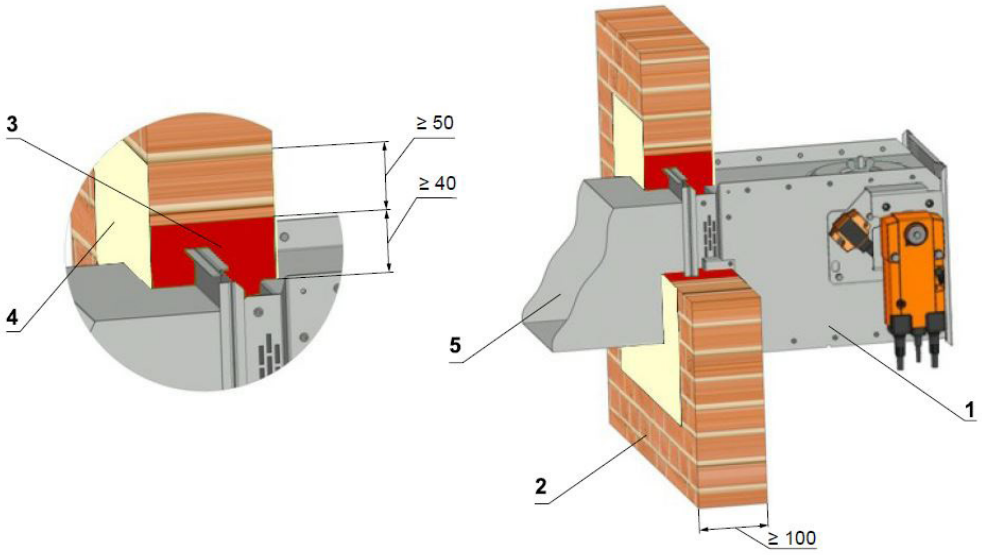
*** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.**

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

Fig. 32 Solid wall construction- fire protection foam with stucco plaster

Maximal damper dimensions 400x400 mm

EIS 60
EIS 45
EIS 30



Position:

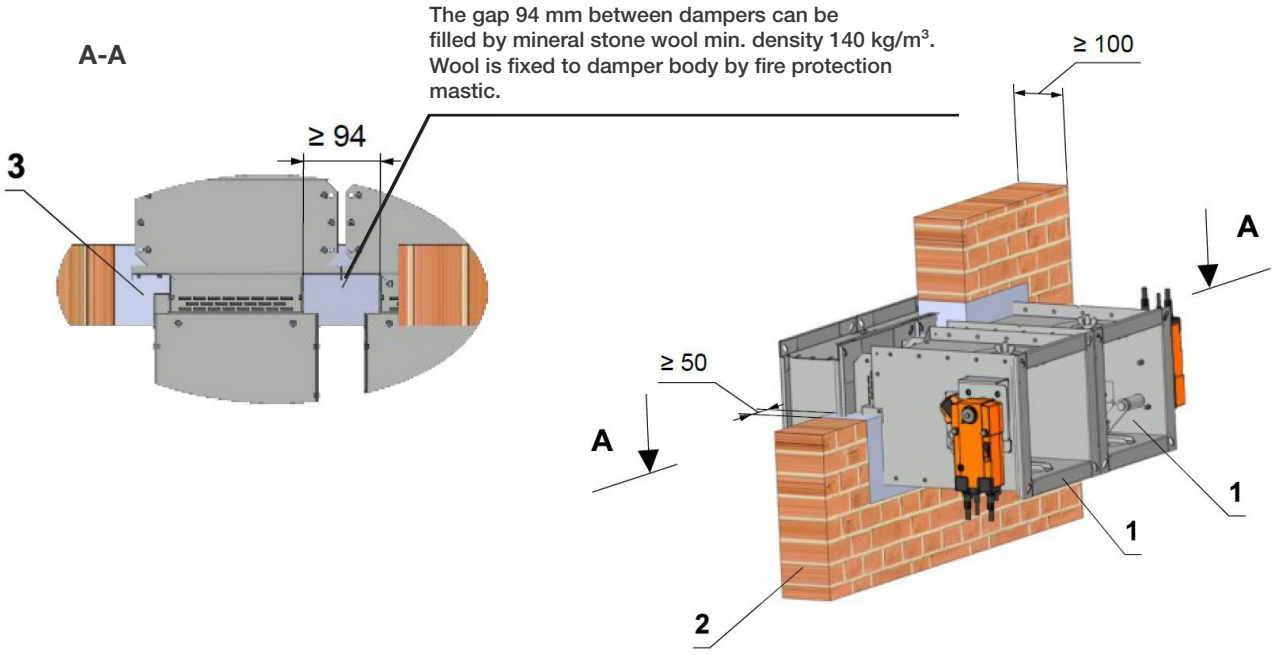
1 Fire damper
2 Solid wall construction
3 Fire protection foam
4 Stucco plaster
5 Duct

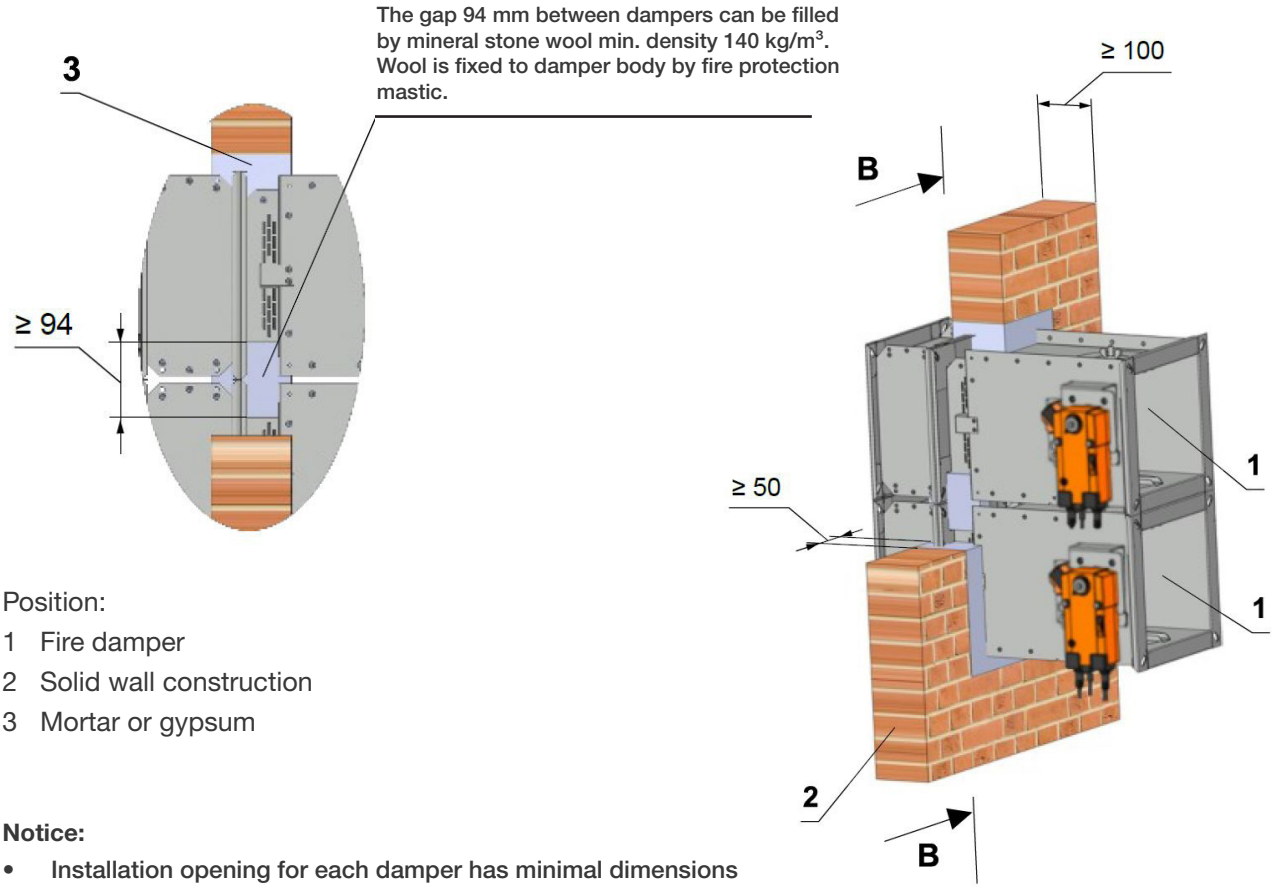
Used materials - example:*

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

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

Fig. 33 Solid wall construction- battery- mortar or gypsum





Position:

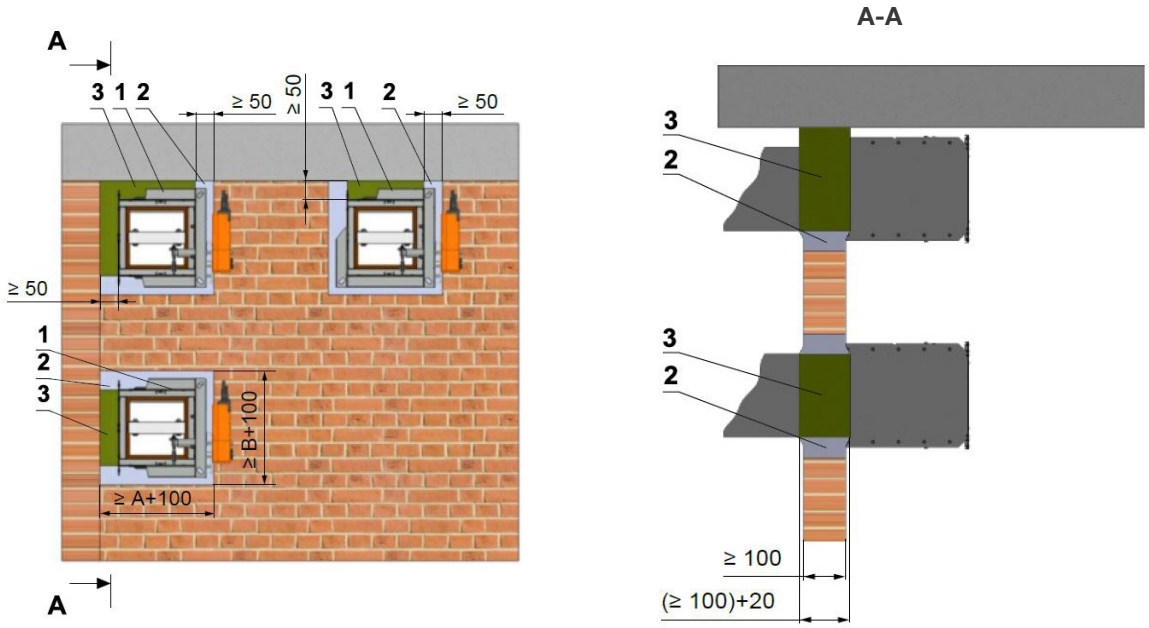
1 Fire damper
2 Solid wall construction
3 Mortar or gypsum

Notice:

- Installation opening for each damper has minimal dimensions a x b = (A+100) x (2xB +100) mm or (2xA+100) x (B +100) mm
- Gap between damper and construction is filled by mortar or gypsum
- Distance between dampers 60 mm
- Flange to flange connection - Up to 4 dampers can be installed

Shown schemes of incorporation and damper are illustrative only!

Fig. 34 Solid wall construction- installation next to wall, ceiling- mortar or gypsum and mineral wool.



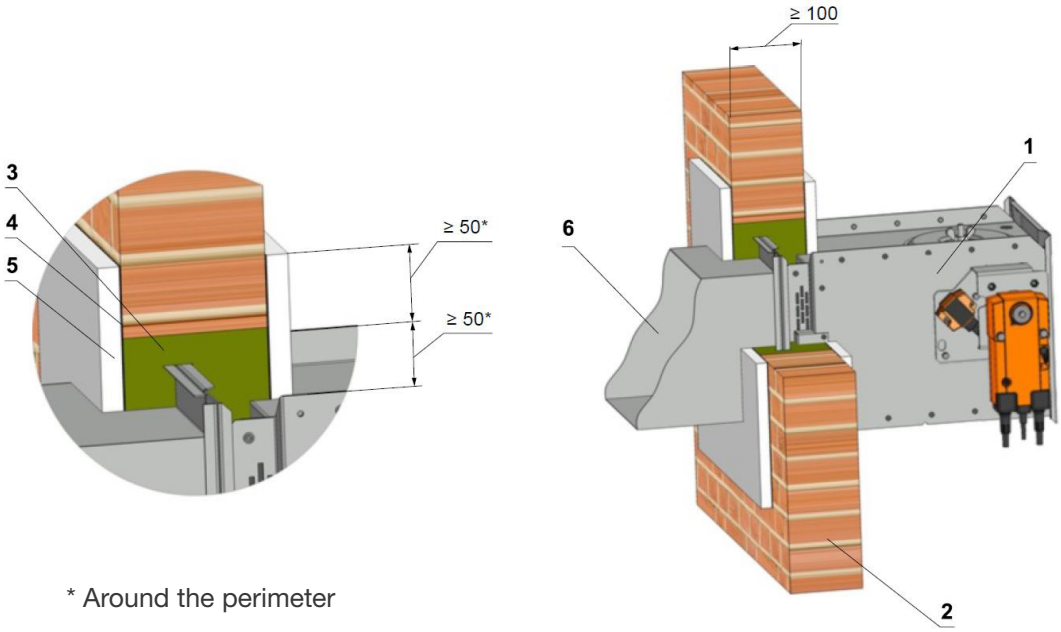
Notice:

- Gap between damper and construction is filled by mortar or gypsum and mineral wool
- Wool is fixed to damper body and construction by fire protection mastic
- Mineral wool thickness = construction thickness + 20 mm or 50 mm
- Installation is valid for ceiling construction

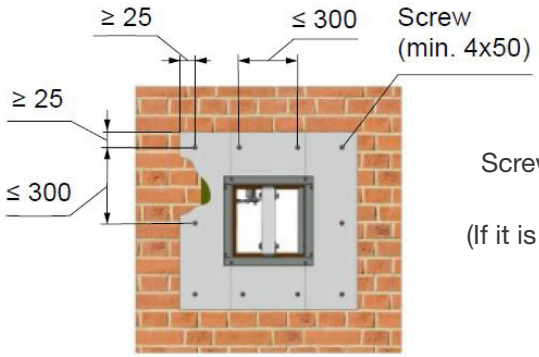
Shown schemes of incorporation and damper are illustrative only!

Fig. 35 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).

Position:

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

Used materials - example:*

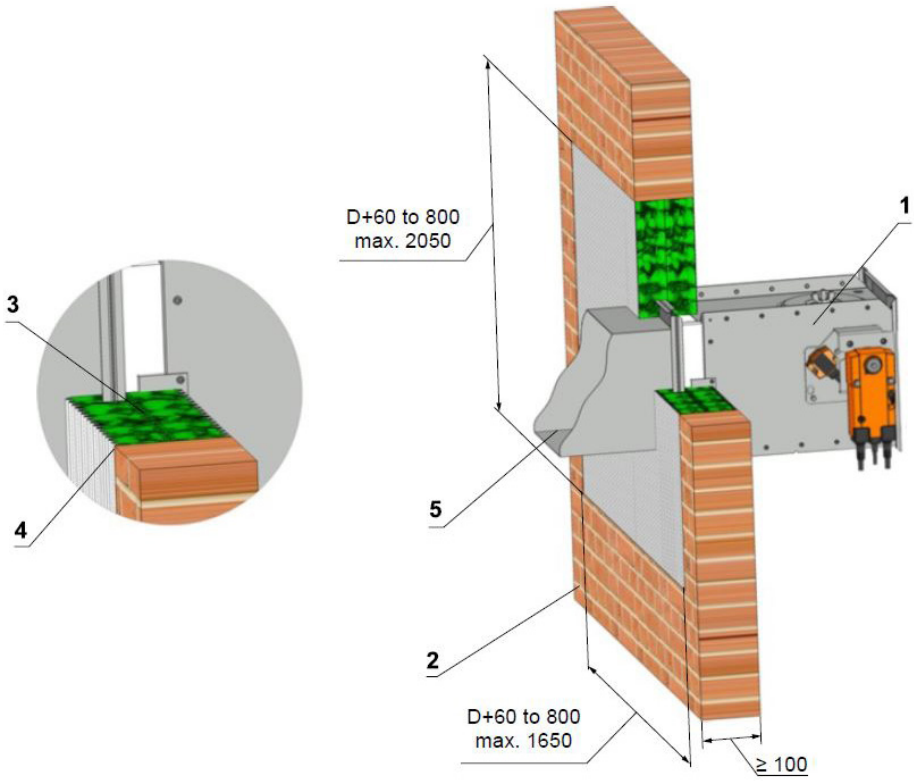
3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
4 Promastop - P, K, Hilti CFS-CT
5 Promatect - H

** 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!

Fig. 36 Solid wall construction- Weichschott

EIS 90



Position:

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

Used materials - example:*

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

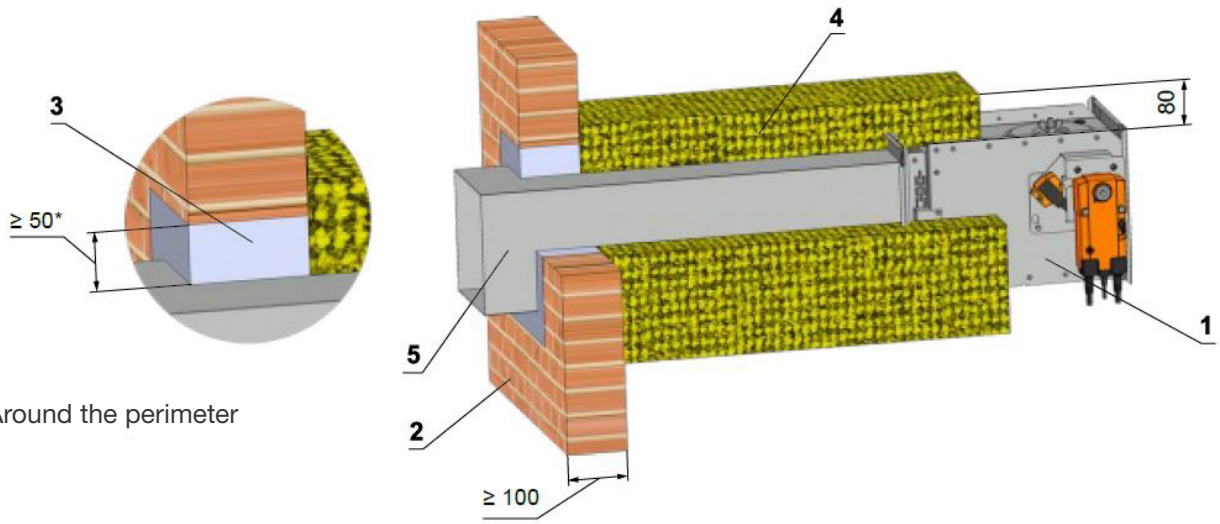
** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

Shown schemes of incorporation and damper are illustrative only!

5.3 Installation outside solid wall construction

Fig. 37 Outside solid wall construction- mineral wool- mortar or gypsum

EIS 60



* Around the perimeter

Position:

1 Fire damper
2 Solid wall construction
3 Mortar or gypsum
4 Stone wool with wired mat on one side, density 66 kg/m^3
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.

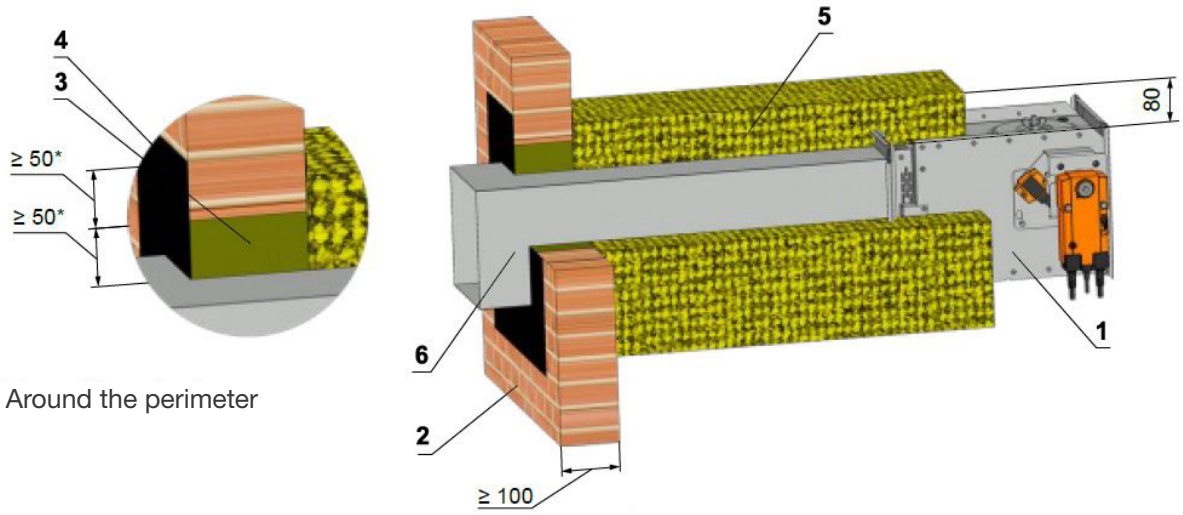
The maximum distance of the fire damper from the structure is not limited and according to EN 15882-2, the required number of suspensions acc. to EN 1366-1:2014 must be used.

The duct at the point of penetration can be anchored to the fire wall construction!

Shown schemes of incorporation and damper are illustrative only!

Fig. 38 Outside solid wall construction- mineral wool- stuffing box and protection mastic

EIS 60



Position:

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

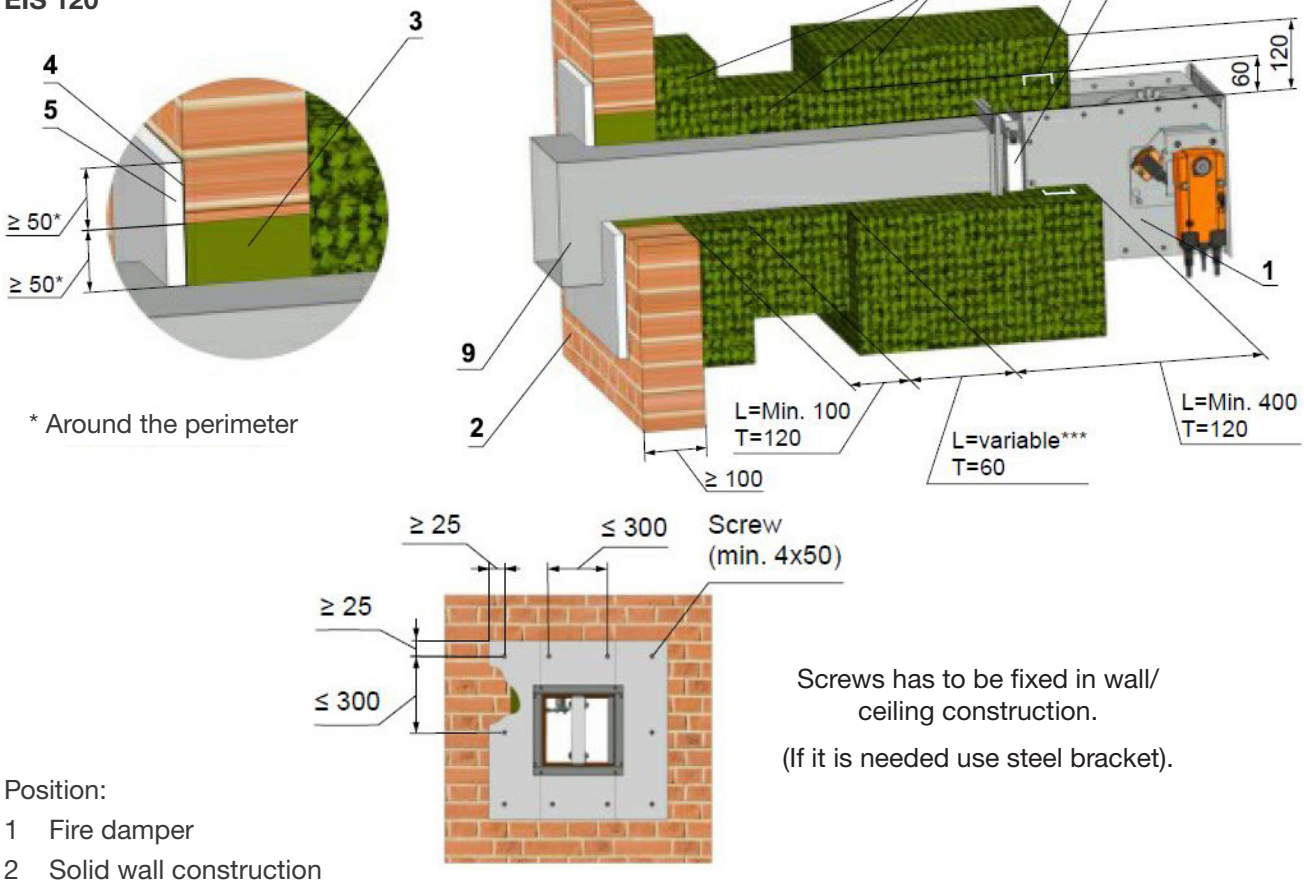
** The materials for stuffing box, fire protection mastic, lining and insulation materials can be replaced by another approved fire sealing system with equivalent properties.

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

Fig. 39 Outside solid wall construction- mineral wool, stuffing box, fire protection mastic and cement lime plate.

EIS 90
EIS 120 ***



* Around the perimeter

Screws has to be fixed in wall/ ceiling construction.

(If it is needed use steel bracket).

Position:

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

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 Conlit Ductrock EIS 90, 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 1366-1:2014.

**** Reinforcement fixing VRM see Fig. 81 Installation of profile U25x40x25 see Fig. 82

***** When using Rockwool Conlit Ductrock EIS 120, th. 60 mm, the overall fire resistance of the EIS 120 can be achieved.

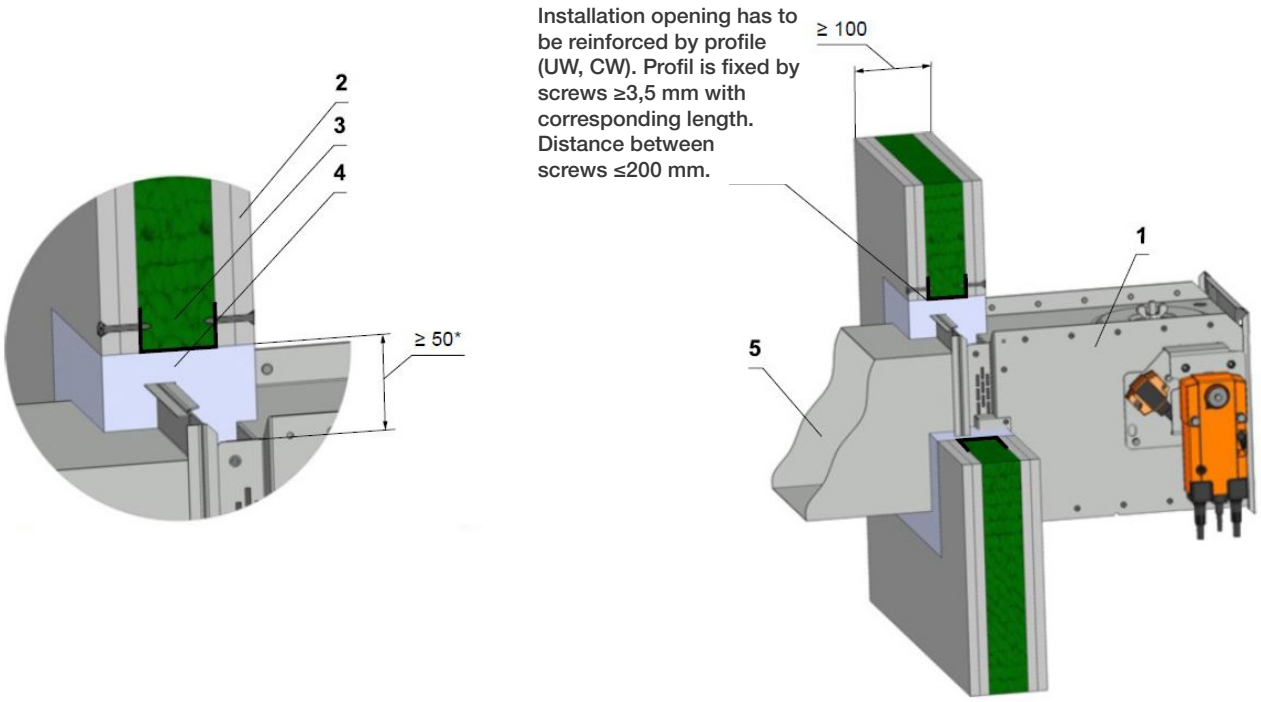
T - thickness of the insulation (mm)

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

5.4 Installation in gypsum wall construction

Fig. 41 Gypsum wall construction- mortar or gypsum

EIS 120
EIS 90



* Around the perimeter

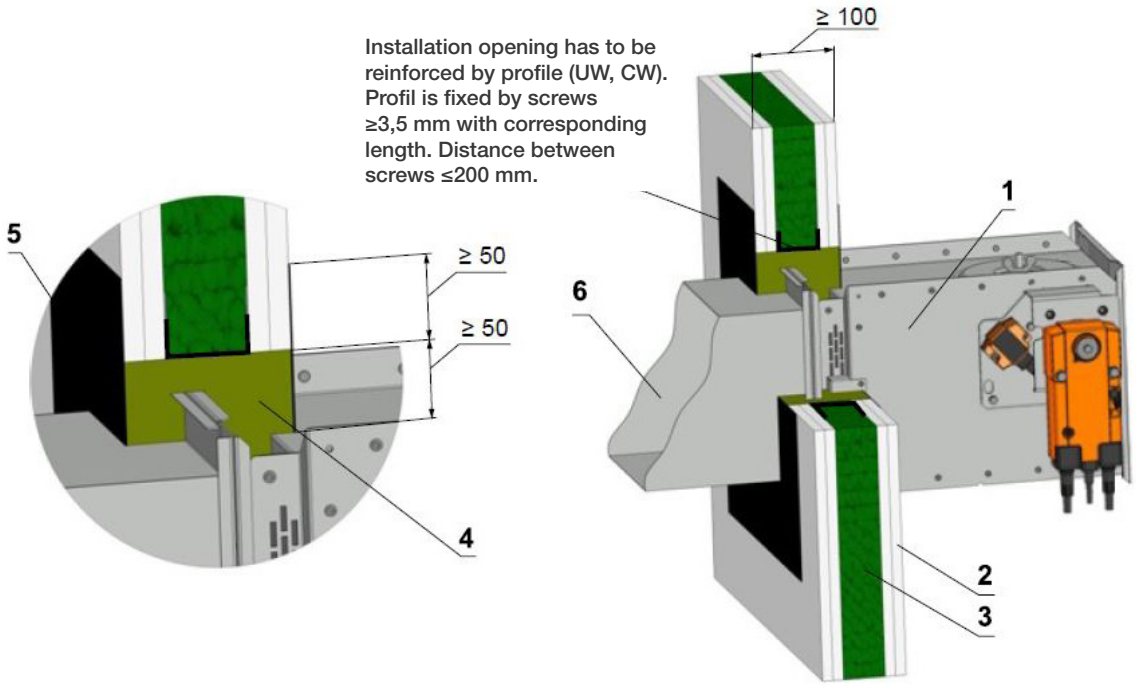
Position:

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

Shown schemes of incorporation and damper are illustrative only! Installation in gypsum wall construction

Fig. 42 Gypsum wall construction- stuffing box and fire protection mastic

EIS 60



Position:

1 Fire damper
2 Gypsum plate
3 Mineral wool (type depending on the type of construction)
4 Mineral stone wool min. min. density 140 kg/m^3
5 Fire protection mastic min. thickness 1 mm
6 Duct

Used materials - example:*

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

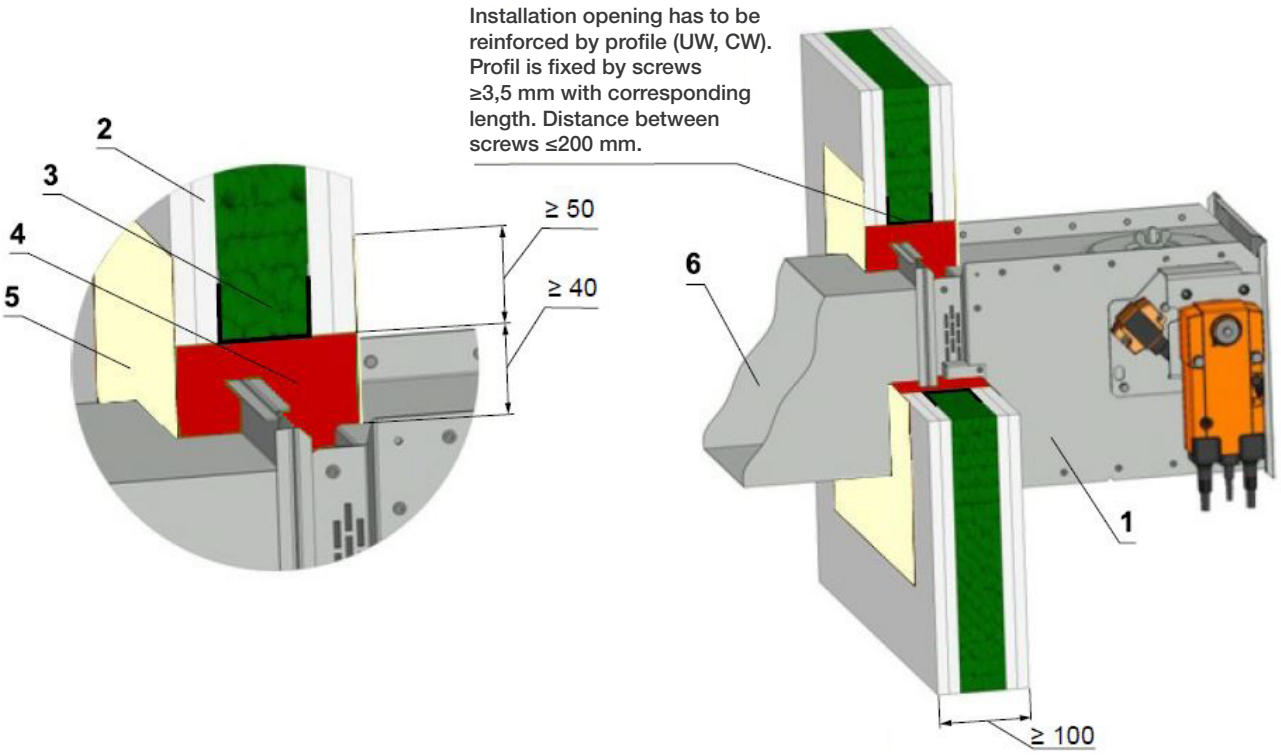
* Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

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

Fig. 43 Gypsum wall construction- fire protection foam with stucco plaster

Maximum damper dimensions 400x400 mm

EIS 60
EIS 45
EIS 30



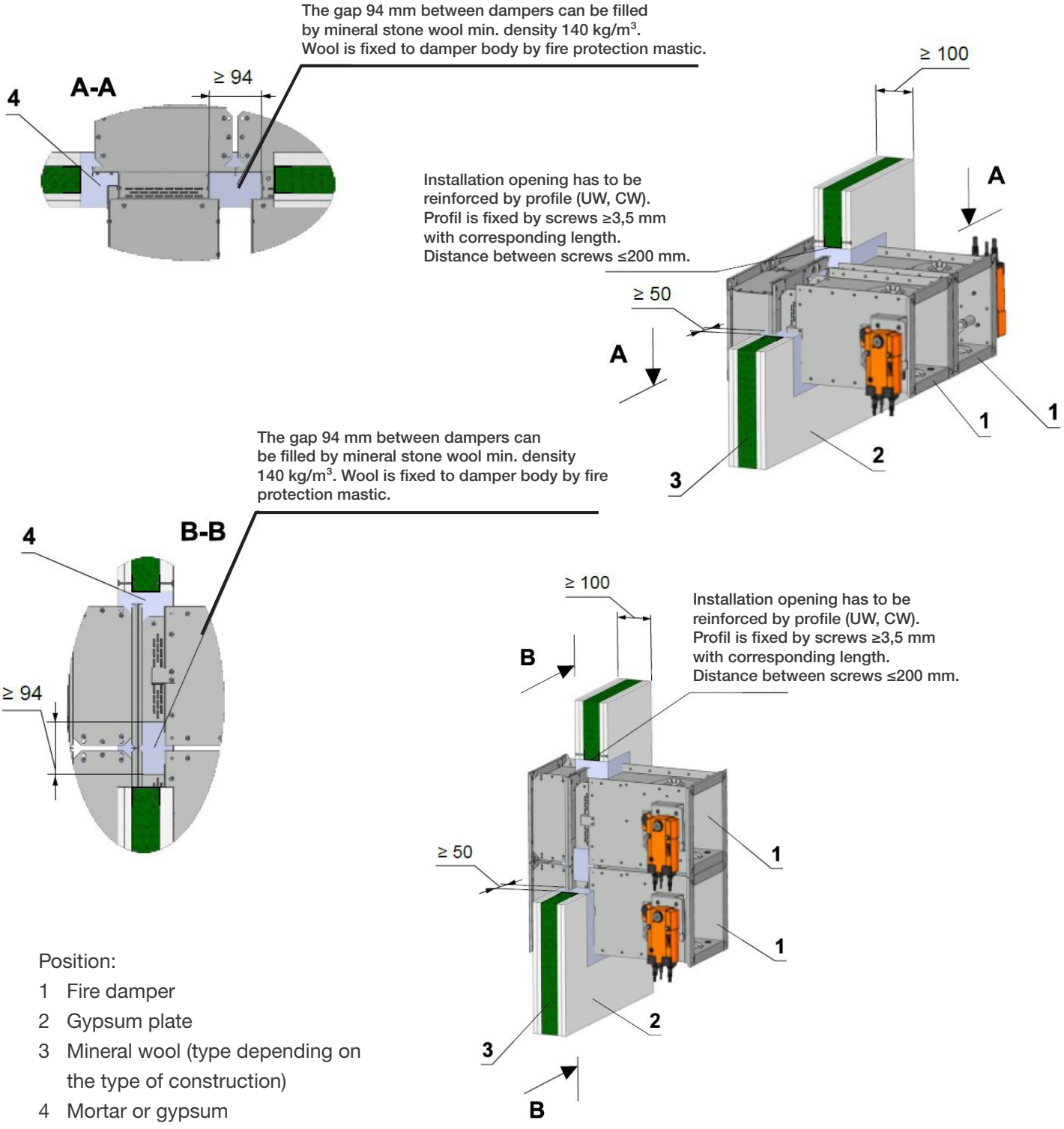
Position:
1 Fire damper
2 Gypsum plate
3 Mineral wool (type depending on the type of construction)
4 Fire protection foam
5 Stucco plaster
6 Duct

Used materials - example:
4 HILTI CFS-F FX - EIS 60
PROMAFOAM-C - EIS 45
SOUDAL, Soudafoam FR-B1 - EIS 30
DenBraven, Fire protection foam - EIS 30

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

Fig. 44 Gypsum wall construction- battery- mortar or gypsum

EIS 90



Position:

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

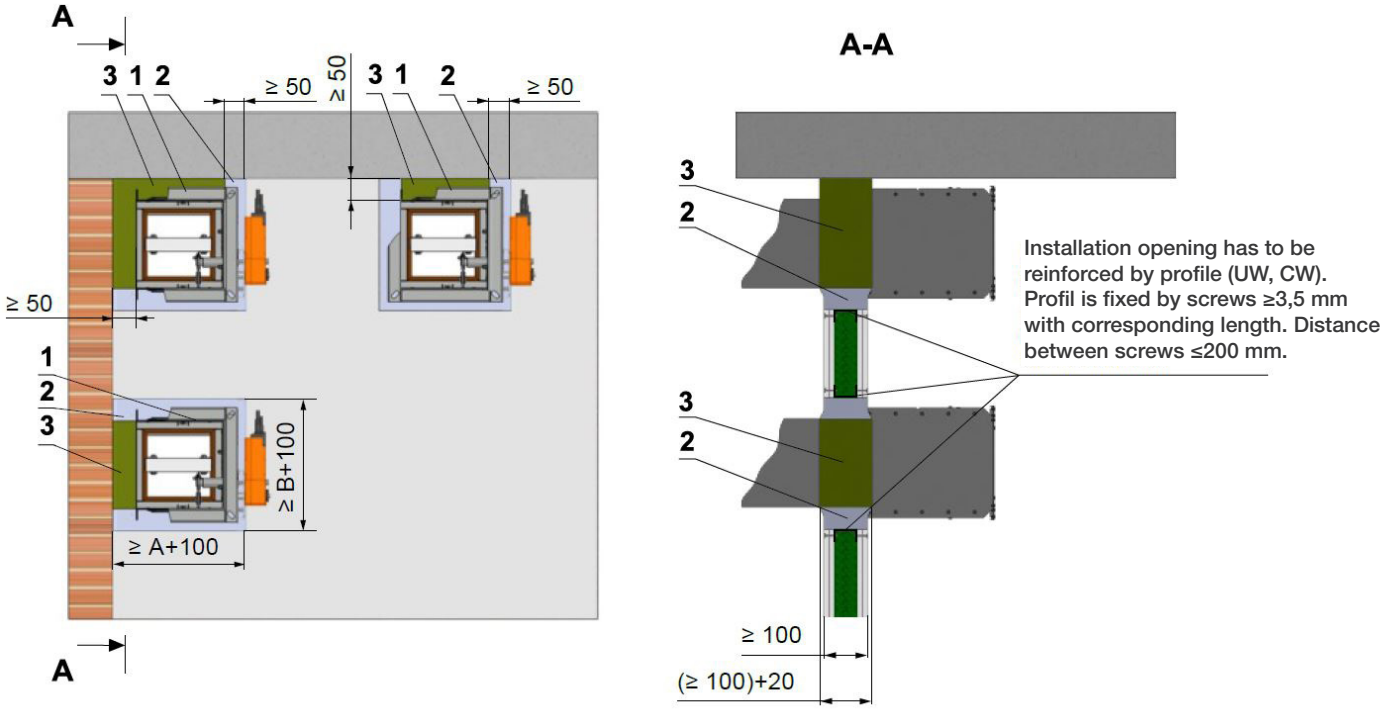
Notice:

- Installation opening for each damper has minimal dimensions
- a x b = (A+100) x (2xB +100) mm or (2xA+100) x (B +100) mm
- Gap between damper and construction is filled by mortar or gypsum
- Distance between dampers 60 mm
- Flange to flange connection - Up to 4 dampers can be installed

Shown schemes of incorporation and damper are illustrative only!

Fig. 45 Gypsum wall construction- installation next to wall, ceiling- mortar or gypsum and mineral wool

EIS 90



Position:

1 Fire damper
2 Mortar or gypsum
3 Mineral stone wool min. density 140 kg/m^3

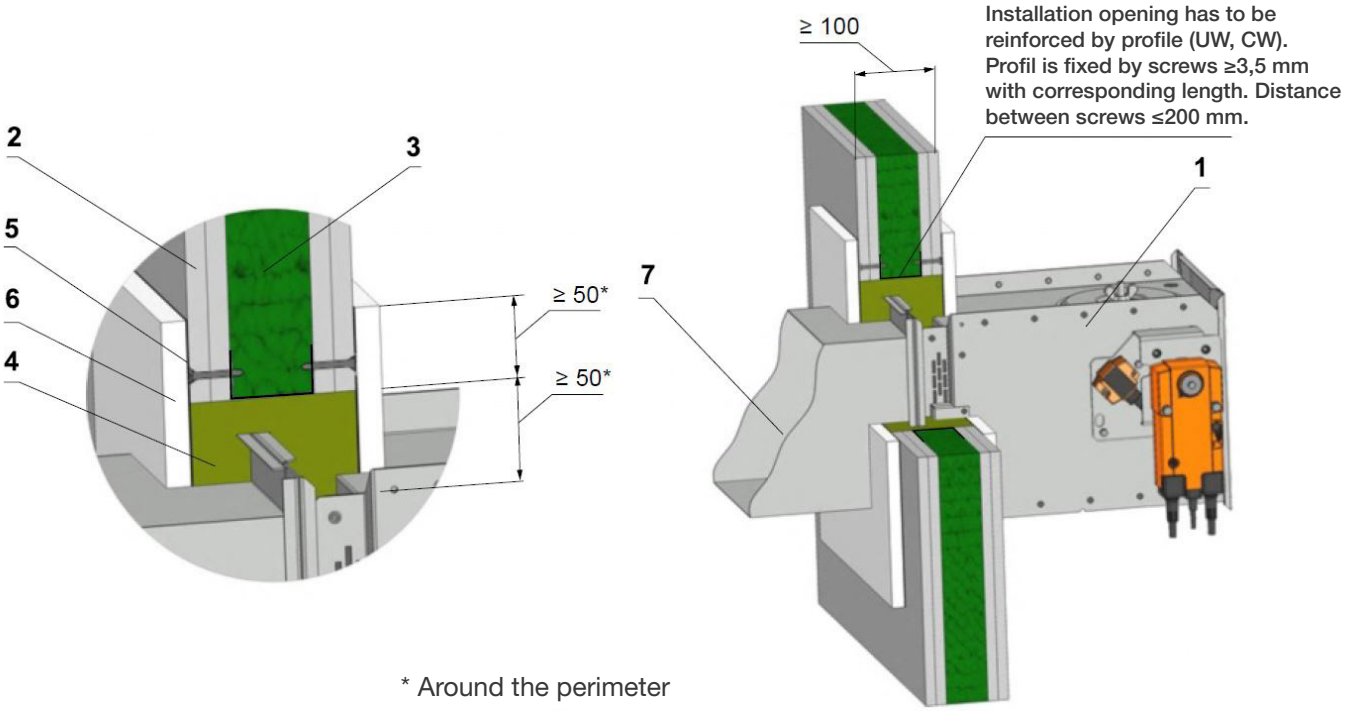
Notice:

- Gap between damper and construction is filled by mortar or gypsum and mineral wool
- Wool is fixed to damper body and construction by fire protection mastic
- Mineral wool thickness = construction thickness + 20 mm or 50 mm
- Installation is valid for ceiling construction

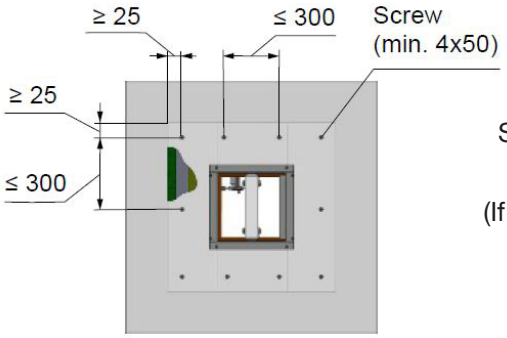
Shown schemes of incorporation and damper are illustrative only!

Fig. 46 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).

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/m^3
5 Fire protection mastic min. thickness 1 mm
6 Cement lime plate min. thickness 15 mm (min. density 870 kg/m^3)
7 Duct

Used materials - example:**

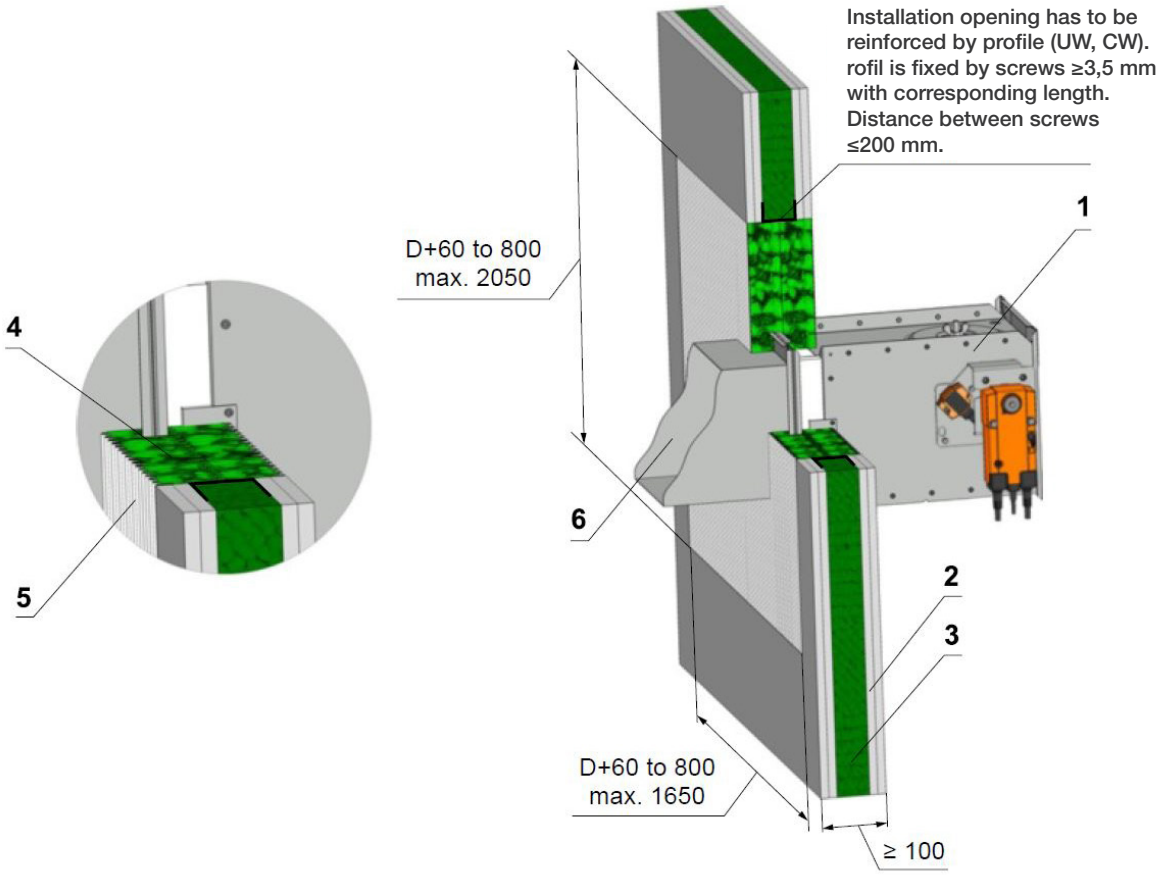
4 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
5 Promastop - P, K, Hilti CFS-CT
6 Promatect - H

** 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!

Fig. 47 Gypsum wall construction- Weichschott

EIS 90



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
6 Duct

Used materials - example:*

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

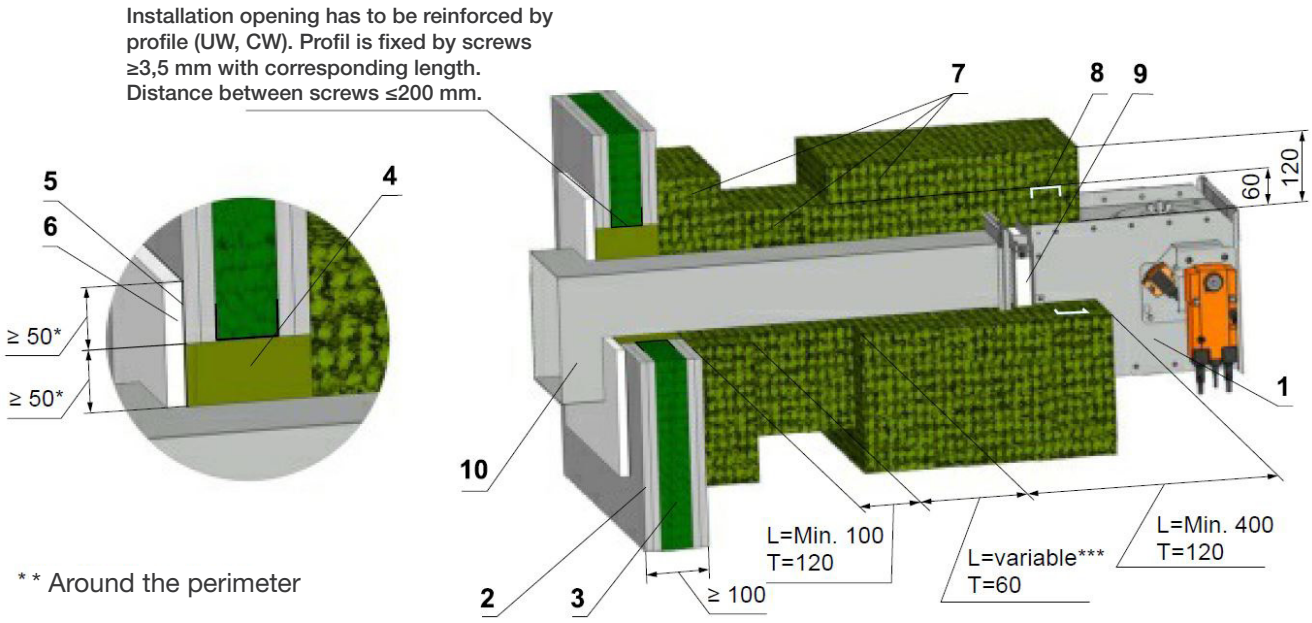
** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.

Shown schemes of incorporation and damper are illustrative only!

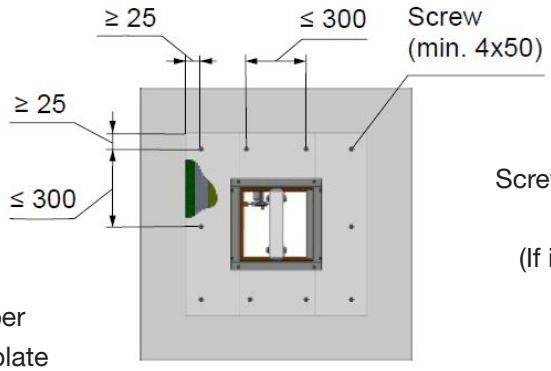
5.5 Installation outside gypsum wall construction

Fig. 48 Outside gypsum wall construction- mineral wool- mortar or gypsum

EIS 60



* * Around the perimeter



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 Mortar or gypsum
5 Stone wool with wired mat on one side, density 66 kg/m^3
6 Duct

Used materials - example:*

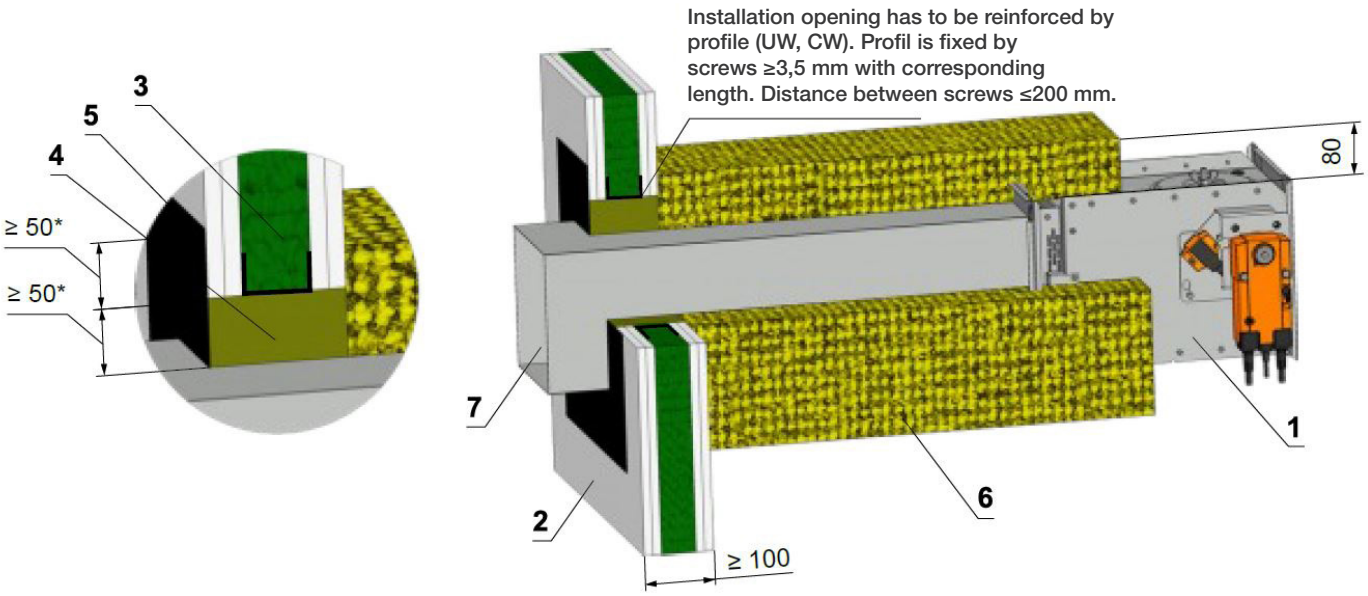
5 Isover Ultimate Protect SLAB 4.0, th. 80 mm ALU1

** 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!

Fig. 49 Outside gypsum wall construction- mineral wool- stuffing box and fire protection mastic

EIS 60



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/m^3)
5 Fire protection mastic min. thickness 1 mm
6 Stone wool with wired mat on one side, density 66 kg/m^3
7 Duct

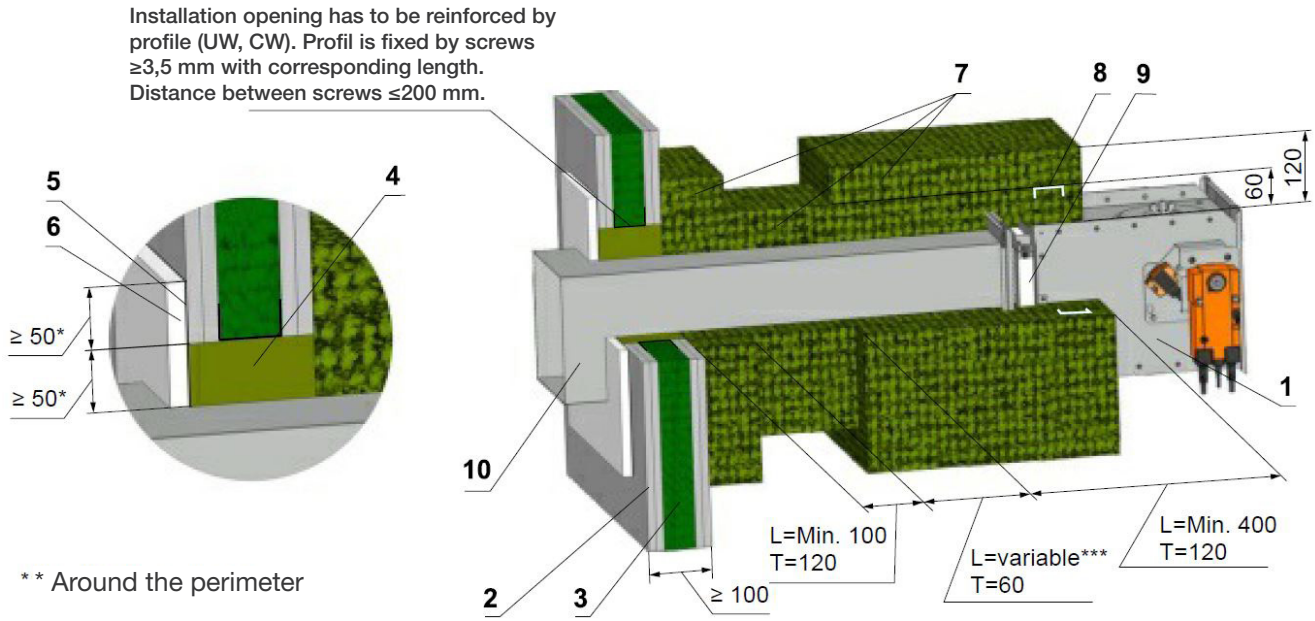
Used materials - example:*
4 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
5 Promastop - P, K, Hilti CFS-CT
6 Isover Ultimate Protect SLAB 4.0, th. 80 mm ALU1

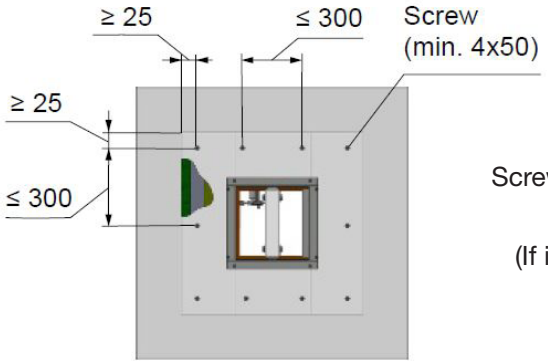
** The materials for stuffing box, fire protection mastic, lining and insulation materials can be replaced by another approved fire sealing system with equivalent properties. The maximum distance of the fire damper from the structure is not limited and according to EN 15882-2, the required number of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

Fig. 50 Outside gypsum wall construction- mineral wool- stuffing box and fire protection mastic and cement plate

EIS 90
EIS 120 ***





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/m^3
5 Fire protection mastic min. thickness 1 mm
6 Cement lime plate min. thickness 15 mm (min. density 870 kg/m^3)
7 Stone wool bound with use of an organic resin with crushed stone as a refrigerant, min. density 300 kg/m^3 and min. thickness 60 mm
8 Profil U25x40x25
9 VRM****
10 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 Conlit Ductrock EIS 90, 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 1366-1:2014.

**** Reinforcement fixing VRM see Fig. 81 Installation of profile U25x40x25 see Fig. 82

***** When using Rockwool Conlit Ductrock EIS 120, th. 60 mm, the overall fire resistance of the EIS 120 can be achieved.

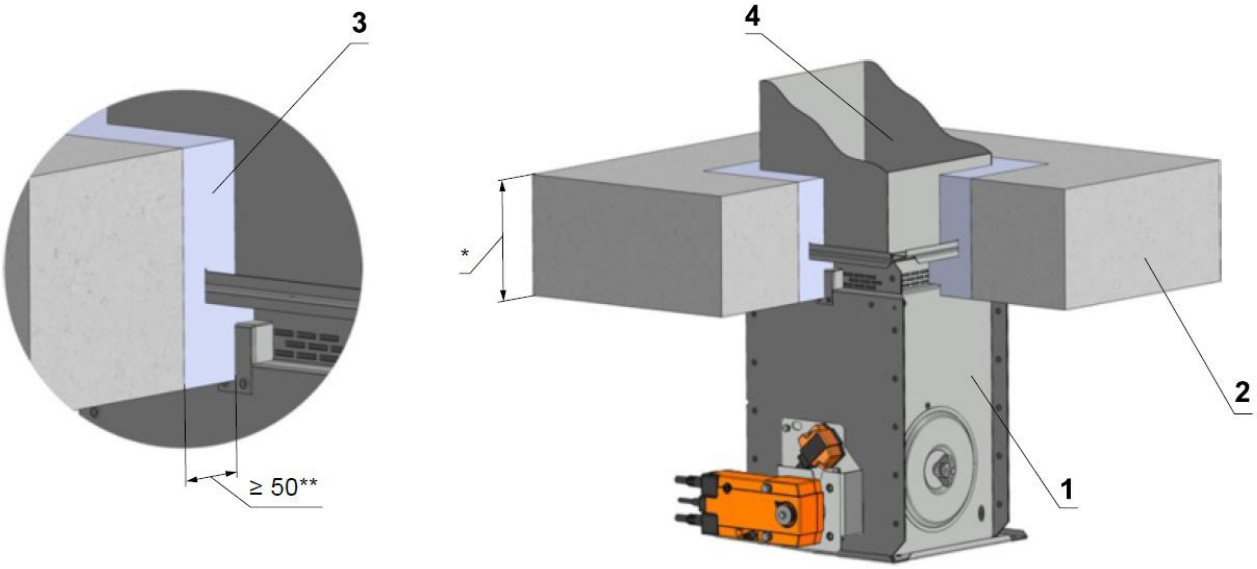
T - thickness of the insulation (mm)

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

5.6 Installation in solid ceiling construction

Fig. 51 Solid ceiling construction- mortar or gypsum

EIS 120
EIS 90



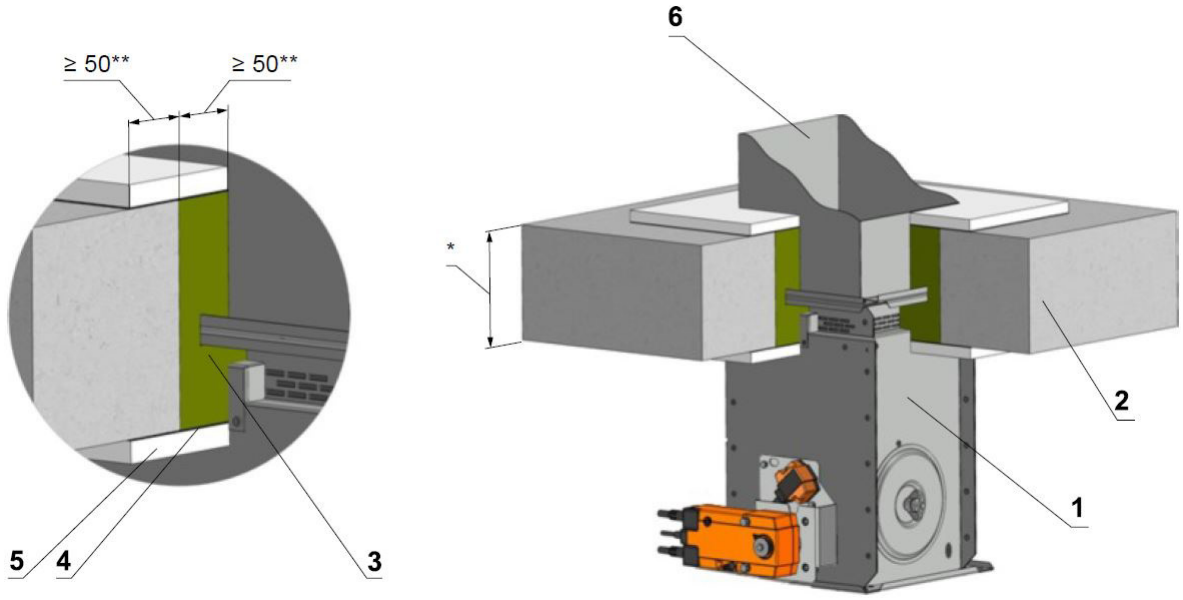
Position:
1 Fire damper
2 Solid ceiling construction
3 Mortar or gypsum
4 Duct

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

Shown schemes of incorporation and damper are illustrative only!

Fig. 53 Solid ceiling construction- stuffing box, fire protection mastic

EIS 60



Position:
1 Fire damper
2 Solid ceiling construction
3 Stuffing box (mineral stone wool min. density 140 kg/m^3)
4 Fire protection mastic min. thickness 1 mm
5 Duct

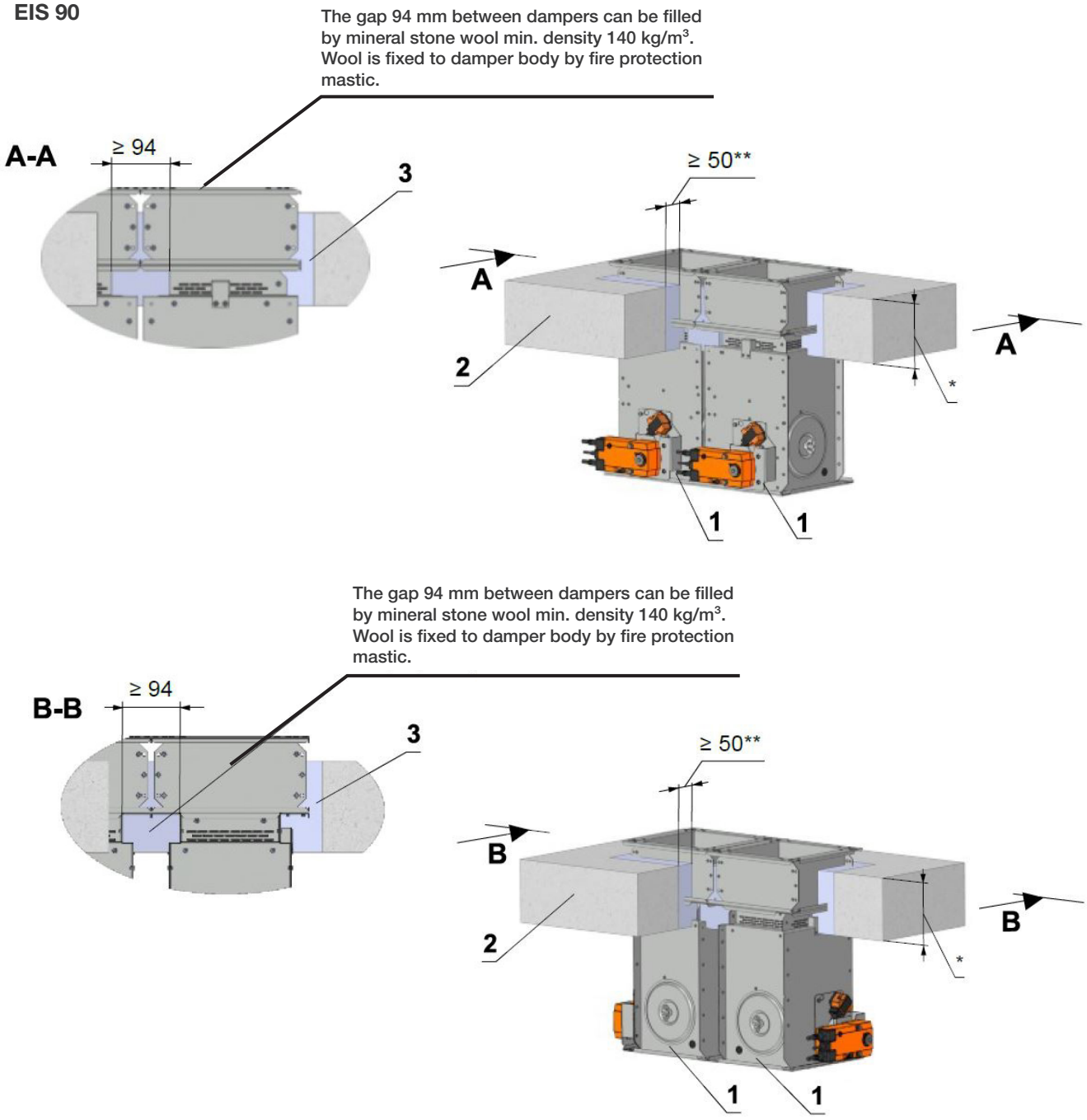
Used materials - example:**
3 Promapyr, Rockwool Steprock HD, Hilti CFS-CT B 1S 140/50
4 Promastop - P, K, Hilti CFS-CT

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

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

Fig. 54 Solid ceiling construction- battery- mortar or gypsum

EIS 90



Position:
1 Fire damper
2 Solid wall construction
3 Mortar or gypsum

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

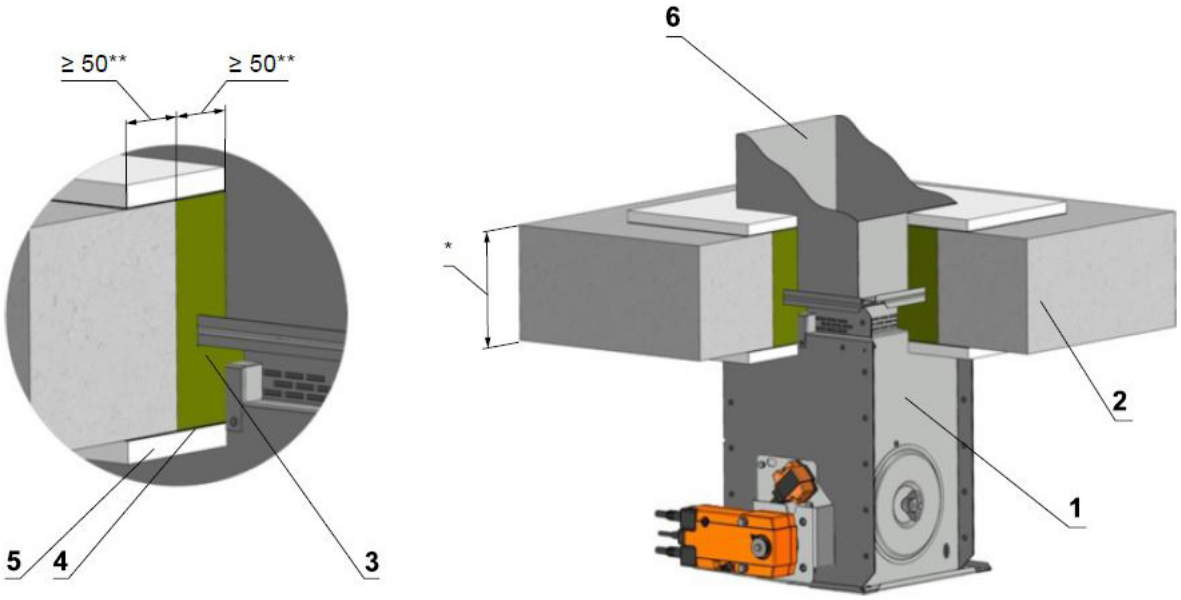
Notice:

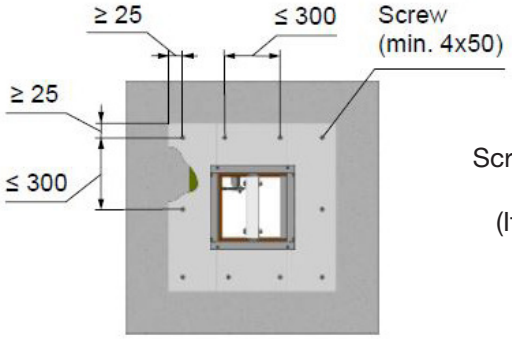
- Installation opening for each damper has minimal dimensions
- a x b = (A+100) x (2xB +100) mm or (2xA+100) x (B +100) mm
- Gap between damper and construction is filled by mortar or gypsum
- Distance between dampers 60 mm
- Flange to flange connection - Up to 4 dampers can be installed

Shown schemes of incorporation and damper are illustrative only!

Fig. 55 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).

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

* 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

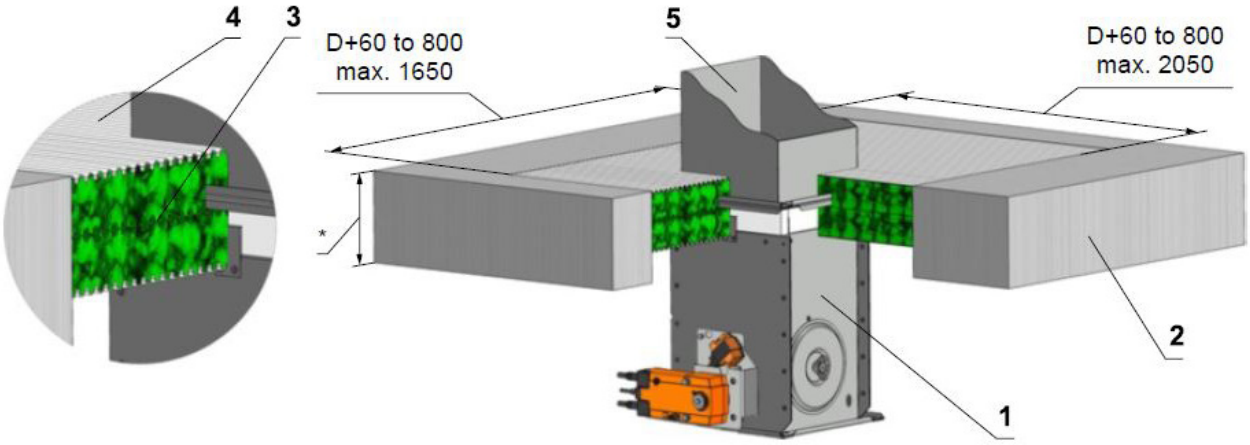
***** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.**

The damper must be anchored to the fire ceiling construction!

Shown schemes of incorporation and damper are illustrative only!

Fig. 56 Solid ceiling construction- Weichschott

EIS 90



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

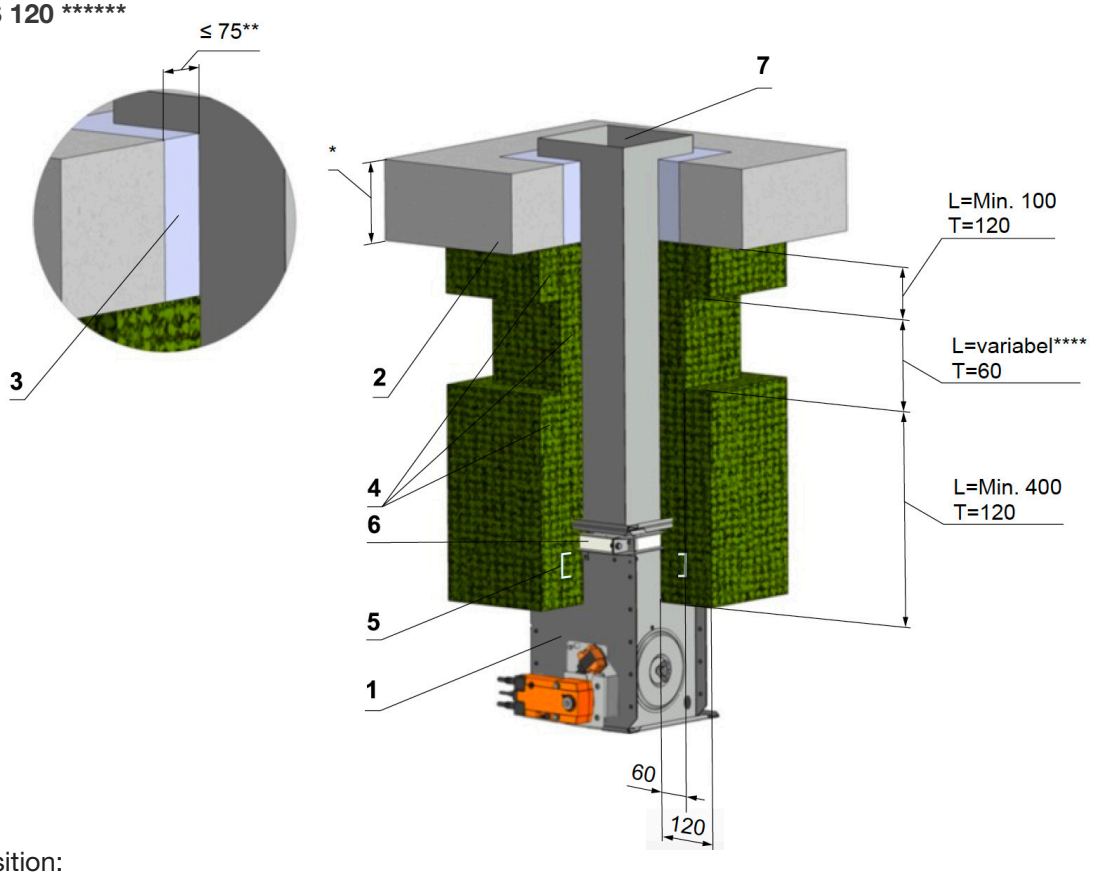
**** Fire resistant insulation and fire resistant board can be replaced by another approved fire sealing system for damper installation with equivalent material properties.**

Shown schemes of incorporation and damper are illustrative only!

5.7 Installation outside solid ceiling construction

Fig. 57 Outside solid ceiling construction- mineral wool- mortar and gypsum

EIS 90
EIS 120 ****



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/m^3 and min. thickness 60 mm
5 Profil U25x40x25
6 VRM*****
7 Duct

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

Used materials - example:**
4 Rockwool Conlit Ductrock EIS 90, 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 1366-1:2014.

**** Reinforcement fixing VRM see Fig. 81 Installation of profile U25x40x25 see Fig. 82

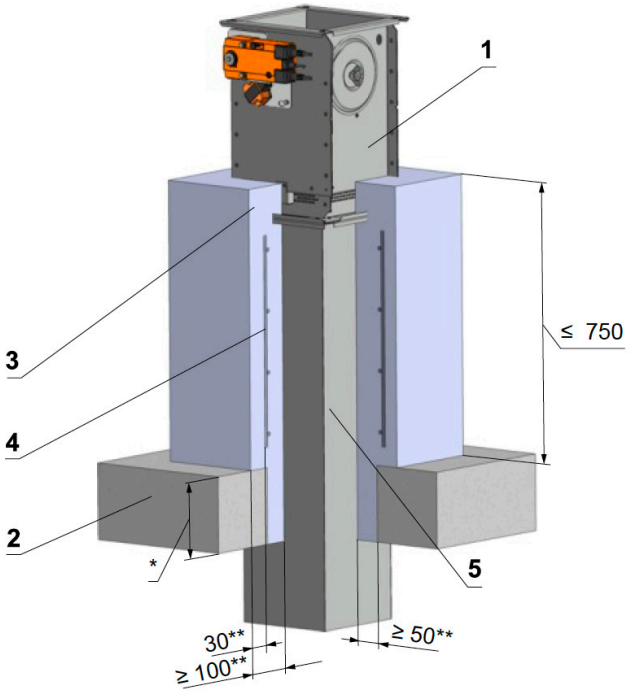
***** When using Rockwool Conlit Ductrock EIS 120, th. 60 mm, the overall fire resistance of the EIS 120 can be achieved.

T - thickness of the insulation (mm)

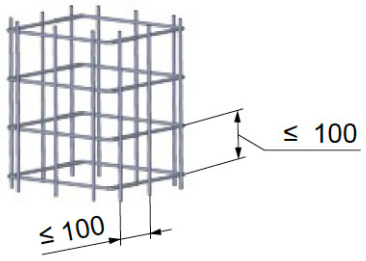
The duct at the point of penetration can be anchored to the fire ceiling construction!
Shown schemes of incorporation and damper are illustrative only!

Fig. 58 Outside solid ceiling construction- Concrete

EIS 90



Rebar- steel wire- Ø 6 mm



Position:
1 Fire damper
2 Solid ceiling construction
3 Concrete B20
4 Rebar
5 Duct

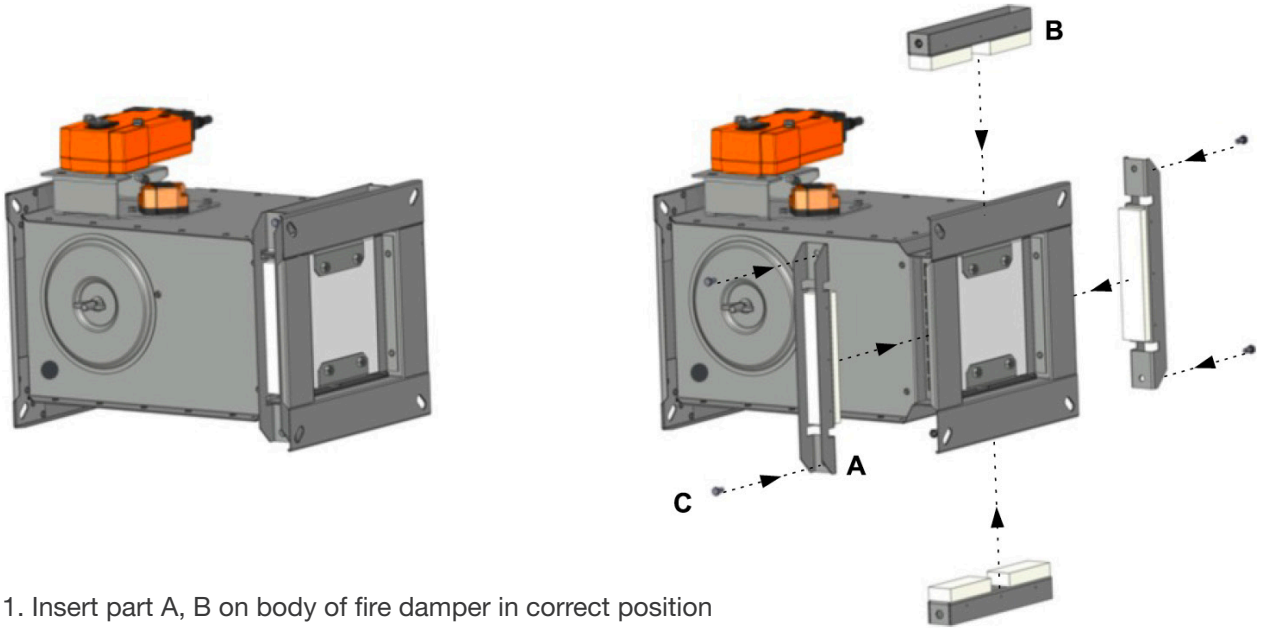
* min. 110 - Concrete/ min. 125 - Aerated concrete
** Around the perimeter

Shown schemes of incorporation and damper are illustrative only!

6. Installation frames

Fig. 59 Fixing of reinforcement to damper body VRM

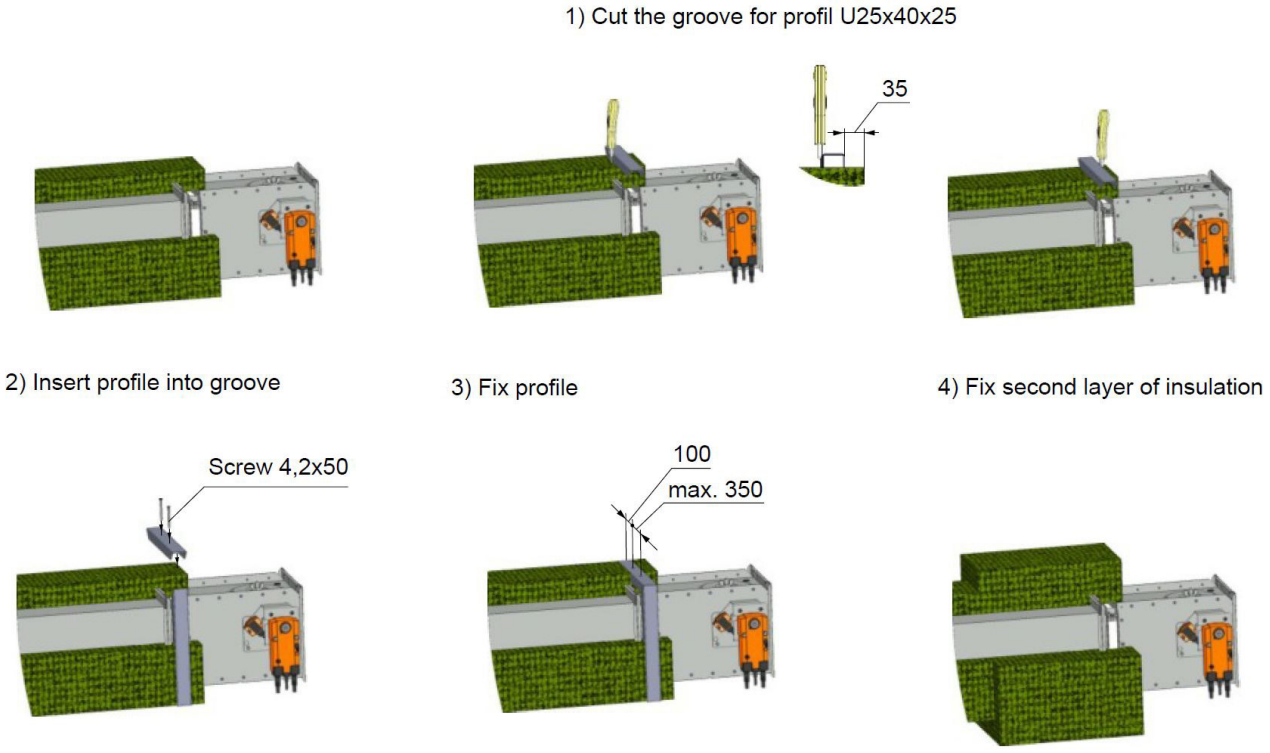
Important: For lower resistance that EI90 the reinforcement VRM is not necessary!



1. Insert part A, B on body of fire damper in correct position
2. Lock screw C
3. It has to be done on each corner of VRM

Shown dampers are illustrative only!

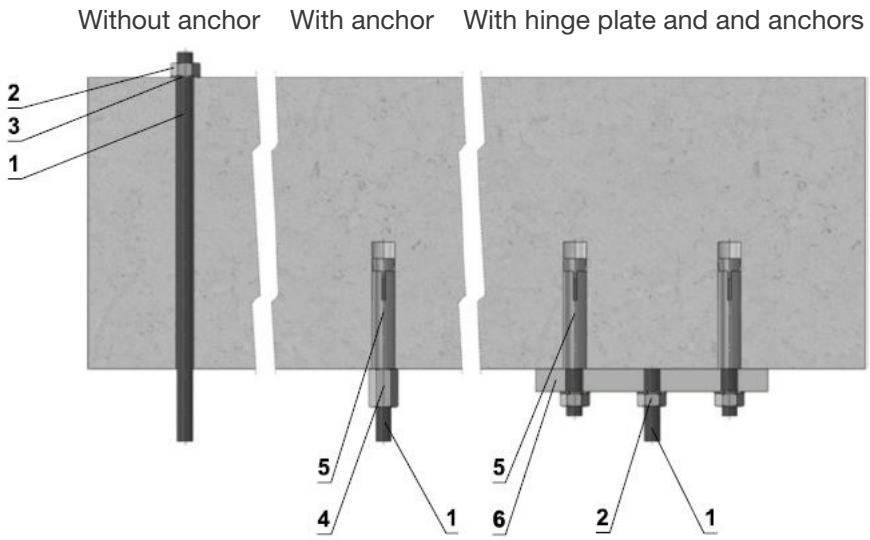
Fig. 60 Installation procedure



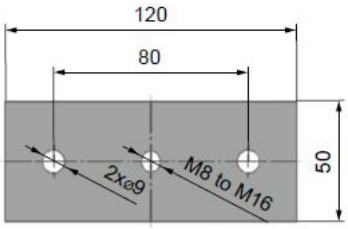
Installation details see chapter 9.4
Shown schemes of incorporation and damper are illustrative only!

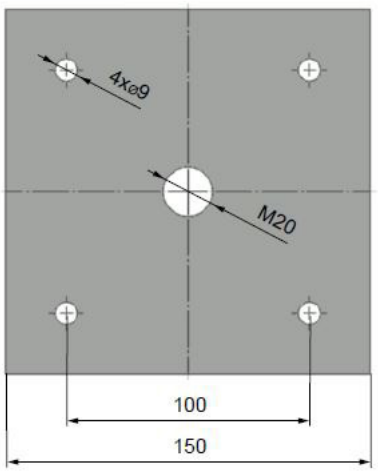
7. Suspension systems

Fig. 60 Mounting to the ceiling wall



Hinge plates





Position:
1 Threaded rod M8 – M20
2 Nut
3 Washer
4 Coupling Nut
5 Anchor
6 Hinge plate - min. thickness 10 mm

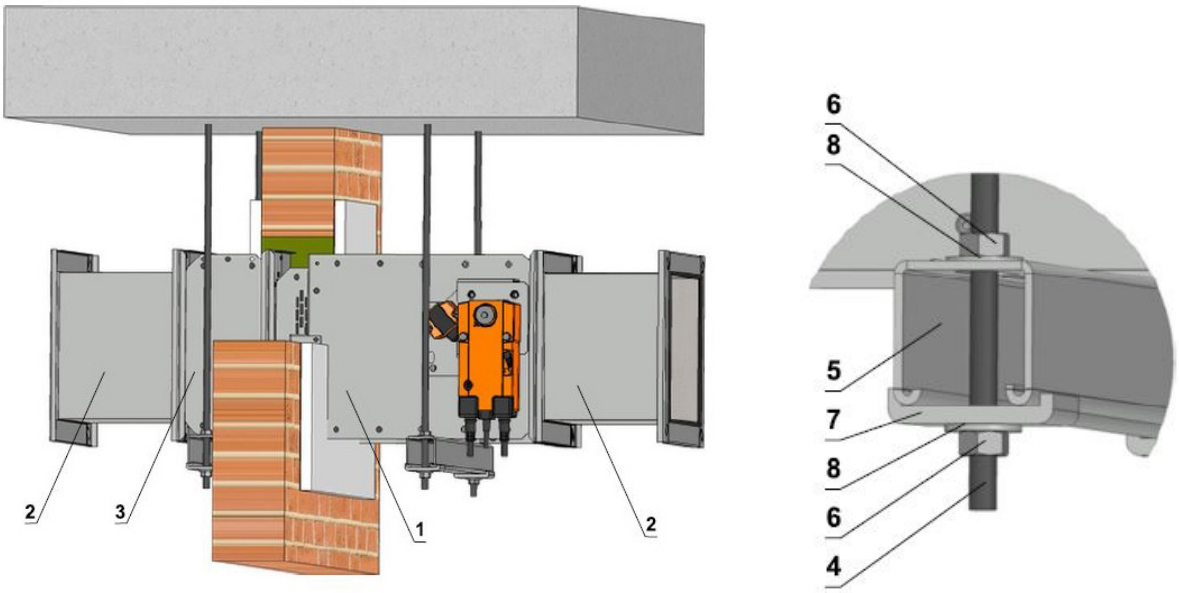
Load capacities of threaded hanger rods F [N] at the required resistance 90 minutes

Size	As [mm²]	Weigh G [kg]	
		for 1 piece	for 1 pair
M8	36,6	22	44
M10	58	35	70
M12	84,3	52	104
M14	115	70	140
M16	157	96	192
M18	192	117	234
M20	245	150	300

7.1 Horizontal installation

Fire dampers can be suspended by using threaded rods and a mounting profiles. Load the suspension system depend on weight of the fire damper.
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.
Threaded rods longer than 1,5 m require fire-resistant insulation.
Threaded rod fixing to the ceiling construction - see fig. 83

Fig. 62 Suspension- horizontal duct



Position:
1 Fire damper
2 Damping pad
3 Extension piece
4 Threaded rod
5 Mounting rail
6 Nut
7 U - Washer
8 Washer

Examples of using materials:
HILTI, SIKLA, MÜPRO etc.

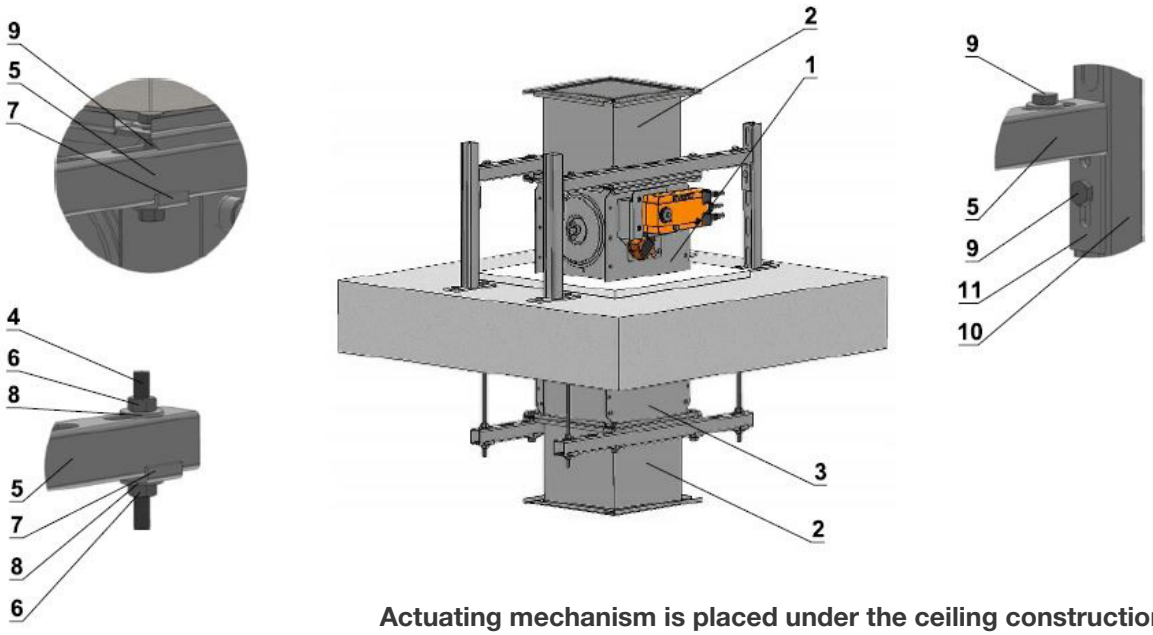
Shown schemes of incorporation and damper are illustrative only!

7.2 Vertical installation

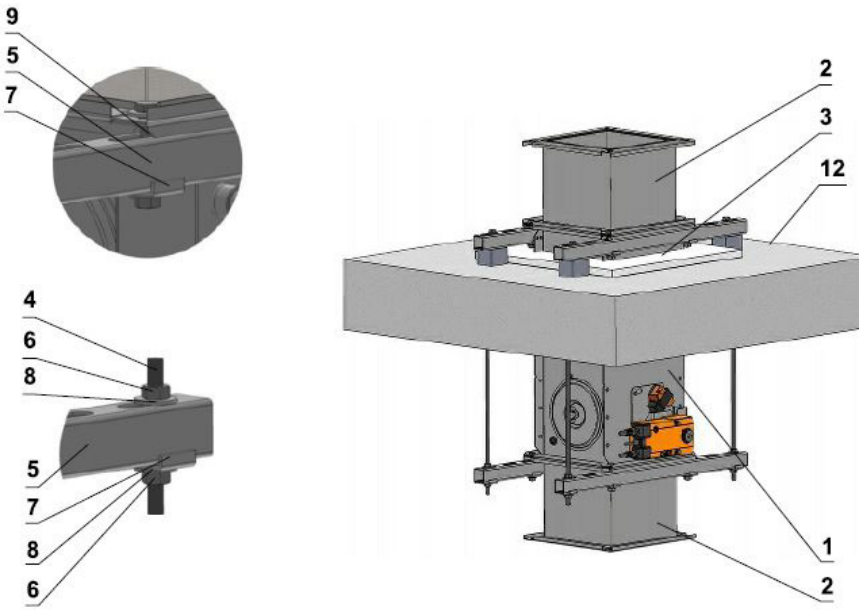
Fire dampers can be suspended by using threaded rods and a mounting profiles.
Load the suspension system depend on weight of the fire damper.
Damper can be suspended from the ceiling construction or supported above the ceiling construction. Damper assembly procedures must be done so as all load transfer 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.
Threaded rods longer than 1,5 m require fire-resistant insulation.
Threaded rod fixing to the ceiling construction - see fig. 83

Fig. 63 Suspension- vertical duct

Actuating mechanism is placed above the ceiling construction.



Actuating mechanism is placed under the ceiling construction.



Position:
1 Fire damper
2 Damping pad
3 Extension piece
4 Threaded rod
5 Mounting rail
6 Nut
7 U - Washer
8 Washer
9 Screw connection
10 Mounting profile
11 Mounting rail
12 Fire resistant board

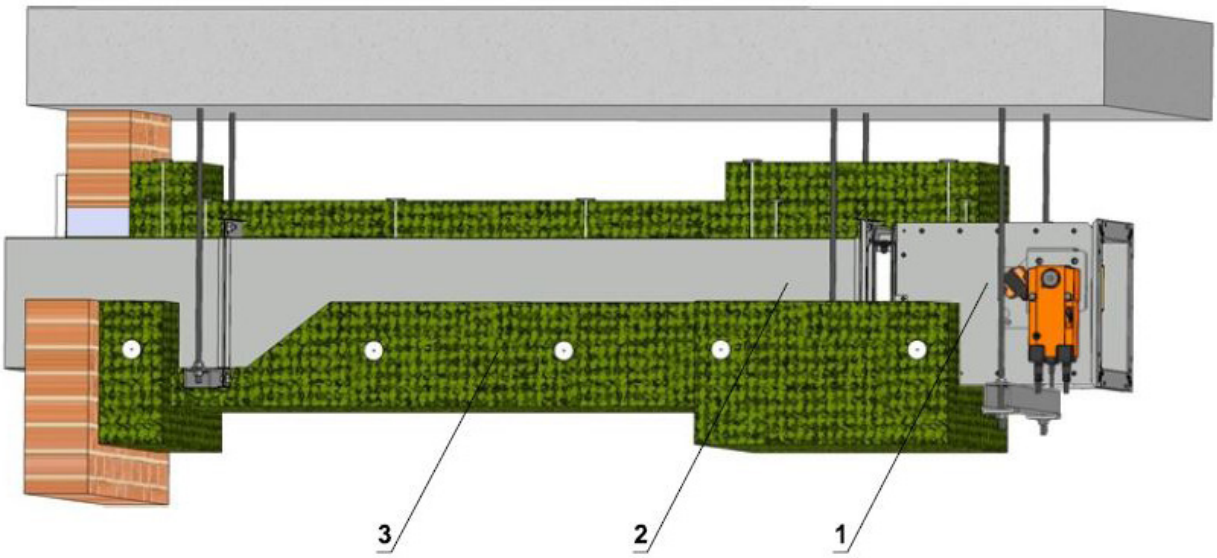
Examples of using materials:
HILTI, SIKLA, MÜPRO etc.

Shown schemes of incorporation and damper are illustrative only!

7.3 Rectangular fire damper suspension on the wall- horizontal installation

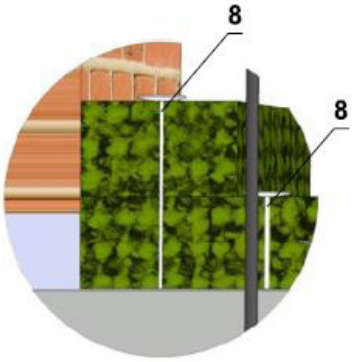
Duct between fire damper and fire separating construction can be suspended by using threaded rods and mounting profiles. Load the suspension system depend on weight of the fire damper and duct system.
Max. length between two suspension systems is 1500 mm.
Damper assembly procedures must be done so as 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.
Threaded rods longer than 1,5 m require fire-resistant insulation.
If the threaded rod is located inside the duct insulation, distance between threaded rod and duct is max 30 mm. If the treaded rod is located outside the duct isolation, distance between threaded rod and isolation is max. 40 mm. Thickness of the insulation under mounting profile must be min. 30 mm.
Threaded rod fixing to the ceiling construction - see fig. 83
The insulation boards are fastened to the duct by weld pins. Distance between weld pins, distance between weld pins and flanges is dependent on the materials. For more information see documentation of insulation manufacturer.

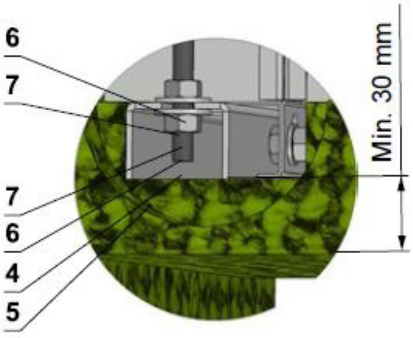
Fig. 64 Suspension on the wall- horizontal installation



Insulation layers on the duct.

Position:
1 Fire damper
2 Duct
3 Insulation
4 Threaded rod
5 Mounting rail
6 Nut
7 Washer
8 Weld pin





Shown schemes of incorporation and damper are illustrative only!

IX. Technical data

8. Pressure loss

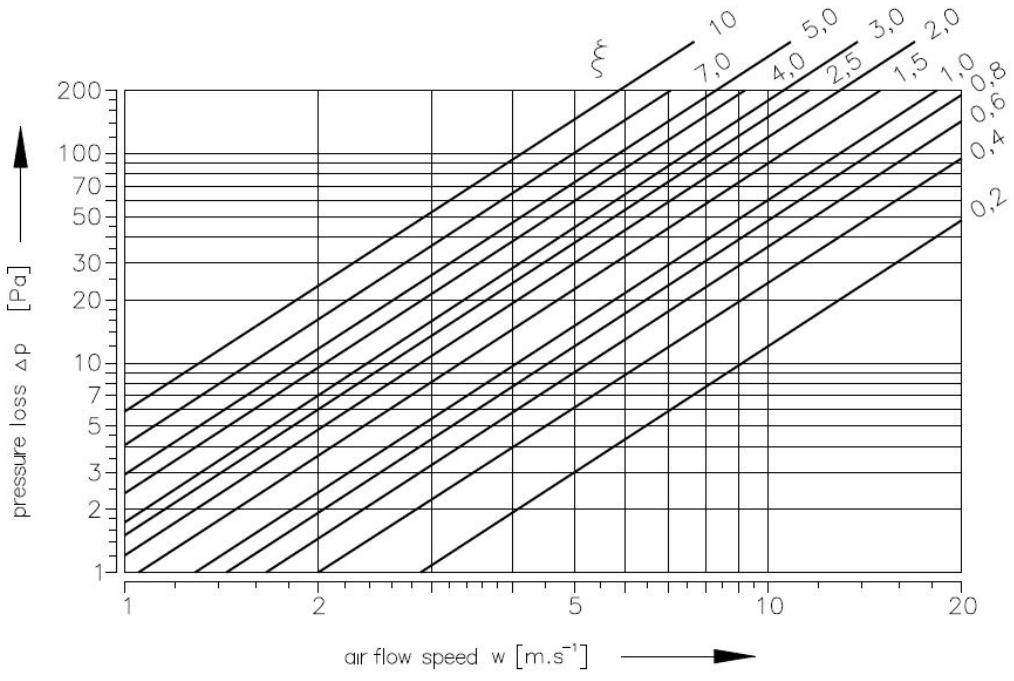
8.1 Pressure loss calculation

$$\Delta p = \xi \cdot \rho \cdot \frac{w^2}{2}$$

Δp	[Pa]	pressure lost
w[	m.s^{-1}]	air flow speed in nominal damper section
ρ	[kg.m^{-3}]	air density
ξ	[-]	coefficient of local pressure loss for the nominal damper section (see Tab. 11.1.1.)

8.2 Determination of pressure loss by using diagram ρ =1,2 kg . m^{-3}

Diagram 8.2.1.Pressure losses for air density ρ =1,2 kg . m^{-3}



9. Coefficient of local pressure loss ξ(-)

9.1 Coefficient of local pressure loss ξ(-)

Tab 9.1.1. Coefficient of local pressure loss

A	B											
	160	180	200	225	250	280	300	315	355	400	450	500
160	4,771	3,458	2,717	2,285	1,813	1,538	1,407	1,327	1,165	1,040	2,025	1,874
180	4,102	3,251	2,351	2,016	1,676	1,342	1,221	1,136	0,986	0,922	1,676	1,548
200	3,701	2,951	2,105	1,867	1,554	1,302	1,113	1,052	0,933	0,801	1,445	1,332
225	3,654	2,873	2,056	1,726	1,475	1,226	1,067	1,029	0,917	0,781	1,239	1,172
250	3,588	2,793	2,005	1,675	1,386	1,155	1,033	0,987	0,893	0,736	1,113	1,021
280	3,411	2,692	1,975	1,599	1,341	1,123	0,986	0,916	0,822	0,713	0,996	0,912
300	3,288	2,599	1,903	1,536	1,315	1,101	0,974	0,911	0,787	0,692	0,937	0,857
315	3,102	2,454	1,833	1,489	1,289	0,988	0,933	0,833	0,721	0,634	0,900	0,822
355	2,955	2,302	1,796	1,412	1,199	0,956	0,902	0,799	0,678	0,588	0,821	0,749
400	2,833	2,159	1,703	1,356	1,126	0,931	0,825	0,711	0,635	0,527	0,757	0,689
450	2,732	2,055	1,623	1,302	1,103	0,852	0,777	0,677	0,599	0,507	0,705	0,640
500	2,670	1,988	1,587	1,251	1,025	0,796	0,725	0,618	0,529	0,460	0,666	0,603
550	4,219	2,941	2,237	1,687	1,402	1,156	1,039	0,968	0,827	0,719	0,635	0,575
560	4,194	2,922	2,222	1,623	1,392	1,147	1,031	0,910	0,820	0,713	0,630	0,570
600	4,104	2,857	2,170	1,573	1,357	1,117	1,004	0,935	0,797	0,692	0,611	0,552
630	4,046	2,814	2,137	1,553	1,334	1,098	0,986	0,918	0,782	0,678	0,598	0,540
650	4,010	2,788	2,116	1,526	1,320	1,086	0,975	0,908	0,773	0,670	0,590	0,533
700	3,975	2,759	2,098	1,515	1,297	1,071	0,965	0,892	0,761	0,656	0,581	0,527
710	3,918	2,720	2,062	1,496	1,284	1,055	0,947	0,881	0,749	0,648	0,571	0,515
750	3,865	2,682	2,032	1,475	1,264	1,037	0,931	0,866	0,736	0,636	0,560	0,504
800	3,808	2,640	1,999	1,445	1,241	1,018	0,913	0,849	0,721	0,623	0,547	0,493
900	3,715	2,572	1,946	1,414	1,205	0,988	0,885	0,822	0,697	0,602	0,528	0,474
1000	3,643	2,519	1,904	1,395	1,177	0,964	0,863	0,801	0,679	0,585	0,512	0,460

A	B										
	550	560	600	630	650	700	710	750	800	900	1000
160	1,761	1,741	1,672	1,627	1,601	1,598	1,532	1,493	1,452	1,386	1,336
180	1,451	1,434	1,375	1,337	1,315	1,289	1,256	1,224	1,18	1,133	1,09
200	1,246	1,232	1,179	1,146	1,126	1,106	1,074	1,046	1,015	0,965	0,928
225	1,075	1,035	0,998	0,965	0,938	0,926	0,905	0,873	0,856	0,822	0,803
250	0,952	0,94	0,898	0,871	0,855	0,831	0,813	0,79	0,765	0,725	0,695
280	0,849	0,88	0,8	0,775	0,76	0,742	0,722	0,701	0,678	0,641	0,613
300	0,797	0,786	0,75	0,726	0,712	0,689	0,675	0,655	0,633	0,599	0,572
315	0,764	0,754	0,718	0,695	0,681	0,662	0,646	0,626	0,605	0,572	0,546
355	0,694	0,685	0,651	0,63	0,617	0,603	0,584	0,566	0,546	0,514	0,49
400	0,637	0,628	0,597	0,577	0,565	0,543	0,534	0,516	0,498	0,468	0,445
450	0,591	0,583	0,553	0,534	0,522	0,503	0,493	0,476	0,458	0,43	0,408
500	0,556	0,548	0,52	0,501	0,49	0,482	0,462	0,446	0,429	0,401	0,38
550	0,529	0,521	0,494	0,476	0,465	0,441	0,437	0,422	0,405	0,379	–
560	0,524	0,517	0,489	0,471	0,461	0,448	0,433	0,418	0,401	–	–
600	0,507	0,5	0,473	0,455	0,445	0,426	0,418	0,403	0,387	–	–
630	0,496	0,489	0,462	0,445	0,435	0,418	0,408	0,393	–	–	–
650	0,49	0,482	0,456	0,439	0,428	0,414	0,402	0,387	–	–	–
700	0,483	0,476	0,444	0,431	0,421	0,409	0,398	0,379	–	–	–
710	0,472	0,465	0,439	0,422	0,412	0,399	–	–	–	–	–
750	0,462	0,455	0,429	0,413	0,403	–	–	–	–	–	–
800	0,451	0,444	0,419	–	–	–	–	–	–	–	–
900	0,434	–	–	–	–	–	–	–	–	–	–

10. Noise data

10.1 Level of acoustic output corrected with filter A.

$$L_{WA} = L_{W1} + 10 \log(S) + K_A$$

L_{WA}	[dB(A)]	level of acoustic output corrected with filter A
L_{W1}	[dB]	level of acoustic output L_{WA} related to the 1 m² section (see Tab. 12.3.1.)
S	[m²]	duct cross section
K_A	[dB]	correction to the weight filter A (viz Tab. 12.3.2.)

10.2 Level of acoustic output in octave ranges.

$$L_{Woct} = L_{W1} + 10 \log(S) + L_{rel}$$

L_{Woct}	[dB]	level of acoustic output corrected with filter A
L_{W1}	[dB]	level of acoustic output L_{WA} related to the 1 m² section (see Tab. 12.3.1.)
S	[m²]	duct cross section
L_{rel}	[dB]	correction to the weight filter A (viz Tab. 12.3.2.)

10.3 Table of acoustics values

Tab 10.3.1.Level of accoustic output LW1 [dB] related to the 1 m² section

v [m/s]	[-] ξ														
	0,2	0,3	0,4	0,5	0,6	0,7	0,8	0,9	1	1,5	2	2,5	3	4	5
2	15,5	18,7	20,9	22,6	24	25,2	26,3	27,2	28	31,2	33,4	35,1	36,5	38,8	40,5
3	26,1	29,2	31,5	33,2	34,6	35,8	36,9	37,8	38,6	41,7	44	45,7	47,1	49,4	51,1
4	33,6	36,7	39	40,7	42,1	43,3	44,3	45,3	46,1	49,2	51,5	53,2	54,6	56,9	58,6
5	39,4	42,5	44,8	46,5	47,9	49,1	50,2	51,1	51,9	55	57,3	59	60,4	62,7	64,4
6	44,1	47,3	49,5	51,3	52,7	53,9	54,9	55,8	56,6	59,8	62	63,8	65,2	67,4	69,2
7	48,2	51,3	53,5	55,3	56,7	57,9	58,9	59,8	60,7	63,8	66,1	67,8	69,2	71,4	73,2
8	51,6	54,8	57	58,8	60,2	61,4	62,4	63,3	64,1	67,3	69,5	71,3	72,7	74,9	76,7
9	54,7	57,9	60,1	61,8	63,2	64,4	65,5	66,4	67,2	70,4	72,6	74,3	75,7	78	79,7
10	57,4	60,6	62,8	64,6	66	67,2	68,2	69,1	70	73,1	75,3	77,1	78,5	80,7	82,5
11	59,9	63,1	65,3	67,1	68,5	69,7	70,7	71,6	72,4	75,6	77,8	79,6	81	83,2	85
12	62,2	65,4	67,6	69,3	70,7	71,9	73	73,9	74,7	77,9	80,1	81,8	83,2	85,5	87,2

Tab 10.3.3. Correction to the weight filter A

w [m/s]	2	3	4	5	6	7	8	9	10	11	12
[dB]	-15,0	-11,8	-9,8	-8,4	-7,3	-6,4	-5,7	-5,0	-4,5	-4,0	-3,6

Tab 10.3.4. Relative level expressing the shape of the spectrum L_{rel}

w [m/s]	f [Hz]							
	63	125	250	500	1000	2000	4000	8000
2	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2	-43,9	-56,4
3	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6	-37,4	-48,9
4	-3,9	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2	-43,9
5	-4,0	-4,1	-5,9	-9,4	-14,6	-21,5	-30	-40,3
6	-4,2	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6	-37,4
7	-4,5	-3,9	-4,9	-7,5	-11,9	-17,9	-25,7	-35,1
8	-4,9	-3,9	-4,5	-6,9	-10,9	-16,7	-24,1	-33,2
9	-5,2	-3,9	-4,3	-6,4	-10,1	-15,6	-22,7	-31,5
10	-5,5	-4	-4,1	-5,9	-9,4	-14,6	-21,5	-30
11	-5,9	-4,1	-4	-5,6	-8,9	-13,8	-20,4	-28,8
12	-6,2	-4,3	-3,9	-5,3	-8,4	-13,1	-19,5	-27,6

IX. Material, finishing

11. Material

11.1 Damper bodies are supplied in the design made of galvanized plate without any other surface finishing. Damper blades are made of fire resistant asbestos free boards made of mineral fibres.
Control devices of dampers has cover from mechanically resistant and standing plastic and rest of the parts is galvanised without further surface treatment.
Springs are galvanized.
Thermal protective fuses are made of sheet brass, thickness = 0.5 mm.
Fasteners is galvanized. Fasteners is galvanized.

11.2 According to the customer's requirements, damper can be made of stainless material.
Specifications for stainless-steel models – classification of stainless steel:
- Class A2 – Food-grade stainless steel (AISI 304 – EN 17240)
- Class A4 – Chemistry-grade stainless steel (AISI 316, 316L – EN 17346, 17349)

The respective stainless steel is the material for all components present or accessing the damper interior; components outside the damper body are typically from galvanised sheet metal (fasteners for mounting the servo drive or mechanics, mechanics components except Item 4), frame components.

The following components, including the fasteners, are made from stainless steel at all times:
1) Damper body and all components permanently attached
2) Leaf holders, including pins, metal parts of leaf
3) Control components inside the damper (leaf angle selector, pin with lever)
4) Mechanical components entering the interior of damper body (lower sheet of mechanics, lock holder “1”, lock lever “2”, lock spring, 8 dia. stopper pin, mechanics pin)
5) Inspection hole cover including the clip and fasteners (if they are parts of the cover)
6) Bearing for torque transfer from the lever with pin on the angle selector at the leaf (made from AISI 440C)

The leaf of the damper is made from a single piece of homogeneous material Promatect-MST, thickness 30 mm.
Plastic, rubber and silicon components, sealants, foaming bands, glass-ceramic seals, housings, brass bearings of the leaf, servo drives, and end switches are identical for all material variants of the dampers.
The thermal link is identical for all material variants of the dampers. Upon specification by customer, the thermal link may be made from A4 stainless steel. The solder is standard, corresponding to the initialisation temperature.

The temperature-dependent initiator of the servo drive (sensor) is modified for stainless-steel variants of the dampers; the standard galvanised screws are replaced with stainless-steel M4 screws of corresponding class the counterpart has stainless-steel riveting M4 nuts.
Some fasteners and components are available in one class of stainless steel; the type will be used in all stainless-steel variants.
The leaf in the variants for chemical environments (Class A4) is always treated with a coating of chemically resistant Promat SR.
Any other requirements for the design shall be considered atypical and shall be addressed on an individual basis.

IX. Inspection, testing

12. Inspection, testing

12.1 The appliance is constructed and preset by the manufacturer, its operation is dependent on proper installation and adjustment.

IX. Transportation and storage

13. Logistic terms

13.1 Dampers are transported by box freight vehicles without direct weather impact, there must not occur any sharp shocks and ambient temperature must not exceed +40°C. Dampers must be protected against mechanic damages when transported and manipulated.
During transportation, the damper blade must be in the "CLOSED" position.

13.2 Dampers are stored indoor in environment without any aggressive vapours, gases or dust.
Indoort emperature must be in the range from -30°C to +40°C and maximum relative humidity 95 % (avoid condensation on the damper body). Dampers must be protected against mechanic damages when transported and manipulated.

IX. Assembly, attendance, maintenance and revisions

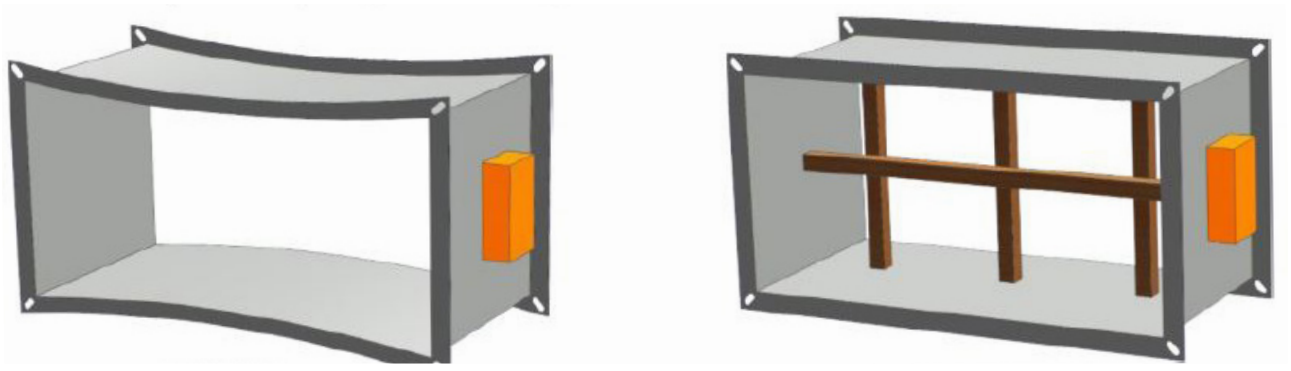
14. Assembly

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

14.2 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.

Fig. 65 Embedding/ fixing the damper

**Protecting the damper against buckling,
above all when there are big sizes of the fire dampers!**



WRONG! **Brace with wooden blocks**

14.3 To ensure reliable fire damper function it is necessary to avoid blocking the closing mechanism and contact surfaces with collected dust, fibre and sticky materials and solvents.

15. Entry into service and revisions

15.1 Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out. Visual inspection of proper damper integration , inside damper area, damper blade, contact surfaces and silicon sealing. Check of thermal protective fuse and closing mechanism. Check the closing function of the damper blade. This can be done by removing of thermal fuse from damper body.
Before entering the dampers with actuating mechanism into operation after their assembly and by sequential checks. 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). 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. It is recommended to provide periodical checks, maintenance and service actions on Fire Equipment by Authorized persons. The authorized persons can be trained by Producer, or by authorized Distributor. All effective safety standards and directives must be observed during fire damper assembly.
For regular or exceptional inspection of interior of fire damper, micro-camera device can be used. On each fire damper is ispection hole. In the case of inspection by camera, take out the black rubber cap, insert the camera inside the damper, check interior and at the end of inspection, put the rubber cap back tightly to cover the empty hole.

15.2 Before entering the dampers with manual control (design .01, .11, .80) into operation after their assembly and by sequential checks and following checks must be carried out.
Verification of closing device and thermal fuse:
When you verify funcionally of mechanism, follow these steps:

Adjustment of damper blade in position "CLOSED" shall be made following:
- Damper is in „OPEN“ position.
- By pressing control button mechanism, you close damper in "CLOSED" position.
- Check damper blade adjustment in "CLOSED" position.
- Closing must be strong and control lever must be in "CLOSED" position.
- If closing is not sufficiently strong and damper control lever is not in "CLOSED" position, you must contact manufacturer and order new mechanism.
- Mechanism dimension is marked M1 to M4, according to internal forces of spring.

Adjustment of damper blade in position "OPEN" shall be made following:
- Rotate control lever by 90°.
- Lever get fasten automatically in “OPEN” position.
- Check damper blade adjustment in "OPEN" position.

Checking function and the status of the thermal fuse shall be made following:
- To check the function and the status of the fuse is possible to remove whole mechanism from the body of fire damper - mechanism is attached to the dampers body with four screws M6.
- Removing the thermal fuse from the fuse holder of initiation device, check its correct functionality.

- There must be a release lever, which releases initiation lever of control and mechanism will displace to "CLOSED" position.
- If not, you need to contact the manufacturer and order new mechanism.
- Mechanism dimension is marked M1 to M4, according to internal forces of spring.

15.3 Before entering the dampers with actuating mechanism into operation after their assembly and by sequential checks 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).

15.4 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.

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

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

15.7 Dampers could be displaced into position “CLOSED” only in case that ventilator, or Air Handling Unit is switched off. The goal is the securing of proper closing and safe function of Fire Damper in case of Fire.

16. Spare parts

16.1 Spare parts are supplied only on basis of an order.

16.2 Control for square damper and round damper is identical.

17. Restore function of actuating mechanism after fuses initiation

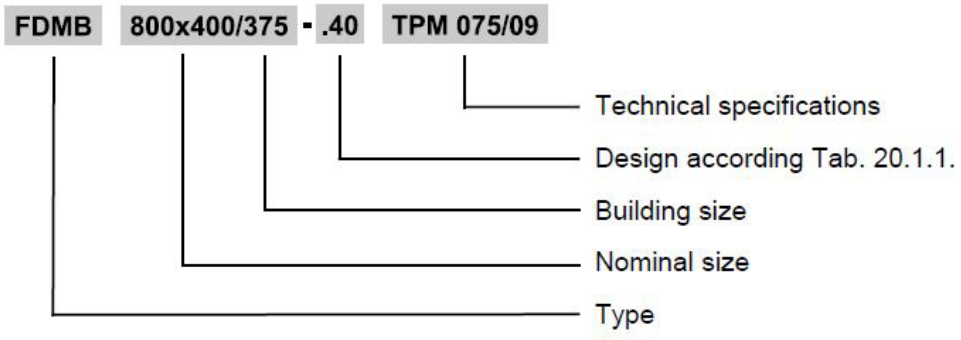
17.1 If fuse Tf1 is initiated (duct outside temperature) than is necessary to change thermoelectrical starting mechanism BAT72B-S. Whereas is initiation temperature higher than actuator mechanism operating temperature +50°C, recommended actuating mechanism manufacturer make complete revision or change actuating mechanism and thermoelectrical starting mechanism.

17.2 If fuses Tf2/Tf3 are initiated (duct inside temperature) than is possible change only part ZBAT72 or ZBAT95 (according initiating temperature).

IX. Ordering information

18. Ordering key

18.1 Fire damper



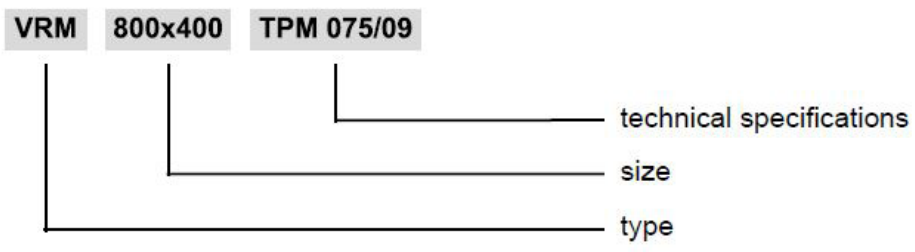
If installation holders, installation frame or design for installation in Weichschott system are requested, it has to be mentioned separately in the order. Installation frame could be fixed to the damper body or supplied separately.

Tab 18.1.1. Dampers design

Dampers design	Additional digit
Manual and thermal	.01
Manual and thermal (Zone 1,2)	.02
With actuating mechanism BF 230-TN (BFL, BFN 230-T) - voltage AC 230 V	.40
With actuating mechanism BF 24-TN (BFL, BFN 24-T) - voltage AC/DC 24 V	.50
Manual and thermal with two terminal switches („OPEN“, „CLOSED“)	.80
Manual and thermal with two terminal switches („OPEN“, „CLOSED“) (Zone 1,2)	.81

Some designs are possible to supply with optical smoke detector ORS 142 K.
For more information contact manufacturer.

Tab 18.1.2.Reinforcement - damper placement outside wall or ceiling construction



IX. Product data

18.2 Data label is placed on the damper body.

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