

EN 15650:2010-09

MANDÍK[®]

FIRE DAMPER
FDMC



These technical specifications state a row of manufactured sizes and models of fire dampers (further only dampers) FDMC. It is valid for production, designing, ordering, delivery, assembly and operation.

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II. GENERAL INFORMATION

1. Description

Fig. 1 FDMC



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.

Damper blade automatically closes air duct using an actuating mechanism back spring. 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 bed in a material which enlarges its capacity and air proofs the air duct.

Dampers have one inspection hole, since the shutting device and the inspection hole can be set into the most advantageous position (with respect to the operation and manipulation with the control device).

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 60
- External Casing leakage class C, Internal leakage class 1 acc. to EN 1751
- Cycling test in class C 10000 acc. to EN 15650
- Corrosion resistant acc. to EN 15650
- Certificate of constancy of performance No. 1391-CPR-0090/2014
- Declaration of Performance No. CDM/FDMC/001/13
- Hygienic assessment of fire dampers - Report No. 1.6/13/16/1

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) 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.
- c) 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 - 20°C to + 50°C.

2. Design

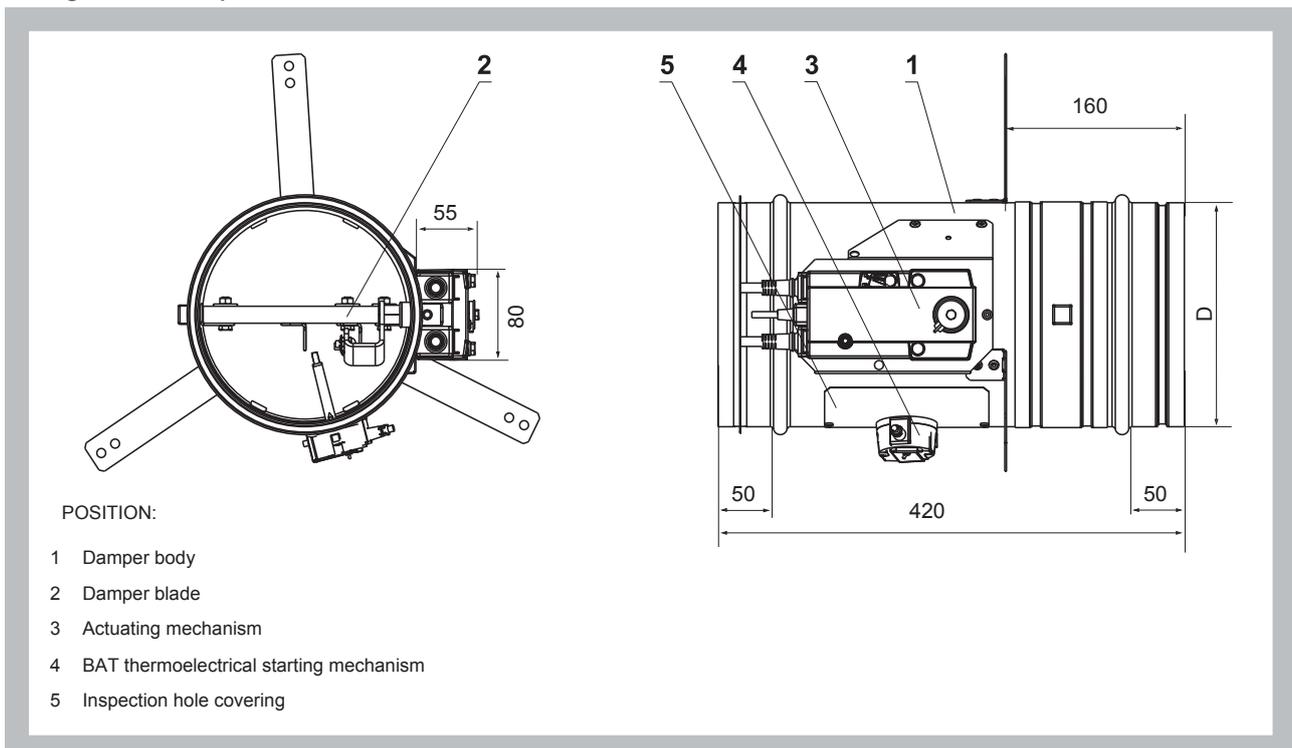
2.1. FDMC

FDMC is always equipped by actuating mechanism BFL 24-T (further only "actuating mechanism"). After being connected to power supply AC/DC 24V, 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 140s. If the actuating power supply is cut off (due to loss of supply voltage, activation of thermoelectrical actuating mechanism 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 16 s. 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 three 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".

3. Dimensions, weights

3.1. Dimensions

Fig. 3 Fire damper FDMC



3.2. Weight and effective area

Tab. 3.2.1. Weight and effective area

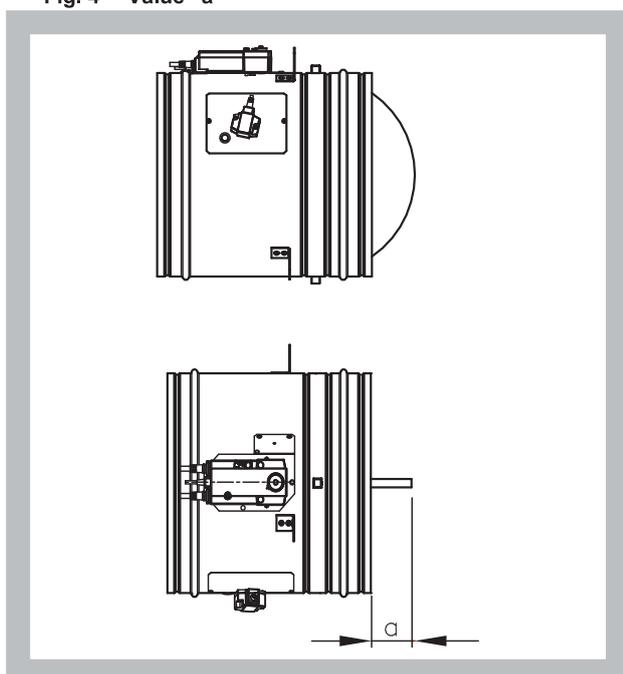
Size $\varnothing D$	a	Weight	Effective area S_{ef} [m ²]	Actuating mechanism
100	-	3,1	0,0036	BFL
125	-	3,4	0,0068	BFL
140	-	3,6	0,0092	BFL
150	-	3,7	0,0109	BFL
160	-	3,8	0,0129	BFL
180	-	4,1	0,0172	BFL
200	-	4,4	0,0222	BFL
225	-	4,7	0,0293	BFL
250	9	5,5	0,0374	BFL
280	24	6,0	0,0484	BFL
315	41,5	6,6	0,0630	BFL
350	59	7,0	0,0793	BFL
355	61,5	7,3	0,0821	BFL
400	84	8,2	0,1065	BFL

3.3. The Blade overlaps

For fire damper the open damper blade overlaps the damper body from dimension $\varnothing 250$ by the "a" value. These values are specified in the Tab. 3.2.1

Value has to be respected when projecting related air-conditioning piping.

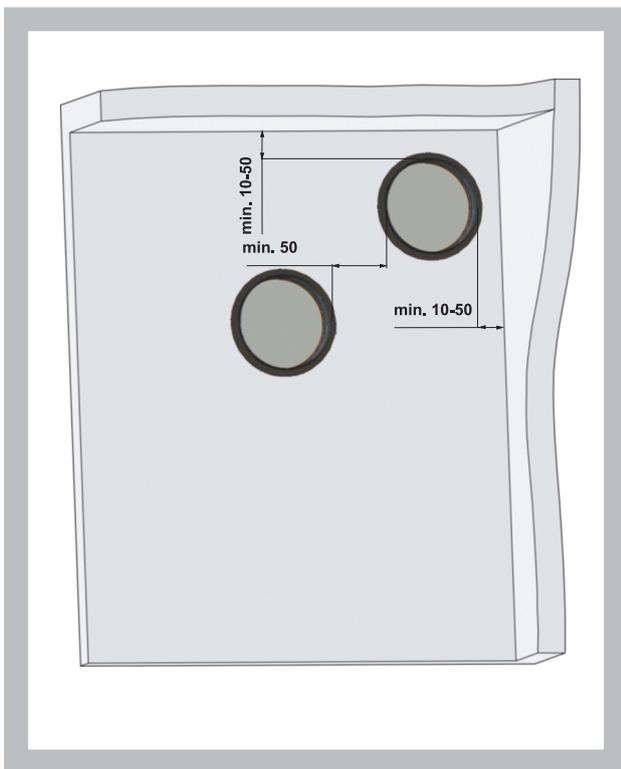
Fig. 4 Value "a"



4. Placement and Assembly

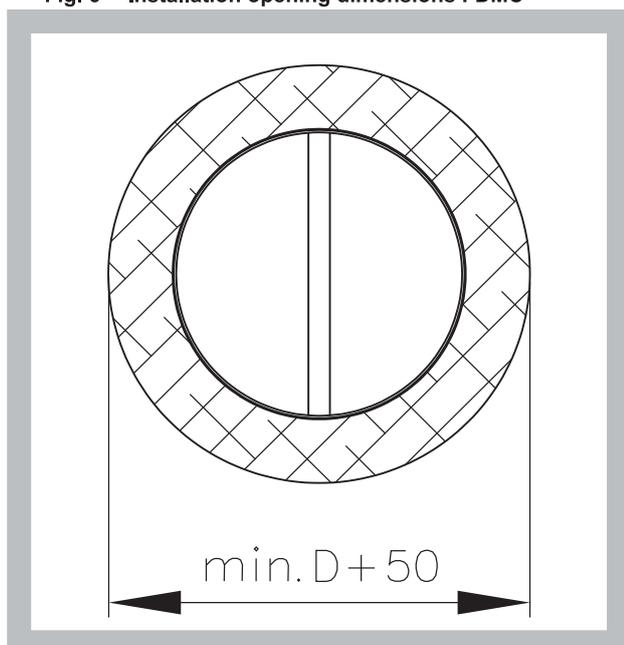
- 4.1. Fire dampers are suitable for installation in arbitrary position in vertical and horizontal passages of fire separating constructions. Damper assembly procedures must be done so as all load transfer from the fire separating constructions to the damper body is absolutely excluded. Back-to-back 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.
- 4.2. 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.
- 4.3. The distance between the fire damper and the construction (wall, ceiling) must be minimal in range from 10 to 50 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 50 mm

Fig. 5 The distance between the fire damper and the construction



- 4.4. The control mechanism has to be protected (covered) against damage and pollution during installation process.
- 4.5. 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.
- 4.6. Round dampers are with rubber tightness and glued all the way around.
- 4.7. Installation opening dimensions

Fig. 6 Installation opening dimensions FDMC



4.8. Examples of fire damper installing

The fire damper can be installed 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/porous concrete with minimum thickness 150 mm. Recommended installation openings are specified in Fig. 6.

The fire damper can be installed into a gypsum wall construction with fire classification EI 60.

5. Statement of installations

5.1. Statement of installation

Tab. 5.1.1. Statement of installations

Damper size	FDMC installation	Classification	Figure
100-400	Damper installed in a solid wall construction. Space between damper and wall is filled by mineral stone wool (min. density 140 kg/m ³) or another approved fire insulation system. Surface is covered by fire protection mastic (Promastop P,K) or equal min. thickness 1 mm.	EIS 60	7
	Damper installed in a gypsum wall construction. Space between damper and wall is filled by mineral stone wool (min. density 140 kg/m ³) or another approved fire insulation system. Surface is covered by fire protection mastic (Promastop P,K) or equal min. thickness 1 mm.	EIS 60	8
	Damper installed in a solid ceiling construction. Space between damper and ceiling is filled by mortar, gypsum or another approved fire sealing system for damper installation.	EIS 60	9
	Damper installed in a solid ceiling construction. Space between damper and wall is filled by mineral stone wool (min. density 140 kg/m ³) or another approved fire insulation system. Surface is covered by fire protection mastic (Promastop P,K) or equal min. thickness 1 mm.	EIS 60	10
	Duct ended by installation shaft. Space between damper and ceiling is filled by mortar, gypsum or another approved fire sealing system into duct installation - solid or gypsum wall construction	EIS 60	11

Appropriate isolation and installation materials for fire resistance EIS 60 should be used. Producer of these materials is random (Isover, Protecta, Rockwool etc.) Used materials must be approved and have min. the same fire resistance as required for Fire Damper - EIS 60, or higher.

Fig. 7 Installation in a solid wall construction

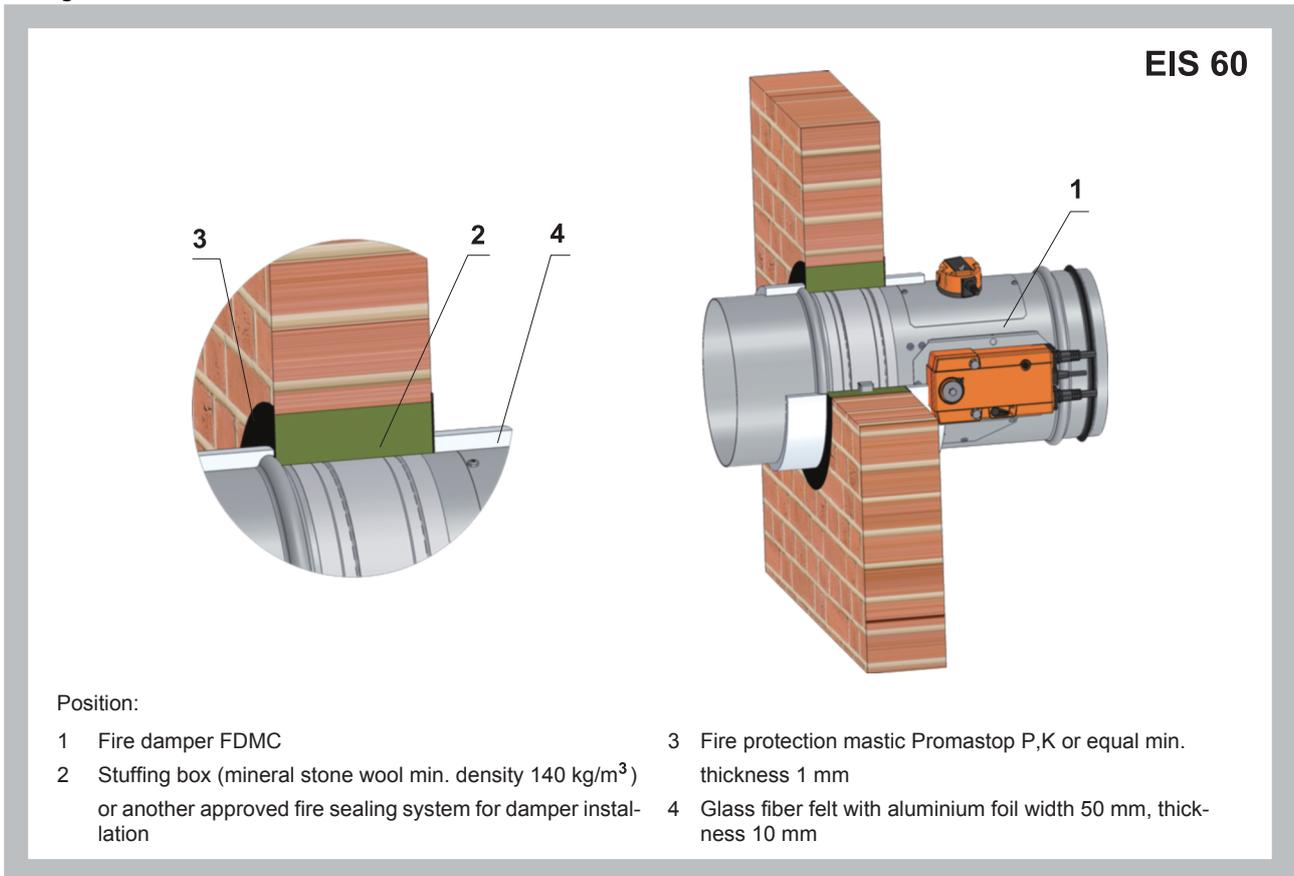


Fig. 8 Installation in a gypsum wall construction

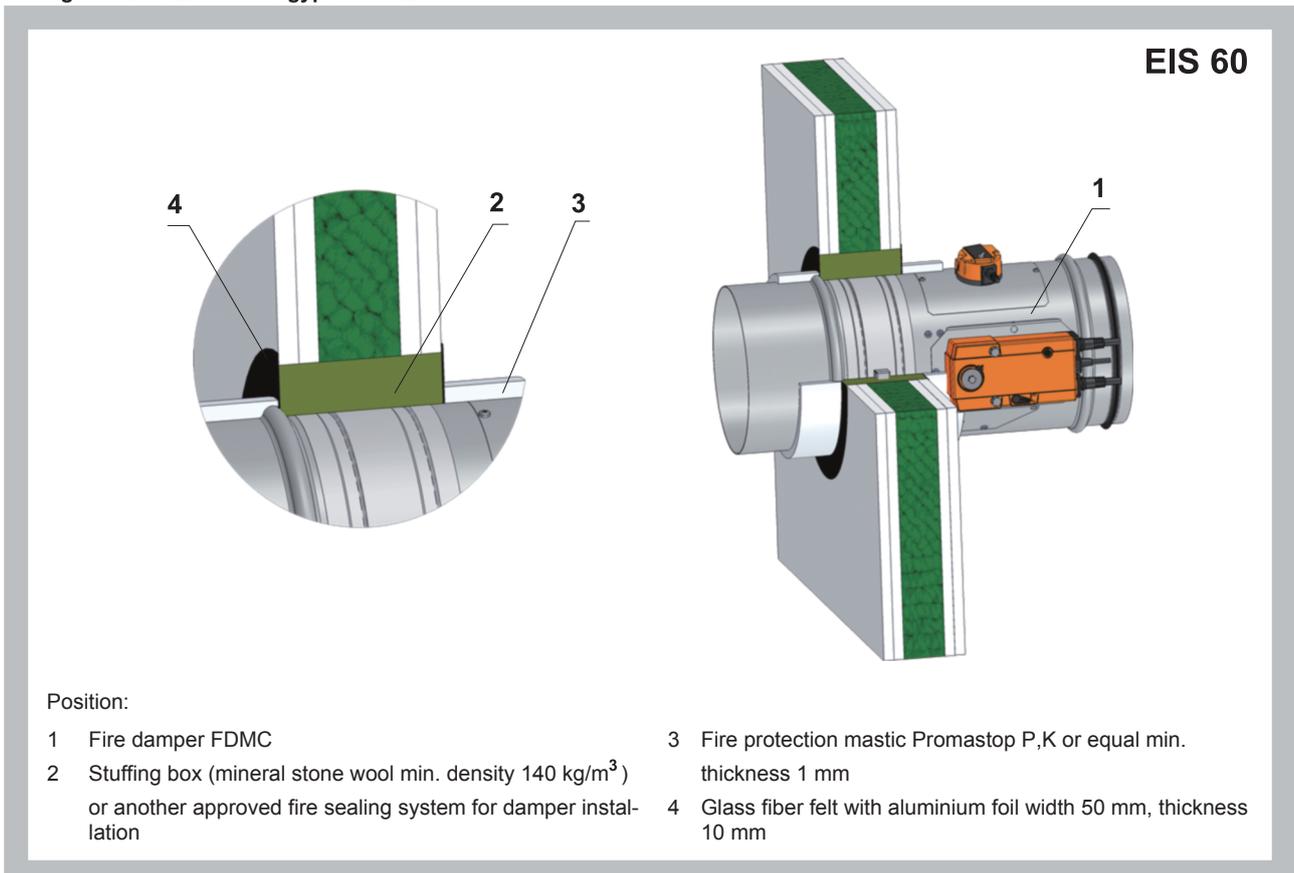


Fig. 9 Installation in a solid ceiling construction

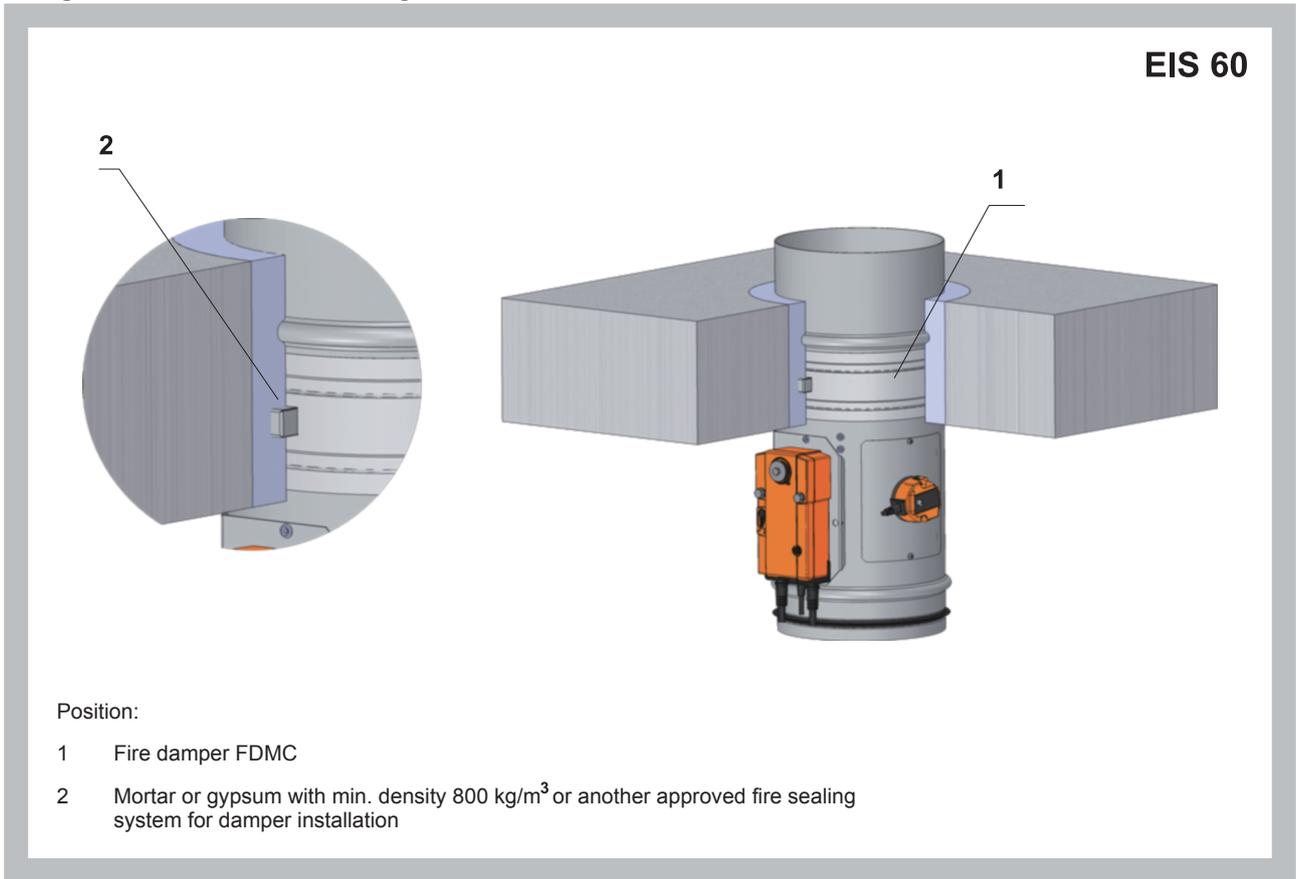


Fig. 10 Installation in a solid ceiling construction

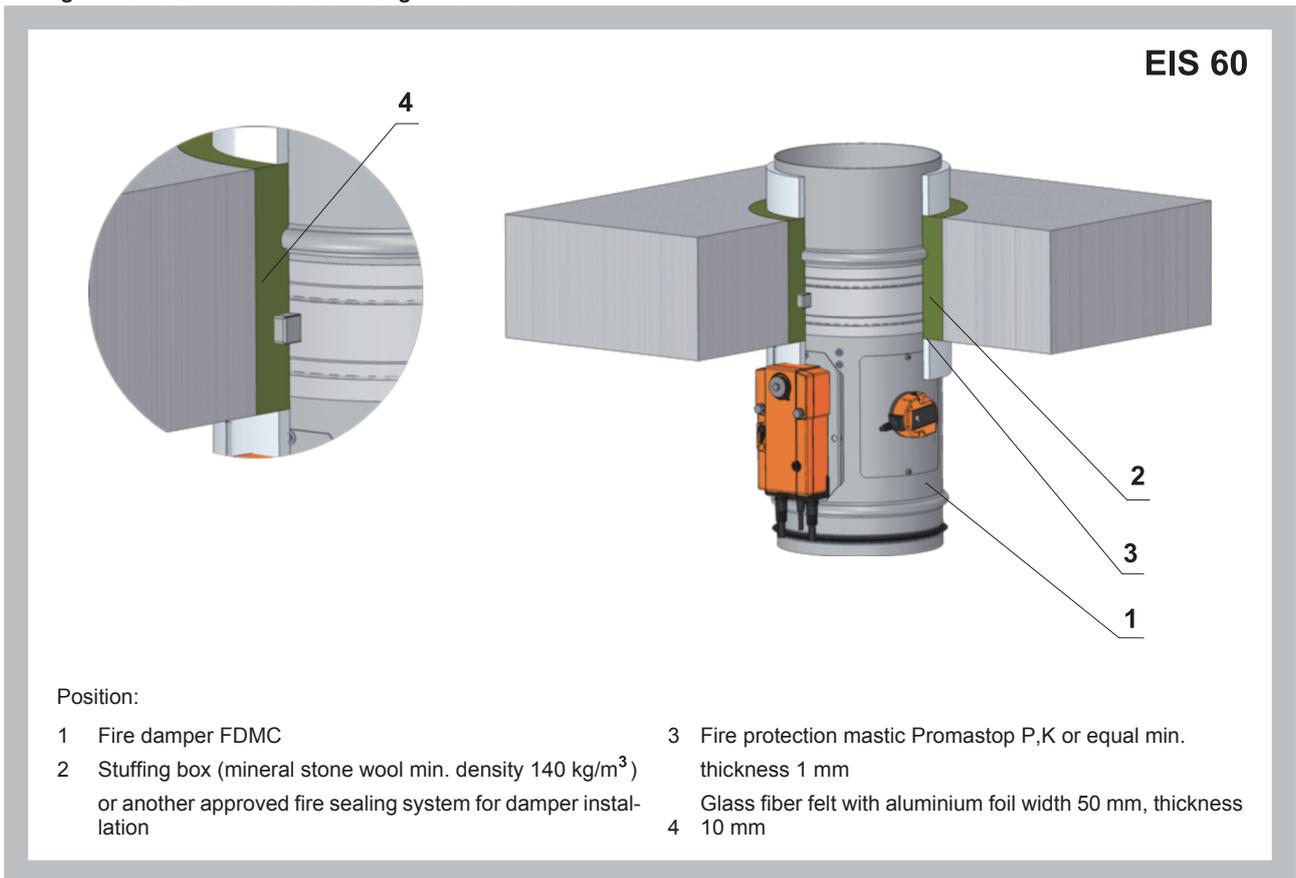
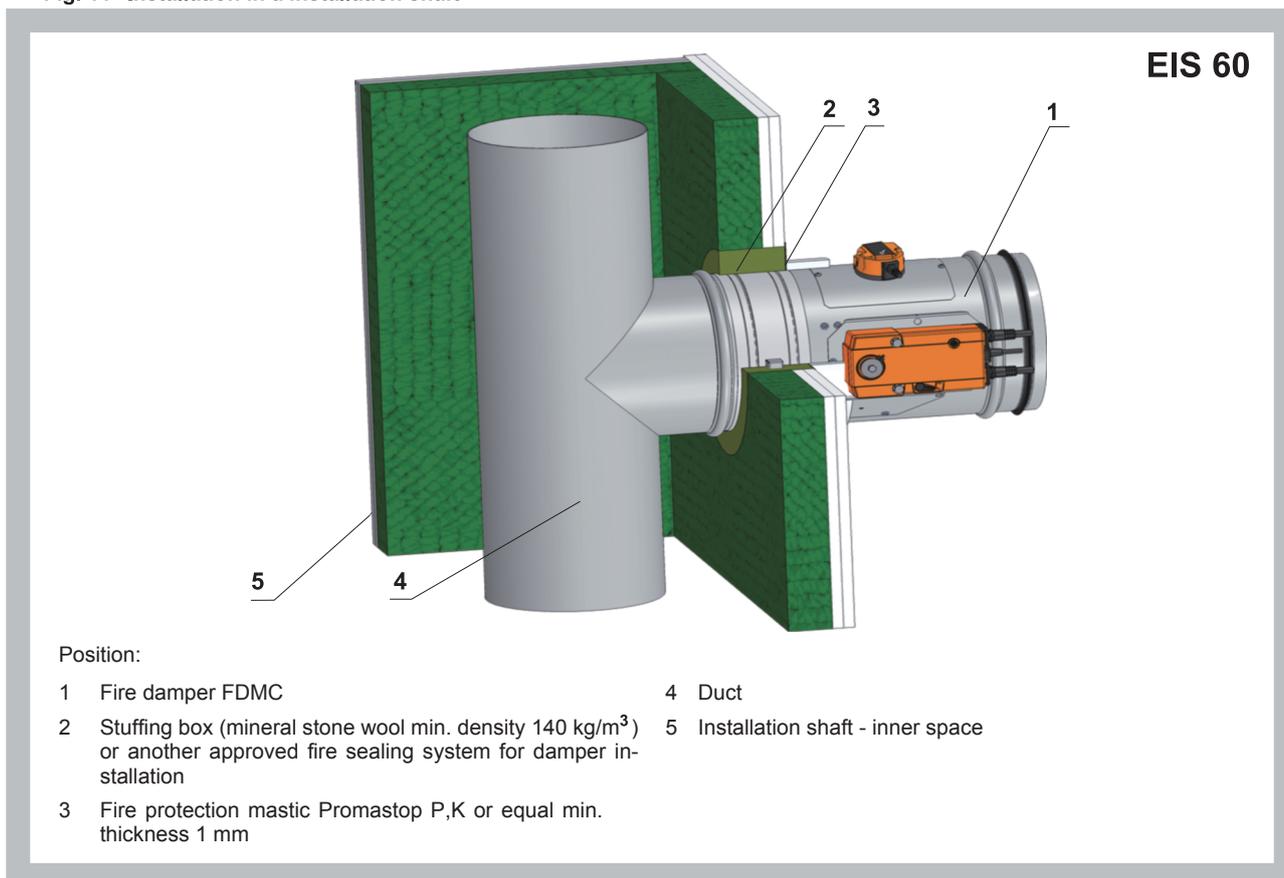


Fig. 11 Installation in a installation shaft



III. TECHNICAL DATA

6. Pressure loss, noise data

Tab. 6.1.1. FDMC

Size		v [m.s ⁻¹]								Size		v [m.s ⁻¹]							
		3	4	5	6	7	8	9	10			3	4	5	6	7	8	9	10
100	\dot{V} [m ³ .h ⁻¹]	85	113	141	170	198	226	254	283	225	\dot{V} [m ³ .h ⁻¹]	429	573	716	859	1002	1145	1288	1431
	v _{ef} [m.s ⁻¹]	6,5	8,7	10,9	13,1	15,3	17,5	19,6	21,8		v _{ef} [m.s ⁻¹]	4,1	5,4	6,8	8,1	9,5	10,9	12,2	13,6
	L _{WA} [dB]	21,6	29,1	35,0	39,7	43,7	47,2	50,3	53,0		L _{WA} [dB]	15,1	22,6	28,4	33,2	37,2	40,7	43,7	46,5
	Δ p [Pa]	148,0	26,3	41,0	59,1	80,4	105,1	133,0	164,2		Δ p [Pa]	2,6	4,6	7,2	10,3	14,0	18,3	23,2	28,6
125	\dot{V} [m ³ .h ⁻¹]	133	177	221	265	309	353	398	442	250	\dot{V} [m ³ .h ⁻¹]	530	707	884	1060	1237	1414	1590	1767
	v _{ef} [m.s ⁻¹]	5,4	7,2	9,0	10,8	12,6	14,4	16,2	18,0		v _{ef} [m.s ⁻¹]	3,9	5,2	6,6	7,9	9,2	10,5	11,8	13,1
	L _{WA} [dB]	21,2	28,7	34,5	39,3	43,3	46,8	49,8	52,6		L _{WA} [dB]	13,3	20,8	26,6	31,3	35,3	38,8	41,9	40,4
	Δ p [Pa]	11,3	20,2	31,5	45,3	61,7	80,6	102,0	125,9		Δ p [Pa]	1,9	3,3	5,2	7,4	10,1	13,2	16,7	20,6
140	\dot{V} [m ³ .h ⁻¹]	166	222	277	333	388	443	499	554	280	\dot{V} [m ³ .h ⁻¹]	665	887	1108	1330	1552	1773	1995	2217
	v _{ef} [m.s ⁻¹]	5,0	6,7	8,4	10,0	11,7	13,4	15,1	16,7		v _{ef} [m.s ⁻¹]	3,8	5,1	6,4	7,6	8,9	10,2	11,4	12,7
	L _{WA} [dB]	21,0	28,5	34,3	39,0	43,1	46,5	49,6	52,3		L _{WA} [dB]	11,3	18,8	24,6	29,4	33,4	36,9	39,9	42,7
	Δ p [Pa]	9,6	17,1	26,7	38,5	52,4	68,4	86,6	106,9		Δ p [Pa]	1,3	2,3	3,6	5,1	7,0	9,1	11,5	14,2
150	\dot{V} [m ³ .h ⁻¹]	191	254	318	382	445	509	573	636	315	\dot{V} [m ³ .h ⁻¹]	842	1122	1403	1683	1964	2244	2525	2806
	v _{ef} [m.s ⁻¹]	4,9	6,5	8,1	9,7	11,3	13,0	14,6	16,2		v _{ef} [m.s ⁻¹]	3,7	4,9	6,2	7,4	8,7	9,9	11,1	12,4
	L _{WA} [dB]	20,3	27,8	33,6	38,3	42,4	45,8	48,9	51,6		L _{WA} [dB]	8,9	16,4	22,2	27,0	31,0	34,5	37,6	40,3
	Δ p [Pa]	8,2	14,7	22,9	33,0	44,9	58,6	74,2	91,6		Δ p [Pa]	0,9	1,5	2,4	3,4	4,7	6,1	7,7	9,5
160	\dot{V} [m ³ .h ⁻¹]	217	290	362	434	507	579	651	724	350	\dot{V} [m ³ .h ⁻¹]	1039	1385	1732	2078	2425	2771	3117	3464
	v _{ef} [m.s ⁻¹]	4,7	6,2	7,8	9,4	10,9	12,5	14,0	15,6		v _{ef} [m.s ⁻¹]	3,6	4,9	6,1	7,3	8,5	9,7	10,9	12,1
	L _{WA} [dB]	19,6	27,1	32,9	37,7	41,7	45,2	48,3	51,0		L _{WA} [dB]	8,2	15,7	21,5	26,3	30,3	33,8	36,9	39,6
	Δ p [Pa]	6,9	12,2	19,1	27,5	37,4	48,8	61,8	76,3		Δ p [Pa]	0,7	1,2	1,9	2,7	3,7	4,8	6,1	7,5
180	\dot{V} [m ³ .h ⁻¹]	275	366	458	550	641	733	824	916	355	\dot{V} [m ³ .h ⁻¹]	1069	1425	1782	2138	2494	2851	3207	3563
	v _{ef} [m.s ⁻¹]	4,4	5,9	7,4	8,9	10,4	11,8	13,3	14,8		v _{ef} [m.s ⁻¹]	3,6	4,8	6,0	7,2	8,4	9,6	10,9	12,1
	L _{WA} [dB]	17,8	25,3	31,1	35,9	39,9	43,3	46,4	49,2		L _{WA} [dB]	7,2	14,7	20,5	25,3	29,3	32,8	35,9	38,6
	Δ p [Pa]	5,0	8,9	13,9	20,1	27,3	35,7	45,1	55,7		Δ p [Pa]	0,6	1,1	1,7	2,5	3,4	4,5	5,6	7,0
200	\dot{V} [m ³ .h ⁻¹]	339	452	565	679	792	905	1018	1131	400	\dot{V} [m ³ .h ⁻¹]	1357	1810	2262	2714	3167	3619	4072	4524
	v _{ef} [m.s ⁻¹]	4,2	5,7	7,1	8,5	9,9	11,3	12,7	14,2		v _{ef} [m.s ⁻¹]	3,5	4,7	5,9	7,1	8,3	9,4	10,6	11,8
	L _{WA} [dB]	15,7	23,1	29,0	33,7	37,7	41,2	44,3	47,0		L _{WA} [dB]	6,6	14,1	19,9	24,7	28,7	32,2	35,3	38,0
	Δ p [Pa]	3,4	6,1	9,5	13,7	18,7	24,4	30,9	38,2		Δ p [Pa]	0,5	0,8	1,3	1,8	2,5	3,3	4,1	5,1

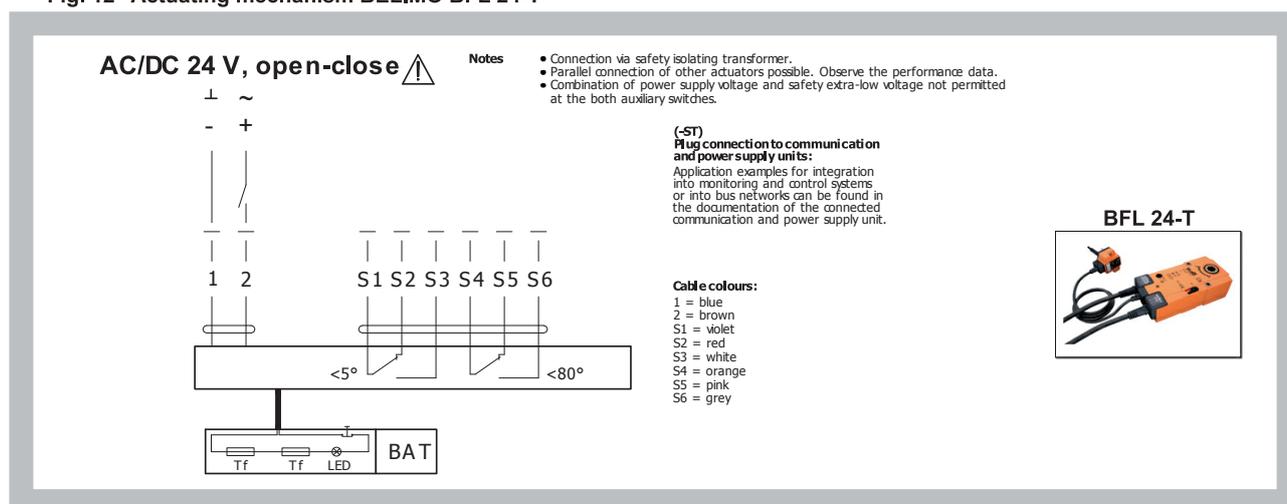
7. Electrical Components, Connection Diagrams

7.1. Actuating mechanism

Tab. 7.1.1. Actuating mechanism BELIMO BFL 24-T

Actuating mechanism BELIMO	BFL 24-T
Nominal voltage	AC 24V 50/60Hz DC 24 V
Power consumption - motoring - holding	2,5 W 0,8 W
Dimensioning	4VA (Imax 8,3 A @ 5 ms)
Protection class	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 24-T-ST) with 3-pin plug-in connectors cable 1 m, 6 x 0,75 mm ² (BFL 24-T-ST) with 6-pin plug-in connectors
Thermal trips	Tf1: duct outside temperature 72°C Tf2: duct inside temperature 72°C

Fig. 12 Actuating mechanism BELIMO BFL 24-T



8. Governing system GBS

8.1. Governing system GBS - Electrical wiring diagram

Fig. 13 Governing system GBS



VII. ASSEMBLY, ATTENDANCE, MAINTENANCE AND REVISIONS

12. Assembly

- 12.1. All effective safety standards and directives must be observed during fire damper assembly.
- 12.2. 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.
- 12.3. Manual operation

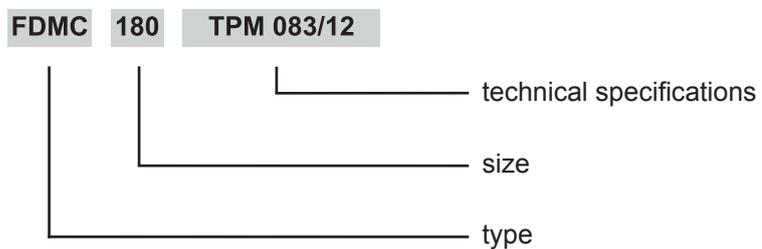
Without power supply, the damper can be operated manually and fixed in any required position. Release of the locking mechanism can be achieved manually or automatically by applying the supply voltage.

13. Entry into service and revisions

- 13.1. 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.
 - 13.1.1. In case that dampers are found unable to serve for their function for any cause, it must be clearly marked. The operator is obliged to ensure so that the damper is put into condition in which it is able to function and meanwhile he is obliged to provide the fire protection another appropriate way.
 - 13.1.2. Results of regular checks, imperfections found and all-important facts connected with the damper function must be recorded in the "FIRE BOOK" and immediately reported to the operator.
- 13.2. Before entering the dampers into operation after their assembly and by sequential checks, the following checks must be carried out.
 - 13.2.1. Visual inspection of proper damper integration, inside damper area, damper blade, contact surfaces and silicon sealing.
 - 13.2.2. Inspection hole disassembly: release the covering lid by unscrewing screws. Then tilt remove lid from its original position.
 - 13.2.3. 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).

VIII. ORDERING INFORMATION

14. Ordering key



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