Doc. no. : 200-24-001

DiEM

The Art of Ventilation

Soler&Palau Ventilation Group

LPP

Technical documentation

CE
1488

DIEM, d.o.o.

No. certificate of constancy of performance: 1488-CPR-1105/W

EN 15650:2010 Fire damper type: LPP	
Nominal activation conditions/sensitivity: Closing/opening during the test at the right time	Pass
Response time/Closure time:	Pass
Reliability	50 cycles <120S
Fire resistance:	
Fire integrity - E Fire insulation - I Smoke leakage - S Mechanical stability (under E) Maintenance of the cross section (under E)	EI 120 (v_e h_o i ↔ o) S
Durability:	
Opening and closing cycle test	LPP-E: 10 000 cycles <120S LPP-S: 100 cycles <120S

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DIEM reserves the right to make changes to this document.

1. INTRODUCTION

The purpose of technical documentation is to familiarize the user with the intended use, design, operation principle, installation, periodic maintenance and operation of product.

2. LEGAL REGULATIONS

The LPP fire dampers are certified by the Scientific and Research Centre for Fire Protection – the National Research Institute, **Certificate of Constancy of Performance No. xxxx-CPR-xxxx**.

The LPP-E(S) fire dampers are designed for application in general ventilation systems as cut-off partitions separating the fire-engulfed zone from the remaining part of the building (normally open). The purpose of these dampers is to prevent the spread of fire, heat and smoke.

The dampers are asymmetrical, designed either for horizontal (in walls) or vertical (in floors) installation.

The dampers are designed, manufactured and tested in accordance with the following standards: **PN-EN 15650** "Ventilation for buildings – Fire dampers" and **PN-EN 13501-3** "Fire classification of construction products and building elements – Part 3: Classification using data from fire resistance tests on products and elements used in building service installations: fire resisting ducts and fire dampers."

The effectiveness of the dampers is confirmed by tests according to **PN-EN 1366-2** "Fire resistance tests for service installations – Part 2: Fire dampers."

The LPP fire damper is classified as **tightness class C** (housing tightness) on the basis of tests carried out according to **PN-EN 1751** "Ventilation for buildings. Air terminal devices. Aerodynamic testing of dampers and valves."

3. INTENDED USE

The LPP-E(S) fire dampers are designed for application in general ventilation systems as cut-off partitions separating the fire-engulfed zone from the remaining part of the building (normally open). The purpose of these dampers is to prevent the spread of fire, heat and smoke. The LPP-0-E(S) fire dampers are classified in the following fire resistance classes and may be installed in the following building partitions:

EI 120 (v_e h_o i ↔ o) S

- It means the damper fulfils the criteria for fire integrity, fire insulation and smoke leakage for at least 120 minutes.
- The LPP fire dampers may be installed in vertical building partitions with either horizontal or vertical rotation axis, with any actuator position.
- The dampers may be mounted individually or in sets (16 pcs max., up to 6 m2) in rigid walls.

Table 1. Table of fire resistance

Construction type	Minimum thickness of building partition mm	Fire resistance class	Sealing type
Ceiling	≥150 mm	EI 120 (h_o i ↔ o) S	mortar
Rigid wall	≥115 mm	EI 120 (v_e i ↔ o) S	mortar
Flexible wall	≥125 mm	EI 120 (v_e i ↔ o) S	mineral wool
Batteries	≥150 mm	EI 120 (v_e i ↔ o) S	mortar

Where:
E – fire integrity
I – fire insulation
S – smoke leakage
120/90/60/30 – duration of fulfilment of E, I and S criteria, expressed in minutes
v_e – damper installed directly in a wall
h_o – damper installed directly in a floor
i ↔ o – operating effectiveness criteria are met from inside to outside (fire inside), and from outside to inside (fire outside).

4. TECHNICAL DESCRIPTION

The LPP-E and LPP-S dampers consist of two steel housing of a rectangular cross-section, a moving, single-axis isolating baffle and an actuating mechanism.

The damper housing and its interacting elements are made of galvanized steel sheet. Connection flanges are on both ends of the housing for easy connection between the duct and the damper.

There is intumescent seal on the inner surface of the housing, in the place of perforation, around the closed isolating baffle. Their characteristic feature is that their volume increases at high temperatures, tightly filling all leaks between the baffle and the body.

Between housing and insulating spacer there is foamed rubber gasket, ensuring the tightness integrity in the ambient temperature.

The isolating baffle of the damper is made of calcium-silica board, and aluminum tape is installed on its perimeter, ensuring reduction of friction.

Baffle is rotating on two steel axles located in the housing. Movement of the baffle is limited in the closed position by a stop bar.

LPP-E damper is provided with an electric actuator BFL, BFN or BF series return spring by BELIMO, and BAT or BAE thermal fuse (72°C), constituting the damper's actuating system having supply voltage AC 230V or AC/DC 24V. After voltage is supplied, the actuator rotates the baffle into the open position. The baffle is closed when the voltage is lost, or when the thermal fuse is activated (the return spring in the actuator closes the baffle by returning to a non-stressed position).

During normal operation of the system, LPP-E and LPP-S dampers are in open position. If a fire breaks out, the baffle rotates to a closed position.

The LPP-S damper is provided with a spring mechanism comprising, ea. an actuating spring, a manual release device and a thermal fuse with a nominal triggering temperature of 70 ± 5°C (optional 95 ± 5°C). When the damper is being opened with a key, the actuating spring is being tensioned. The baffle is kept in the open position by the manual release device, blocked with a thermal fuse. The damper is automatically closed as a result of triggering the thermal fuse. The damage to the thermal fuse automatically rotates the isolating baffle (to the closed position).

The permissible air velocity in a B x H connection duct is 12 m/s for the LPP-E damper with an actuator and 8 m/s for the LPP-S damper with a spring mechanism.

The range of dampers covers the following dimensions: a clear damper width **from 200 to 1500 mm** (10 mm intervals) and clear damper height **from 200 to 1000 mm** (50 mm intervals). The length of LPP-E and LPP-S dampers is L=350 mm.

Table 1. Type series of damper dimension LPP-E and LPP-S

LPP	Width B mm																												
Height H mm	200	250	300	350	400	450	500	550	600	650	700	750	800	850	900	950	1000	1050	1100	1150	1200	1250	1300	1350	1400	1450	1500
200	0,027	0,035	0,042	0,049	0,056	0,064	0,071	0,078	0,085	0,093	0,100	0,107	0,114*	0,122*	-	-	-	-	-	-	-	-	-	-	-	-	-
250	0,037	0,046	0,056	0,066	0,076	0,085	0,095	0,105	0,115	0,124	0,134	0,144	0,154	0,163	0,173	0,183*	0,193*	0,202*	-	-	-	-	-	-	-	-	-
300	0,046	0,058	0,070	0,083	0,095	0,107	0,119	0,132	0,144	0,156	0,168	0,181	0,193	0,205	0,217	0,230	0,242	0,254	0,266	0,279*	0,291*	0,303*	-	-	-	-	-
350	0,055	0,070	0,085	0,099	0,114	0,129	0,144	0,158	0,173	0,188	0,203	0,217	0,232	0,247	0,262	0,276	0,291	0,306	0,321	0,335	0,350	0,365	0,380	0,394*	0,409*	0,424*	-
400	0,064	0,082	0,099	0,116	0,133	0,151	0,168	0,185	0,202	0,220	0,237	0,254	0,271	0,289	0,306	0,323	0,340	0,358	0,375	0,392	0,409	0,427	0,444	0,461	0,478	0,496	0,513
450	0,074	0,093	0,113	0,133	0,153	0,172	0,192	0,212	0,232	0,251	0,271	0,291	0,311	0,330	0,350	0,370	0,390	0,409	0,429	0,449	0,469	0,488	0,508	0,528	0,548	0,567	0,587
500	0,083	0,105	0,127	0,150	0,172	0,194	0,216	0,239	0,261	0,283	0,305	0,328	0,350	0,372	0,394	0,417	0,439	0,461	0,483	0,506	0,528	0,550	0,572	0,595	0,617	0,639	0,661
550	0,092*	0,117	0,142	0,166	0,191	0,216	0,241	0,265	0,290	0,315	0,340	0,364	0,389	0,414	0,439	0,463	0,488	0,513	0,538	0,562	0,587	0,612	0,637	0,661	0,686	0,711	0,736
600	0,101*	0,129	0,156	0,183	0,210	0,238	0,265	0,292	0,319	0,347	0,374	0,401	0,428	0,456	0,483	0,510	0,537	0,565	0,592	0,619	0,646	0,674	0,701	0,728	0,755	0,783	0,810
650	-	0,140*	0,170	0,200	0,230	0,259	0,289	0,319	0,349	0,378	0,408	0,438	0,468	0,497	0,527	0,557	0,587	0,616	0,646	0,676	0,706	0,735	0,765	0,795	0,825	0,854	0,884
700	-	0,152*	0,184	0,217	0,249	0,281	0,313	0,346	0,378	0,410	0,442	0,475	0,507	0,539	0,571	0,604	0,636	0,668	0,700	0,733	0,765	0,797	0,829	0,862	0,894	0,926*	0,958*
750	-	0,164*	0,199	0,233	0,268	0,303	0,338	0,372	0,407	0,442	0,477	0,511	0,546	0,581	0,616	0,650	0,685	0,720	0,755	0,789	0,824	0,859	0,894	0,928*	0,963*	0,998*	1,033*
800	-	-	0,213*	0,250	0,287	0,325	0,362	0,399	0,436	0,474	0,511	0,548	0,585	0,623	0,660	0,697	0,734	0,772	0,809	0,846	0,883	0,921	0,958*	0,995*	1,032*	1,070*	1,107*
850	-	-	0,227*	0,267	0,307	0,346	0,386	0,426	0,466	0,505	0,545	0,585	0,625	0,664	0,704	0,744	0,784	0,823	0,863	0,903	0,943*	0,982*	1,022*	1,062*	1,102*	1,141*	1,181*
900	-	-	0,241*	0,284*	0,326	0,368	0,410	0,453	0,495	0,537	0,579	0,622	0,664	0,706	0,748	0,791	0,833	0,875	0,917	0,960*	1,002*	1,044*	1,086*	1,129*	1,171*	1,213*	1,255*
950	-	-	-	0,300*	0,345	0,390	0,435	0,479	0,524	0,569	0,614	0,658	0,703	0,748	0,793	0,837	0,882	0,927	0,972*	1,016*	1,061*	1,106*	1,151*	1,195*	1,240*	1,285*	1,330*
1000	-	-	-	0,317*	0,364	0,412	0,459	0,506	0,553	0,601	0,648	0,695	0,742	0,790	0,837	0,884	0,931	0,979*	1,026*	1,073*	1,120*	1,168*	1,215*	1,262*	1,309*	1,357*	1,404*

* Maximum cross-sectional area for LPP-S series totals 1 m^2, and for LPP-E totals 1,5 m^2

BFL actuators are used for the damper clear area of P ≤ 0,25 m^2.

BFN actuators are used for the damper clear area of 0,25 m2 < P ≤ 0,75 m^2.

BF actuators are used for all series fire dampers P > 0,75 m^2.

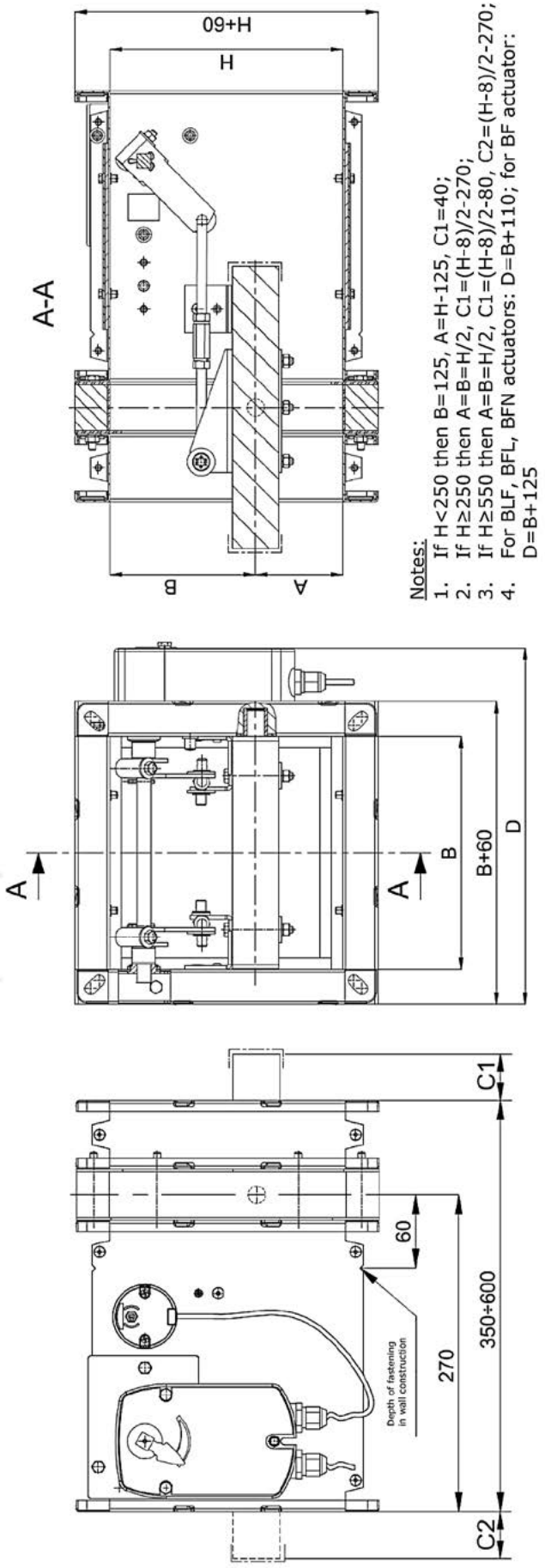


Figure 1. LPP-E damper

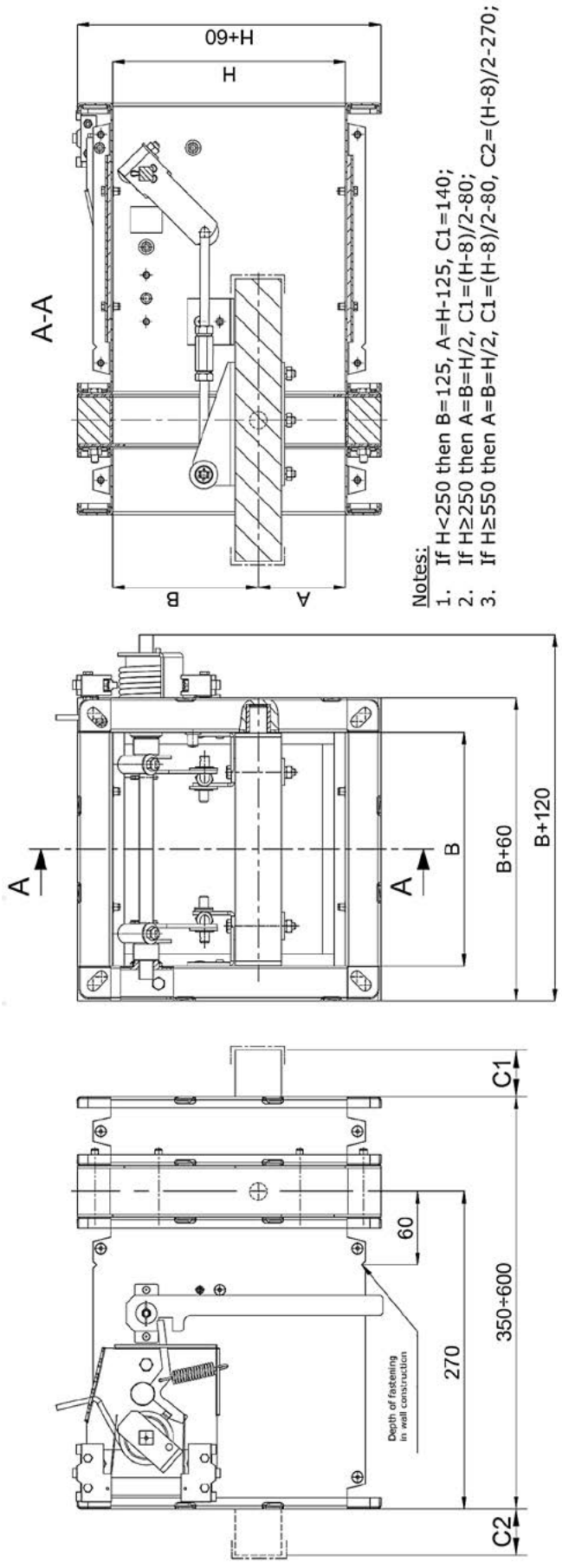


Figure 2. LPP-S damper

Table 3. Weight of LPP-R damper, m [kg]

LPP-R		Width B mm													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H	200	11,9	14,2	16,4	18,6	20,8	23,0	25,2	-	-	-	-	-	-	-
	300	14,0	16,6	19,3	21,8	24,4	27,0	29,7	32,6	35,3	38,0	40,7	-	-	-
	400	16,2	19,2	22,2	25,2	28,2	31,5	34,6	37,6	40,7	43,7	46,7	55,1	58,5	61,9
	500	18,3	21,7	25,2	28,6	32,3	35,7	39,2	42,6	46,0	49,4	52,9	62,1	65,8	70,9
	600	20,3	24,2	28,1	32,2	36,0	39,8	43,7	47,5	51,3	55,2	59,0	70,3	74,4	78,6
	700	-	26,7	31,3	35,4	39,7	43,9	48,2	52,4	56,6	62,2	66,4	77,1	81,7	86,2
	800	-	29,2	34,2	38,8	43,4	48,0	52,7	57,3	63,3	68,0	72,6	84,0	89,0	93,9
	900	-	32,0	37,1	42,0	47,1	52,1	57,2	63,6	68,6	73,7	78,7	90,9	96,2	101,6
	1000	-	-	40,0	45,4	50,9	56,3	63,2	68,6	74,1	79,5	84,9	97,8	103,6	109,4

Table 4. Weight of LPP-S damper, m [kg]

LPP-S		Width B mm													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H	200	11,8	14,0	16,2	18,4	20,6	22,8	-	-	-	-	-	-	-	-
	300	13,8	16,5	19,1	21,7	24,3	26,9	29,6	32,0	34,4	36,8	-	-	-	-
	400	16,0	19,0	22,1	25,0	28,0	31,1	34,1	36,9	40,0	43,1	46,2	49,3	52,4	55,5
	500	18,2	21,6	25,0	28,4	31,8	35,2	38,7	42,3	45,7	49,1	52,5	55,9	59,3	62,7
	600	-	23,8	27,7	31,5	35,3	39,5	43,4	47,2	51,1	55,0	58,9	62,8	66,7	70,6
	700	-	26,3	30,6	34,8	39,4	43,6	47,9	52,1	56,4	60,7	65,0	69,3	73,6	-
	800	-	-	33,5	38,1	43,1	47,7	52,4	57,1	61,7	66,3	70,9	-	-	-
	900	-	-	36,4	41,8	46,8	51,8	56,9	62,0	67,0	72,0	-	-	-	-
	1000	-	-	39,4	45,2	50,6	56,0	61,5	67,0	72,4	-	-	-	-	

Figure 2. LPO-L damper (with spring mechanism, nipple connections)

5. BELIMO ELECTRIC ACTUATORS USED IN LPO

Spring-return 90° actuator BFL series,
combined with thermoelectric tripping device BAT:

- BFL230-T,
- BFL24-T,
- BFL24-T-ST.

Where: ST – connection plug

Spring-return 90° actuator BFN series,
combined with thermoelectric tripping device:

- BFN230-T,
- BFN24-T,
- BFN24-T-ST.

Where: ST – connection plug

Spring-return 90° actuator BF series,
combined with thermoelectric tripping device BAE:

- BF230-TN,
- BF24-TN,
- BF24-TN-ST,
- BF24-TL-TN-ST

Where:

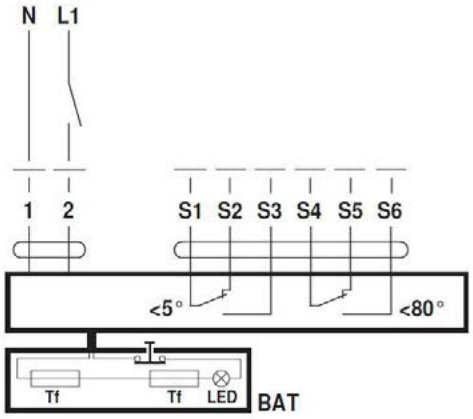
ST – connection plug

TL- communicative control

Figure 3. LPO-L-E damper (with electric actuator, sleeve connections)

Wiring diagram BFL230-T

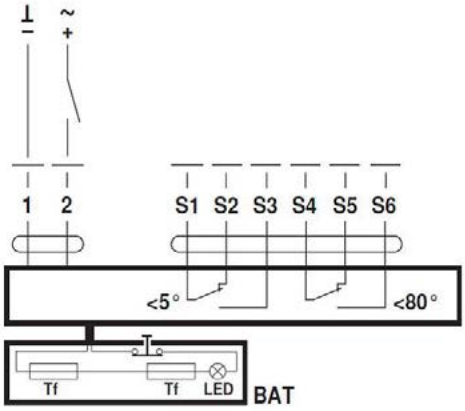
AC 230 V, open-close



Cable colours:
1 = blue
2 = brown
S1 = violet
S2 = red
S3 = white
S4 = orange
S5 = pink
S6 = grey
Tf: Thermal fuse (see "Technical data")

Wiring diagram BFL24-T and BFN24-T

AC/DC 24 V, open-close



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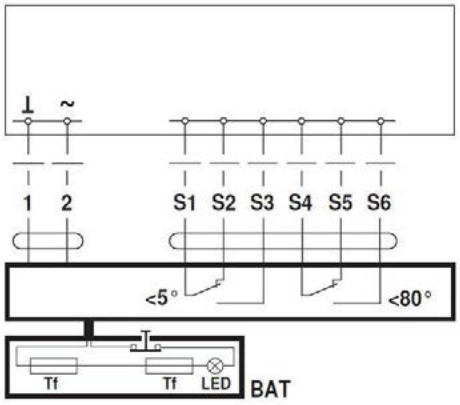
S5 = pink
S6 = grey
Tf: Thermal fuse (see "Technical data")

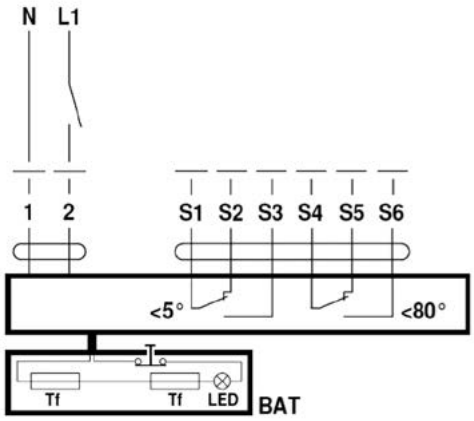
Wiring diagram BFL24-T-ST and BFN24-T-ST

AC/DC 24 V, open-close



Wiring diagram BF230-TN

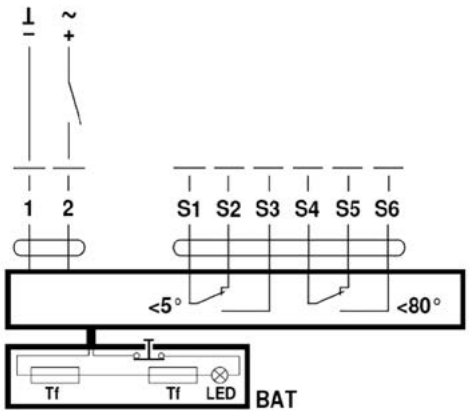
AC 230 V, open-close



Cable colours:
1 = blue
2 = brown
S1 = violet
S2 = red
S3 = white
S4 = orange
S5 = pink
S6 = grey
Tf: Thermal fuse (see "Technical data")

Wiring diagram BF24-TN

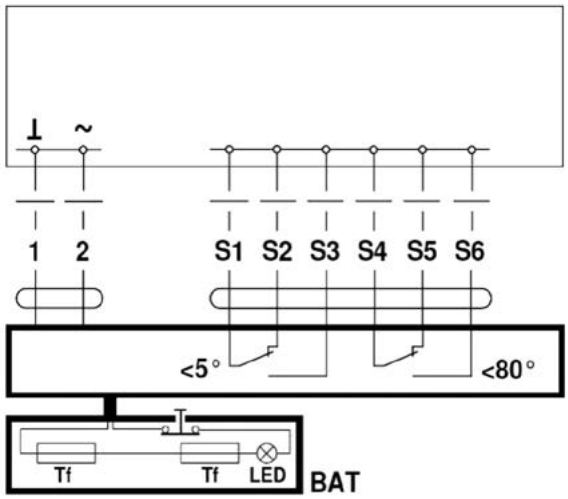
AC/DC 24 V, open-close



Cable colours:
1 = black
2 = red
S1 = violet
S2 = red
S3 = white
S4 = orange
S5 = pink
S6 = grey
Tf: Thermal fuse (see "Technical data")

Wiring diagram BF24-TN-ST

AC/DC 24 V, open-close



Technical data:	BFL230-T	BFN230-T
Nominal voltage	AC 230 V	AC 230 V
Nominal voltage frequency	50/60 Hz	50/60 Hz
Nominal voltage range	AC 198...264 V	AC 198...264 V
Power consumption in operation	3.5 W	5 W
Power consumption in rest position	1.1 W	2.1 W
Power consumption for wire sizing	6.5 VA	10 VA
Power consumption for wire sizing note	Imax 4 A @ 5 ms	Imax 4 A @ 5 ms
Auxiliary switch	2 x SPDT	2 x SPDT
Switching capacity auxiliary switch	1 mA...3 (0.5 inductive) A, AC 250 V	1 mA...3 (0.5 inductive) A, AC 250 V
Switching points auxiliary switch	5° / 80°	5° / 80°
Connection supply / control	Cable 1 m, 2 x 0.75 mm² (halogen-free)	Cable 1 m, 2 x 0.75 mm² (halogen-free)
Connection auxiliary switch	Cable 1 m, 6 x 0.75 mm² (halogen-free)	Cable 1 m, 6 x 0.75 mm² (halogen-free)
Cable length thermoelectric tripping device	0.5 m	1 m
Torque motor	Min. 4 Nm	Min. 9 Nm
Torque spring return	Min. 3 Nm	Min. 7 Nm
Direction of rotation motor	Can be selected by mounting L/R	Can be selected by mounting L/R
Manual override	With position stop	With position stop
Angle of rotation	Max. 95°	Max. 95°
Running time motor	<60 s / 90°	<60 s / 90°
Running time spring-return	20 s @ -10...55°C / <60 s @ -30...-10°C	20 s @ -10...55°C / <60 s @ -30...-10°C
Sound power level motor	<43 dB(A)	<55 dB(A)
Sound power level spring-return	<62 dB(A)	<67 dB(A)
Spindle driver	Form fit 12x12 mm, Continuous hollow shaft	Form fit 12x12 mm, Continuous hollow shaft
Position indication	Mechanically, with pointer	Mechanically, with pointer
Service life	Min. 60,000 safety positions	Min. 60,000 safety positions
Response temperature thermal fuse	Duct outside temperature 72°C Duct inside temperature 72°C	Duct outside temperature 72°C Duct inside temperature 72°C
Protection class IEC/EN	II Protective insulated	II Protective insulated
Protection class auxiliary switch IEC/EN	II Protective insulated	II Protective insulated
Degree of protection IEC/EN	IP54 in all mounting positions	IP54 in all mounting positions
EMC	CE according to 2014/30/EU	CE according to 2014/30/EU
Low voltage directive	CE according to 2014/35/EU	CE according to 2014/35/EU
Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14	IEC/EN 60730-1 and IEC/EN 60730-2-14
Mode of operation	Type 1.AA.B	Type 1.AA.B
Rated impulse voltage supply / control	4 kV	4 kV
Control pollution degree	3	3
Ambient temperature normal operation	-30...55°C	-30...55°C
Ambient temperature safety operation	The safety position will be attained up to max. 75°C	The safety position will be attained up to max. 75°C
Non-operating temperature	-40...55°C	-40...55°C
Ambient humidity	95% r.h., non-condensing	95% r.h., non-condensing
Maintenance	Maintenance-free	Maintenance-free
Weight	1.2 kg	1.5 kg

Technical data:	BFL24-T -(ST)	BFN24-T-(ST)
Nominal voltage	AC/DC 24 V	AC/DC 24 V
Nominal voltage frequency	50/60 Hz	50/60 Hz
Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V	AC 19.2...28.8 V / DC 21.6...28.8 V
Power consumption in operation	2.5 W	4 W
Power consumption in rest position	0.8 W	1.4 W
Power consumption for wire sizing	4 VA	6 VA
Power consumption for wire sizing note	Imax 8.3 A @ 5 ms	Imax 8.3 A @ 5 ms
Auxiliary switch	2 x SPDT	2 x SPDT
Switching capacity auxiliary switch	1 mA...3 (0.5 inductive) A, AC 250 V	1 mA...3 (0.5 inductive) A, AC 250 V
Switching points auxiliary switch	5° / 80°	5° / 80°
Connection supply / control	Cable 1 m, 2 x 0.75 mm² (halogen-free)	Cable 1 m, 2 x 0.75 mm² (halogen-free)
Connection auxiliary switch	Cable 1 m, 6 x 0.75 mm² (halogen-free)	Cable 1 m, 6 x 0.75 mm² (halogen-free)
Cable length thermoelectric tripping device	0.5 m	1 m
Torque motor	Min. 4 Nm	Min. 9 Nm
Torque spring return	Min. 3 Nm	Min. 7 Nm
Direction of rotation motor	Can be selected by mounting L/R	Can be selected by mounting L/R
Manual override	With position stop	With position stop
Angle of rotation	Max. 95°	Max. 95°
Running time motor	<60 s / 90°	<60 s / 90°
Running time spring-return	20 s @ -10...55°C / <60 s @ -30...-10°C	20 s @ -10...55°C / <60 s @ -30...-10°C
Sound power level motor	<43 dB(A)	<55 dB(A)
Sound power level spring-return	<62 dB(A)	<67 dB(A)
Spindle driver	Form fit 12x12 mm, Continuous hollow shaft	Form fit 12x12 mm, Continuous hollow shaft
Position indication	Mechanically, with pointer	Mechanically, with pointer
Service life	Min. 60,000 safety positions	Min. 60,000 safety positions
Response temperature thermal fuse	Duct outside temperature 72°C Duct inside temperature 72°C	Duct outside temperature 72°C Duct inside temperature 72°C
Protection class IEC/EN	III Safety extra-low voltage	III Safety extra-low voltage
Protection class auxiliary switch IEC/EN	II Protective insulated	II Protective insulated
Degree of protection IEC/EN	IP54 in all mounting positions	IP54 in all mounting positions
EMC	CE according to 2014/30/EU	CE according to 2014/30/EU
Low voltage directive	CE according to 2014/35/EU	CE according to 2014/35/EU
Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14	IEC/EN 60730-1 and IEC/EN 60730-2-14
Mode of operation	Type 1.AA.B	Type 1.AA.B
Rated impulse voltage supply / control	0.8 kV	0.8 kV
Control pollution degree	3	3
Ambient temperature normal operation	-30...55°C	-30...55°C
Ambient temperature safety operation	The safety position will be attained up to max. 75°C	The safety position will be attained up to max. 75°C
Non-operating temperature	-40...55°C	-40...55°C
Ambient humidity	95% r.h., non-condensing	95% r.h., non-condensing
Maintenance	Maintenance-free	Maintenance-free
Weight	1.2 kg	1.5 kg

	Technical data:	BF230-TN
Electrical data	Nominal voltage	AC 230 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 198...264 V
	Power consumption in operation	8.5 W
	Power consumption in rest position	3 W
	Power consumption for wire sizing	11 VA
	Power consumption for wire sizing note	Imax 8.3 A @ 5 ms
	Auxiliary switch	2 x SPDT
	Switching capacity auxiliary switch	1 mA...6 A (3 A inductive), DC 5 V...AC 250 V (II, reinforced insulation)
	Switching points auxiliary switch	5° / 80°
	Connection supply / control	Cable 1 m, 2 x 0.75 mm^2 (halogen-free)
	Connection auxiliary switch	Cable 1 m, 6 x 0.75 mm^2 (halogen-free)
	Cable length thermoelectric tripping device	1 m
Functional data	Torque motor	18 Nm
	Torque fail-safe	12 Nm
	Direction of motion motor	selectable by mounting L/R
	Manual override	with position stop
	Angle of rotation	Max. 95°
	Running time motor	<120 s / 90°
	Running time fail-safe	16 s @ 20°C
	Sound power level, motor	45 dB(A)
	Sound power level, fail-safe	63 dB(A)
	Mechanical interface	Form fit 12x12 mm, non-continuous hollow shaft
	Position indication	Mechanical, with pointer
	Service life	Min. 60'000 safety positions
Safety data	Response temperature thermal fuse	Duct outside temperature 72°C Duct inside temperature 72°C (colour black)
	Protection class IEC/EN	II, reinforced insulation
	Protection class auxiliary switch IEC/EN	II, reinforced insulation
	Degree of protection IEC/EN	IP54 IP protection in all mounting positions
	EMC	CE according to 2014/30/EU
	Low voltage directive	CE according to 2014/35/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Type of action	Type 1.AA.B
	Rated impulse voltage supply / control	4 kV
	Pollution degree	3
	Ambient humidity	Max. 95% RH, non-condensing
	Ambient temperature normal operation	-30...50°C
Safety data	Ambient temperature safety operation	The safety position will be attained up to max. 75°C
	Storage temperature	-40...50°C [-40...122°F]
	Servicing	maintenance-free
Weight	Weight	3.1 kg

	Technical data:	BF24-TN
Electrical data	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption in operation	7 W
	Power consumption in rest position	2 W
	Power consumption for wire sizing	10 VA
	Power consumption for wire sizing note	Imax 8.3 A @ 5 ms
	Auxiliary switch	2 x SPDT
	Switching capacity auxiliary switch	1 mA...6 A (3 A inductive), DC 5 V...AC 250 V (II, reinforced insulation)
	Switching points auxiliary switch	5° / 80°
	Connection supply / control	Cable 1 m, 2 x 0.75 mm² (halogen-free)
	Connection auxiliary switch	Cable 1 m, 6 x 0.75 mm² (halogen-free)
	Cable length thermoelectric tripping device	1 m
Functional data	Torque motor	18 Nm
	Torque fail-safe	12 Nm
	Direction of motion motor	selectable by mounting L/R
	Manual override	with position stop
	Angle of rotation	Max. 95°
	Running time motor	<120 s / 90°
	Running time fail-safe	16 s @ 20°C
	Sound power level, motor	45 dB(A)
	Sound power level, fail-safe	63 dB(A)
	Mechanical interface	Form fit 12x12 mm, non-continuous hollow shaft
	Position indication	Mechanical, with pointer
	Service life	Min. 60'000 safety positions
Safety data	Response temperature thermal fuse	Duct outside temperature 72°C Duct inside temperature 72°C (colour black)
	Protection class IEC/EN	III, Safety Extra-Low Voltage (SELV)
	Protection class auxiliary switch IEC/EN	II, reinforced insulation
	Degree of protection IEC/EN	IP54 IP protection in all mounting positions
	EMC	CE according to 2014/30/EU
	Low voltage directive	CE according to 2014/35/EU
	Certification IEC/EN	IEC/EN 60730-1 and IEC/EN 60730-2-14
	Type of action	Type 1.AA.B
	Rated impulse voltage supply / control	0.8 kV
	Pollution degree	3
	Ambient humidity	Max. 95% RH, non-condensing
	Ambient temperature normal operation	-30...50°C
Safety data	Ambient temperature safety operation	The safety position will be attained up to max. 75°C
	Storage temperature	-40...50°C [-40...122°F]
	Servicing	maintenance-free
Weight	Weight	2.7 kg

6. CONDITIONS OF TRANSPORT AND STORAGE

Fire dampers LPP-E(S) should be stored in cardboard boxes and/or on pallets. LPP should have a pre-protected actuator cardboard box. Fire dampers should be stored indoors, providing protection against atmospheric agents, at a minimum temperature of +5°C.

Do not allow mechanical damage of damper, that may be caused e.g. blows or dropping.

After each transport, visual inspection of each fire damper must be carried out.

7. INSTALLATION TECHNOLOGY

Prior to the installation, fire dampers should be checked whether there has been no damage to the dampers during transportation or storage..

Check whether the damper baffle could be opened and closed (fully open and closed position). To open fire dampers LPP-E use the actuator key.

The full opening and closing must proceed smoothly (not stepwise).

You must not pull by baffle to open or close fire damper, it could cause lead to permanent damage, not covered by the warranty.

While testing LPP-S open it by key, placed on the damper.

The damper must be protected with covering material before montage, so it will be protected from soiling, and consequently damaging the elements of the damper.

ATTENTION: Distance between fire dampers or fire damper and construction elements must be compatible with standard 1366-2:

- Minimal 200 mm between fire damper, which are installed in different ventilating wires,
- Minimal 75 mm between fire damper and construction element (wall/ceiling).

Before installing fire dampers please read assembly technology recommended by the manufacturer. The way of installing recommended by one manufacturer may not be the same for other dampers. Recommended material and dimensions of the openings follow from experience from conducted research. In rectangular dampers, most of all dampers with cross-sectional area more than 1 m2, it is recommended to use mounting wedge and spreader securing the housing against squeezing during assembly.

Squeezing the housing can change the dimensions of slot between baffle and housing, correct dimensions of this slot is needed to keep correct way of opening and closing the damper. Correct preparation of the damper for the installation is presented on the figure 3 and 4.

Figure 3. Correct preparation of the damper for the installation (using spreader securing the housing).

Figure 4. Correct preparation of the damper for the installation (using mounting wedge).

ATTENTIONS:

a. The damper must be installed in such way, that the axis of baffle must be in horizontal or vertical position.

b. Damper can not be used as formwork for the wall.

c. Ventilation ducts should be installed that they cannot put any load on the damper, their suspension must ensure their full load capacity.

d. The suspensions of the ventilation ducts connected to the dampers batteries must be made in accordance with the instruction of the manufacturer of ventilation ducts.

e. In place of Z1 and Z2 suspensions, which are installed for the time of assembly of the damper and in place of mortar binding, it is possible to use mounting brackets, paying attention to the immobilization of the damper.

7.1. INSTALLATION TECHNOLOGY – RIGID WALL

a. Make an opening in the wall with the 100 mm (acceptable 80 ÷ 120 mm) greater than the nominal dimensions of the fire damper = B+100 and H+100.

b. Put the closed fire damper into the installation opening on depth marked by undercuts on the damper body (dimension 60 mm), from one side fix it with suspension Z1, and from other side fix it to the ventilation duct suspended on Z2 suspension.

c. After setting the fire damper as described, fill the gap between the fire damper and the wall with cement, cement-lime mortar, concrete, or PROMASTOP MG III made by PROMAT.

d. After 48 hours from the installation, the suspensions and supports used during installation of fire damper, may be removed.

ATTENTIONS:

- Carry out the installation in protective clothing, (gloves, glasses, helmet),
- Pay attention at the sharp edges of the sheets,
- Damper Baffle axis must be in horizontal or vertical position after montage,
- Damper can not be a formwork for wall,
- Ventilations duct should be installed that they cannot put any load on the damper, their suspension must ensure their full load capacity,
- The suspensions of the ventilation duct connected with the damper battery must be done according to instruction manufacturer of ventilation ducts,
- In place of suspensions Z1 and Z2, which are installed for the time of assembly of the damper and in place of mortar binding it can be used mounting brackets, paying attention to the immobilization of the damper.

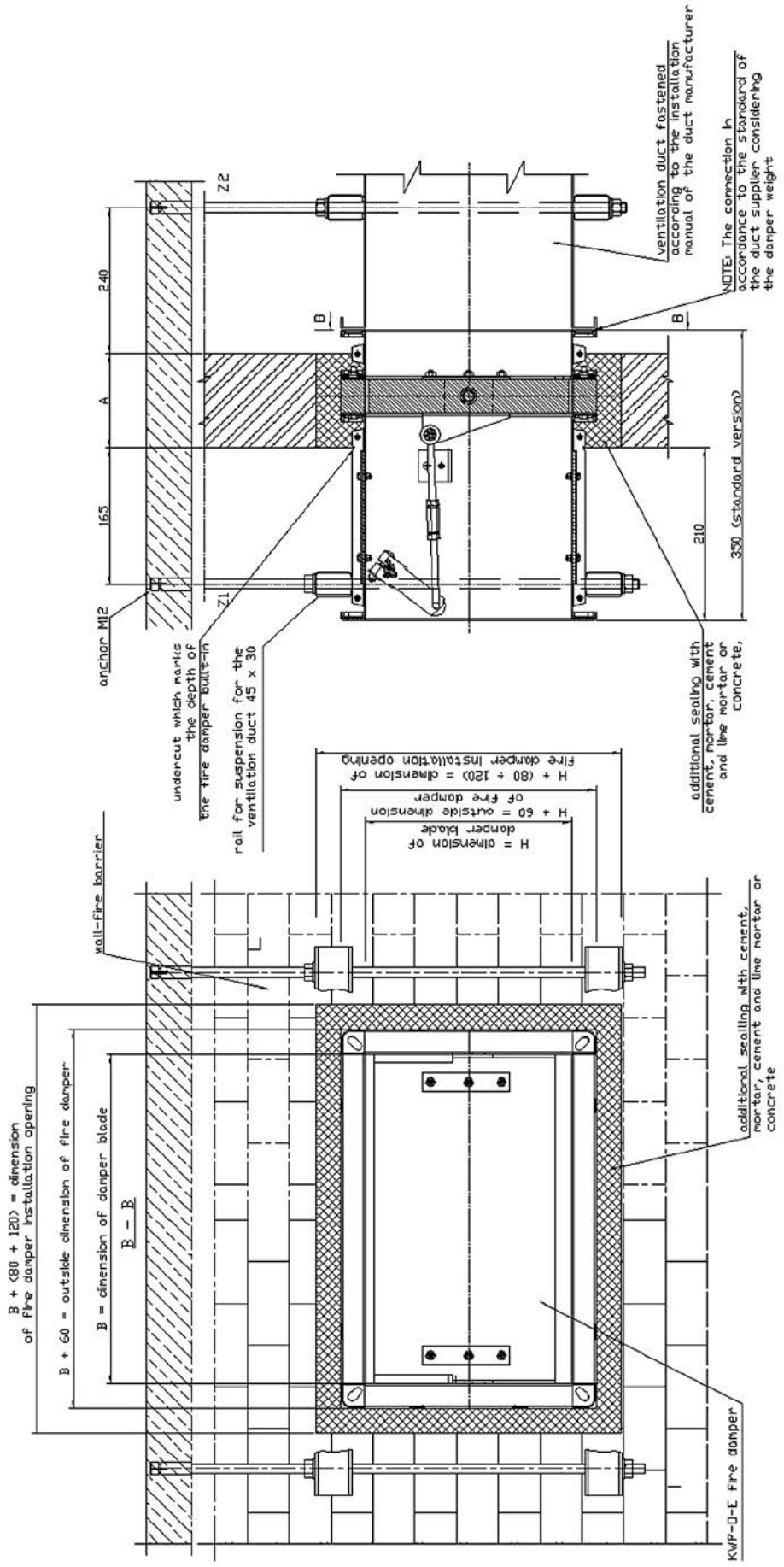


Figure 5. Installation method of LPP fire dampers in a rigid wall.

7.2. INSTALLATION TECHNOLOGY – FLEXIBLE WALL

a. Make an opening in the wall with the dimensions 100 mm (acceptable 80 ÷ 120 mm) greater than the nominal dimensions of the fire damper = B+100 i H+100.

b. Make a frame of two layers of GKF boards, 12,5 mm thick and the width relative to the width of opening, mounting by screws screws remembering to carefully seal the contact edges with a mastic: Hilti Firestop Coating CP 673, Promastop-Coating, Promaseal-Mastic lub Soudal Firesilicone B1 FR.

c. Put the closed fire damper into the installation opening and support or suspend, in this way that the minimum installation depth mark is on the plane of the flange surface.

d. After setting the fire damper as described, fill the gap between the fire damper and the wall with non-flammable mineral wool of high density, 80 kg/m3 or more.

e. Seal the place of filling with mineral wool using the sealing compounds given in pts.2.

f. Mount collar, both side of wall, made of GKF boards, 15 mm thick and 150 mm wide, using screws.

g. After mounting the collar, remove the supports or suspensions, check the fire damper correct operation and leave it in open position.

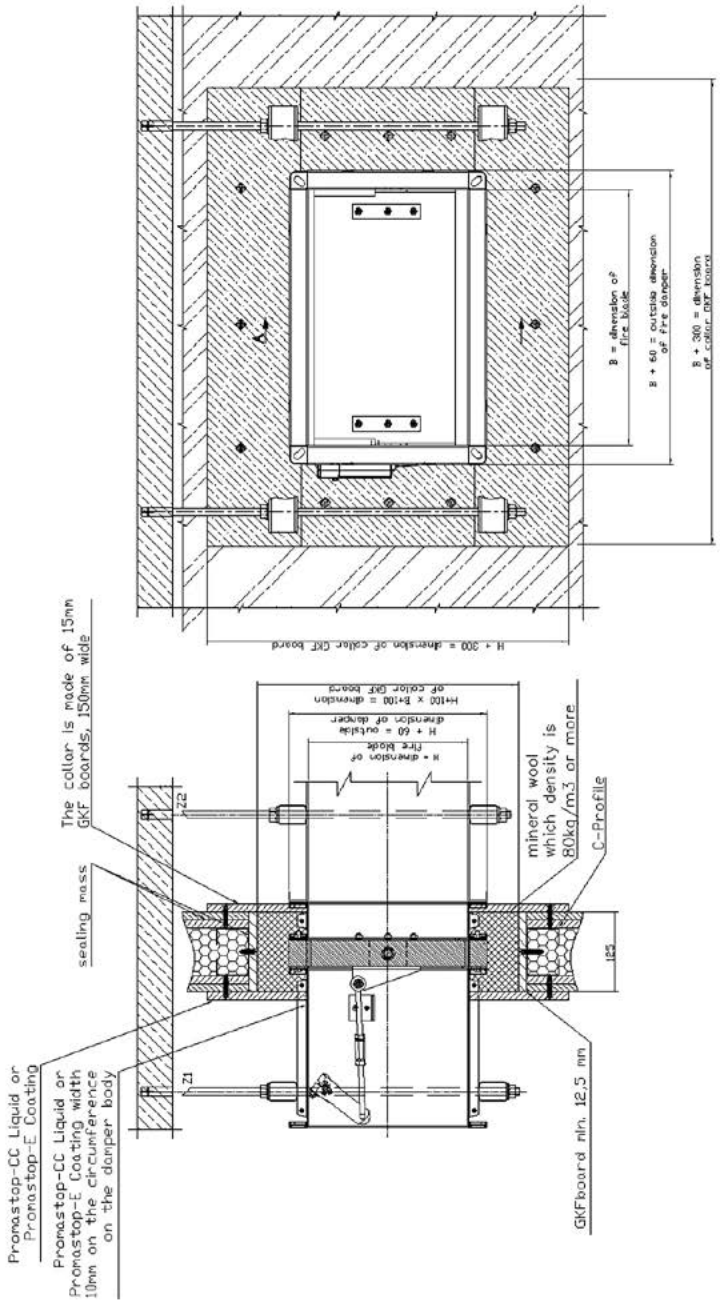


Figure 11. Installation of LPO-L fire dampers in rigid wall with vertical rotation axis of baffle.

7.3. INSTALLATION TECHNOLOGY – CEILING

a. Make an opening in the ceiling with the 100 mm (acceptable 80 ÷ 120 mm) greater than the nominal dimensions of the fire damper = B+100 and H+100.

b. Put the closed fire damper into the ceiling to the depth marked on housing (dimension 60mm)

c. After setting the fire damper as described, with using montage supports, fill the gap between the fire damper and the wall with cement, cement-lime mortar, concrete. Under difficult working conditions producer recommend PROMASTOP MG III mortar of production of the PROMAT company.

d. Mount the mounting brackets on each side.

   Number of mounting brackets:

   - Side length up to 500 mm – 1 pcs.
   - Side length from 500 to 800 mm – 2 pcs.

e. Housing install with actuator similarly as in the picture. Only the length of the supports changes. Install the mounting brackets to the ceiling by using dowels

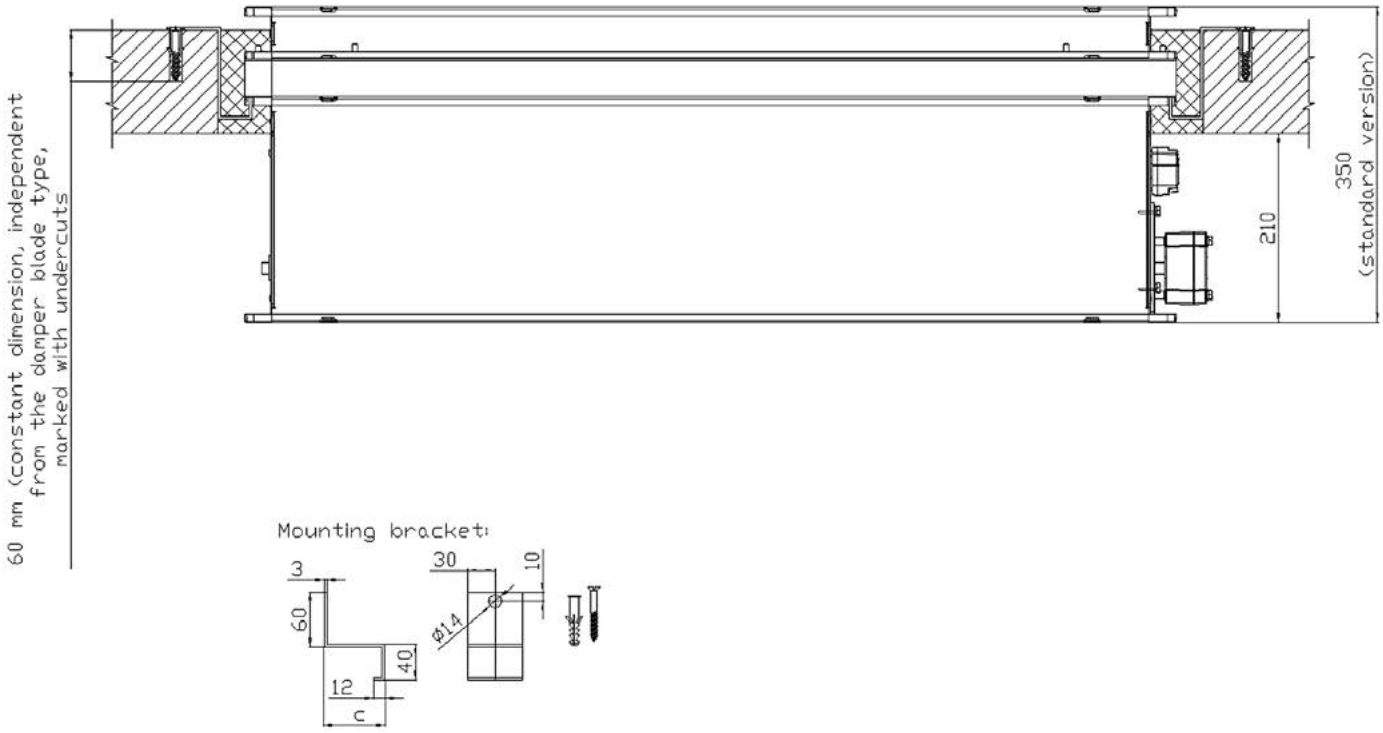


Figure 7. Proposed dimensions of mounting brackets for installation in a ceiling.

	Actuator under ceiling	Actuator above ceiling
E mm	Thickness of ceiling - 28	96

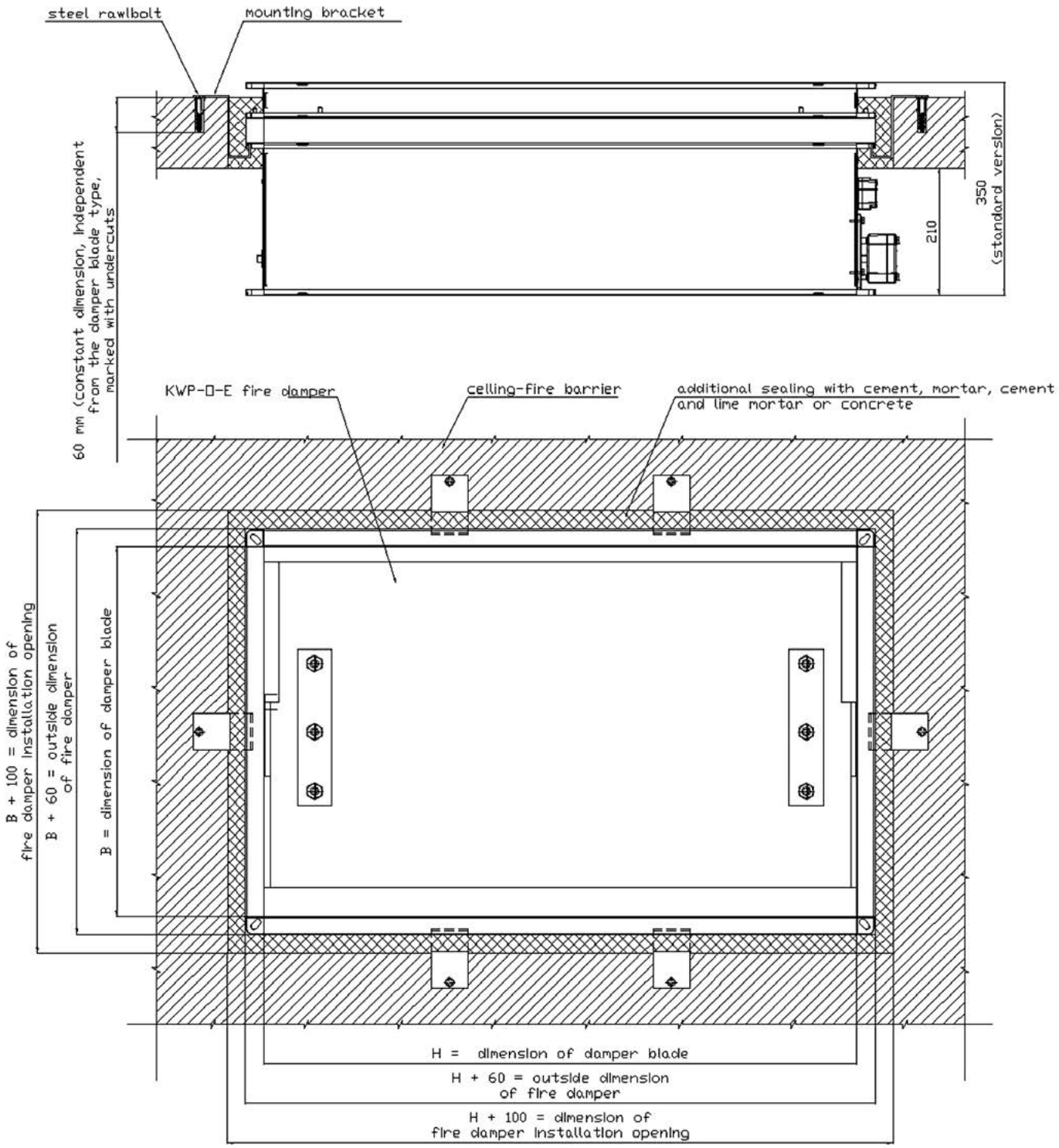


Figure 8. Installation method of LPP fire dampers in a ceiling.

7.4. INSTALLATION TECHNOLOGY – STRUCTURES THICKER THAN 135 mm

The LPP-E(S) damper can be installed also in horizontal compartments thicker than length of damper's body. In this case, ventilation ducts are going to be partially inbuilt in the fire compartment (Figure 9).

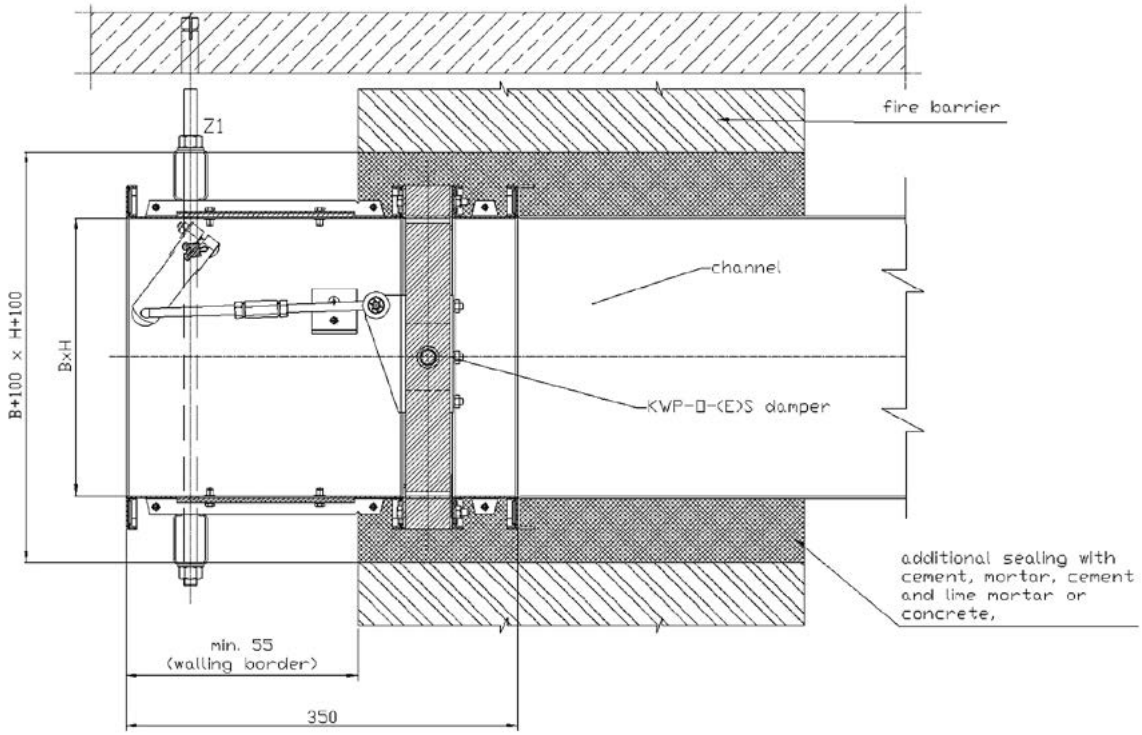


Figure 9. Installation method of LPP fire dampers in structures thicker than 135 mm.

8. INSTALLATION TECHNOLOGY FOR FIRE DAMPERS IN BATTERIES

The assembly of fire dampers in batteries is possible only after previous delivery of the information (at the stage of ordering) about which fire dampers and in which arrangement (horizontal or vertical) would be installed in a wall, in order to prepare suitable opening for self-tapping screws in the fire damper body.

There are two possibilities of realizing the order of fire damper batteries: basic and complete. First one covers the set of fire dampers, assembly strips and complete set of self-tapping screws. The purchase of other materials needed such as: intumescent gasket (PROMASEAL-PL PVC SK), mineral wool for thermal insulation (with minimum density of 60 kg/m3) and aluminum tape remains with the Customer. The secund variant provides for supply by the Manufacturer of complete set of fire dampers and all the elements needed for installation.

The fire dampers are assembled into batteries with use of assembly strips with length of 1200 mm. In case when total dimension of their battery is smaller than multiple of the length of the assembling strip, the last one should be cut with angle grinder on the construction site to match the dimension of the battery (basic variant) or cut in manufacturing facility by Manufacturer (complete variant)

Fire dampers should be marked with letters: A, B, C, D.

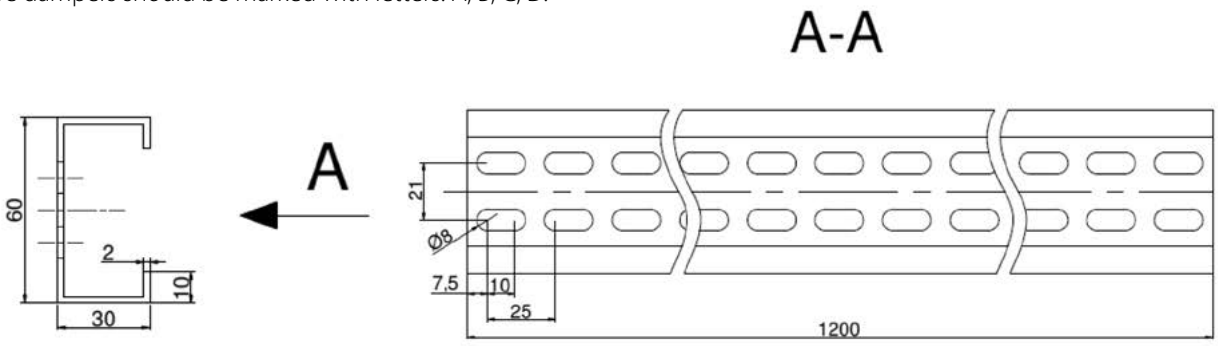


Figure 10. Connection strip**.**

DIEM offers four basic types of damper battery systems.

Arrangement 1 – vertical battery consisting of two fire dampers LPP (Figure 11):

a. Fix the gasket on insulating spacer of one of adjoining fire dampers (position (1) in the Figure 11).

b. Put non-combustible mineral wool into recess in upper surface of the fire damper. The thickness of mineral wool should be twice as the thickness of the recess in upper surface of the fire damper in order to fill the whole free space between the fire dampers as shown in (w1).

   NOTE: The alternative way of wool mounting is to use two layers of wool with thickness of 30 mm. In this case, apply the fire resistant PROMASTOP-Coating with width of 50 mm. The mass is placed between the strips of wool and between wool and damper housings.

d. Place the fire damper A on the fire damper B and assemble them together on the front and back with use of perforated assembly strips (2) and self-tapping screws M6 x 16 (3), which should be tightened into the openings in fire damper body. In order to carry out the correct assembly, 4 self-tapping screws should be used per each assembly strip with length of 1200 mm.

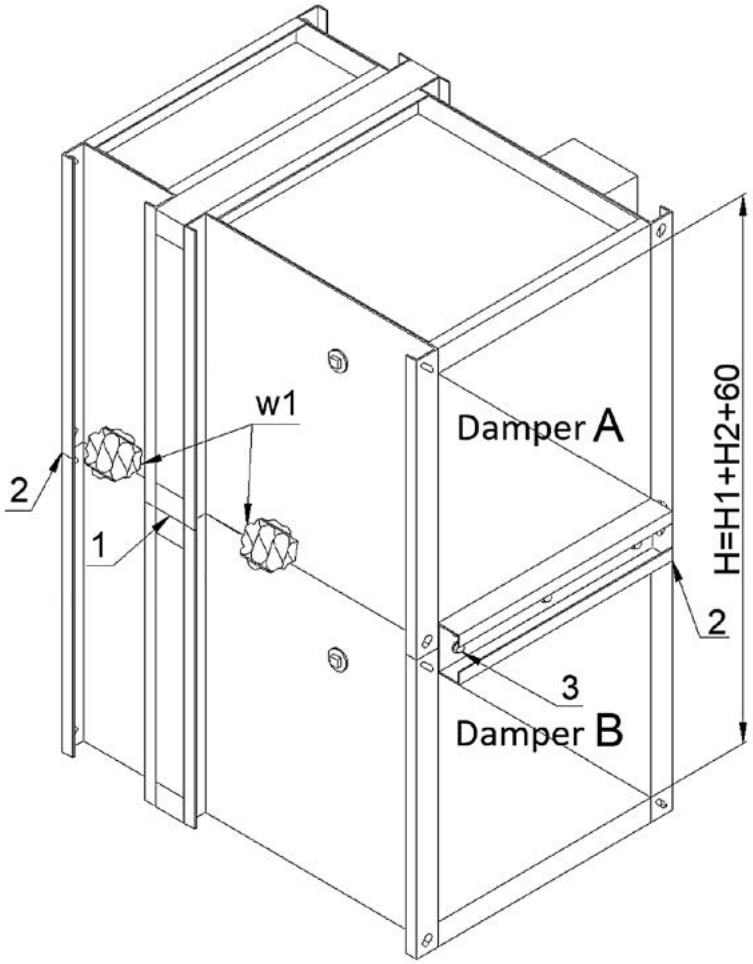


Figure 10. Arrangement 1 - vertical battery consisting of two LPP fire dampers.

Arrangement 2 – vertical battery consisting of three fire dampers LPP (Figure 12):

a. Fix the gasket on insulating spacer of one of adjoining fire dampers (position (1) in the Figure 12).

b. Put non-combustible mineral wool into recess in upper surface of the fire damper. The thickness of mineral wool should be twice as the thickness of the recess in upper surface of the fire damper in order to fill the whole free space between the fire dampers as shown in (w1).

   NOTE: The alternative way of wool mounting is to use two layers of wool with thickness of 30 mm. In this case, apply the fire resistant PROMASTOP-Coating with width of 50 mm. The mass is placed between the strips of wool and between wool and damper housings.

c. Place the fire damper B on the fire damper C and assemble them together on the front and back with use of perforated assembly strips (2) and self-tapping screws M6 x 16 (3), which should be tightened into the openings in fire damper body. In order to carry out the correct assembly, 4 self-tapping screws should be used per each assembly strip with length of 1200 mm.

d. Repeat accordingly paragraphs 2 and 3 to assemble fire damper A on fire damper B.

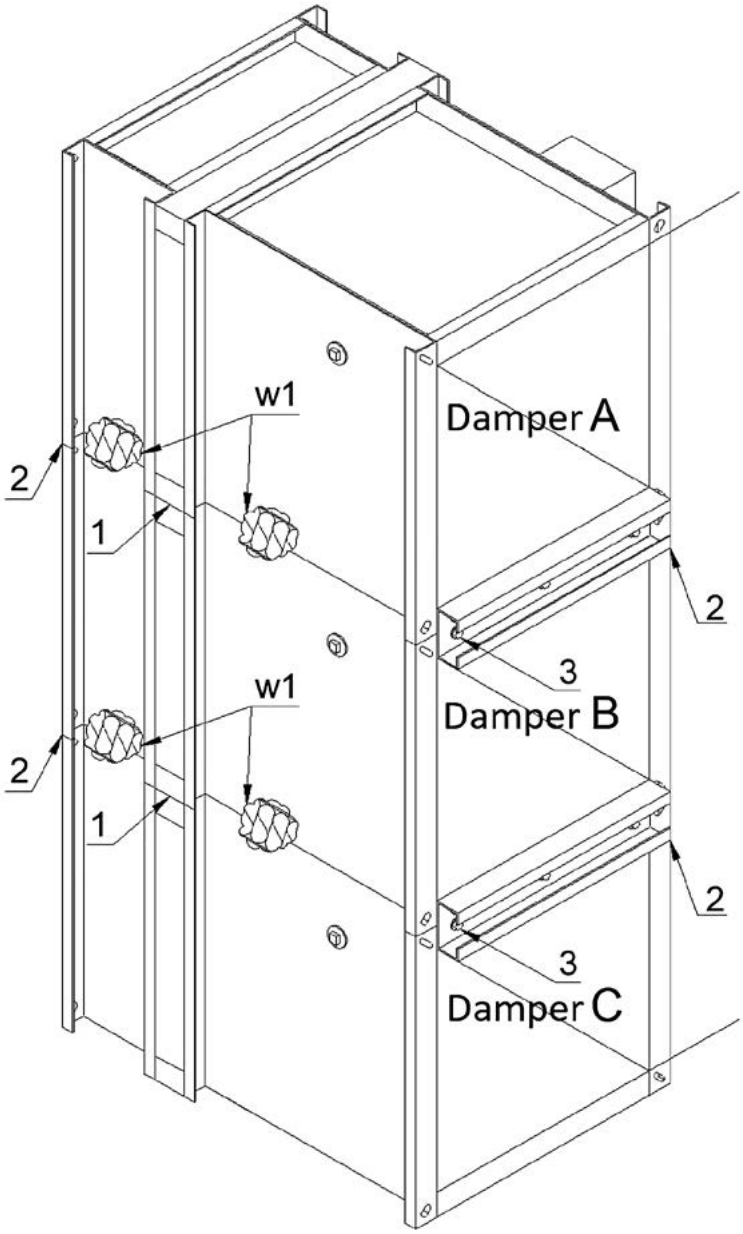


Figure 12. Arrangement 2 - vertical battery consisting of three LPP fire dampers.

Arrangement 2 – horizontal battery consisting of two fire dampers LPP (Figure 13):

a. Fix the gasket on insulating spacer of one of adjoining fire dampers (position (1) in the Figure 13).

b. Set together the sides of fire damper A and the fire damper B (where the gasket was fixed) and assemble them together on the front and back with use of perforated assembly strips (2) and self-tapping screws M6x16 (3), which should be tightened into the openings in fire damper body. In order to carry out the correct assembly, 4 self-tapping screws should be used per each assembly strip with length of 1200 mm.

c. Fill the whole free space between the joint of fire dampers with non-combustible mineral wool, as shown in (w1).

NOTE: The alternative way of wool mounting is to use two layers of wool with thickness of 30 mm. In this case, apply the fire resistant PROMASTOP-Coating with width of 50 mm. The mass is placed between the strips of wool and between wool and damper housings.

c. The place of sealing the top of the fire damper with mineral wool should be sealed with aluminum tape (4).

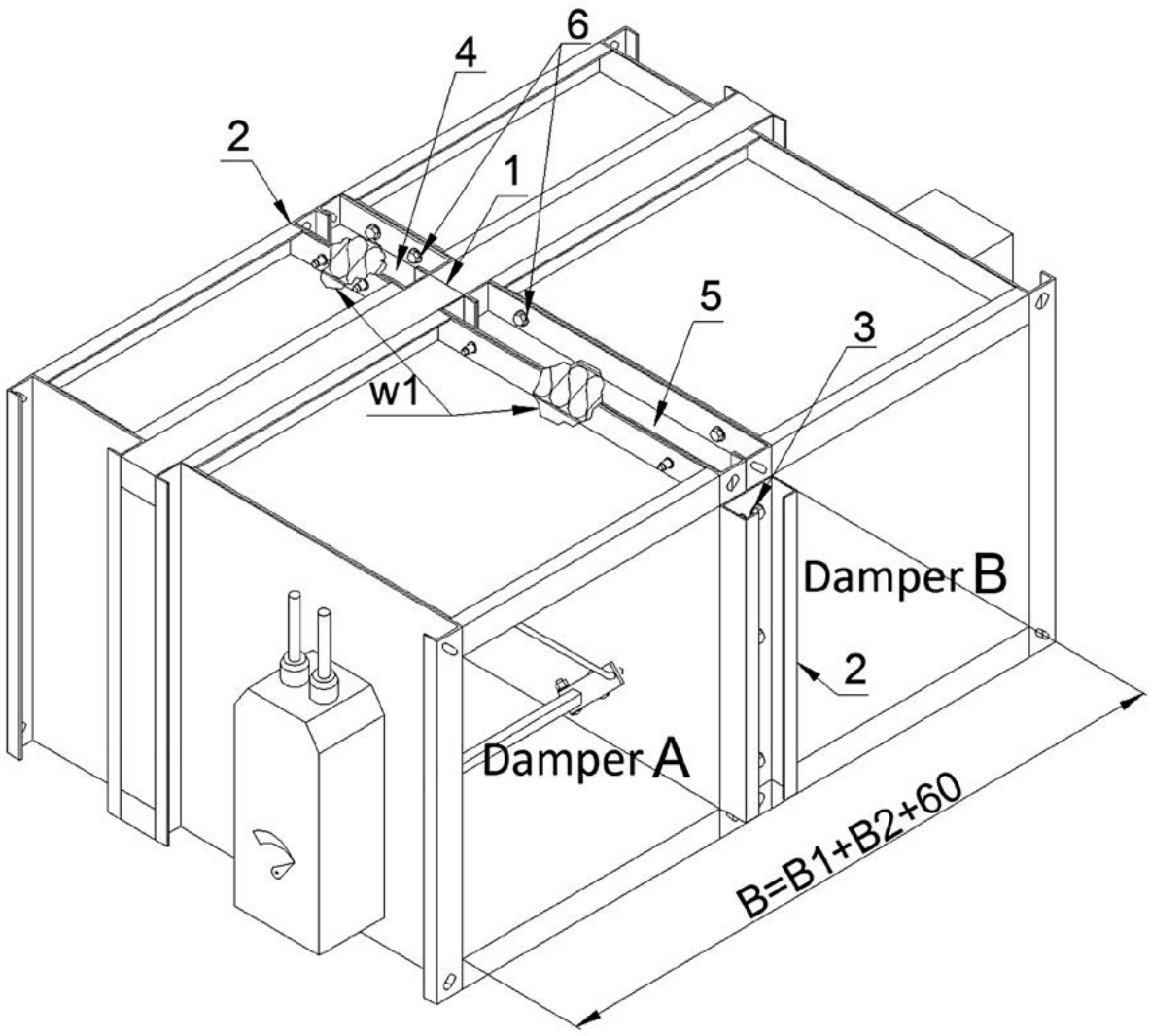


Figure 12. Arrangement 3 – horizontal battery consisting of two LPP fire dampers.

Arrangement 2 – battery consisting of four fire dampers LPP (Figure 14):

The assembly of battery consisting of four LPP fire dampers is divided into two steps:

- Step 1 – assembly of fire damper A and fire damper B and assembly of fire damper C and fire damper D.
- Step 2 – assembly of the set of fire dampers A, B and the set of fire dampers C, D.

Step 1:

a. Fix the gasket on insulating spacer of one of adjoining fire dampers (position (1) in the Figure 14).

b. Set together the sides of fire damper A and the fire damper B (where the gasket was fixed) and assemble them together on the front and back with use of perforated assembly strips (2) and self-tapping screws M6 x 16 (3), which should be tightened into the openings in fire damper body. In order to carry out the correct assembly, 4 self-tapping screws should be used per each assembly strip with length of 1200 mm.

c. Repeat paragraph 2 to assemble fire damper **C** on the fire damper **D**.

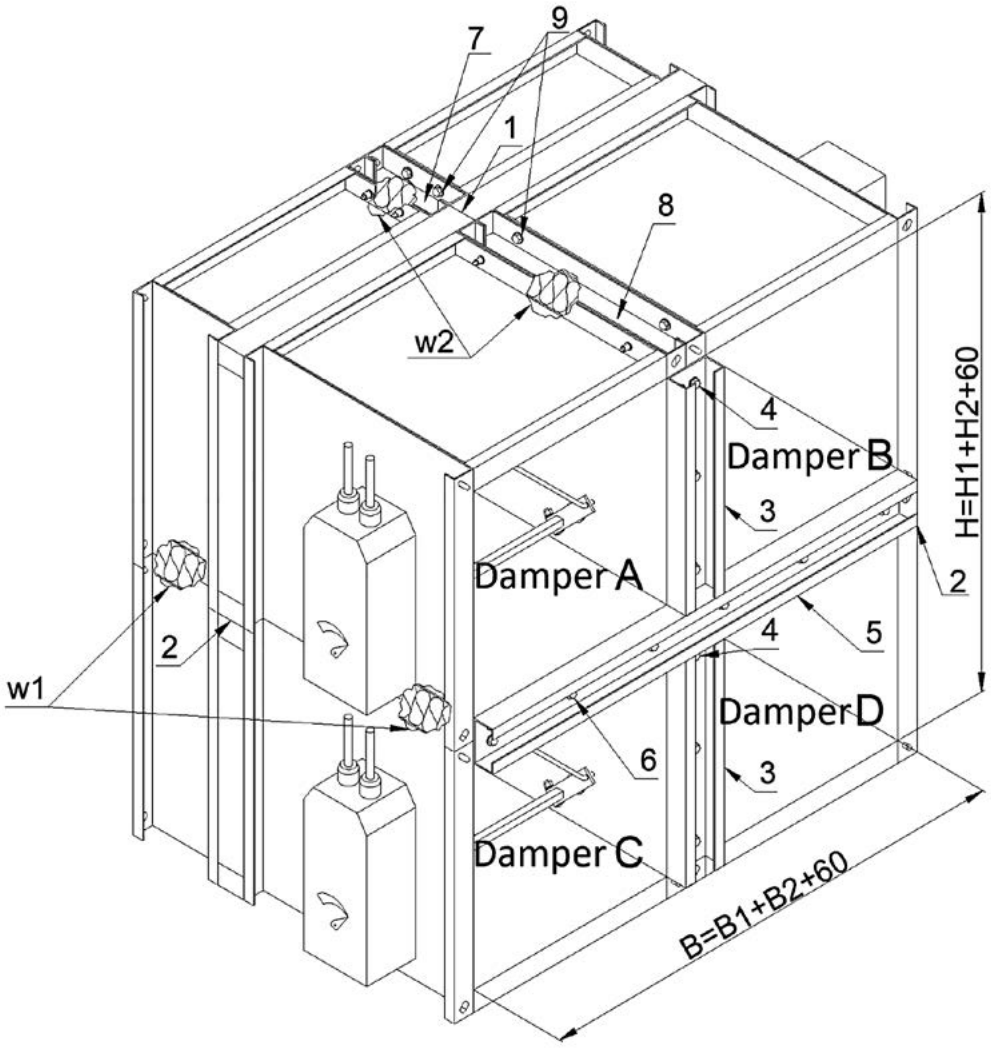


Figure 14. Battery made of four LPP fire dampers.

Step 2:

a. Fix the gasket on insulating spacer of one of adjoining fire dampers (position (2) in the Figure 13).

b. Put non-combustible mineral wool into recess in upper surface of the fire damper C and fire damper D. The thickness of mineral wool should be twice as the thickness of the recess in upper surface of the fire dampers in order to fill the whole free space between the fire dampers C and D and the fire dampers A and B, as shown in (w1).

   NOTE: The alternative way of wool mounting is to use two layers of wool with thickness of 30mm. In this case, apply the fire resistant PROMASTOP-Coating with width of 50 mm. The mass is placed between the strips of wool and between wool and damper housings.

d. Place the set of fire dampers A and B on the set of fire dampers C and D and assemble them together on the front and back with use of perforated assembly strips (5) and self-tapping screws M6 x 16 (6), which should be tightened into the openings in fire damper body. In order to carry out the correct assembly, 4 self-tapping screws should be used per each assembly strip with length of 1200 mm.

e. The empty space between joint of the bodies of fire dampers A, B and fire dampers C, D should be filled with non-combustible mineral wool (as shown in (w2)).

f. NOTE: The alternative way of wool mounting is to use two layers of wool with thickness of 30mm. In this case, apply the fire resistant PROMASTOP-Coating with width of 50 mm. The mass is placed between the strips of wool and between wool and damper housings.

g. The place of sealing the top of the battery with mineral wool should be sealed with aluminum tape (7).

Installation of LPP fire dampers batteries in rigid wall compartment (Figure 15 to 18):

a. Make an opening in the wall with dimensions depending on the battery size and its arrangement.
   - For vertical battery consisting of two LPP fire dampers: (B1+120)x(H1+H2+180) (Figure 15).
   - For vertical battery consisting of three LPP fire dampers: (B1+120)x(H1+H2+H3+240) (Figure 16).
   - For horizontal battery consisting of two LPP fire dampers: (B1+B2+180)x(H1+120) (Figure 17).
   - For battery consisting of four LPP fire: (B1+B2+180)x(H1+H2+180) (Figure 18)

b. Put the battery of fire dampers into the installation opening on depth marked by undercuts on the damper body [dimension 60 mm). From one side fix it with suspension Z1, and from other side, fix it to ventilation duct suspended on suspension Z2 according to the figure).

c. NOTE: Fixing of the ductwork has to cover the weight of the battery of fire dampers. Specifically the bolts, anchors, installation frame of the duct and screws used to join the duct with battery of fire dampers should be taken into account. If there is no possibility of ensuring the safe suspension of the battery of fire dampers during installation, the battery should be supported from the bottom side.

d. After setting the fire damper as described, fill the gap between the fire damper and the wall with cement, cement-lime mortar or concrete or PROMASTOP MG III of production of the PROMAT company.

e. After 72 hours from the finish of assembly, you can disassemble suspensions.

REMARKS:

a. Install the fire damper in such way, that the damper blades would be in horizontal position.

b. Fire damper cannot be the support for the constructed wall.

c. Ductwork cannot be the load for the fire damper, ductwork suspensions have to provide full load capacity.

d. Ductwork suspensions fixed to the fire damper have to be made in accordance with the ductwork manufacturer instructions.

e. Selection of mounting rails should be performed in accordance to the guidelines provided by the manufacturer of suspensions, considering weight and arrangement of the battery of fire dampers.

f. In place of suspensions Z1, Z2 and cement mortar, mounting brackets may be applied! Paying special attention for immobilization of the fire damper).

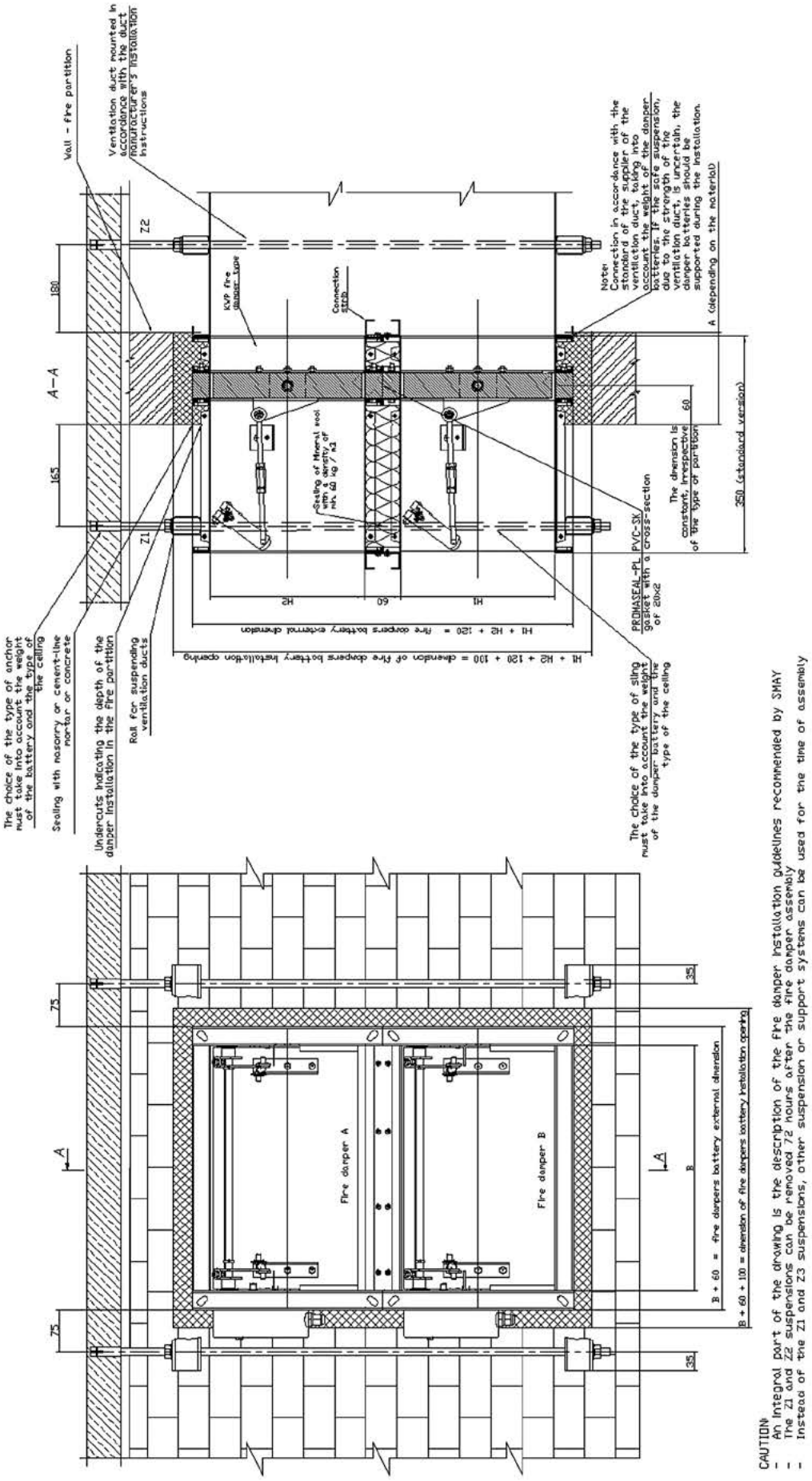


Figure 15. Installation of a battery consisting of two fire dampers LPP in vertical arrangement in ceiling.

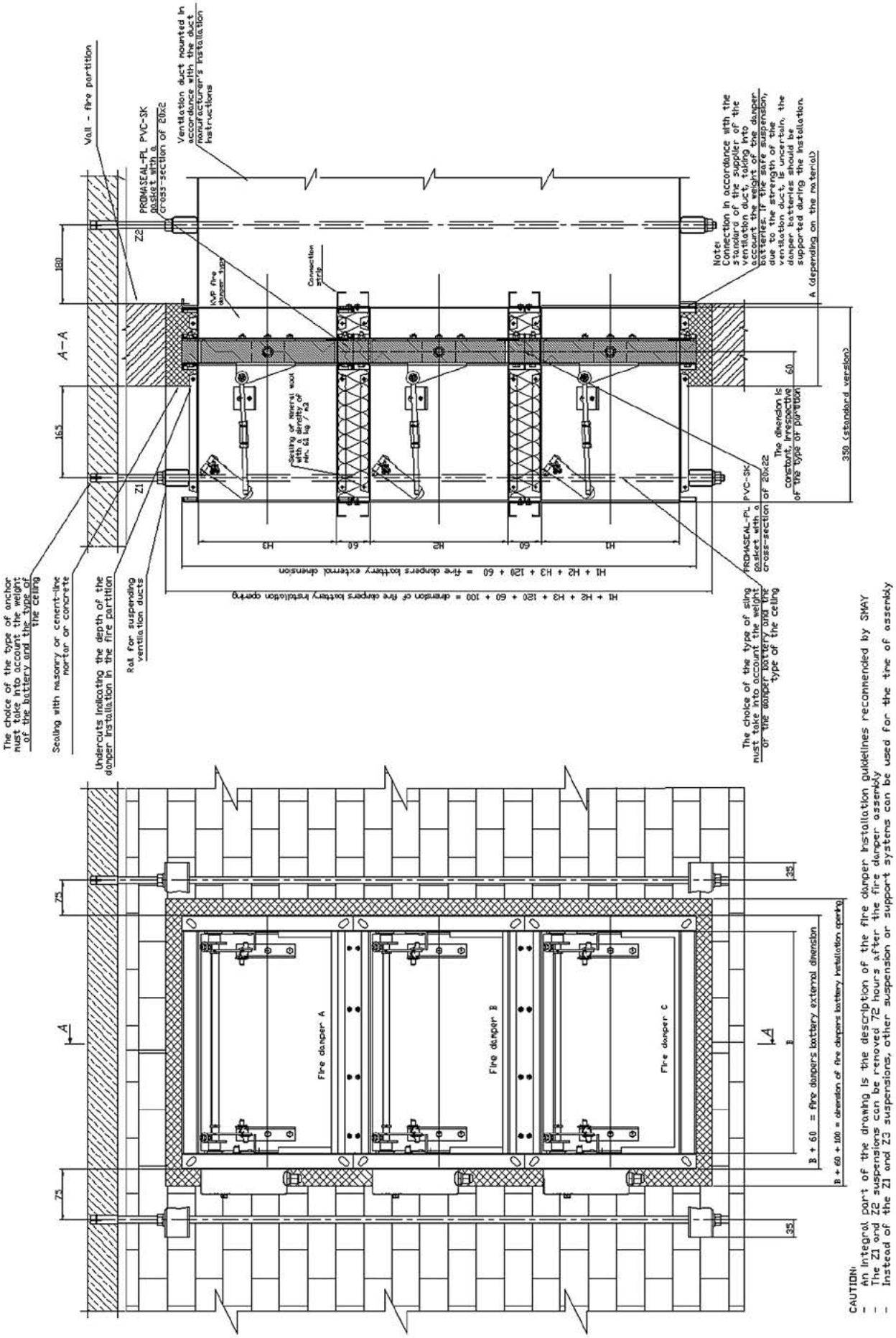


Figure 16. Installation of a battery consisting of three fire dampers LPP in vertical arrangement in ceiling.

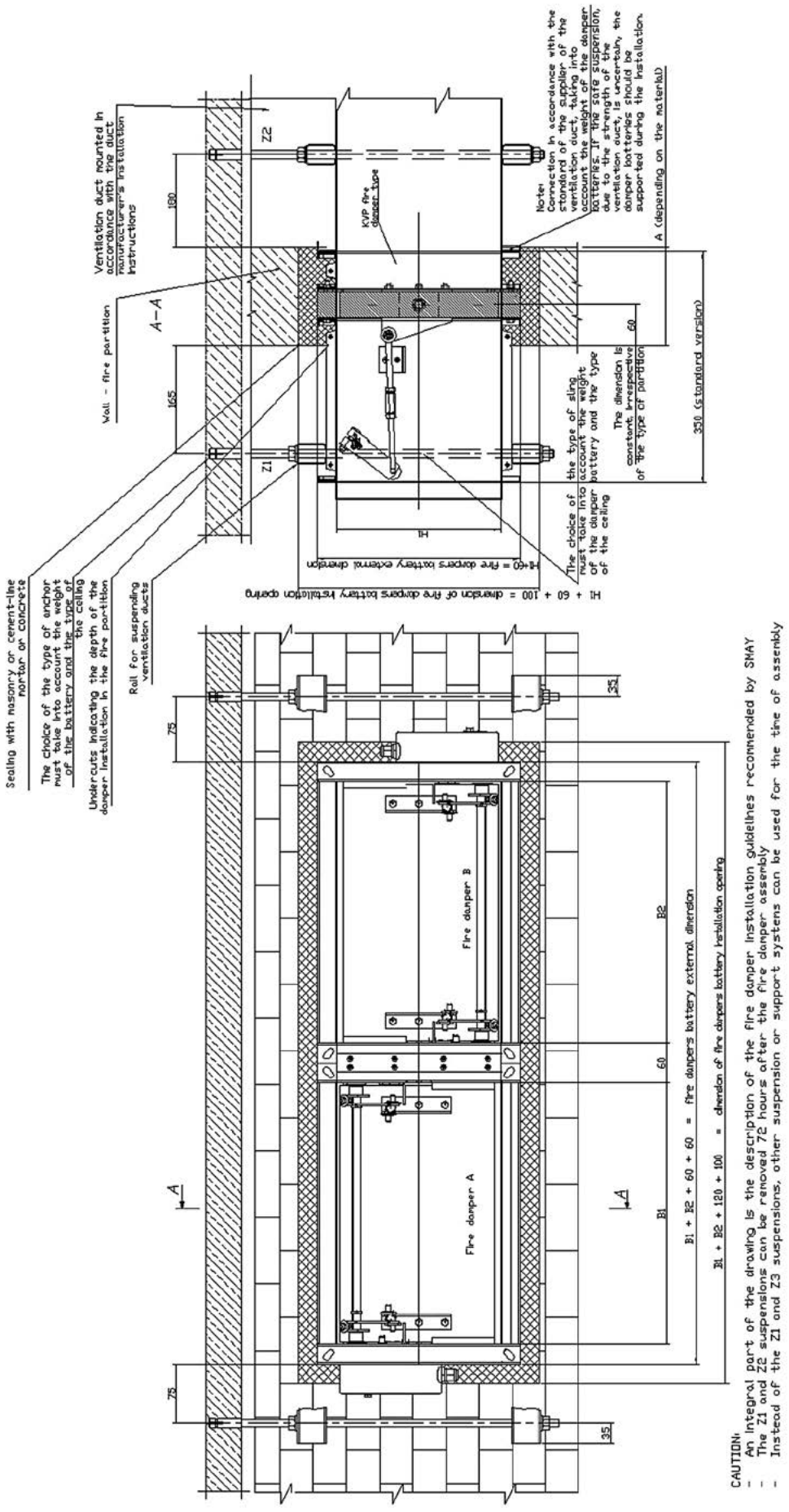


Figure 17. Installation of battery consisting of two fire dampers LPP in horizontal arrangement in ceiling.

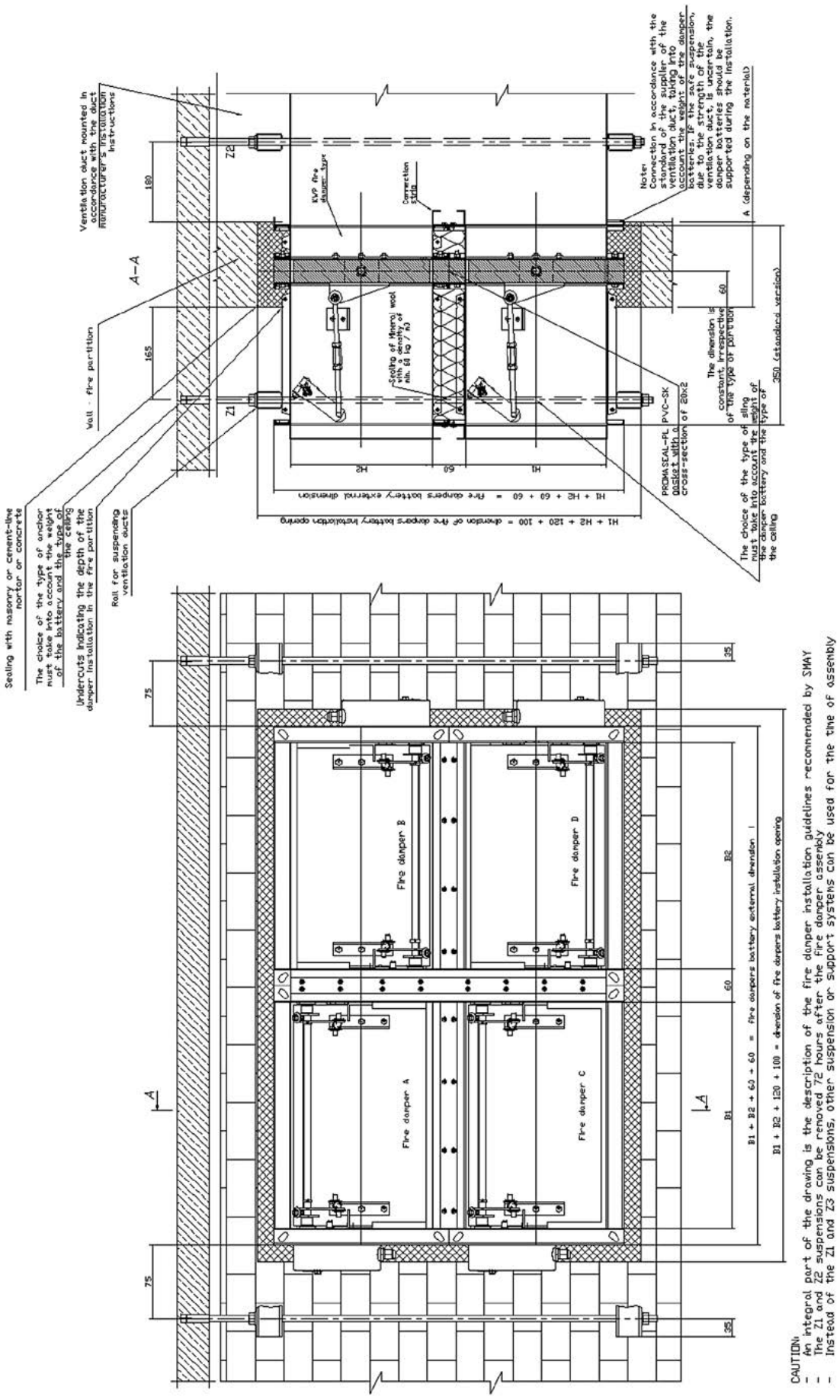


Figure 18. Installation of a battery consisting of four fire dampers LPP in ceiling.

Table 6. Weight of battery made of two LPP dampers [kg]

LPP-E(S)		Bmm - clear LPP damper width													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H	200	26,7	31,7	36,6	41,1	46	50,9	55,9	60,8	65,8	70,9	75,9	90,5	96,3	101,9
	300	31,1	36,8	42,9	48,1	54	59,8	65,2	70,8	76,8	82,6	88,4	104,4	110,8	117,4
	400	36	42,5	49,2	55,4	61,7	65,3	75,2	81,7	88	94,8	101,4	118,8	126,2	133,4
	500	-	48,1	55,6	62,8	70,1	77,5	85	92,3	99,9	106,8	114,2	133,4	141,4	149,4
	600	-	53,4	61,7	69,8	78	86,1	94,6	102,7	111	119,3	127,6	147,9	156,8	165,5
	700	-	59	68	76,8	86,2	95,3	104,5	108,7	117,3	131,5	140,5	162,5	172,1	181,9
	800	-	64,4	74,5	83,9	94,2	104	113,9	124,1	133,8	143,8	153,7	177,4	187,9	198,6
	900	-	70,1	80,5	91,1	102	112,6	123,8	134,5	145,1	155,8	167	192,2	206,4	218
	1000	-	-	87	98,3	110,1	121,8	133,6	145,3	156,9	168,3	180,1	209,1	221,5	233,7

Table 7. Weight of battery made of three LPP dampers [kg]

LPP-E(S)		Bmm - clear LPP damper width													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H	200	40,1	47,5	54,9	61,7	69,1	76,3	83,5	90,8	98,0	105,2	112,4	134,0	142,5	150,6
	300	46,7	55,2	64,3	72,2	81,0	89,8	97,7	106,2	115,1	123,6	132,0	155,9	165,3	175,0
	400	53,9	63,8	73,7	83,0	92,6	98,0	112,7	122,6	131,9	141,8	152,0	177,7	188,5	199,1
	500	-	72,2	83,5	94,1	105,5	116,2	127,5	138,5	149,9	160,2	171,2	199,8	211,5	223,2
	600	-	80,2	92,6	104,7	117,1	129,2	142,0	154,1	166,5	178,9	191,3	222,0	235,5	248,7
	700	-	88,4	102,0	115,2	14,9	142,9	156,8	163,1	176,0	197,3	211,1	247,6	264,9	282,5
	800	-	96,6	111,8	125,8	141,3	155,9	170,9	186,1	200,7	215,7	230,6	266,0	281,6	297,6
	900	-	104,8	120,8	14,9	152,9	169,0	185,6	201,7	217,7	233,8	250,4	287,6	308,4	325,4
	1000	-	-	130,6	147,5	165,2	182,6	200,4	217,8	235,3	252,5	270,2	313,7	332,2	350,5

Table 8. Weight of battery made of four LPP dampers [kg]

LPP-E(S)		Bmm - clear LPP damper width													
		200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
Height H	200	53,5	63,3	73,2	82,2	92,1	101,7	111,3	120,9	130,5	140,1	149,7	178,5	189,7	200,5
	300	62,2	73,6	85,7	96,3	108,0	119,7	130,2	141,6	153,5	164,7	176,0	207,6	220,0	232,8
	400	71,9	85,1	98,3	110,7	123,5	130,7	150,3	163,5	176,0	189,1	202,7	236,8	251,5	265,8
	500	-	96,2	111,3	125,6	140,2	154,9	170,0	184,7	199,7	213,7	228,4	266,7	282,6	298,4
	600	-	106,9	123,4	139,6	156,1	172,3	189,3	205,5	222,0	238,6	255,1	295,9	313,9	331,4
	700	-	118,0	136,0	153,7	172,1	190,5	209,0	217,4	234,6	263,1	281,5	320,8	339,6	358,7
	800	-	128,9	149,0	167,7	188,4	207,9	227,8	248,1	267,7	287,6	307,5	354,7	375,6	397,0
	900	-	139,9	161,1	19,6	203,9	225,3	247,5	268,9	290,3	311,7	333,8	406,0	442,0	472,7
	1000	-	-	174,1	196,5	220,2	243,5	267,2	290,4	313,7	336,6	360,3	418,1	442,8	467,2

9. PRINCIPLE OF MAINTENANCE

Before started any operation and maintenance works it is recommended to read this documentation. This responsibility falls mostly on workers which will operate device/systems during operation and service works. In case of lack of trained personnel (which have specific technical skills) service works should be made by DIEM Service or DIEM Authorized service.

Damage to the LPP damper resulting from non-compliance with the guidelines included in this documentation, will not be subject to warranty repairs.

Exchange and modification of device components can be done, just by DIEM Service or DIEM]Authorized service (does not apply to exchange thermal fuse).

Factory sealed elements, should have undamaged, original seals, installed by DIEM Service or DIEM Authorized service.

After installation of the LPP-E and LPP-S, fire damper, when running the system, it is recommended to carry out regular checks and record them as shown in table below. It is recommended to repeat checks at intervals or at least once every 6 months.

Table 9. Recommended checks

Fire damper type	
Control date	
Check actuator wiring condition, if doesn`t damaged	
Check limit switch wiring condition, if doesn`t damaged	
Check cleanliness in fire damper, clean if necessary	
Check baffle and seal condition, if necessary, report a problem	
Confirm correct operation of safe shutdown of the fire damper, if necessary, report a problem	
Confirm correct operation of the fire damper when OPEN and CLOSE, using the control system and physical observation	
Confirm correct operation of limit switches in OPEN and CLOSED positions, if necessary, report a problem	
Confirm that the fire damper meets its function as a part of the control system	
Confirm that the fire damper remains its working position	
ATTENTION: Fire dampers are usually part of ventilation system. In this case, the entire system should be checked according to the operating and maintenance requirements.	

In order to check the proper functioning of fire damper, in particular:

LPP-E fire damper:

a. Take off inspection hatch, Make a visual inspection of the interior of fire damper, determine the condition of the baffle and seal, whether there are no damage or dirt that could block the fire baffle during closing. After an inspection put the inspection hatch back.
b. Check the fire damper without disconnecting the supply voltage from the actuator.
c. The opening and closing test should be carried out by positioning the baffle from control system („open" and „closed" position read on the position indicator located on the actuator).
d. Put the inspection hatch back. Leave the fire damper in the right position.
e. Make a control protocol.

LPP-S fire damper:

a. Take off inspection hatch, Make a visual inspection of the interior of fire damper, determine the condition of the baffle and seal, whether there are no damage or dirt that could block the fire baffle during closing. After an inspection put the inspection hatch back.

b. Check the wiring of the limit switches.

c. Close the fire damper by pulling on the hand release. The baffle should close freely. Check that the baffle is closed properly. If the baffle does not close properly, adjust by pulling the spring to the next latch of the spring mechanism.

d. After that, move several times the baffle using a key, attaching it to the axle.

e. After doing the above, leave the fire damper in the open position.

f. Make a control protocol.

Fire damper can be cleaned with a dry or damp cloth. Dirt and other pollution can be cleaned with generally available cleaners. Do not use aggressive, caustic cleaners and sharp tools.

Replacing the thermal fuse element in LPP-S:

Exchange must be performer on the closed position.

To replace the thermal fuse element:

a. Release the spring **7** from the spring mechanism plate **1**.

b. Unscrew the bolt **14** and pull out the entire thermal fuse element. The assembly of these elements consists of a thermal fuse element **16**, hook 6, console **5**, washer **7**, release spring **9**, nut M8 **12**, round nut **8**, thermal fuse plate **13**. To replace the thermal fuse, press the hook **6** towards to the nut and put into console. When you put the thermal fuse, release the hook and push the lever of hand mechanism.

c. Install the assembly of thermal fuse with the bolt **14**.

d. Pull the spring onto spring mechanism plate **1**.

e. Open the fire damper and check that it opens and closes correctly after push the hand release lever **11**.

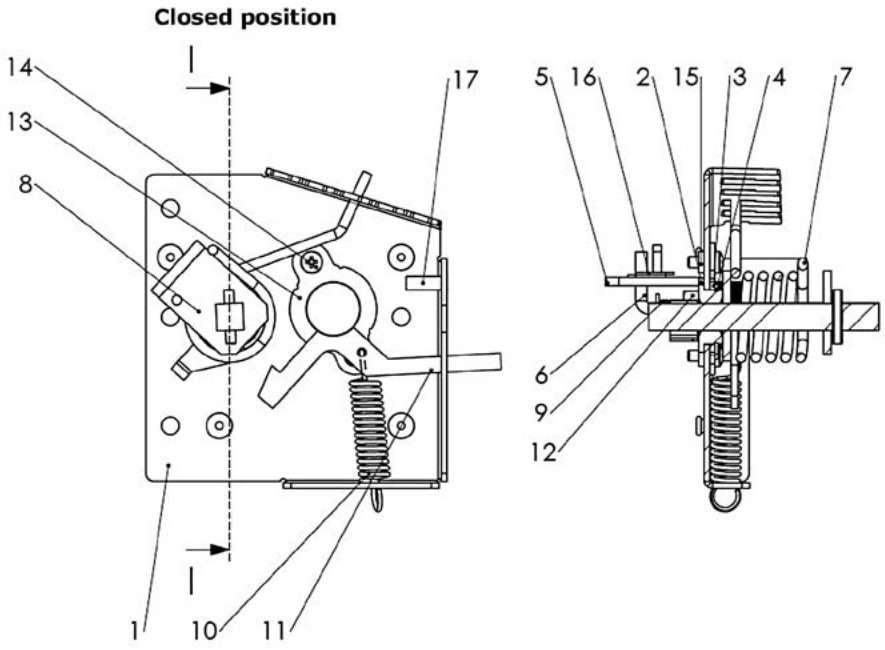


Figure 19. Spring mechanism – replacement of the thermal fuse element.

Table 4. Diagnostic card

Diagnostic card			
No.	**Symptoms of malfunction**	**Causes of malfunction**	**How to remove malfunction**
1	No signaling opening/closing fire damper.	1. Failure to fully open the baffle (wrong connected ventilation duct). 2. Improperly connected wires of limit switch. 3. Damaged actuator.	1. Removing the cause of blocking baffle. 2. Correct wiring. 3. Replacing the actuator with a new one (after consulting with fire damper`s manufacturer).
2	No actuator response after connecting power.	1. Damaged actuator. 2. Damaged temperature sensor. 3. Locked baffle.	1. Replacing the actuator with a new one (after consulting with fire damper`s manufacturer). 2. Replacing the temperature sensor to a new one. 3. Removing the cause of blocking baffle.
3	No possibility of opening the fire damper with actuator by key.	1. Broken mechanism in the actuator (too rapid rotation). 2. Locked baffle.	1. Replacing the actuator with a new one (after consulting with fire damper`s manufacturer). 2. Removing the cause of blocking baffle.

10. TERMS OF WARRANTY

a. The manufacturer provides guarantee for the delivered product for a period of 24 moths from the date of sale or another period agreed in the contract. There is a possibility of extending the guarantee, provided that a separate Maintenance and Service Agreement is signed between the manufacturer and the owner/manager of the facility.

b. The basis for complaint handling is to file a complaint within the warranty period, within 7 days of the detect being discovered. Make the product available in the state in which it appeared to be defective, together with a detailed description of the technical problem and documents confirming the performance of any inspection provided by the manufacturer and periodic maintenance.

c. The manufacturer undertakes to remove the defect within 2 working days of receiving the notification. The manufacturer undertakes to remove the defect within 21 working days from the date of receipt of the application together with the complete set of documents, and in the case of necessity to bring in hard-to-reach materials or parts, the repair will be carried out within the shortest technically reasonable time.

d. The warranty period is extended by the duration of the repair.

e. The warranty is valid in the cases described in the OWG.

f. OWG & OWS documents are available on the website www.diem.si