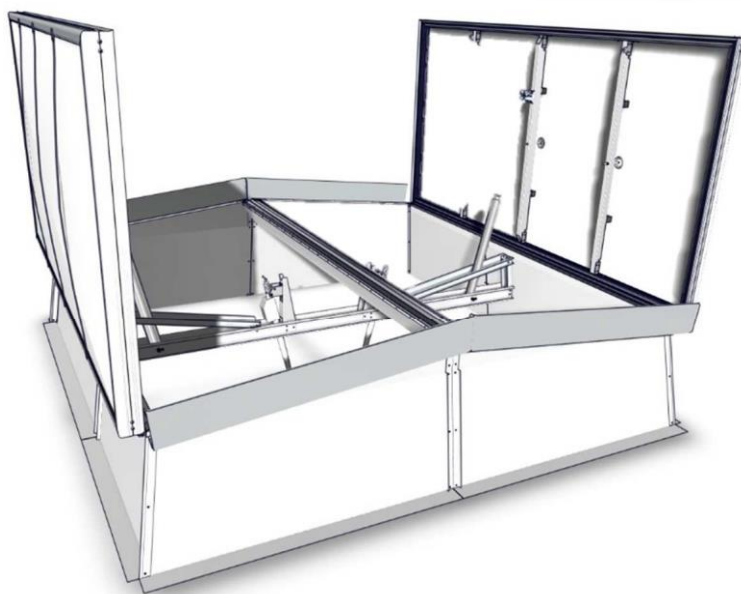


# Operation and Maintenance Manual SCD Smoke Dampers



**SCD**

**SMOKE DAMPERS**



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## 1. INTRODUCTION

The purpose of this Operation and Maintenance Manual is to familiarize the user with the intended use, design, operating principle, installation, periodic maintenance and operation of the product. Observing instructions contained in the Operation and Maintenance Manual will ensure correct operation of the device throughout its entire lifetime.

SCD smoke dampers together with the control system may constitute the configuration of several components made by various Manufacturers. Each component is delivered along with the Manufacturer's Manual. Both – assembly companies and the User – are obliged to read those Manuals and apply them with regard to installation, operation and maintenance.

## 2. FORMAL AND LEGAL ASPECTS OF INTRODUCING SCD SMOKE DAMPERS INTO THE MARKET

Certificate of Constancy of Performance No. 1438-CPR-0503, specified in PN-EN 12101-2:2005, is a legal basis for using SCD smoke dampers.

## 3. INTENDED USE AND PRODUCT CLASSIFICATION

SCD smoke dampers are used in public buildings, warehouses, production facilities etc. They are designed for mounting onto flat roofs slanted at not more than 15°.

The main function of SCD smoke dampers is extracting smoke and hot toxic gases occurring during fire in the under-ceiling space.

SCD smoke dampers by Smay Sp. z o. o. have openable leafs filled with translucent material. Therefore, they additionally function as spot skylights. The third function of SCDs, when appropriate tooling is used, is cyclic ventilation.

In each and every case smoke extraction is the priority function of SCD smoke dampers. SCDs make it possible to evacuate people and enable rescue services to undertake appropriate intervention by keeping the lower areas of a building, including escape routes, free of smoke. Smoke dampers reduce the thermal load of the building structure by reconducting the heat created during a fire, and thus reducing material injury caused by the fire.

Using SCD smoke dampers gives the possibility to lower the building fire protection class, enlarge permissible fire zones and lengthen escape routes.

SCD smoke dampers are classified according to PN-EN 12101-2 criteria, with regard to the following areas:

Reliability: double action, Re 1000,

Snow load: SL550 – SL 1000 (depending on the drive size and type),

Low temperature: T(00) – T(-25) (depending on the drive size and type),

Wind load: WL 1500,

Resistance to high temperature: B 300,

Single leaf damper effective areas are presented in Table 1, and double leaf damper effective areas – in Table 2.

**It is possible to make the dampers in the version meeting the requirements of the B<sub>ROOF(t1)</sub> classification. The properties distinctive for the skylight function are declared according to EN 1873:2014+A1:2016 requirements**

**Table 1 Declared active areas for single leaf dampers**

Position	Nominal dimensions		SCD-1-P... damper with a straight base						SCD-1-S... damper with a sloping base					
			Base height [mm]						Base height [mm]					
			700		500		350		700		500		350	
			Deflectors						Deflectors					
	w [mm]	l (hinges) [mm]	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*
Aa active area [m2]						Aa active area [m2]								
1	1000	1000	0.69		0.68		0.66		0.68		0.67		0.66	
2	1000	1200	0.83		0.80		0.79		0.80		0.80		0.79	
3	1000	1300			0.87		0.86		0.87		0.87		0.86	
4	1000	1400			0.94		0.91		0.94		0.94		0.92	
5	1000	1500	1.02		1.01		0.98		1.01		1.01		0.99	
6	1000	1600			1.07		1.04		1.07		1.07		1.06	
7	1000	1700	1.16		1.14		1.11		1.14		1.14		1.12	
8	1000	1800	1.22		1.19		1.17		1.21		1.21		1.19	
9	1000	1900			1.25		1.24		1.25		1.25		1.25	
10	1000	2000	1.36		1.32		1.30		1.32		1.32		1.32	
11	1000	2200	1.47		1.45		1.41		1.45		1.45		1.43	
12	1000	2300	1.54		1.52		1.47		1.52		1.52		1.50	
13	1000	2400	1.61		1.58		1.54		1.56		1.56		1.51	1.54
14	1000	2500	1.68		1.65		1.60		1.63		1.63		1.55	1.60
15	1100	1100	0.83		0.81		0.80		0.82		0.81		0.80	
16	1100	2000	1.47		1.45		1.41		1.45		1.45		1.45	
17	1150	1150	0.91		0.89		0.87		0.90		0.89		0.87	
18	1150	2000	1.54		1.52		1.47		1.52		1.52		1.52	
19	1200	1200	0.98		0.96		0.94		0.98		0.96		0.95	
20	1200	1500	1.22		1.19		1.17		1.21		1.21		1.19	
21	1200	1700	1.39		1.35		1.33		1.37		1.37		1.35	
22	1200	1800	1.47		1.43		1.38		1.45		1.45		1.43	
23	1200	2000	1.61		1.58		1.54		1.58		1.58		1.58	
24	1200	2200	1.77		1.72		1.69		1.74		1.74		1.72	
25	1200	2300	1.85		1.79		1.77		1.82		1.82		1.79	
26	1200	2500	2.01		1.95		1.92		1.98		1.95		1.86	1.92
27	1250	1250	1.06		1.05		1.02		1.06		1.05		1.03	
28	1250	2500	2.09		2.03		1.97		2.06		2.03		1.94	2.03
29	1300	1300	1.15		1.13		1.10		1.15		1.13		1.12	
30	1300	1500	1.33		1.29		1.27		1.31		1.31		1.29	

\* If the field is empty, a deflector is optional

**Table 1 Declared active areas for single leaf dampers**

Position	Nominal dimensions		SCD-1-P... damper with a straight base						SCD-1-S... damper with a sloping base					
			Base height [mm]						Base height [mm]					
			700		500		350		700		500		350	
			Deflectors						Deflectors					
	w [mm]	l (hinges) [mm]	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*
Aa active area [m2]						Aa active area [m2]								
31	1300	1600	1.41		1.37		1.33		1.39		1.39		1.37	
32	1300	1800	1.57		1.54		1.50		1.57		1.57		1.54	
33	1300	1900	1.65		1.63		1.58		1.65		1.65		1.63	
34	1300	2000	1.74		1.69		1.66		1.72		1.72		1.72	
35	1300	2200	1.92		1.86		1.83		1.89		1.89		1.86	
36	1300	2500	2.15		2.11		2.05		2.15		2.11		2.02	2.11
37	1400	1400	1.33		1.29		1.27		1.33		1.31		1.29	
38	1400	1500	1.43		1.39		1.34		1.41		1.41		1.39	
39	1400	1800	1.69		1.64		1.61		1.69		1.69		1.66	
40	1400	2000	1.88		1.82		1.76		1.85		1.85		1.85	
41	1400	2500	2.31		2.28		2.21		2.31		2.28	2.31	2.14	2.28
42	1450	1450	1.43		1.39		1.35		1.43		1.41		1.39	
43	1500	1500	1.53		1.49		1.44		1.53		1.51		1.49	
44	1500	1700	1.71		1.66		1.63		1.71		1.71		1.68	
45	1500	1800	1.81		1.76		1.70		1.81		1.81		1.78	
46	1500	2000	2.01		1.95		1.89		1.98		1.98		1.98	
47	1500	2200	2.18		2.15		2.08		2.18		2.18		2.15	
48	1500	2300	2.28		2.24		2.17		2.28		2.28		2.24	
49	1500	2500	2.48		2.44		2.36		2.48		2.44	2.48	2.29	2.44
50	1500	2700	2.67		2.59		2.55		2.67		2.59	2.67	2.43	2.63
51	1500	3000	2.97		2.88		2.79		2.97		2.88	2.97	2.66	2.93
52	1600	1600	1.72		1.66		1.64		1.74		1.72		1.69	
53	1600	1700	1.82		1.77		1.71		1.82		1.82		1.80	
54	1600	1800	1.93		1.87		1.81		1.93		1.93		1.90	
55	1600	2000	2.11		2.08		2.02		2.14		2.11		2.11	
56	1600	2200	2.32		2.29		2.22		2.36		2.32		2.29	
57	1600	2300	2.43		2.36		2.32		2.47		2.39	2.43	2.32	2.39
58	1600	2500	2.64		2.56		2.52		2.68		2.60	2.64	2.44	2.60
59	1600	2700	2.85		2.76		2.72		2.89		2.76	2.85	2.59	2.81
60	1600	3000	3.12		3.07		2.98		3.22		3.02	3.17	2.78	3.12
61	1700	1700	1.94		1.88		1.82		1.97		1.94		1.91	
62	1700	1800	2.05		1.99		1.93		2.05		2.05		2.02	
63	1700	2000	2.24		2.18		2.14		2.28		2.24		2.24	
64	1700	2200	2.47		2.39		2.36		2.51		2.47		2.43	2.47
65	1700	2300	2.58		2.50		2.46		2.62		2.54	2.58	2.46	2.58
66	1700	2500	2.81		2.72		2.64		2.85		2.76	2.81	2.59	2.81

\* If the field is empty, a deflector is optional

**Table 1 Declared active areas for single leaf dampers**

Position	Nominal dimensions		SCD-1-P... damper with a straight base						SCD-1-S... damper with a sloping base					
			Base height [mm]						Base height [mm]					
			700		500		350		700		500		350	
			Deflectors						Deflectors					
	w [mm]	l (hinges) [mm]	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*
Aa active area [m2]						Aa active area [m2]								
67	1700	2700	3.03		2.94		2.85		3.08		2.94	3.03	2.75	2.98
68	1700	3000	3.32		3.26		3.16		3.42		3.21	3.37	2.96	3.32
69	1800	1800	2.14		2.07		2.04		2.20		2.17		2.14	
70	1800	2000	2.38		2.30		2.23		2.41		2.38		2.38	
71	1800	2200	2.61		2.53		2.46		2.65		2.61		2.53	2.61
72	1800	2300	2.73		2.65		2.57		2.77		2.69	2.73	2.61	2.73
73	1800	2500	2.97		2.88		2.79		3.02		2.88	3.02	2.75	2.97
74	1800	2700	3.16		3.11		3.01		3.26		3.11	3.26	2.92	3.21
75	1800	3000	3.51		3.46		3.35		3.62		3.40	3.62	3.13	3.56
76	1920	1900	2.41		2.33		2.26		2.48		2.44		2.41	
77	1920	2000	2.53		2.46		2.38		2.61		2.57		2.53	
78	1920	2200	2.79		2.70		2.62		2.87		2.75	2.83	2.70	2.79
79	1920	2300	2.91		2.83		2.74		3.00		2.87	2.96	2.78	2.91
80	1920	2500	3.12		3.07		2.98		3.26		3.07	3.22	2.93	3.17
81	1920	2700	3.37		3.32		3.21		3.53		3.32	3.47	3.06	3.42
82	1920	3000	3.74		3.69		3.57		3.92		3.63	3.86	3.28	3.80

\* If the field is empty, a deflector is optional

**Table 2 Declared active areas for single leaf dampers**

Position	Nominal dimensions		SCD-2-P... damper with a straight base						SCD-2-S... damper with a sloping base					
			Base height [mm]						Base height [mm]					
			700		500		350		700		500		350	
			Deflectors						Deflectors					
	w [mm]	l (hinges) [mm]	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*
Aa active area [m2]						Aa active area [m2]								
1	1250	2500	2.09		2.03		1.97		2.16		2.13		2.06	
2	1500	1500	1.53		1.49		1.42		1.44	1.55	1.42	1.53	1.35	1.51
3	1500	2500	2.51		2.44		2.36		2.51	2.59	2.44	2.55	2.36	2.48
4	1500	3000	3.02		2.93		2.84		3.11		3.02	3.06	2.88	2.97
5	1600	1600	1.74		1.69		1.61		1.64	1.77	1.59	1.74	1.51	1.72
6	1600	2500	2.68		2.60		2.52		2.68	2.76	2.56	2.72	2.44	2.64
7	1600	2800	3.00		2.91		2.82		3.00	3.09	2.91	3.05	2.78	2.96
8	1600	3000	3.22		3.12		3.02		3.31		3.17	3.26	3.02	3.17
9	1800	1600	1.90	1.96	1.90		1.81		1.81	1.99	1.73	1.96	1.61	1.93
10	1800	1800	2.14	2.20	2.04	2.14	1.98	2.04	2.04	2.24	1.94	2.20	1.85	2.17
11	1800	2500	2.97	3.02	2.84	2.93	2.75	2.84	2.93	3.11	2.79	3.06	2.66	2.97

\* If the field is empty, a deflector is optional

**Table 2 Declared active areas for single leaf dampers**

Position	Nominal dimensions		SCD-2-P... damper with a straight base						SCD-2-S... damper with a sloping base					
			Base height [mm]						Base height [mm]					
			700		500		350		700		500		350	
	Deflectors						Deflectors							
w [mm]	l (hinges) [mm]	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	no	yes*	
Aa active area [m2]						Aa active area [m2]								
12	1800	2800	3.33	3.38	3.18	3.28	3.07	3.18	3.33	3.48	3.18	3.43	3.02	3.33
13	1800	3000	3.56	3.62	3.40	3.51	3.29	3.40	3.56	3.73	3.40	3.67	3.24	3.56
14	2000	2000	2.60	2.72	2.48	2.64	2.40	2.52	2.52	2.76	2.36	2.72	2.16	2.68
15	2000	2400	3.12	3.26	2.98	3.12	2.88	3.02	3.02	3.31	2.88	3.26	2.69	3.22
16	2000	2500	3.25	3.35	3.10	3.25	3.00	3.15	3.15	3.45	3.00	3.40	2.80	3.30
17	2000	2800	3.64	3.75	3.47	3.64	3.36	3.53	3.58	3.86	3.42	3.81	3.19	3.70
18	2000	3000	3.90	4.02	3.72	3.90	3.60	3.78	3.84	4.14	3.66	4.08	3.48	3.96
19	2200	2200	3.10	3.29	2.95	3.19	2.86	3.05	3.00	3.34	2.76	3.29	2.52	3.24
20	2200	2400	3.38	3.59	3.22	3.43	3.12	3.33	3.27	3.64	3.06	3.59	2.80	3.54
21	2200	2500	3.52	3.69	3.36	3.58	3.25	3.47	3.41	3.80	3.19	3.74	2.97	3.63
22	2400	2400	3.63	3.92	3.46	3.80	3.34	3.63	3.46	3.97	3.23	3.92	2.94	3.86
23	2400	2500	3.78	4.08	3.60	3.90	3.42	3.78	3.60	4.14	3.36	4.08	3.06	4.02
24	2500	2500	3.94	4.25	3.75	4.13	3.56	4.00	3.69	4.31	3.44	4.25	3.13	4.19
25	2500	3000	4.73	5.03	4.50	4.88	4.20	4.80	4.50	5.18	4.20	5.10	3.83	4.95
26	3000	3000	5.49	6.03	5.13	5.94	4.77	5.85	4.95	6.21	4.50	6.12	4.05	5.94

\* If the field is empty, a deflector is optional

## 4. TECHNICAL DESCRIPTION OF PRODUCTS

### 4.1. DESCRIPTION/TYPES

SCD smoke dampers are rectangular in cross-section. They are available as single or double leaf. The dimension range is specified in Tables 4 and 5.

The opening angle of a single leaf damper is not less than 140°.

The opening angle of a double leaf damper is not less than 90°.

A profiled aluminium drainpipe is mounted on a straight or sloping base, made of 1.5 mm thick galvanised sheet metal. The purpose of the drainpipe is to drain the condensation moisture created as the result of temperature difference on the inner surface of the leaf. The drainpipe corners are sealed with silicone and secured with an aluminium fitting.

The base is adapted for placing insulation material on its entire perimeter. It is recommended to use mineral wool insulation, 50 mm thick. The insulation material should be of A1 reaction-to-fire class and be characterised by high density (150 kg/m<sup>3</sup> minimum) and thermal insulation power (thermal resistance Ri = 1.25 m<sup>2</sup>·K/W minimum).

Heat-transfer coefficient for the base insulated by means of 50 mm thick mineral wool is U = 0.80 [W/m<sup>2</sup>K].

Moisture tightness is obtained by means of applying insulation with bituminous materials or sheet-metal work, appropriate for the given roof structure.

The drainpipe is connected, alongside the longer side of the damper, by means of a linear rack hinge, with an openable cover. The hinge is protected against unwanted



impurities by means of an aluminium cover. The cover frame is a one-piece item made of specially designed aluminium profile, which makes it possible to mount porous polycarbonate cover, 10, 16, 20 or 25 mm thick.

In the basic version Lexan LT2UV169X Opal White polycarbonate plate, 16 mm thick, is used. Important properties of this material are presented in Table 3.

**Table 3**

Grade-Color	Gauge [mm]	Weight (kg/m <sup>3</sup> )	Sound Red. Value [dB]	U-Value [W/m <sup>2</sup> K]	Hail Impact Test [m/sec]	LT D65 [%LT]	DST [DST]	TST [%TST]	SHGC	LSGR	SC
LT2UV105R175											
Clear	10	1.75	20	2.39	>21	65	61	62	0.62	1.05	0.72
Opal White	10	1.75	20	2.39	>21	60	58	59	0.59	1.02	0.68
SC IR Green	10	1.75	20	2.39	>21	48	34	48	0.48	1.08	0.56
LT2UV169X											
Clear	16	2.5	21	1.77	>21	54	51	54	0.54	1.00	0.62
Opal White	16	2.5	21	1.77	>21	47	45	49	0.49	0.96	0.56
SC IR Green	16	2.5	21	1.77	>21	38	25	39	0.39	0.97	0.44
LT2UV209X											
Clear	20	2.8	21	1.59	>21	53	50	53	0.53	1.00	0.61
Opal White	20	2.8	21	1.59	>21	47	46	50	0.50	0.94	0.57
SC IR Green	20	2.8	21	1.59	>21	37	25	39	0.39	0.97	0.44
LT2UV259X											
Clear	25	3.0	22	1.40	>21	51	49	52	0.52	0.98	0.60
Opal White	25	3.0	22	1.40	>21	44	42	47	0.47	0.94	0.54
SC IR Green	25	3.0	22	1.40	>21	36	23	37	0.37	0.97	0.42

Explanations for the parameters presented in Table 1 are given in the original Manufacturer's notation.

Light Transmission D65 (% LT) - Percentage of the incident visible light that passes through an object.

Direct Solar Transmission (%DST) - Percentage of incident solar radiation that passes directly through an object.

Total Solar Transmission (%TST) - The percentage of incident Solar radiation transmitted by an object which includes the direct Solar Transmission plus the part of the Solar Absorption reradiated inward.

Solar Heat Gain Coefficient (SHGC) - or g-value is the total solar energy that enters the interior of a building, divided by 100.

Shading Coefficient (SC) – The ratio of the total solar radiation transmitted by a given material to that transmitted by normal 3 mm glass, whose light transmission is 87%.  $SC = \%TST / 87$ .

Light to Solar Gain Ratio (LSGR) - The ratio between total light transmission (LT) and the total solar transmission (TST).

The contact between the polycarbonate plate and the cover profile is sealed by means of a EPDM profile gasket. The polycarbonate panel is pressured to the gasket by means of an aluminium lock profile of the height appropriate to the panel thickness.

The airtightness is obtained by means of using a EPDM gasket mounted between the cover and drainpipe profiles.

*The aluminium profile shapes and dimensions are patented.*

The whole damper is made with the use of mounting technologies, which may be used both in a production plant and at a stand prepared at a building site, or directly on the building roof. The dampers may be delivered as an easy-to-transport set of ideally matched parts, with all the connecting members needed. The mounting procedure takes place on the basis of a clearly presented manual, by means of standard fitting tools, without the need to use a welder or a grinding machine.

It is possible to deliver completely assembled dampers. In this case, in each damper with a pneumatic drive, in order to make it ready for operation, a thermal trip – delivered separately – needs to be mounted and set. Deflectors are delivered separately as well. Moreover, the delivery of assembled dampers requires individual agreements on installation and insulation preparation.

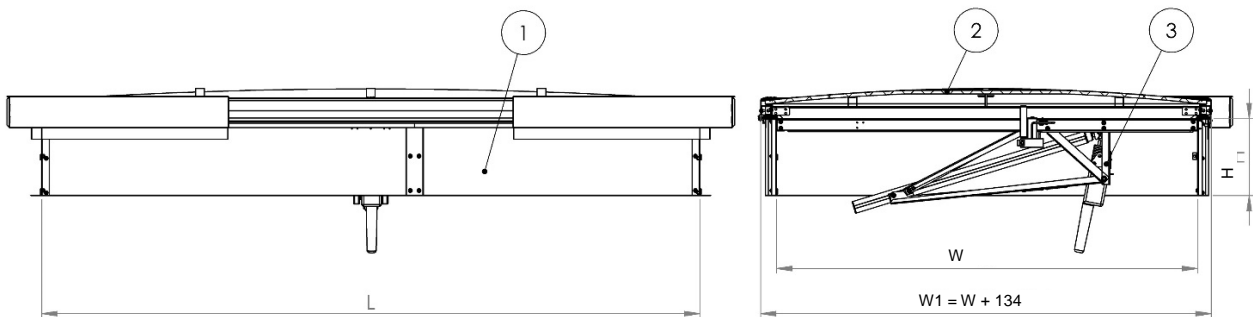
#### Smoke Dampers with the SCD-1-W Roof Hatch Function

Smoke dampers with the roof hatch function, besides all functions of standard dampers, also enable workers to get on the roof. They are made with a straight base only, in two versions:

Version 1 – with a single electric actuator – for dimensions 1000 x 1000 and 1000 x 1200,

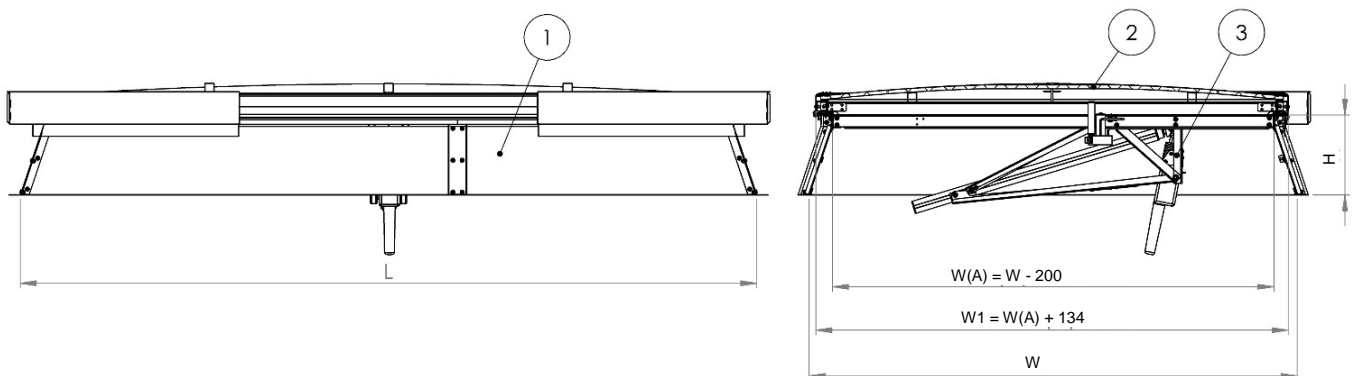
Version 2 – with two electric actuators – within the range from 1000 x 1300 to 1800 x 1800. Their detailed description is presented on page 22.

### 4.2. SINGLE LEAF DAMPERS – DIMENSIONS



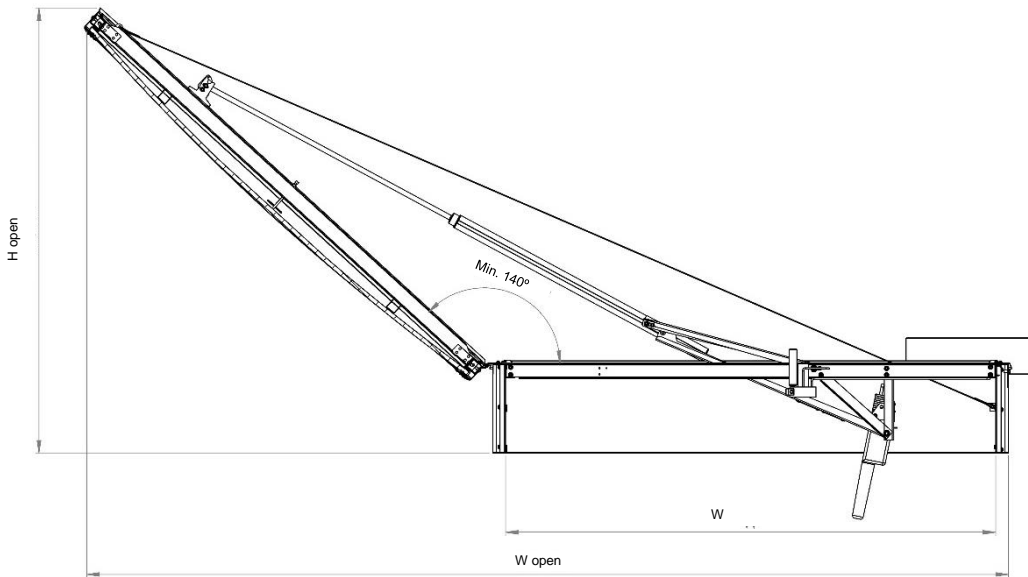
1. Base unit
2. Leaf unit
3. Mechanical drive unit

Rys. 1. SCD-1-P... single leaf damper on a straight base



1. Base unit
2. Leaf unit
3. Mechanical drive unit

Rys. 2. SCD-1-S... single leaf damper on a sloping base



Rys. 3. SCD-1-P... single leaf damper in open position

Distinctive dimensions of SCD-1... dampers are shown in Table 4.

Table 4

Pos.	Nominal size		Dimensions in open position		Geometric area AV [m <sup>2</sup> ]	Cover weight [N]
	w [mm]	l (hinges) [mm]	W open [mm]	H open [mm]		
1	1000	1000	1880	670+h	1.00	190.0
2	1000	1200	1880	670+h	1.20	210.0
3	1000	1300	1880	670+h	1.3	215.0
4	1000	1400	1880	670+h	1.4	225.0
5	1000	1500	1880	670+h	1.5	240.0
6	1000	1600	1880	670+h	1.6	245.0
7	1000	1700	1880	670+h	1.70	250.0
8	1000	1800	1880	670+h	1.80	260.0
9	1000	1900	1880	670+h	1.9	330.0
10	1000	2000	1880	670+h	2.00	340.0
11	1000	2200	1880	670+h	2.20	370.0
12	1000	2300	1880	670+h	2.30	380.0
13	1000	2400	1880	670+h	2.4	375.0
14	1000	2500	1880	670+h	2.50	390.0
15	1100	1100	2060	740+h	1.21	205.0
16	1100	2000	2060	740+h	2.2	355.0
17	1150	1150	2150	770+h	1.32	215.0
18	1150	2000	2150	770+h	2.3	355.0
19	1200	1200	2235	800+h	1.44	230.0
20	1200	1500	2235	800+h	1.80	260.0
21	1200	1700	2235	800+h	2.04	270.0

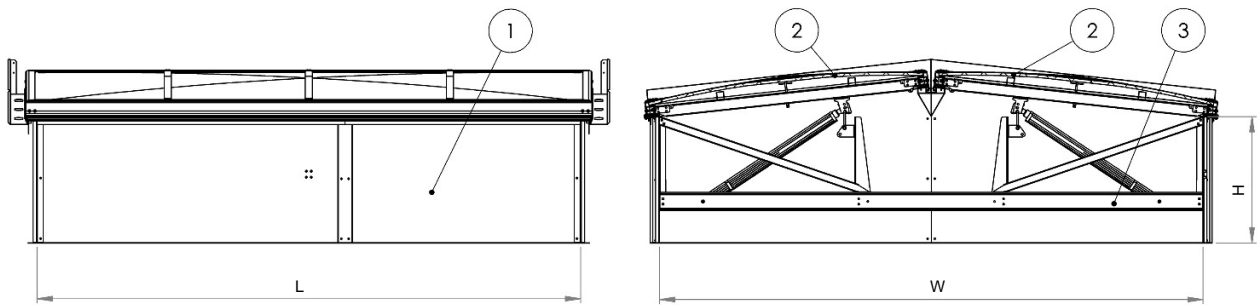
**Table 4**

Pos.	Nominal size		Dimensions in open position		Geometric area AV [m <sup>2</sup> ]	Cover weight [N]
	w [mm]	l (hinges) [mm]	W open [mm]	H open [mm]		
22	1200	1800	2235	800+h	2.16	280.0
23	1200	2000	2235	800+h	2.40	380.0
24	1200	2200	2235	800+h	2.64	400.0
25	1200	2300	2235	800+h	2.76	410.0
26	1200	2500	2235	800+h	3.00	430.0
27	1250	1250	2315	830+h	1.56	235.0
28	1250	2500	2315	830+h	3.12	430.0
29	1300	1300	2410	865+h	1.69	245.0
30	1300	1500	2410	865+h	1.95	265.0
31	1300	1600	2410	865+h	2.08	275.0
32	1300	1800	2410	865+h	2.34	290.0
33	1300	1900	2410	865+h	2.47	375.0
34	1300	2000	2410	865+h	2.6	385.0
35	1300	2200	2410	865+h	2.86	415.0
36	1300	2500	2410	865+h	3.25	440.0
37	1400	1400	2595	930+h	1.96	265.0
38	1400	1500	2595	930+h	2.1	275.0
39	1400	1800	2595	930+h	2.52	300.0
40	1400	2000	2595	930+h	2.8	405.0
41	1400	2500	2595	930+h	3.5	460.0
42	1450	1450	2690	965+h	2.1	275.0
43	1500	1500	2765	995+h	2.25	290.0
44	1500	1700	2765	995+h	2.55	310.0
45	1500	1800	2765	995+h	2.70	320.0
46	1500	2000	2765	995+h	3.00	430.0
47	1500	2200	2765	995+h	3.30	450.0
48	1500	2300	2765	995+h	3.45	460.0
49	1500	2500	2765	995+h	3.75	480.0
50	1500	2700	2765	995+h	4.05	500.0
51	1500	3000	2765	995+h	4.50	530.0
52	1600	1600	2940	1060+h	2.56	310.0
53	1600	1700	2940	1060+h	2.72	320.0
54	1600	1800	2940	1060+h	2.88	330.0
55	1600	2000	2940	1060+h	3.20	440.0
56	1600	2200	2940	1060+h	3.52	470.0
57	1600	2300	2940	1060+h	3.68	480.0
58	1600	2500	2940	1060+h	4.00	500.0
59	1600	2700	2940	1060+h	4.32	520.0
60	1600	3000	2940	1060+h	4.80	550.0

**Table 4**

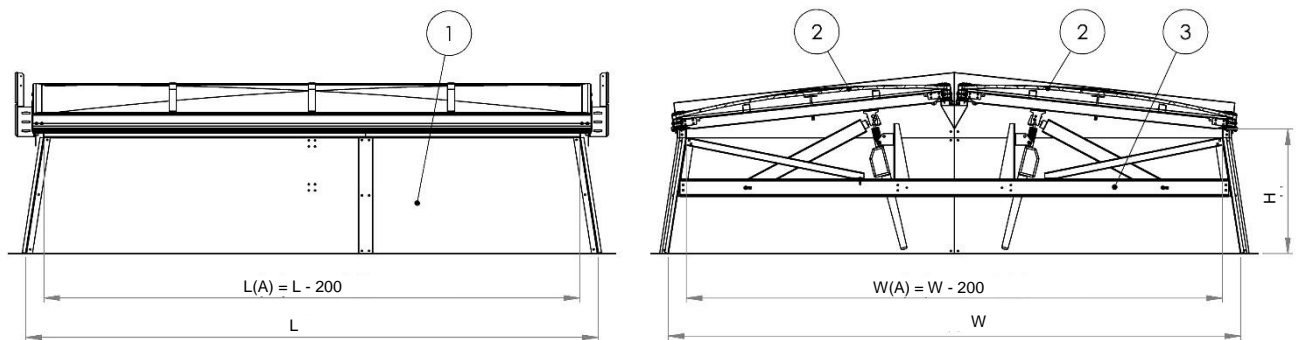
Pos.	Nominal size		Dimensions in open position		Geometric area AV [m <sup>2</sup> ]	Cover weight [N]
	w [mm]	l (hinges) [mm]	W open [mm]	H open [mm]		
61	1700	1700	3120	1125+h	2.89	330.0
62	1700	1800	3120	1125+h	3.06	340.0
63	1700	2000	3120	1125+h	3.40	460.0
64	1700	2200	3120	1125+h	3.74	490.0
65	1700	2300	3120	1125+h	3.91	500.0
66	1700	2500	3120	1125+h	4.25	520.0
67	1700	2700	3120	1125+h	4.59	540.0
68	1700	3000	3120	1125+h	5.10	570.0
69	1800	1800	3295	1190+h	3.24	350.0
70	1800	2000	3295	1190+h	3.60	480.0
71	1800	2200	3295	1190+h	3.96	510.0
72	1800	2300	3295	1190+h	4.14	520.0
73	1800	2500	3295	1190+h	4.50	540.0
74	1800	2700	3295	1190+h	4.86	560.0
75	1800	3000	3295	1190+h	5.40	590.0
76	1920	1900	3505	1265+h	3.61	480.0
77	1920	2000	3505	1265+h	3.80	500.0
78	1920	2200	3505	1265+h	4.18	530.0
79	1920	2300	3505	1265+h	4.37	540.0
80	1920	2500	3505	1265+h	4.75	560.0
81	1920	2700	3505	1265+h	5.13	580.0
82	1920	3000	3505	1265+h	5.70	610.0

**4.3. DOUBLE LEAF DAMPERS – DIMENSIONS**



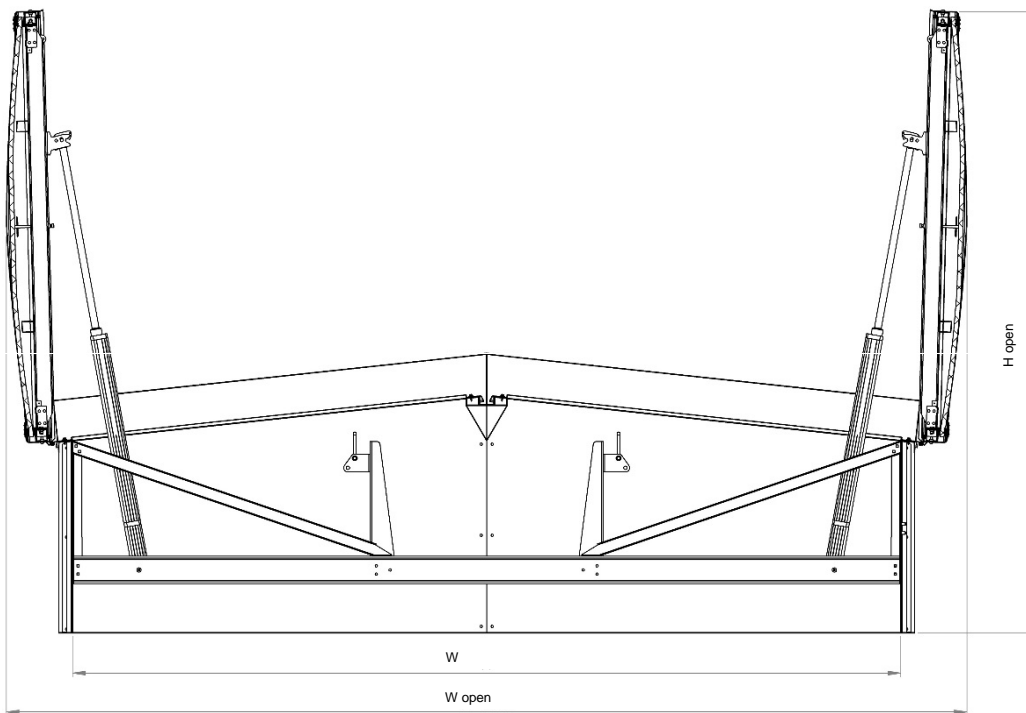
- 1. Base unit
- 2. Leaf unit
- 3. Mechanical drive unit

*Rys. 4. SCD-2-P... double leaf damper on a straight base*



- 1. Base unit
- 2. Leaf unit
- 3. Mechanical drive unit

*Rys. 5. SCD-2-S... double leaf damper on a sloping base*



Rys. 6. SCD-2-P... double leaf damper in open position

Distinctive dimensions of SCD-2... dampers are shown in Table 5.

Table 5

Pos.	Nominal size		Dimensions in open position		Geometric area AV [m <sup>2</sup> ]	Weight of a single cover [N]
	w [mm]	l (hinges) [mm]	W open [mm]	h open [mm]		
1	1250	2500	1710	630+h	3.13	320
2	1500	1500	1960	830+h	2.25	210
3	1500	2500	1960	830+h	3.75	350
4	1500	3000	1960	830+h	4.50	390
5	1600	1600	2060	880+h	2.56	220
6	1600	2500	2060	880+h	4.00	360
7	1600	2800	2060	880+h	4.48	380
8	1600	3000	2060	880+h	4.80	400
9	1800	1600	2260	880+h	2.88	230
10	1800	1800	2260	980+h	3.24	250
11	1800	2500	2260	980+h	4.50	370
12	1800	2800	2260	980+h	5.04	400
13	1800	3000	2260	980+h	5.40	420
14	2000	2000	2460	1080+h	4.00	340
15	2000	2400	2460	1080+h	4.80	380
16	2000	2500	2460	1080+h	5.00	390
17	2000	2800	2460	1080+h	5.60	420

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18	2000	3000	2460	1080+h	6.00	440
19	2200	2200	2660	1180+h	4.84	380
20	2200	2400	2660	1180+h	5.28	400
21	2200	2500	2660	1180+h	5.50	410
22	2400	2400	2860	1280+h	5.76	420
23	2400	2500	2860	1280+h	6.00	430
24	2500	2500	2960	1330+h	6.25	440
25	2500	3000	2960	1330+h	7.50	480
26	3000	3000	3460	1580+h	9.00	530

**4.4. MANUFACTURING VERSIONS**

Damper type	Main drive	Base type		Base height			Deflectors		Function Operating mode			Operating mode		Thickness of PC filling				
		straight	sloping	350	500	700	Yes	No	smoke extraction only	smoke extraction + electric ventilation	smoke extraction + pneumatic ventilation	Open	Open-close	10	16	20	25	
Single leaf	pneumatic	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	electric	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x
Double leaf	pneumatic	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
	electric	x	x	x	x	x	x	x	x	x	x		x	x	x	x	x	x



**4.5. DAMPER WEIGHTS**

Approximate weights\* of single leaf dampers are shown in Table 6

**Table 6**

w [mm]	L [mm] (hinges)	Base height 350 mm				Base height 500 mm				Base height 700 mm			
		St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI
1000	1000	73.7	76.1	65.90	68.30	84.40	86.80	75.90	78.30	98.70	101.1	89.20	91.60
1000	1200	78.9	81.3	71.10	73.50	90.40	92.80	81.80	84.20	105.6	108.0	96.10	98.50
1000	1300	81.5	83.9	72.70	75.10	93.30	95.70	83.70	86.10	109.0	111.4	98.50	100.9
1000	1400	84.1	86.5	75.20	77.60	96.20	98.60	86.70	89.10	112.4	114.8	101.9	104.3
1000	1500	86.7	89.1	77.90	80.30	99.20	101.6	89.60	92.00	115.9	118.3	105.4	107.8
1000	1600	89.3	91.7	80.40	82.80	102.2	104.6	92.60	95.00	119.3	121.7	108.8	111.2
1000	1700	91.9	94.3	83.00	85.40	105.1	107.5	95.50	97.90	122.7	125.1	112.2	114.6
1000	1800	94.5	96.9	84.60	87.00	108.1	110.5	97.50	99.90	126.2	128.6	114.7	117.1
1000	1900	103.1	105.5	93.20	95.60	117.0	119.4	106.5	108.9	135.6	138.0	124.1	126.5
1000	2000	105.6	108	94.80	97.20	120.0	122.4	108.4	110.8	139.1	141.5	126.5	128.9
1000	2200	110.8	113.2	101.0	103.4	125.9	128.3	115.3	117.7	146.0	148.4	134.4	136.8
1000	2300	113.4	115.8	102.6	105.0	128.8	131.2	117.3	119.7	149.4	151.8	136.8	139.20
1000	2400	116.0	118.4	105.2	107.6	131.8	134.2	120.2	122.6	152.8	155.2	140.3	142.7
1000	2500	118.6	121.0	107.8	110.2	134.8	137.2	123.2	125.6	156.3	158.7	143.7	146.1
1100	1100	78.80	81.20	70.90	73.30	90.30	92.70	81.60	84.00	105.5	107.9	95.90	98.30
1100	2000	109.2	111.6	98.30	100.7	123.9	126.3	112.2	114.6	143.4	145.8	130.9	133.30
1150	1150	81.40	83.80	73.50	75.90	93.20	95.60	84.60	87.00	108.9	111.3	99.30	101.70
1150	2000	110.9	113.3	100.1	102.5	125.8	128.2	114.2	116.6	145.6	148.0	133.1	135.50
1200	1200	83.90	86.30	75.00	77.40	96.00	98.40	86.50	88.90	112.2	114.6	101.7	104.10
1200	1500	91.70	94.10	82.80	85.20	104.9	107.3	95.30	97.70	122.6	125.0	112.0	114.40
1200	1700	96.90	99.30	88.00	90.40	110.8	113.2	101.3	103.7	129.5	131.9	118.9	121.30
1200	1800	99.40	101.8	89.60	92.00	113.8	116.2	103.2	105.6	132.9	135.3	121.3	123.70
1200	2000	117.7	119.9	107.9	110.1	132.8	135.0	122.2	124.4	152.9	155.1	141.3	143.50
1200	2200	123.9		113.1		139.7		128.1		160.7		148.2	
1200	2300	129.0		118.2		145.2		133.6		166.7		154.1	
1200	2500	134.2		123.3		151.0		139.5		173.5		161.0	
1250	1250	86.40	88.80	77.60	80.00	98.90	101.3	89.40	91.80	115.6	118.0	105.1	107.50
1250	2500	127.4		115.5		144.4		131.8		167.1		153.6	
1300	1300	89.00	91.40	80.20	82.60	101.9	104.3	92.30	94.70	119.0	121.4	108.5	110.90
1300	1500	94.20	96.60	85.30	87.70	107.8	110.2	98.20	100.6	125.9	128.3	115.3	117.70
1300	1600	96.80	99.20	87.90	90.30	110.7	113.1	101.2	103.6	129.4	131.8	118.8	121.20
1300	1800	101.9	104.3	93.10	95.50	116.6	119.0	107.0	109.4	136.2	138.6	125.7	128.10
1300	1900	112.6	115.0	101.7	104.1	127.6	130.0	116.0	118.4	147.7	150.1	135.1	137.50
1300	2000	121.2	123.4	110.4	112.6	136.6	138.8	125.1	127.3	157.2	159.4	144.7	146.90
1300	2200	127.4	129.6	116.6	118.8	143.6	145.8	132.0	134.2	165.1	167.3	152.6	154.80
1300	2500	137.7	145.1	125.9	133.3	154.9	162.3	142.4	149.8	177.9	185.3	164.4	171.80
1400	1400	100.2	102.4	91.30	93.50	113.8	116.0	104.2	106.4	131.9	134.1	121.4	123.60
1400	1500	102.8	105.0	93.90	96.10	116.7	118.9	107.1	109.3	135.4	137.6	124.8	127.00
1400	1800	111.6	113.8	101.7	103.9	126.6	128.8	116.0	118.2	146.7	148.9	135.1	137.30
1400	2000	124.7	126.9	113.9	116.1	140.5	142.7	128.9	131.1	161.5	163.7	149.0	151.20

**Table 6**

w [mm]	L [mm] (hinges)	Base height 350 mm				Base height 500 mm				Base height 700 mm			
		St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI
1400	2500	141.2	148.6	129.3	136.7	158.8	166.2	146.2	153.6	182.2	189.6	168.7	176.10
1450	1450	103.7	105.9	93.80	96.00	117.7	119.9	107.1	109.3	136.3	138.5	124.7	126.90
1500	1500	106.3	108.5	96.40	98.60	120.6	122.8	110.0	112.2	139.7	141.9	128.2	130.40
1500	1700	111.4	113.6	101.6	103.8	126.5	128.7	115.9	118.1	146.5	148.7	135.0	137.20
1500	1800	116.5	123.9	106.7	114.1	132.0	139.4	121.4	128.8	152.5	159.9	141.0	148.40
1500	2000	130.7	138.1	118.8	126.2	146.8	154.2	134.3	141.7	168.3	175.7	154.8	162.20
1500	2200	136.9	144.3	125.1	132.5	153.8	161.2	141.2	148.6	176.2	183.6	162.7	170.10
1500	2300	139.5	146.9	127.6	135.0	156.7	164.1	144.1	151.5	179.7	187.1	166.1	173.50
1500	2500	144.7		132.8		162.6		150.1		186.6		173.0	
1500	2700	149.9		138.0		168.6		156.0		193.5		179.9	
1500	3000	162.0		150.1		181.7		169.1		208.1		194.5	
1600	1600	111.3	113.5	101.5	103.7	126.4	128.6	115.8	118.0	146.4	148.6	134.9	137.10
1600	1700	113.9	116.1	104.1	106.3	129.4	131.6	118.8	121.0	149.9	152.1	138.4	140.60
1600	1800	116.5	118.7	106.7	108.9	132.3	134.5	121.7	123.9	153.3	155.5	141.8	144.00
1600	2000	131.7	133.9	119.9	122.1	148.2	150.4	135.7	137.9	170.2	172.4	156.7	158.90
1600	2200	137.9	140.1	126.0	128.2	155.1	157.3	142.5	144.7	178.1	180.3	164.5	166.70
1600	2300	140.5	142.7	128.7	130.9	158.1	160.3	145.5	147.7	181.5	183.7	168.0	170.20
1600	2500	152.5	156.4	140.6	144.5	170.8	174.7	158.2	162.1	195.2	199.1	181.6	185.50
1600	2700	157.7		145.8		176.7		164.1		202.1		188.5	
1600	3000	165.4		152.6		185.6		172.0		212.4		197.9	
1700	1700	116.4	118.6	106.6	108.8	132.2	134.4	121.6	123.8	153.2	155.4	141.7	143.90
1700	1800	121.5	128.9	111.7	119.1	137.6	145.0	127.1	134.5	159.2	166.6	147.6	155.00
1700	2000	137.7	145.1	125.9	133.3	154.6	162.0	142.0	149.4	177.1	184.5	163.5	170.90
1700	2200	143.9	151.3	132.0	139.4	161.5	168.9	148.9	156.3	184.9	192.3	171.4	178.80
1700	2300	150.8		138.9		168.7		156.2		192.7		179.1	
1700	2500	156.0		143.1		174.7		161.0		199.6		185.0	
1700	2700	161.1		148.3		180.5		167.0		206.4		191.9	
1700	3000	169.9		156.1		190.4		175.8		217.7		202.2	
1800	1800	125.0	132.4	114.1	121.5	141.5	148.9	129.9	137.3	163.5	170.9	151.0	158.40
1800	2000	144.5		132.6		161.7		149.1		184.7		171.1	
1800	2200	151.7		138.8		169.6		156.1		193.6		179.0	
1800	2300	154.3		141.4		172.6		159.0		197.0		182.5	
1800	2500	159.5		146.6		178.5		164.9		203.9		189.4	
1800	2700	164.6		151.8		184.4		170.8		210.7		196.2	
1800	3000	173.4		159.6		194.2		179.7		222.0		206.5	
1920	1900	145.7		133.8		163.0		150.4		186.1		172.5	
1920	2000	149.3		136.4		166.9		153.4		190.5		175.9	
1920	2200	155.5		142.6		173.9		160.3		198.4		183.8	
1920	2300	158.0		145.2		176.8		163.2		201.8		187.3	
1920	2500	163.2		150.4		182.7		169.1		208.7		194.1	

**Table 6**

w [mm]	L [mm] (hinges)	Base height 350 mm				Base height 500 mm				Base height 700 mm			
		St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI
1920	2700	169.5		155.6		189.6		175.1		216.6		201.0	
1920	3000	177.2		163.4		198.5		183.9		226.9		211.4	

St – straight base Pn – pneumatic actuator (exemplary selection. The actuator type depends on T, SL class)

SI – sloping base EI – electric actuator

*Damper weight\** – applies to dampers with 16 mm thick polycarbonate filling and SL 550

**Approximate weights\* of double leaf dampers are shown in Table 7.**

**Table 7**

w [mm]	L [mm] (hinges)	Base height 350 mm				Base height 500 mm				Base height 700 mm			
		St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI	St-Pn	St-EI	SI-Pn	SI-EI
1250	2500	162.7	167.5	153.7	158.5	179.7	184.5	170	174.8	202.4	207.2	191.8	196.6
1500	1500	126	130.8	117	121.8	140.4	145.2	130.6	135.4	159.5	164.3	148.8	153.6
1500	2500	173.5	178.3	162.5	167.3	191.4	196.2	179.7	184.5	215.4	220.2	202.7	207.5
1500	3000	200.4	204.8	191.4	195.8	220.1	224.5	210.4	214.8	246.5	250.9	235.8	240.2
1600	1600	133.7	138.5	124.7	129.5	148.8	153.6	139.1	143.9	168.8	173.6	158.2	163
1600	2500	177.4	182.2	166.4	171.2	195.7	200.5	184	188.8	220.1	224.9	207.5	212.3
1600	2800	198.8	203.2	187.9	192.3	218.2	222.6	206.5	210.9	244.1	248.5	231.4	235.8
1600	3000	204.3	208.7	195.3	199.7	224.4	228.8	214.7	219.1	251.3	255.7	240.6	245
1800	1600	139.6	144.4	130.6	135.4	155.4	160.2	145.6	150.4	176.4	181.2	165.7	170.5
1800	1800	147	151.8	138.1	142.9	163.5	168.3	153.8	158.6	185.5	190.3	174.9	179.7
1800	2500	185.3	190.1	174.3	179.1	204.3	209.1	192.6	197.4	229.7	234.5	217	221.8
1800	2800	206.7	211.1	195.7	200.1	226.8	231.2	215.1	219.5	253.7	258.1	241	245.4
1800	3000	218.1	232.9	207.2	222.0	239	253.8	227.3	242.1	266.8	281.6	254.1	268.9
2000	2000	172.4	177.2	163.4	168.2	190.3	195.1	180.6	185.4	214.3	219.1	203.6	208.4
2000	2400	189.3	194.1	180.4	185.2	208.7	213.5	199	203.8	234.6	239.4	223.9	228.7
2000	2500	203.3	207.7	192.3	196.7	223.1	227.5	211.4	215.8	249.4	253.8	236.8	241.2
2000	2800	218.5	233.3	207.6	222.4	239.4	254.2	227.7	242.5	267.2	282	254.5	269.3
2000	3000	226	240.8	215	229.8	247.6	262.4	235.9	250.7	276.3	291.1	263.7	278.5
2200	2200	191.7	196.5	180.8	185.6	211.1	215.9	199.4	204.2	237	241.8	224.3	229.1
2200	2400	197.2	202	188.2	193	217.3	222.1	207.6	212.4	244.2	249	233.5	238.3
2200	2500	211.2	215.6	200.2	204.6	231.7	236.1	219.9	224.3	259	263.4	246.3	250.7
2400	2400	219.2	234	210.3	225.1	240.1	254.9	230.4	245.2	267.9	282.7	257.2	272
2400	2500	223	237.8	214	228.8	244.2	259	234.5	249.3	272.5	287.3	261.8	276.6
2500	2500	227	241.8	218	232.8	248.5	263.3	238.8	253.6	277.3	292.1	266.6	281.4
2500	3000	254.2	262.0	243.2	251.0	277.6	285.4	265.9	273.7	308.8	316.6	296.1	303.9
3000	3000	272.2	280.0	261.2	269.0	294.9	302.7	283.2	291.0	325.3	333.1	312.6	320.4

St – straight base Pn – pneumatic actuator (exemplary selection. The actuator type depends on T, SL class)

SI – sloping base EI – electric actuator

*Damper weight\** – applies to dampers with 16 mm thick polycarbonate filling and SL 550

In exceptional situations there is the possibility of making dampers with different hole dimensions, but only within the range of terminal dimensions shown in Tables 4 and 5.

The basic heights of the damper bases are 350, 500 or 700 mm.

It is possible to make dampers with other base dimensions, however not smaller than 350 mm. For dampers with base heights other than the basic ones, the dampers with a lower base should be considered as valid declarations for Aa active area.

#### 4.6. DRIVE SELECTION

In SCD smoke dampers, a basic function of emergency opening in order to extract smoke is carried out by a pneumatic or electric 24 V actuator.

The function of damper release in order to vent for dampers with a pneumatic drive is carried out by the 230 V or 24 V electric actuator (for dampers with maximum leaf dimensions up to 1920 x 2500), double action pneumatic actuator or a second electric actuator.

The power transmission from the actuator to the damper's cover is carried out by a special mechanism, and the cover position is set by a spring lock.

The selection of actuators for individual single leaf damper sizes is presented in Table 8, and for double leaf damper sizes in Table 9. For intermediate dimensions or other classification than the one given in Tables 8 and 9, it is possible to approximate actuators meeting the durability and mechanical criteria.

**Table 8**

W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification	W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification
1000	1000	SG26F/25S	1000	1700	SG26M/25A
		SG20M/25A			SG40B/25A
		SG40B/25A			SG60N/25A
1000	1200	SG26F/25S	1000	1800	SG60F/25S
		SG20M/25A			SG40B/25A
		SG40B/25A			SG60N/25A
1000	1300	SG26F/25S	1000	2000	SG60F/25S
		SG26M/25A			SG40M/25A
		SG40B/25A			SG60N/25A
1000	1400	SG26M/25A	1000	2200	SG40M/25A
		SG40B/25A			SG60N/25A
1000	1500	SG26M/25A	1000	2300	SG40M/25A
		SG40B/25A			SG60N/25A
		SG60N/25A	1000	2400	SG60N/25A
		SG60F/25S			SG60F/25S
1000	1600	SG26M/25A	1000	2500	SG60F/25S
		SG40B/25A			SG80T/25S
		SG60N/25A	1100	1100	SG40B/25A
		SG60F/25S			SG60N/25A
			1100	2000	SG60F/25S
1150	1150	SG40B/25A	1300	2000	SG60N/25A
		SG60N/25A			SG80T/25S
		SG60F/25S			SG100R/25A

**Table 8**

W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification	W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification
1150	2000	SG60F/25S	1300	2200	SG60N/25A
		SG80T/25S			SG80T/25S
1200	1200	SG40B/25A	1300	2500	SG100R/25A
		SG60N/25A			SG80T/25S
1200	1500	SG40B/25A	1400	1400	SG100R/25A
		SG60N/25A			SG60N/25A
1200	1700	SG60N/25A	1400	1400	SG60T/25S
		SG60F/25S			SG80P/25A
1200	1800	SG60N/25A	1400	1500	SG60N/25A
		SG60F/25S			SG60T/25S
		SG80T/25S			SG80P/25A
1200	2000	SG60N/25A	1400	1800	SG60N/25A
		SG60F/25S			SG80T/25S
		SG80T/25S			SG100R/25A
1200	2200	SG60N/25A	1400	2000	SG80T/25S
1200	2300	SG60N/25A			SG100R/25A
1200	2500	SG60N/25A	1400	2500	SG120R/25A
1250	1250	SG40B/25A	1450	1450	SG60N/25A
		SG60N/25A			SG60F/25S
		SG60F/25S			SG80T/25S
1250	2500	SG60N/25A			SG80U/25S
1300	1300	SG40B/25A	1500	1500	SG60T/25A
		SG60T/25S			SG60U/25S
		SG60U/25S			SG80T/25S
1300	1500	SG60N/25A	1500	1700	SG100R/25A
		SG60T/25S			SG60T/25A
		SG80P/25A			SG80P/25A
1300	1600	SG60N/25A	1500	1800	SG80T/25S
		SG60T/25S			SG100R/25A
		SG80P/25A			SG60T/25A
1300	1800	SG60N/25A	1500	1800	SG80P/25A
		SG60T/25S			SG80T/25S
		SG80P/25A			SG100R/25A
1300	1900	SG60N/25A	1500	2000	SG80T/25S
		SG80T/25S			SG80P/25A
		SG100R/25A			SG120R/25A

**Table 8**

W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification	W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification
1500	2200	SG80T/25S	1700	1800	SG80T/25S
		SG100R/25A			SG100R/25A
		SG120R/25A			SG100V/25S
1500	2300	SG80T/25S	1700	2000	SG120W/25S
		SG100R/25A			SG80T/25S
		SG120R/25A			SG100R/25A
1500	2500	SG100R/25A			SG120V/25S
1500	2700	SG100R/25A			SG100R/25A
1500	3000		1700	2200	SG120V/25S
1600	1600	SG60T/25A	1700	2300	SG120R/25A
		SG80P/25A	1700	2500	SG120R/25A
		SG100V/25S	1700	2700	
		SG100W/25S	1700	3000	
1600	1700	SG60T/25A	1800	1800	SG100V/25S
		SG80P/25A			SG100W/25S
		SG100V/25S			SG120V/25S
		SG100W/25S			SG100V/25S
1600	1800	SG80T/25S	1800	2000	SG120W/25S
		SG100R/25A	1800	2200	SG100V/25S
		SG100V/25S			SG120W/25S
		SG120W/25S	1800	2300	SG120V/25S
1600	2000	SG80T/25S			SG120W/25S
		SG100R/25A	1800	2500	SG120V/25S
		SG100V/25S	1800	2700	SG120V/25S
		SG120W/25S	1800	3000	
1600	2200	SG80T/25S	1920	1900	SG100V/25S
		SG100R/25A			SG120W/25S
		SG120V/25S			SG100V/25S
1600	2300	SG80T/25S	1920	2000	SG120W/25S
		SG100R/25A			SG120V/25S
		SG120V/25S			
1600	2500	SG100R/25A	1920	2500	
		SG120V/25S	1920	2700	
1600	2700	SG120R/25A	1920	3000	
1600	3000				
1700	1700	SG80T/25S			
		SG100R/25A			
		SG100V/25S			
		SG120W/25S			

**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1000	1000	PMAV 50/16	SL 1000	T (-15)	1000	1700	PMAV 50/16	SL 1000	T (-5)
		PMAV 63/20	SL 1000	T (-25)			PMAV 50/16	SL 1000	T (-15)
		PMAV 50/16	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-25)
1000	1200	PMAV 50/16	SL 1000	T (-15)	1000	1800	PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (-25)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-25)			PMAV 50/16	SL 1000	T (-5)
1000	1300	PMAV 50/16	SL 1000	T (-15)	1000	1900	PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 1000	T (-25)
		PMAV 50/16	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 550	T (-25)			PMAV 50/16	SL 550	T (-25)
1000	1400	PMAV 50/16	SL 1000	T (-5)	1000	2000	PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 1000	T (-15)			PMAV 50/16	SL 1000	T (-5)
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 1000	T (-25)
		PMAV 50/16	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-15)
1000	1500	PMAV 50/16	SL 550	T (-25)	1000	2200	PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (-5)			PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (-15)			PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 550	T (-25)
1000	1600	PMAV 50/16	SL 550	T (-25)	1000	2300	PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (-5)			PMAV 50/16	SL 1000	T (-5)
		PMAV 50/16	SL 1000	T (-15)			PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-15)
1000	1700	PMAV 63/20	SL 1000	T (-25)	1000	2300	PMAV 50/16	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-15)			PMAV 50/16	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-25)

**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1000	2400	PMAV 50/16	SL 550	T (-5)	1200	1500	PMAV 50/20	SL 1000	T (00)
		PMAV 50/16	SL 1000	T (00)			PMAV 50/16	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/20	SL 1000	T (-25)
		PMAV 50/16	SL 550	T (-15)			PMAV 50/16	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-15)
1000	2500	PMAV 50/16	SL 550	T (-5)	1200	1700	PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (00)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-15)			PMAV 50/16	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-15)			PMAV 50/16	SL 1000	T (-5)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-25)
1100	1100	PMAV 50/16	SL 1000	T (-15)	1200	1800	PMAV 50/16	SL 550	T (-25)
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-25)			PMAV 50/16	SL 1000	T (-5)
1100	2000	PMAV 50/16	SL 550	T (-5)	1200	2000	PMAV 63/20	SL 1000	T (-15)
		PMAV 50/16	SL 1000	T (-5)			PMAV 50/16	SL 550	T (-25)
		PMAV 63/20	SL 1000	T (-15)			PMAV 50/16	SL 550	T (-5)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 50/16	SL 1000	T (-5)
1150	1150	PMAV 50/16	SL 1000	T (-5)	1200	2200	PMAV 63/20	SL 1000	T (-15)
		PMAV 50/16	SL 1000	T (-15)			PMAV 50/16	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-25)			PMAV 63/20	SL 550	T (-15)
1150	2000	PMAV 50/20	SL 550	T (-5)	1200	2300	PMAV 50/20	SL 1000	T (00)
		PMAV 50/16	SL 1000	T (-5)			PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 1000	T (-15)			PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-15)			PMAV 50/16	SL 550	T (-15)
1200	1200	PMAV 50/16	SL 1000	T (-5)	1200	2500	PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 1000	T (-15)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-25)			PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 550	T (-25)			PMAV 63/20	SL 550	T (-25)
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/20	SL 550	T (-15)
		PMAV 50/16	SL 550	T (-15)					
		PMAV 63/20	SL 550	T (-25)					



**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]		
1250	1250	PMAV 50/16	SL 1000	T (00)	1300	2000	PMAV 63/20	SL 1000	T (-5)		
		PMAV 50/16	SL 1000	T (-15)			PMAV 50/16	SL 550	T (-15)		
		PMAV 63/20	SL 1000	T (-25)			PMAV 50/20	SL 550	T (-5)		
		PMAV 50/16	SL 550	T (-25)			PMAV 63/20	SL 550	T (-25)		
		PMAV 63/20	SL 1000	T (-15)			1300	2200	PMAV 63/20	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-15)					PMAV 50/16	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-25)					PMAV 63/20	SL 550	T (-25)
1250	2500	PMAV 63/20	SL 550	T (-15)	1300	2500	PMAV 50/20	SL 550	T (-5)		
1300	1300	PMAV 50/20	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-15)		
		PMAV 50/16	SL 1000	T (-15)			PMAV 63/25	SL 1000	T (-5)		
		PMAV 63/20	SL 1000	T (-25)			PMAV 63/20	SL 550	T (-15)		
		PMAV 63/20	SL 1000	T (-15)			1400	1400	PMAV 50/20	SL 1000	T (00)
		PMAV 50/16	SL 550	T (-25)					PMAV 50/16	SL 1000	T (-5)
PMAV 50/20	SL 1000	T (-5)	PMAV 63/20	SL 1000					T (-15)		
1300	1500	PMAV 63/20	SL 1000	T (-15)	1400	1500	PMAV 50/16	SL 550	T (-15)		
		PMAV 50/16	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-25)		
		PMAV 50/16	SL 550	T (-15)			1400	1800	PMAV 63/20	SL 1000	T (-15)
		PMAV 63/20	SL 550	T (-25)					PMAV 50/16	SL 1000	T (-5)
		PMAV 50/20	SL 1000	T (00)					PMAV 50/20	SL 550	T (-15)
1300	1600	PMAV 50/16	SL 550	T (-25)	1400	2000	PMAV 63/20	SL 550	T (-25)		
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/20	SL 550	T (-25)		
		PMAV 50/16	SL 1000	T (-5)			1400	2500	PMAV 63/20	SL 1000	T (-15)
		PMAV 50/16	SL 550	T (-15)					PMAV 50/16	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-25)					PMAV 50/20	SL 550	T (-5)
		PMAV 50/20	SL 1000	T (00)					PMAV 63/20	SL 550	T (-25)
1300	1800	PMAV 50/16	SL 550	T (-15)	1400	2000	PMAV 63/20	SL 1000	T (-5)		
		PMAV 50/20	SL 550	T (-15)			PMAV 50/16	SL 550	T (-5)		
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-25)		
		PMAV 50/20	SL 550	T (-5)			PMAV 50/20	SL 550	T (-5)		
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-15)		
1300	1900	PMAV 50/16	SL 1000	T (-5)	1450	1450	PMAV 63/20	SL 550	T (-15)		
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/20	SL 550	T (-15)		
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 1000	T (-15)		
		PMAV 63/20	SL 1000	T (-5)			PMAV 50/16	SL 1000	T (00)		
		PMAV 50/20	SL 550	T (-5)			PMAV 50/16	SL 550	T (-15)		
		PMAV 63/20	SL 550	T (-25)			PMAV 50/20	SL 550	T (-15)		
							PMAV 63/20	SL 550	T (-25)		

**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1300	2000	PMAV 63/20	SL 1000	T (-5)	1500	1500	PMAV 50/20	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 1000	T (-15)
		PMAV 50/20	SL 550	T (-5)			PMAV 50/16	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-5)
1300	2200	PMAV 63/20	SL 1000	T (-5)	1500	1700	PMAV 50/20	SL 550	T (-5)
		PMAV 50/16	SL 550	T (-5)			PMAV 63/20	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-5)			PMAV 50/20	SL 1000	T (-5)
1300	2500	PMAV 63/20	SL 550	T (-15)	1500	1700	PMAV 63/20	SL 1000	T (-15)
		PMAV 63/25	SL 1000	T (-5)			PMAV 50/16	SL 550	T (-15)
1400	1400	PMAV 50/20	SL 1000	T (00)	1500	1800	PMAV 50/20	SL 550	T (-5)
		PMAV 50/16	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/25	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-15)			PMAV 50/20	SL 1000	T (00)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 1000	T (-15)
1400	1500	PMAV 63/20	SL 1000	T (-15)	1500	1800	PMAV 50/16	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-25)			PMAV 50/20	SL 550	T (-5)
		PMAV 50/20	SL 550	T (-15)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/25	SL 1000	T (00)
1400	1800	PMAV 63/20	SL 1000	T (-5)	1500	2000	PMAV 63/20	SL 1000	T (-15)
		PMAV 50/16	SL 550	T (-15)			PMAV 50/20	SL 550	T (-15)
		PMAV 50/20	SL 550	T (-5)			PMAV 63/20	SL 550	T (-25)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-15)
1400	2000	PMAV 63/20	SL 1000	T (-5)	1500	2200	PMAV 63/20	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-5)			PMAV 50/20	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-25)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/20	SL 550	T (-5)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-15)			PMAV 63/20	SL 1000	T (-5)
1400	2500	PMAV 63/20	SL 550	T (-15)	1500	2300	PMAV 50/20	SL 550	T (-5)
1450	1450	PMAV 63/20	SL 1000	T (-15)	1500	2500	PMAV 63/20	SL 550	T (-15)
		PMAV 50/16	SL 1000	T (00)			PMAV 63/25	SL 1000	T (-5)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/20	SL 550	T (-15)
		PMAV 50/20	SL 550	T (-15)			PMAV 63/20	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-25)					
1500	2700	PMAV 63/25	SL 1000	T (-5)	1600	3000	PMAV 63/25	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-15)			PMAV 63/25	SL 550	T (-15)

**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1500	3000	PMAV 63/25	SL 550	T (-5)	1700	1700	PMAV 63/25	SL 1000	T (-5)
		PMAV 63/20	SL 550	T (-5)			PMAV 63/20	SL 1000	T (-5)
		PMAV 63/25	SL 550	T (-5)			PMAV 50/20	SL 550	T (-5)
1600	1600	PMAV 50/20	SL 1000	T (00)	1700	1800	PMAV 50/20	SL 550	T (-15)
		PMAV 50/20	SL 1000	T (00)			PMAV 63/20	SL 550	T (-25)
		PMAV 50/16	SL 550	T (-15)			PMAV 63/25	SL 1000	T (-5)
		PMAV 63/20	SL 1000	T (-15)			PMAV 63/20	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-15)			PMAV 63/20	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-25)			PMAV 50/20	SL 550	T (-5)
1600	1700	PMAV 63/25	SL 1000	T (-15)	1700	2000	PMAV 63/20	SL 550	T (-25)
		PMAV 50/20	SL 550	T (-15)			PMAV 63/25	SL 1000	T (-5)
		PMAV 63/20	SL 1000	T (-15)			PMAV 50/20	SL 550	T (-5)
1600	1800	PMAV 63/20	SL 550	T (-25)	1700	2300	PMAV 63/20	SL 550	T (-15)
		PMAV 63/25	SL 1000	T (-15)			PMAV 63/25	SL 1000	T (00)
		PMAV 63/20	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-15)
		PMAV 50/20	SL 550	T (-5)			PMAV 63/25	SL 550	T (-15)
		PMAV 50/20	SL 550	T (-15)			PMAV 63/25	SL 1000	T (00)
1600	2000	PMAV 63/20	SL 550	T (-25)	1700	2500	PMAV 63/20	SL 550	T (-15)
		PMAV 63/25	SL 1000	T (-5)			PMAV 63/25	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-15)
		PMAV 50/20	SL 550	T (-5)			PMAV 63/25	SL 550	T (-15)
1600	2200	PMAV 63/20	SL 550	T (-25)	1700	2700	PMAV 63/20	SL 550	T (-5)
		PMAV 63/25	SL 1000	T (-5)			PMAV 63/25	SL 550	T (-15)
		PMAV 63/20	SL 1000	T (-5)			PMAV 63/25	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-5)			PMAV 50/20	SL 1000	T (00)
1600	2300	PMAV 63/20	SL 550	T (-15)	1800	1800	PMAV 63/20	SL 1000	T (-15)
		PMAV 63/25	SL 1000	T (00)			PMAV 50/20	SL 550	T (-15)
		PMAV 63/25	SL 1000	T (-5)			PMAV 63/20	SL 550	T (-25)
1600	2500	PMAV 63/25	SL 1000	T (00)	1800	2000	PMAV 63/25	SL 1000	T (00)
		PMAV 63/20	SL 550	T (-15)			PMAV 50/20	SL 550	T (-5)
		PMAV 63/25	SL 550	T (-15)			PMAV 63/20	SL 550	T (-15)
1600	2700	PMAV 63/25	SL 1000	T (00)	1800	2000	PMAV 63/25	SL 1000	T (-15)
		PMAV 63/20	SL 550	T (-15)			PMAV 50/20	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-15)			PMAV 63/20	SL 550	T (-25)
							PMAV 63/25	SL 550	T (-15)

**Table 8**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1800	2200	PMAV 63/25	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-25)
		PMAV 63/25	SL 550	T (-15)
1800	2300	PMAV 63/25	SL 1000	T (-5)
		PMAV 63/20	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-15)
1800	2500	PMAV 63/25	SL 1000	T (-5)
		PMAV 63/20	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1800	2700	PMAV 63/25	SL 1000	T (00)
		PMAV 63/25	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1800	3000	PMAV 63/25	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1920	1900	PMAV 63/25	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-15)
		PMAV 63/20	SL 550	T (-25)
		PMAV 63/25	SL 1000	T (00)
		PMAV 63/25	SL 550	T (-15)
1920	2000	PMAV 63/25	SL 1000	T (-5)
		PMAV 50/20	SL 550	T (-5)
		PMAV 63/20	SL 550	T (-25)
		PMAV 63/25	SL 550	T (-15)
1920	2200	PMAV 63/25	SL 550	T (-5)
1920	2300	PMAV 63/25	SL 1000	T (00)
		PMAV 63/25	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1920	2500	PMAV 63/25	SL 1000	T (00)
		PMAV 63/25	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1920	2700	PMAV 63/25	SL 550	T (-15)
		PMAV 63/25	SL 550	T (-5)
1920	3000	PMAV 63/25	SL 550	T (-5)

**Table 8**

W [mm]	L [mm] (hinges)	Type of the electric actuator, SL550 T(-25) classification
1250	2500	SG26M/25A
1500	1500	SG16M/25A
1500	2500	SG26M/25A
1500	3000	SG26M/25A
1600	1600	SG20M/25A
1600	2500	SG26M/25A
1600	2800	SG26M/25A
1600	3000	SG40M/25A
1800	1600	SG20M/25A
1800	1800	SG26M/25A
1800	2500	SG40M/25A
1800	2800	SG40M/25A
1800	3000	SG40M/25A
2000	2000	SG40M/25A
2000	2400	SG40M/25A
2000	2500	SG40M/25A
2000	2800	SG40M/25A
2000	3000	SG40M/25A
2200	2200	SG40M/25A
2200	2400	SG40M/25A
2200	2500	SG40M/25A
2400	2400	SG60M/25A
2400	2500	SG60M/25A
2500	2500	SG60M/25A
2500	3000	SG60M/25A
3000	3000	SG80T/25A

**Table 9**

W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]	W [mm]	L [mm] (hinges)	Pneumatic actuator type	Classification [SL]	Temperature classification [T]
1250	2500	PUDV/PUAV 32/12	1000	T(-5)	1800	1600	PUDV/PUAV 32/16	1000	T(00)
		PUDV/PUAV 40/12	1000	T(-15)			PUDV/PUAV 40/16	1000	T(-15)
		PUDV/PUAV 50/16	1000	T(-25)			PUDV/PUAV 50/16	1000	T(-25)
		PUDV/PUAV 32/12	550	T(-15)			PUDV/PUAV 32/16	550	T(-15)
		PUDV/PUAV 40/12	550	T(-25)			PUDV/PUAV 40/16	550	T(-25)
1500	1500	PUDV/PUAV 32/12	1000	T(-15)	1800	1800	PUDV/PUAV 40/16	1000	T(-5)
		PUDV/PUAV 40/16	1000	T(-25)			PUDV/PUAV 50/16	1000	T(-25)
		PUDV/PUAV 32/12	550	T(-25)			PUDV/PUAV 32/16	550	T(-15)
1500	2500	PUDV/PUAV 40/16	1000	T(-5)	1800	2500	PUDV/PUAV 40/16	550	T(-25)
		PUDV/PUAV 50/16	1000	T(-25)			PUDV/PUAV 40/16	1000	T(00)
		PUDV/PUAV 32/12	550	T(-5)			PUDV/PUAV 50/16	1000	T(-15)
		PUDV/PUAV 40/16	550	T(-25)			PUDV/PUAV 63/20	1000	T(-25)
1500	3000	PUDV/PUAV 40/16	1000	T(-5)	1800	2800	PUDV/PUAV 32/16	550	T(00)
		PUDV/PUAV 32/12	550	T(-5)			PUDV/PUAV 40/16	550	T(-15)
		PUDV/PUAV 50/16	1000	T(-15)			PUDV/PUAV 50/16	550	T(-25)
		PUDV/PUAV 40/16	550	T(-15)			PUDV/PUAV 50/16	1000	T(-15)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 63/20	1000	T(-25)
		PUDV/PUAV 50/16	550	T(-25)			PUDV/PUAV 32/16	550	T(00)
1600	1600	PUDV/PUAV 32/16	1000	T(-5)	1800	3000	PUDV/PUAV 40/16	550	T(-15)
		PUDV/PUAV 40/16	1000	T(-15)			PUDV/PUAV 50/16	550	T(-25)
		PUDV/PUAV 50/16	1000	T(-25)			PUDV/PUAV 50/16	1000	T(-5)
		PUDV/PUAV 32/16	550	T(-15)			PUDV/PUAV 63/20	1000	T(-25)
		PUDV/PUAV 40/16	550	T(-25)			PUDV/PUAV 40/16	550	T(-5)
1600	2500	PUDV/PUAV 40/16	1000	T(-5)	2000	2000	PUDV/PUAV 50/16	550	T(-25)
		PUDV/PUAV 50/16	1000	T(-15)			PUDV/PUAV 40/16	1000	T(-5)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 50/20	1000	T(-15)
		PUDV/PUAV 32/16	550	T(-5)			PUDV/PUAV 63/20	1000	T(-25)
		PUDV/PUAV 40/16	550	T(-25)			PUDV/PUAV 32/16	550	T(-5)
1600	2800	PUDV/PUAV 40/16	1000	T(-5)	2000	2400	PUDV/PUAV 40/16	550	T(-15)
		PUDV/PUAV 50/16	1000	T(-15)			PUDV/PUAV 50/20	550	T(-25)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 40/16	1000	T(00)
		PUDV/PUAV 32/16	550	T(-5)			PUDV/PUAV 50/20	1000	T(-15)
		PUDV/PUAV 40/16	550	T(-15)			PUDV/PUAV 63/20	1000	T(-25)
		PUDV/PUAV 50/16	550	T(-25)			PUDV/PUAV 32/16	550	T(00)
1600	3000	PUDV/PUAV 40/16	1000	T(-5)			PUDV/PUAV 40/16	550	T(-15)
		PUDV/PUAV 50/16	1000	T(-15)			PUDV/PUAV 50/20	550	T(-25)
		PUDV/PUAV 63/20	1000	T(-25)					
		PUDV/PUAV 32/16	550	T(-5)					
		PUDV/PUAV 40/16	550	T(-15)					
		PUDV/PUAV 50/16	550	T(-25)					

**Table 9**

2000	2500	PUDV/PUAV 50/20	1000	T(-15)	2400	2400	PUDV/PUAV 50/20	1000	T(-5)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 63/20	1000	T(-15)
		PUDV/PUAV 32/16	550	T(00)			PUDV/PUAV 40/16	550	T(-5)
		PUDV/PUAV 40/16	550	T(-15)			PUDV/PUAV 50/20	550	T(-15)
		PUDV/PUAV 50/20	550	T(-25)			PUDV/PUAV 63/20	550	T(-25)
2000	2800	PUDV/PUAV 50/20	1000	T(-5)	2400	2500	PUDV/PUAV 50/20	1000	T(00)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 63/20	1000	T(-15)
		PUDV/PUAV 40/16	550	T(-5)			PUDV/PUAV 40/16	550	T(-5)
		PUDV/PUAV 50/20	550	T(-25)			PUDV/PUAV 50/20	550	T(-15)
2000	3000	PUDV/PUAV 50/20	1000	T(-5)	2500	2500	PUDV/PUAV 63/20	550	T(-25)
		PUDV/PUAV 63/20	1000	T(-15)			PUDV/PUAV 50/20	1000	T(00)
		PUDV/PUAV 40/16	550	T(-5)			PUDV/PUAV 63/20	1000	T(-15)
2200	2200	PUDV/PUAV 50/20	550	T(-25)	2500	3000	PUDV/PUAV 40/16	550	T(00)
		PUDV/PUAV 50/20	1000	T(-5)			PUDV/PUAV 50/20	550	T(-15)
		PUDV/PUAV 63/20	1000	T(-25)			PUDV/PUAV 63/20	550	T(-25)
		PUDV/PUAV 40/16	550	T(-15)			PUDV/PUAV 63/20	1000	T(-5)
2200	2400	PUDV/PUAV 50/20	550	T(-25)	3000	3000	PUDV/PUAV 50/20	550	T(-5)
		PUDV/PUAV 50/20	1000	T(-5)			PUDV/PUAV 63/20	550	T(-25)
		PUDV/PUAV 63/20	1000	T(-15)			PUDV/PUAV 63/25	1000	T(00)
		PUDV/PUAV 40/16	550	T(-5)			PUDV/PUAV 50/20	550	T(00)
2200	2500	PUDV/PUAV 50/20	550	T(-25)			PUDV/PUAV 63/25	550	T(-15)
		PUDV/PUAV 50/20	1000	T(-5)					
		PUDV/PUAV 63/20	1000	T(-15)					
		PUDV/PUAV 40/16	550	T(-5)					
		PUDV/PUAV 50/20	550	T(-15)					

Dedicated actuators from Grasl Pneumatic-Mechanik and K+G Pneumatik are presented in Tables 8 and 9.

TAVE and TAVZ type thermal triggers interoperate with the actuators.

**4.7. SMOKE DAMPERS WITH THE SCD-1-W ROOF HATCH FUNCTION**



*Rys. 7. A damper with a roof hatch function – version 1.*

*Rys. 8. A damper with a roof hatch function – version 2.*

**Table 10 Distinctive dimensions of dampers**

Pos.	Nominal size		Dimensions in open position		Geometric area AV [m <sup>2</sup> ]	Cover weight [N]
	w [mm]	l (hinges) [mm]	W open [mm]	H open [mm]		
1	1000	1000	1880	670+h	1.00	190.0
2	1000	1200	1880	670+h	1.20	210.0
3	1000	1300	1880	670+h	1.3	215.0
4	1000	1400	1880	670+h	1.4	225.0
5	1000	1500	1880	670+h	1.5	240.0
6	1000	1600	1880	670+h	1.6	245.0
7	1000	1700	1880	670+h	1.70	250.0
8	1000	1800	1880	670+h	1.80	260.0
9	1100	1100	2060	740+h	1.21	205.0
10	1150	1150	2150	770+h	1.32	215.0
11	1200	1200	2235	800+h	1.44	230.0
12	1200	1500	2235	800+h	1.80	260.0
13	1200	1700	2235	800+h	2.04	270.0
14	1200	1800	2235	800+h	2.16	280.0
15	1250	1250	2315	830+h	1.56	235.0
16	1300	1300	2410	865+h	1.69	245.0
17	1300	1500	2410	865+h	1.95	265.0
18	1300	1600	2410	865+h	2.08	275.0
19	1300	1800	2410	865+h	2.34	290.0
20	1400	1400	2595	930+h	1.96	265.0
21	1400	1500	2595	930+h	2.1	275.0
22	1400	1800	2595	930+h	2.52	300.0



23	1450	1450	2690	965+h	2.1	275.0
24	1500	1500	2765	995+h	2.25	290.0
25	1500	1700	2765	995+h	2.55	310.0
26	1500	1800	2765	995+h	2.70	320.0
27	1600	1600	2940	1060+h	2.56	310.0
28	1600	1700	2940	1060+h	2.72	320.0
29	1600	1800	2940	1060+h	2.88	330.0
30	1700	1700	3120	1125+h	2.89	330.0
31	1700	1800	3120	1125+h	3.06	340.0
32	1800	1800	3295	1190+h	3.24	350.0

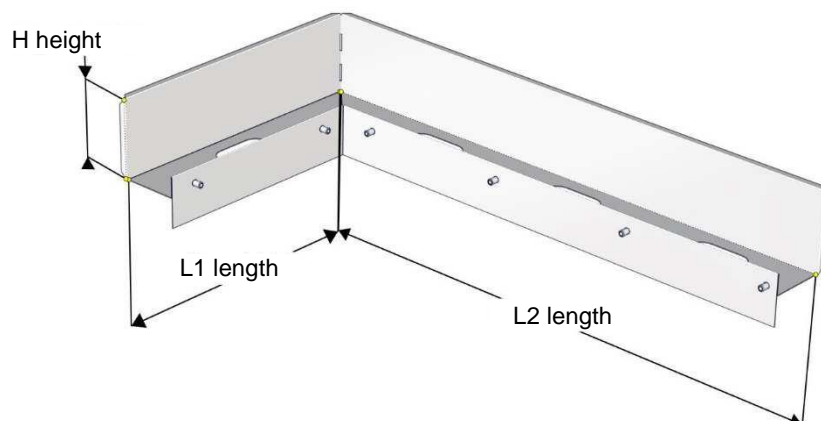
SCD-1-W smoke dampers are classified according to PN-EN 12101-2 criteria, with reference to the following areas:

- Reliability: double action, Re 1000,
- Snow load: SL 550
- Low temperature: T(-25) Wind load: WL 1500
- Resistance to high temperature: B300
- The active area of the dampers with a roof hatch function, with  $w \leq 1200$  dimension is smaller by 3% than the area of standard version dampers.
- The active area of the dampers with a roof hatch function, with  $w > 1200$  dimension is equal to the area of standard version dampers.
- It is possible to make the dampers in the version meeting the requirements of the BROOF(t1) classification.

#### 4.8. OPTIONAL ACCESSORIES

##### 4.8.1. WIND DEFLECTORS

Wind deflectors are to maximize the active area of smoke dampers. They are used when expected impact of wind would decrease the active area of a smoke damper. These are profiled elements made of galvanised steel sheet, optimized during aerodynamic tests. Deflectors are mounted to a damper base with the use of the bolted connection.



Rys. 9. Wind deflector.

#### 4.8.2. KA ANTI-BURGLAR BARS

Anti-burglar bars are to protect a facility against unauthorized persons' entry through a smoke damper. The bars are made for the full dimension range of single and double leaf dampers.

The anti-burglar bars are made with the use of standard and custom galvanised steel profiles and 1/2" pipes. Maximum gap between pipes is equal to 180 mm. They may be painted to any colour from the RAL palette.

They are mounted in the hole under the damper base. To avoid any collision with the drive elements they can consist of two parts.

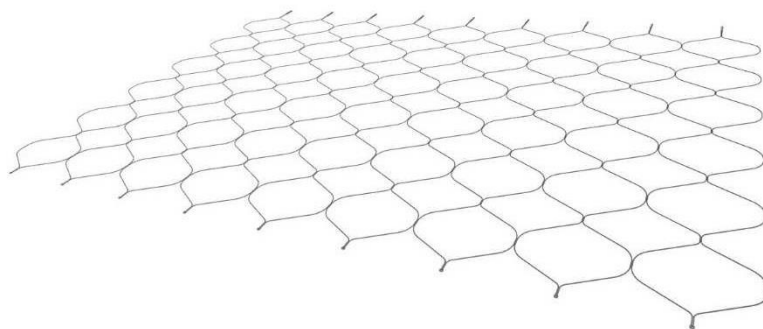


*Rys. 10. KA anti-burglar bars.*

#### 4.8.3. KZU ANTI-FALL GRATES

The purpose of the anti-fall grate is to protect people staying on the roof near a smoke damper against falling through the damper hole. They are made for the full dimension range of single and double leaf dampers. To avoid any collision with drive elements they consist of two parts.

The anti-fall grates are made of galvanised steel. They may be painted to any colour from the RAL palette.



*Rys. 11. KZU anti-fall grate.*

## 5. DRIVES AND CONTROL

In SCD smoke dampers, a basic function of emergency opening in order to extract smoke is carried out by a pneumatic or electric 24 V actuator.

The power transmission from the actuator to the damper cover is carried out by a special mechanism, and the cover position is set by a MHV spring lock.



*Rys. 12. MHV spring lock.*

In the case of control system failure, which prevents the SCD damper leaf from closing, please contact Smay Sp. z o.o. Service Department.

For the leaf emergency closing, when the control system does not operate, before the service staff arrives, it is necessary to disconnect the immobilised actuator from the leaf (by disconnecting the eye bolt from the MHV lock or by unscrewing the eye bolt from the actuator, or by disconnecting the E actuator from the fixing console), close the leaf and protect it against opening.

### 5.1. PNEUMATIC DRIVES

#### 5.1.1. CONFIGURATIONS

For emergency opening, dampers with a pneumatic drive use pneumatic actuators powered by the energy of CO<sub>2</sub> gas compressed in special dedicated containers. The containers are equipped with safety valves. The compressed gas energy release may take place:

- Automatically – when a thermal trip operates. After the trigger temperature has been reached, the detector in the TAVE thermal trip is destroyed, a pin is triggered, which – in turn – triggers a cartridge with compressed CO<sub>2</sub>, the gas fills up pneumatic actuators and the smoke damper opens.
- Manually – if fire has been noticed, a member of staff pushes the manual start button in the AK alarm box of the given fire zone. The AK box is connected with the smoke damper by means of a Ø6 mm copper tube. In the AK box there are cylinders with compressed CO<sub>2</sub>; the gas fills up the system and opens smoke dampers in the given zone.
- From the Fire Alarm System (Polish acronym SAP) – the system is adapted for connecting 24 V electric signal from SAP.

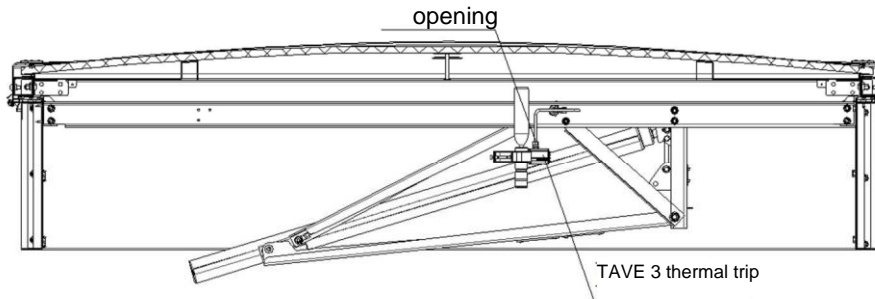
It is possible to control dampers by means of a “open only” function – “A” type damper. At that time, after test opening, it is necessary to close the damper manually, from the roof level.

In the case the double pipe system and a proper actuator type are used, there is the possibility of carrying out control by means of “open-close” function – “B” type damper. This type of control by means of a compressor and a PLZ ventilation box, can also carry out the service function.

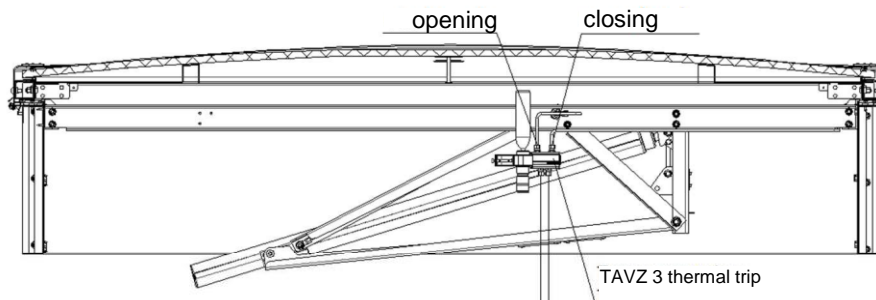
SCD-1..., single leaf dampers with a pneumatic drive are equipped with cables to limit the leaf movement. Before starting up a damper, check if the cables are in free position.

The compressed air supply system of the actuator shall be appropriate for pressure of 30 bar. Most often it is made of stainless steel or copper pipes.

Exemplary schemes of damper opening control as the function of smoke extraction and ventilation are shown in Fig. 13 and 15.

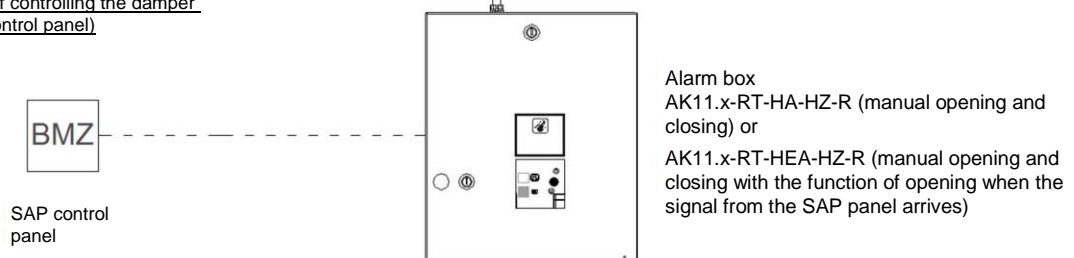


Rys. 13. "A" or "B" type damper (with a TAVZ thermal trip), with a pneumatic actuator and thermal trip. Without ventilation function.

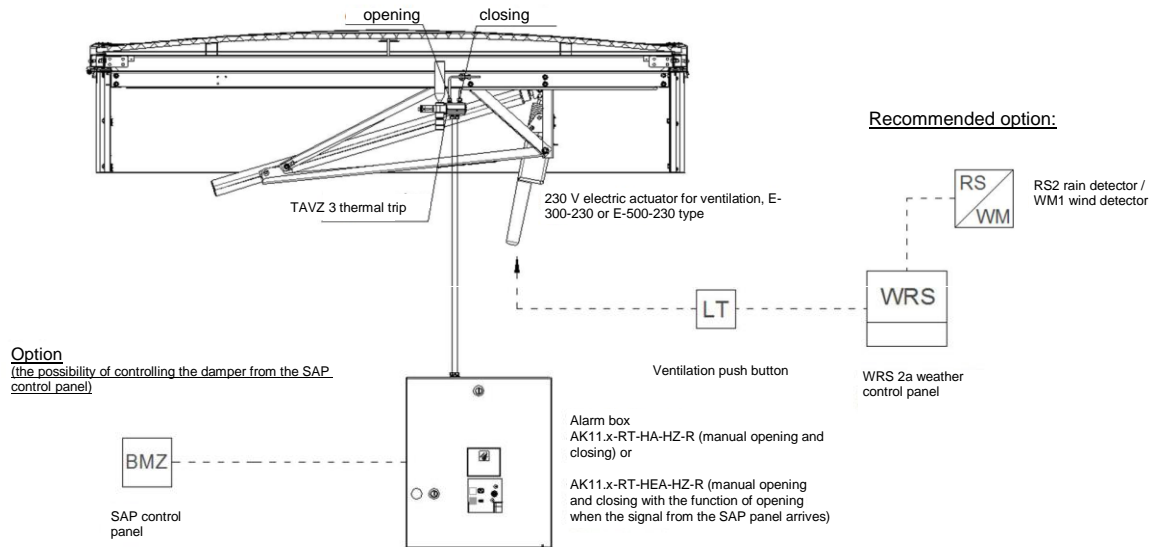


**Option**

(the possibility of controlling the damper from the SAP control panel)



Rys. 14. "B" type damper, with a pneumatic actuator, thermal trip and alarm box. Manual or automatic opening after the limit temperature has been reached or opening with a SAP signal (with an electric module in the AK box). Without ventilation function.



Rys. 15. “B” type damper, with a pneumatic actuator, thermal trip and alarm box. Manual or automatic opening after the limit temperature has been reached or opening with a SAP signal (with an electric module in the AK box). Ventilation by means of an electric actuator.

### 5.1.2. PNEUMATIC ACTUATORS

Depending on a damper size and required SL... parameter, the following types of actuators are dedicated: PxxV-32, PxxV-40, PxxV-50 PxxV-63, or DxxV-32, DxxV-40, DxxV-50, DxxV-63.



Rys. 16. Pxxx actuator



Rys. 17. Dxxx actuator

In respect of functionality, the following devices may be used: actuators with the following stroke:

- single (PxxV),
- double (DxxV),

actuators with the following fastening:

- bottom (PUxV, DUxV),
- mid-level (PMxV, DMxV),
- top (POxV, DOxV),

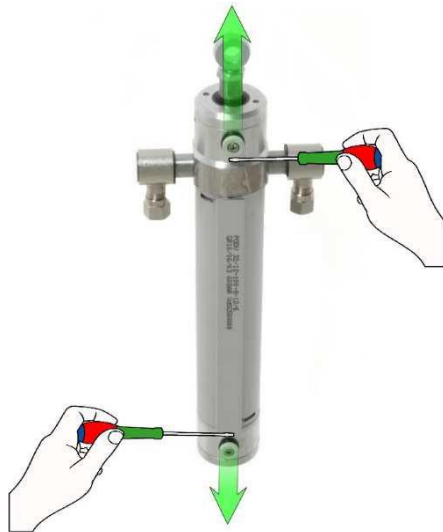
actuators with the following position lock:

- advanced (PxAV, DxAV),
- both outermost positions (PxDV, DxDV).

Basic features:

- The piston actuator, single- or double-acting, with the body diameter of 32-63 mm, the body made of anodised aluminium,
- 12, 16, 20 or 25 mm diameter piston rod, depending on the actuator size,
- Eye bolt with M8 thread, gasket being also a wiper for the piston,
- M8 x 40 – Ø8-Ø12 eye bolt holes, depending on the actuator size, recommended operating pressure 6-10 bar,
- Maximum static operating pressure 60 bar,
- Theoretical lifting force, depending on size, at 6 bar pressure: 480-1870 N, depending on the actuator size (when selecting, take into account approximately 15% loss due to friction),
- Installation and gas inflow through rotatable screw couplers,
- Ambient temperature range from -20 to +60 °C (within the range of VdS 2159 Certificate, for 2 hours, up to +110 °C),
- Maximum locking force 6500 N,
- Pneumatic actuators have internal mechanical bolt locking lug, which makes the lock of the open position. When needed, it is possible to unlock the actuator manually according to the instruction below.

Actuator unlocking:



*Rys. 18. Releasing the actuator lock.*

Before the damper closing it is necessary to release the gas from the pneumatic system. For that purpose unscrew CO2 cylinders and unlock the actuators. Shifting the pins manually by 4 mm in the direction of the arrow makes it possible to unlock the piston rod and move it manually.

Once all the dampers are closed, check if they are locked. An unlocked damper may, under the influence of wind, open uncontrollably. This fact may result in damaging the damper or roofing.

PxxV and DxxV series pneumatic actuators are maintenance-free, because their design ensures constant lubrication. However the piston rod and actuator locks should be cleaned regularly and lubricated with widely available silicone-free greases. In the case of actuators operating in such an environment as the landfarm, food industry, galvanising plants, chemical industry, swimming pools, SPA etc., it is recommended to use water separators, preferably just before control valves, and the condensate drain in a compressed air tank. Alternatively an air dehumidifier can be used.

After the actuator has been installed, but before it is ON, check the following items:

- That the actuator cylinder can move freely in the BG scissor mechanism.
- That, at full stroke actuation, the damper leaf does not hit any elements.
- That, at the maximum load and maximum vacuum, there is no excessive deformation of the leaf or mechanism.
- Final locking position (if present).
- That the piston rod and unlocking screws are free of rust.
- That the piston is not damaged.
- That the atmosphere the pneumatic actuator is installed in is not corrosive.

There is an open position lock in the pneumatic actuator.

In order to close the “A” type damper after emergency opening carry out the following operations:

1. Unscrew the cartridge from the TAVE thermal trip or AK alarm box. CO<sub>2</sub> will flow out from the system. NOTE: When the cartridge is unscrewed, the cylinder gets suddenly cold.
2. Unlock the actuator by moving the locking pins away (see Fig. 18).
3. Carefully close the damper leaf.
4. Set the thermal trip according to the instruction given on page 32.
5. Check if the leaf is closed.
6. Install a new CO<sub>2</sub> cartridge in the thermal trip or alarm box.
7. Replace the thermal fuse.

Maintenance actions:

Only trained employees may perform maintenance of the actuators and CO<sub>2</sub> system. The maintenance shall be carried out at least once a year.

The following elements must be checked:

- The unlocking screws for traces of rust.
- The state of the unlocking screws sealing ring for abrasion and damage, as well as sealing of the housing.
- The piston rod for traces of rust, damage and dirt (clean if necessary).
- Piston rod gaskets (wipers) for dirt and wear and tear in terms of the piston rod sealing.
- The tightness of all components (it is necessary to check the actuator tightness in every compression position and in the outermost positions – open and closed).
- Air dustiness.

### 5.1.3. THERMAL TRIP

In the thermal trip, when the thermal fuse has been triggered at the given limit temperature, CO<sub>2</sub> is released from its cylinder and flows to the actuator, causing the damper to open. The thermal fuse reacts at the specific nominal temperature, with -3 °C / +8 °C tolerance.

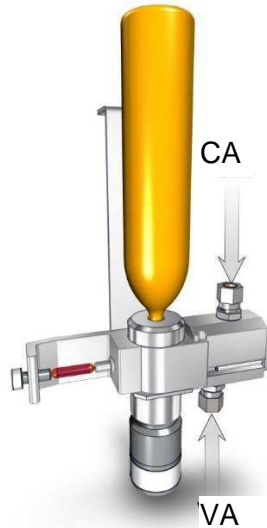
Components:

- Thermal fuse (ampoule)
- Cylinder with CO<sub>2</sub>
- Pin

**Technical Data:**

Maximum static operating pressure	80 bar
Maximum dynamic operating pressure	80 bar
Valve nominal diameter	2 mm
Pin nominal diameter	2 mm
Operating temperature range	-250 °C to +1100 °C

In systems carrying out the “A” “open only” operating mode, TAVE thermal trips are used.



*Channels marking:*  
 VA - “Open” input  
 CA - “Open” output

*Rys. 19. TAVE thermal trip*

**Types of TAVE thermal trips:**

Type	Vent valve	A Cylinder thread
TAVE 3.01	no	1/2" UNF (standard)
TAVE 3.01-M	no	M18 x 1.5
TAVE 3.01-F	no	W21.8 x 1/14"
TAVE 3.11	yes	1/2" UNF (standard)
TAVE 3.11-M	yes	M18 x 1.5
TAVE 3.11-F	yes	W21.8 x 1/14"

VA input in standby mode (the valve enabled–disabled) is connected with the CA output, which makes it possible, among other things, to carry out the damper ventilation function without any interruption. Option with venting:

CA output in standby mode is vented by means of an integrated drain (vent) valve. After pressurising VA input (from the alarm or ventilation box), connection between VA input and CA output is set up.

Installation:

1. Make the following connections:  
 CA – OPEN side of the actuator  
 VA – OPEN ventilation or smoke extraction circuit

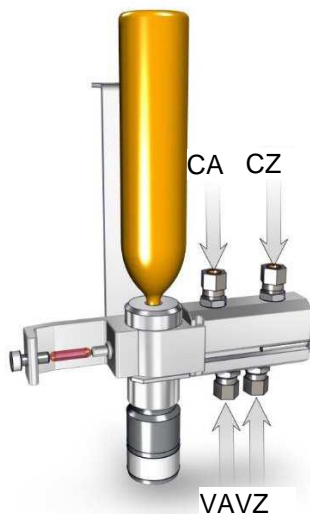


2. TAVE 3 should be mounted so that it is placed in the fire gas stream, and the socket for the cylinder screwing is located at the top.
3. Seal the threaded connections with Teflon tape or Loctite 243 liquid sealing, which should only be applied on the outer thread of the connector.
4. Use only cylinders provided by Smay Sp. z o.o., because this determines the validity of the Certificate.

Setting and operation:

1. Unscrew the pin tensioning bolt home.
2. Install the ampoule so that the sharp end of the ampoule is pointed towards the nut in the ampoule fixture.
3. Tighten the nut home until resistance is felt, then additionally tighten the nut half a turn, pressing the ampoule.
4. Tighten the pin tensioning bolt home.
5. Examine visually if the pin is placed below the thread level in the hole for the CO<sub>2</sub> cylinder.
6. Slightly lubricate the gasket (o-ring) in the hole for the CO<sub>2</sub> cylinder.
7. Screw the CO<sub>2</sub> cylinder in.
8. After launching/triggering remove the empty CO<sub>2</sub> cylinder (attention: there may still be high pressure in the valve) and repeat the operations in order to set the thermal trip again.

In systems carrying out the “B” “open-close” operating mode, TAVZ thermal trips are used.



*Channels marking:*

- VA - “Open” input
- VZ - “Close” input
- CA - “Open” output
- CZ - “Close” output

Rys. 20. TAVZ thermal trip

**Types of TAVZ thermal trips:**

Type	Vent valve	A Cylinder thread
TAVZ 3.01	no	1/2" UNF (standard)
TAVZ 3.01-M	no	M18 x 1.5
TAVZ 3.01-F	no	W21.8 x 1/14"

TAVZ 3.11	yes	1/2" UNF (standard)
TAVZ 3.11-M	yes	M18 x 1.5
TAVZ 3.11-F	yes	W21.8 x 1/14"

VA and VZ inputs in standby mode (the valve enabled–disabled) are connected with CA and CZ outputs, which makes it possible, among other things, to carry out the damper ventilation function without any interruption. Option with venting:

CA and CZ outputs in standby mode are vented by means of an integrated drain (vent) valves. After pressurising the VA or VZ input (from the alarm or ventilation box), a connection between the VA input and CA output or between VZ input and CZ output is set up.

**Installation:**

1. Make the following connections:  
 CA – OPEN side of the actuator / VA – OPEN ventilation or smoke extraction circuit  
 CZ – CLOSED side of the actuator / VZ – CLOSED ventilation or smoke extraction circuit
2. TAVE 3 should be mounted so that it is placed in the fire gas stream, and the socket for the cylinder screwing is located at the top.
3. Seal the threaded connections with Teflon tape or Loctite 243 liquid sealing, which should only be applied on the outer thread of the connector.
4. Use only cylinders provided by Smay Sp. z o.o., because this determines the validity of the Certificate.

**Setting and operation:**

1. Unscrew the pin tensioning bolt home.
2. Install the ampoule so that the sharp end of the ampoule is pointed towards the nut in the ampoule fixture.
3. Tighten the nut home until resistance is felt, then additionally tighten the nut half a turn, pressing the ampoule.
4. Tighten the pin tensioning bolt home.
5. Examine visually if the pin is placed below the thread level in the hole for the CO<sub>2</sub> cylinder.
6. Slightly lubricate the gasket (o-ring) in the hole for the CO<sub>2</sub> cylinder.
7. Screw the CO<sub>2</sub> cylinder in.
8. After launching/triggering remove the empty CO<sub>2</sub> cylinder (attention: there may still be high pressure in the valve) and repeat the operations in order to set the thermal trip again.

After emergency triggering reset the valve manually.

### 5.1.4. THERMAL FUSES

In TAVE and TAVZ thermal trips, only G5-RWA-xx thermal fuses, which were tested with the trips, can be used



*Rys. 21. Thermal fuses.*

G5-RWA

Colour of a thermal fuse defines the limit temperature:

G5-RWA-68, G8-RWA-68	red	68 °C
G5-RWA-93,	green	93 °C
G5-RWA-141, G8-RWA-141	blue	141 °C

**Note:** The nominal temperature of a thermal trip ampoule shall always be lower (or equal to) than the nominal temperature of the CO<sub>2</sub> cylinder.

### 5.1.5. CO<sub>2</sub> CYLINDERS (CARTRIDGES)

Cylinders with compressed CO<sub>2</sub> are the source of energy for the basic function of the smoke dampers with a pneumatic drive. They are equipped with safety valves. The connection thread is ½" UNF (extra-fine).

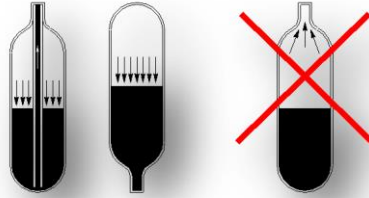


*Note: CO<sub>2</sub> is always released from a cylinder in the liquid state!*

*Rys. 22. CO<sub>2</sub> cartridges*

When a cylinder with CO<sub>2</sub> has been punctured, the gas rapidly expands and stays cool at the same time. It may result in liquid CO<sub>2</sub> freezing inside the cylinder. In this state the gas cannot go out of the tank, so there will be not enough gas in the pneumatic system.

To prevent this phenomenon cylinders with CO<sub>2</sub> are mounted with the outlet at the bottom. Then, when the cylinder has been perforated, the gas pressure forces liquid gas through the valve to the pneumatic system made of tubes. In the system the liquid gas phase is quickly heated by the environmental heat and it becomes gas, without the risk of freezing.



**The cylinders of different sizes are available:**

Size (CO <sub>2</sub> [g] content)	Dimensions [mm]	Nominal temperature [°C]	Charging efficiency (density) [g/ml]
20	26 x 115	93	0.54
24	26 x 115	68	0.65
38	30 x 144	93	0.58
40	30 x 144	68	0.62
55	35 x 159	93	0.58
75	30 x 205	50	0.74
80	35 x 217	93	0.57
120	50 x 178	93	0.56
150	50 x 178	68	0.70
300	50 x 315	50	0.71
500	60 x 342	50	0.75
750	60 x 490	50	0.71
1000	80 x 382	50	0.71
1500	80 x 525	50	0.75

**5.1.6. AK ALARM BOXES**

AKs are one of the main elements of the smoke damper control system. They make it possible to release gas energy in order to open a damper, in the following scenarios:

1. Manual release – by pushing the black push button,
2. Electric release – by applying nominal voltage to the electromagnet (with HEA and HEPA option only),
3. Pneumatic release – by applying pneumatic triggering agent (e.g. CO<sub>2</sub>) to the PA connection (with HEA/HEPA option only).



*Due to the way of start-up there are four types of AK boxes:*  
*HA – manual start-up*  
*HEA – manual and electric start-up*  
*HPA – manual and pneumatic start-up*  
*HEPA – manual, electric and pneumatic start-up*

*Rys. 23. AK alarm boxes.*

Technical Data:

- Maximum operating pressure 80 bar,
- Nominal NW valve size 4 mm,
- Nominal NW pin size 2 mm,
- Operating temperature range -250C to +500C,
- Electromagnet nominal voltage 24 V DC,
- Electromagnet nominal current 0.29 A DC,
- Electromagnet operating time 100%,
- Minimum trigger pressure for HPA/HEPA version 5 bar.

The full marking of AK box also contains information about the number of cylinders with CO<sub>2</sub> for opening and for closing, housing colour, box height and a handle for additional cartridge.

The full marking includes the following elements: AK 1 0. x – yy - .... - R

Where:

- AK – alarm box
- 1 – number of cylinders with CO<sub>2</sub> for opening
- 0 – number of cylinders with CO<sub>2</sub> for closing
- X – box height
- yy – housing colour (RT – red, OR – orange)
- ..... – way of start-up (HA, HEA, HPA, HEPA)
- R – fixture for an additional cartridge.

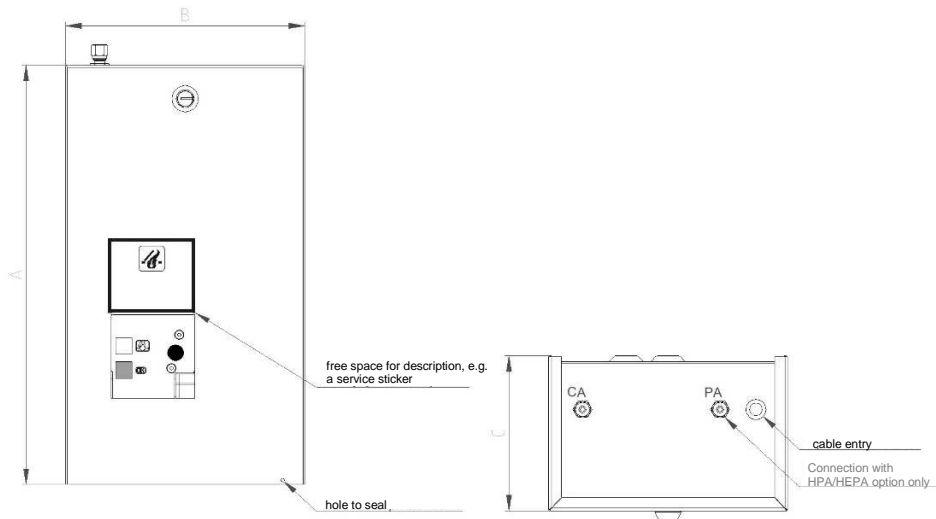


Rys. 24. AK box for a "A" type damper



Rys. 25. AK box for a "B" type damper

**Dimensions of single cylinder boxes**



Rys. 26. Dimensions of alarm boxes.

Type	A [mm]	B [mm]	C [mm]	Maximum cylinder size [g]
AK10.3	350	200	130	150
AK10.5	500	200	130	500
AK10.7	650	200	130	750
AK10.9	700	220	170	1500
AK11.3	350	300	130	150
AK11.5	500	300	130	500
AK11.7	650	300	130	750
AK11.9	700	320	170	1500

**Box installation:**

1. Connect properly the box outputs.
2. The cartridge has to be mounted with the thread directed down inside the box.
3. It is recommended to use cylinders with CO<sub>2</sub> purchased from Smay Sp. z o.o. The certificate is only valid with these cartridges.

Connections:

CA ... “opening” actuators

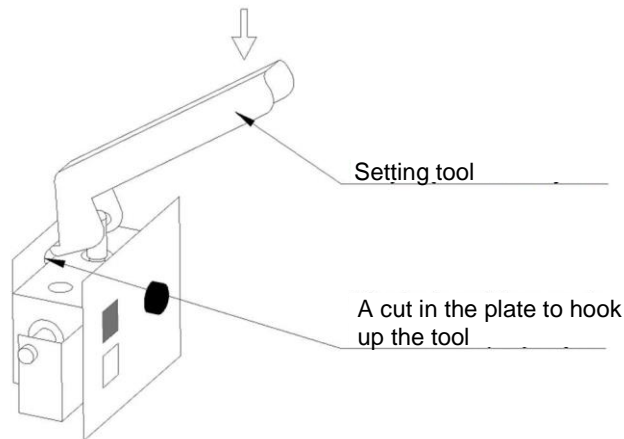
CZ ... “closing” actuators

PA ... pneumatic triggering (with HPA/HEPA option only)

Operation:

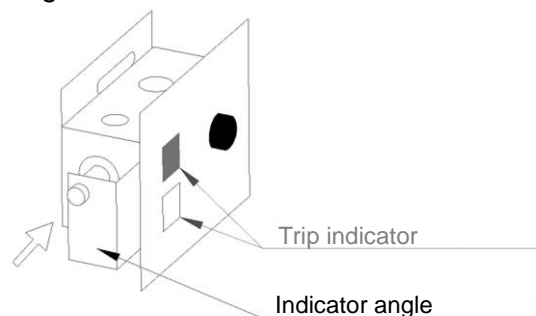
After triggering the gas flows out from the CO<sub>2</sub> cartridge.

Setting:



*Rys. 27. Setting the AK box with a CO<sub>2</sub> cartridge.*

1. Take the setting tool off the fixture.
2. Insert the setting tool teeth into proper cuts (see A view).
3. Put the tool pusher onto the pin.
4. Press the tool down until the pin is locked.
5. Check if the pin is positioned below the bearing surface of the cartridge thread.
6. Slightly lubricate sealing O-rings of the CO<sub>2</sub> cartridge thread.
7. Check the position of the trip indicator. The indicator must point green colour. If it does not indicate green, push the indicator angle towards the valve until it indicates the green colour.

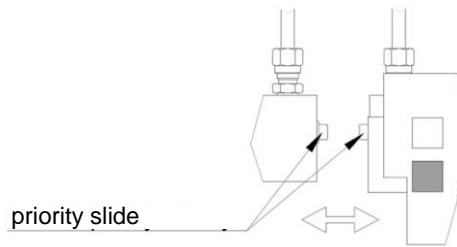


*Rys. 28. Setting the AK box with a CO<sub>2</sub> cartridge.*

8. After the emergency opening replace the glass and close the box.
9. Remove the empty cartridge after activation (attention: there still may be residual pressure in the system) and carry out the setting procedure once again.

Activating the trigger (for damper closing):

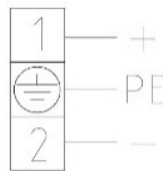
1. Carry out steps 1-6 described above.
2. Check the positions of the priority slides. Both slides need to be placed in home position (see C view).



*Rys. 29. Setting the AK box with a CO<sub>2</sub> cartridge.*

3. Screw in the new CO<sub>2</sub> cartridge and close the box.
4. Remove the empty cartridge after activation (attention: there still may be residual pressure) and carry out the setting procedure once again.

Electromagnet connection diagram:



*Rys. 30. Electromagnet connection diagram.*

### 5.1.7. PLZ VENTILATION BOXES

PLZs are important elements of smoke damper control systems with a ventilation function. They make it possible to carry out the ventilation function, and – at the same time – to keep the priority of the smoke exhaust function.

The ventilation function is started by means of a manual lever loaded valve. It is possible to carry out the remote control function with an electric or pneumatic subassembly in A (opening), Z (closing) or AZ (opening-closing) operating mode.

In the alarm function, when gas appears on the alarm box input, the emergency power output is vented, and the ventilation function is disabled. After the emergency release, the state of readiness should be restored by means of a returnable push button.





Rys. 31. PLZ ventilation box.

Technical Data:

- Maximum operating pressure 10 bar,
- Operating temperature range -200C to +600C,
- Ø6/4 pipe connection

Types of PZL boxes:

For ventilation only:

- PLZ 10.0.1: 1 ventilation section with a lever externally accessible and a pressure regulator with a filter; dimensions: 300 x 200 x 80 mm
- PLZ 10.0.2: 2 ventilation sections with two levers externally accessible and a pressure regulator with a filter; dimensions: 300 x 270 x 100 mm

For A mode (“open only”) + ventilation:

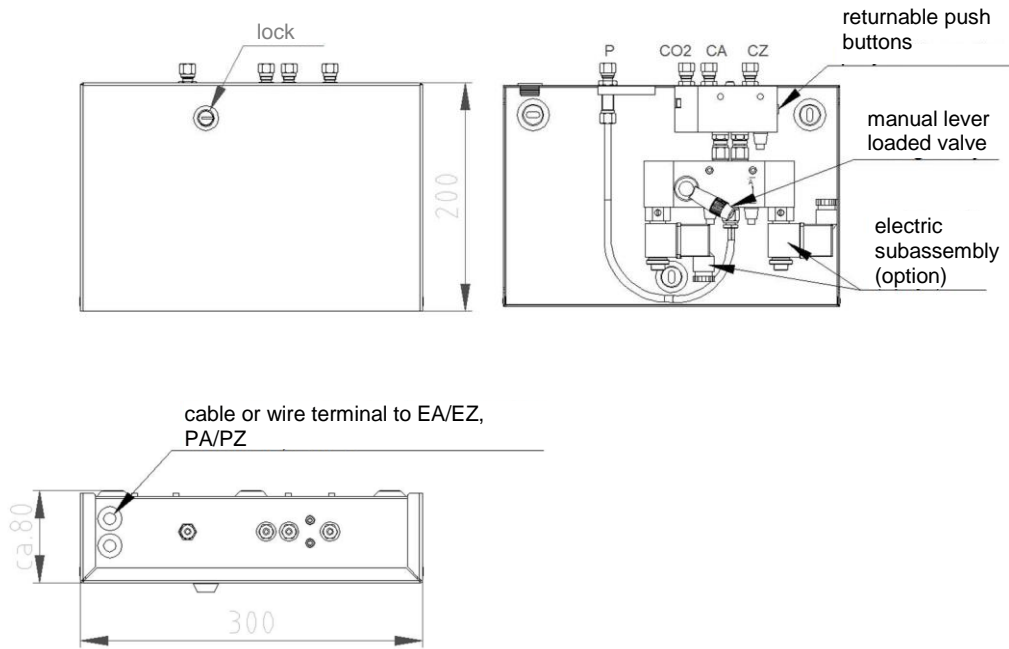
- PLZ 20.1.1: 1 section for A mode (“open only”), 1 ventilation section with a lever externally accessible and a pressure regulator with a filter; dimensions: 300 x 200 x 80 mm
- PLZ 20.1.2: 1 section for A mode (“open only”), 2 ventilation sections with two levers externally accessible and a pressure regulator with a filter; dimensions: 300 x 270 x 100 mm

For AZ mode (“open-close”) + ventilation:

- PLZ 30.1.1: 1 section for AZ mode (“open-close”), 1 ventilation section with a lever externally accessible and a pressure regulator with a filter; dimensions: 300 x 200 x 80 mm
- PLZ 30.1.2: 1 section for AZ mode (“open-close”), 2 ventilation sections with two levers externally accessible and a pressure regulator with a filter; dimensions: 300 x 270 x 100 mm
- PLZ 30.2.2: 2 sections for AZ mode (“open-close”), 2 ventilation sections with two levers externally accessible and a pressure regulator with a filter; dimensions: 300 x 270 x 100 mm

In designations of PZL boxes with a ventilation lever that is not accessible from the outer side, “1” is a second digit (PZL 11.x.x, PZL 21.x.x, PZL 31.x.x).

Other versions, including remote control (electric or pneumatic), are available on individual request.



Rys. 32. Dimensions of PLZ boxes.

### 5.1.8. ELECTRIC VENTILATION ACTUATORS

The drive for realizing the ventilation function is alternatively made by means of E-300-24, E-500-24, E-300-230, E-500-230 electric actuators from Grasl Pneumatik-Mechanik and K+G Pneumatik. E-xxx-24 actuator



Rys. 33. E300-24 actuator.

**Technical Data:**

Supply voltage: 24 V

Current consumption 650 mA,

Feed force: 500 N when feeding, 250 N when pulling,

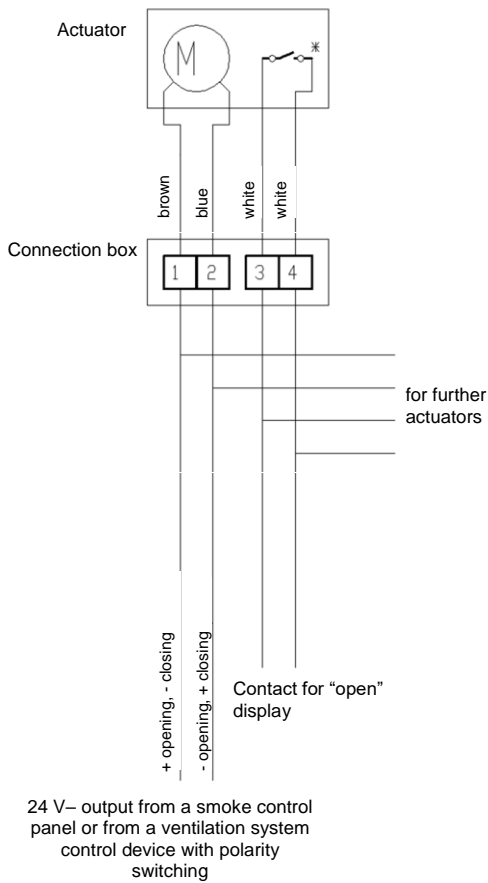
Feed speed ca. 8 mm/s,

Ingress Protection Rating IP 54 (300 mm outreach), IP 33 (500 mm outreach), (EN 60529):  
 Ambient temperature: -100C to +600C  
 Power cable: 2 x 0.75 mm<sup>2</sup>,  
 Load capacity: 24 V / 1 A  
 S3 25% operating mode (EN 60034, control voltage may be provided continuously), direct switching of the feed direction is forbidden (about 1 s break is required),

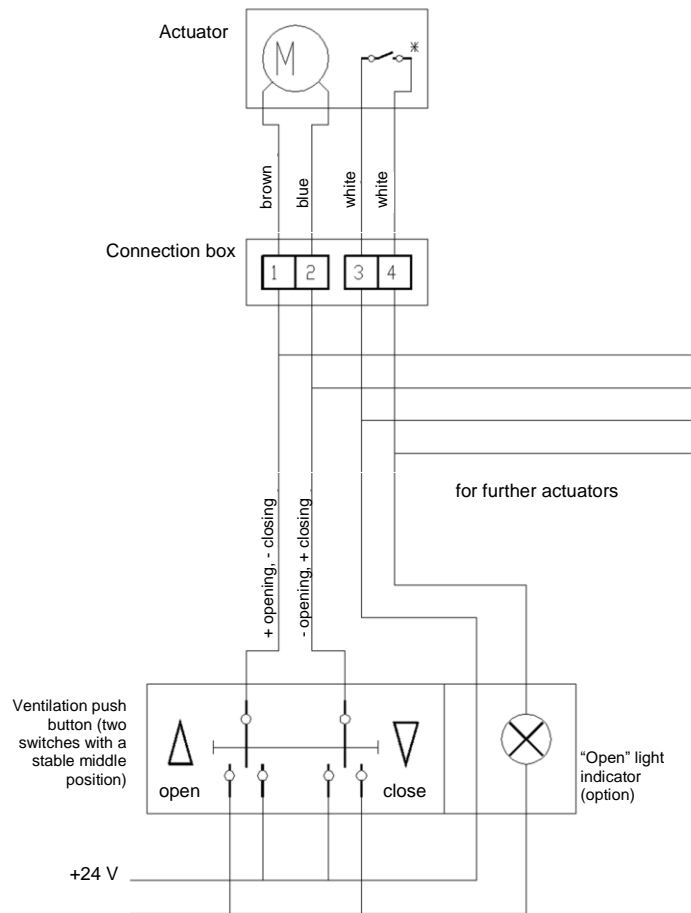
In order to ensure correct operation of the actuator in the end and overload position, power supply unit of each actuator should provide current higher than the nominal value by 20%.

The actuator is equipped with an overload circuit breaker. After the circuit breaker has been triggered, it is necessary to move the actuator back (start it in the opposite direction) before it can be restarted in the same direction as the limit switch triggered.

*Connecting, e.g. to a smoke control panel*



*Connecting directly to 24 V*



*Rys. 34. E-xxx-24 actuators connection diagram.*

E-xxx-230 actuator



Rys. 35. E300-230 actuator.

Technical Data:

Supply voltage:	230 V~, 50 Hz,
Current consumption	100 mA,
Feed force:	500 N when feeding, 250 N when pulling,
Feed speed	ca. 10 mm/s,
Operating mode (EN 60034)	S3 25%,
Ingress Protection Rating (EN 60529):	IP 54 (300 mm outreach), IP 33 (500 mm outreach),
Ambient temperature:	-100C to +600C
Power cable:	3 x 1.5 mm <sub>2</sub> ,
Load capacity:	230 V~ / 1 A

The actuator is equipped with an overload circuit breaker. After the circuit breaker has been triggered, it is necessary to move the actuator back (start it in the opposite direction) before it can be restarted in the same direction as the limit switch triggered.

Assembly recommendations for E-xxx-24, E-xxx-230 actuators:

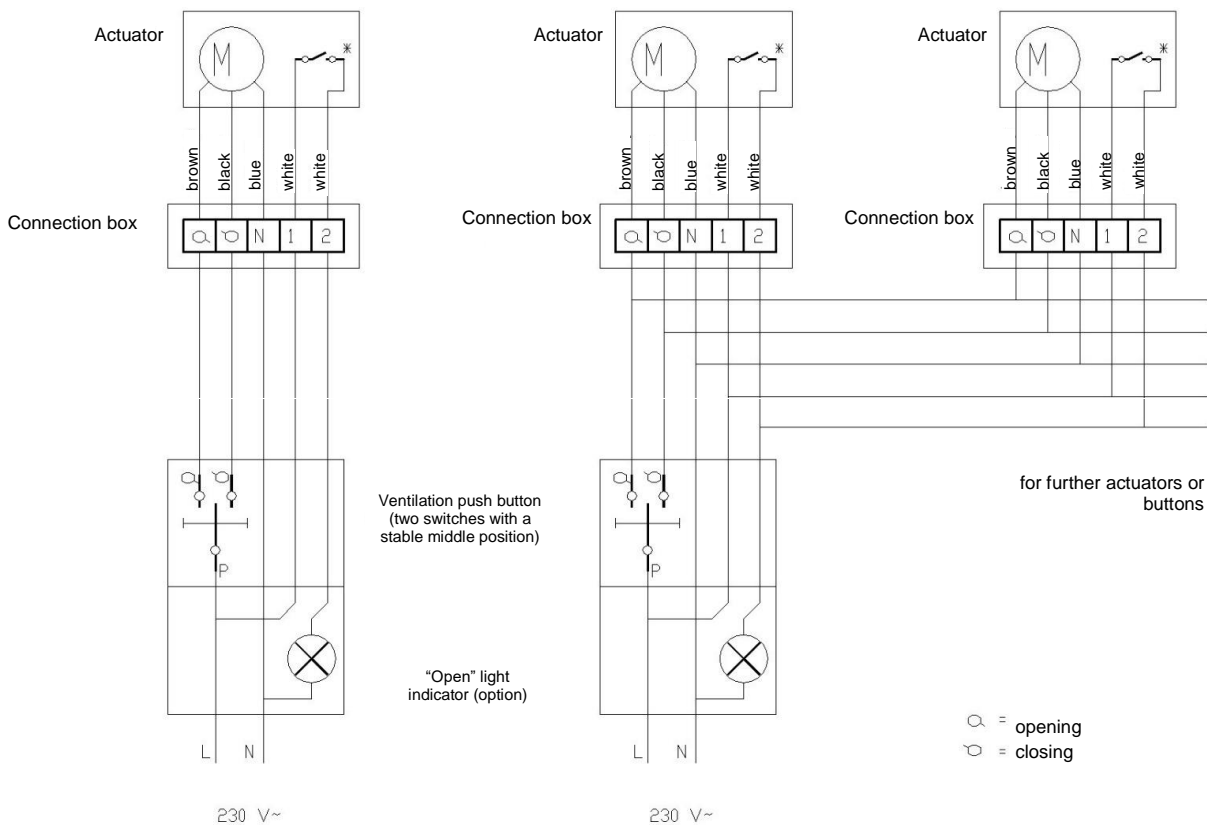
- Observe relevant OSH regulations, directives and commonly accepted technical practices. This type of actuators may be connected to control panels provided by Smay Sp. z o.o. When using the actuators with other panels, pay attention to compatibility.
- The actuators may only be connected to mains characterized with parameters (voltage and current) compatible with the ones given on the device housing.
- Actions performed on live device elements should be taken only by authorized personnel only. Disconnect the actuator from power supply and secure it against reconnection when performing such actions.
- The actuator should be connected to the connection box located in the mounting location. When selecting the location of the connection box, take into account the actuator movement (leaning) during operation.
- The connection box should be protected against tearing the cable out.
- The actuator may only be used when installed at the height greater than 2.5 m.

- In the test mode, e.g. with batteries (insert the fuse!), avoid connecting the actuator to the control panel at the same time. Ignoring this instruction may result in damaging the power outlet of the control panel.
- Remember to ensure free movement of the actuator for the entire feed range. The actuator shall not meet any solid obstacles on its way.
- The distance between the actuator pivoting point and the eye bolt hole is equal to 100 mm and may be adjusted within the range from 92 mm to 105 mm by unscrewing the eye bolt.

**Non-compliance with the recommendations given above, as well as opening or any attempts to open the housing, will result in voiding the warranty.**

*Single actuator*

*Set of actuators*



*Rys. 36. E-xxx-230 actuators connection diagram.*

**5.1.9. PNEUMATIC SYSTEM**

The gas pressure in the system after emergency release, may exceed 30 bar. For that reason it is very important to make the installation connecting individual elements of the pneumatic system very carefully. It is recommended to make this installation of certified elements for this level of pressure: Ø6/4 copper tubes, 10000 series screw connectors. Screw joints should be sealed with a Teflon tape or Loctite 243 glue for bolts. To protect actuator fixing screws against loosening caused by vibrations, also use Loctite 243 glue.

## 5.2. ELECTRIC DRIVES

### 5.2.1. CONFIGURATION

Dampers with an electric drive are equipped with 24 V actuators. The same actuator supports emergency operation and ventilation functions.

The elements of the system equipment are as follows: control panel, 24 V DC, Manual emergency push button.

Activation in emergency mode may take place:

- Automatically – by means of an electric signal, sent by smoke or temperature detectors.
- Automatically – from the Fire Alarm System (Polish acronym SAP)
- Manually – if fire has been noticed, a member of staff pushes the manual emergency push button.

The continuity of power supply is imperative for this. Non-combustible cables are used to connect elements of the system.

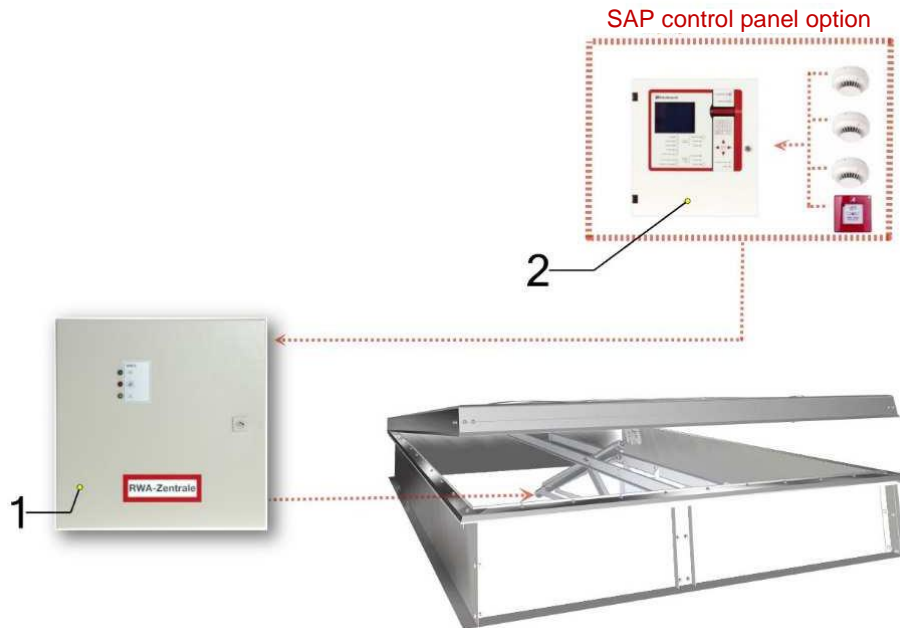


1. Smoke extraction system control panel
2. SAP control panel
3. Emergency push button
4. Smoke detector
5. Ventilation push button
6. Weather station
7. Alarm signalling device

Rys. 37. The “B” type damper with an electric actuator, control panel and weather control panel.

The exemplary scheme of the damper opening control as the function of smoke extraction and ventilation is shown in Fig. 38.

Manual or automatic opening after the limit temperature has been reached or opening with SAP signal (with an electric module). Ventilation with an electric actuator.



1. Smoke extraction system control panel
2. SAP control panel

*Rys. 38. "B" type damper with an electric actuator and control panel.*

### 5.2.2. ELECTRIC ACTUATORS

Depending on the damper size and required SL... parameter, the following types of actuators are dedicated: SG16.., SG20.., SG26.., SG40.., SG60.., SG80.., SG100.., SG120..



*Rys. 39. SG electric actuator*

The bodies of the actuators are made of anodised aluminium, and piston rod is made of aluminium, 1.4301 stainless steel or St52 galvanised steel. The actuators meet requirements for acceptable interference emission defined by EN 55011. Internal limit switches ensure turning off at end positions, and an electronic switch protects the device against overload. Parallel electric connection is also possible (without the speed synchronization). The standard size of the piston rod eye bolt is Ø8 (possible variants: Ø6, Ø10).

Every actuator has a cable in light grey silicon insulation, 2.5 m long:

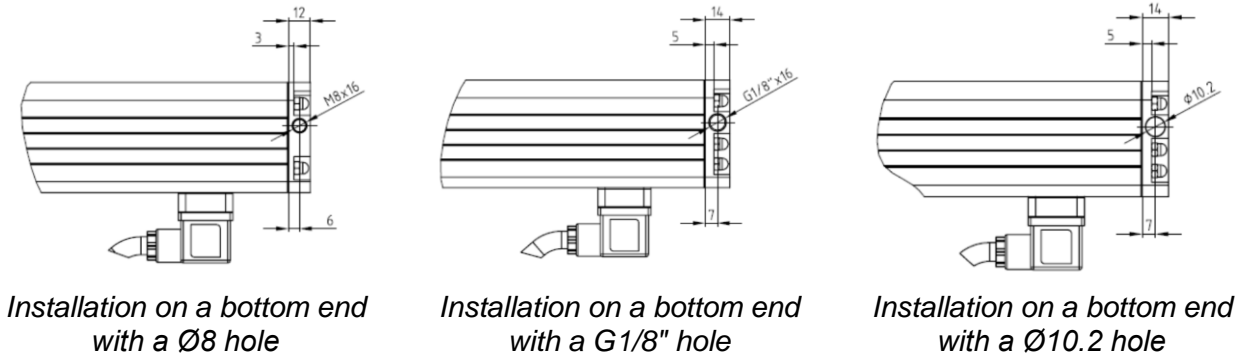
standard version: 2 x 2.5 mm<sup>2</sup> / OD ~ Ø9 mm

for "E" option: 2 x 2.5 mm<sup>2</sup> / 3 x 1.5 mm<sup>2</sup> / OD ~Ø11 mm

Options on request:

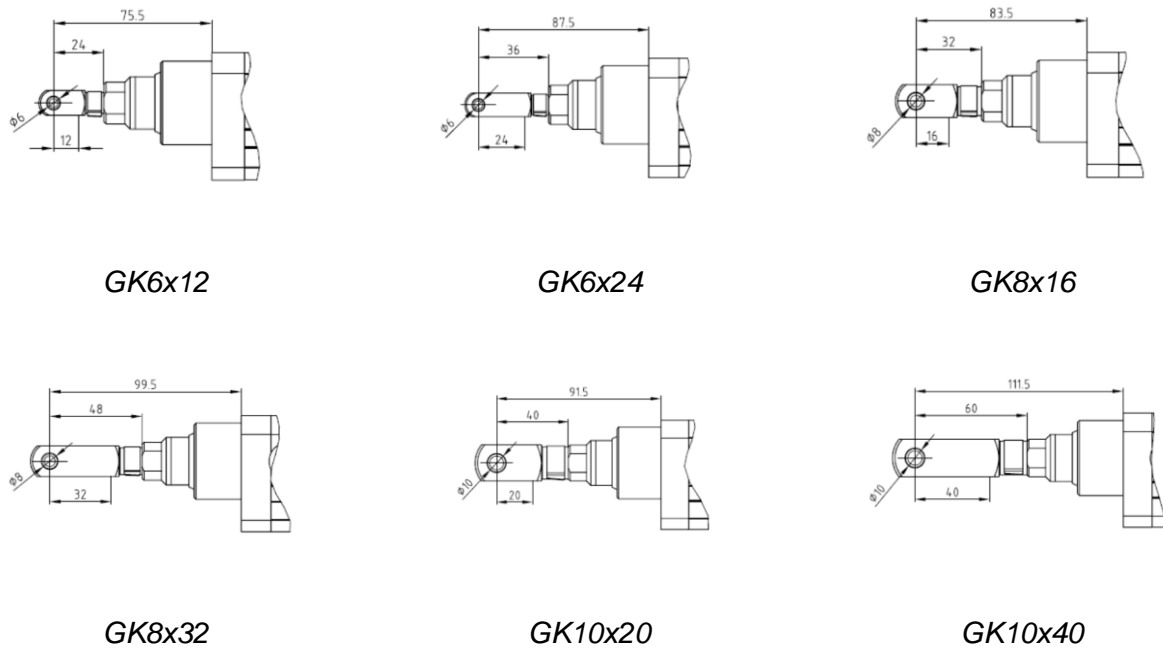
- Actuator with a lower centre of suspension,
- Other versions of the piston rod finishing,
- Actuator housing painted to RAL colour.

"E" option – additional limit switches for both end positions, potential-free contact, closed for the end position. Load capacity 1 A / 24 V- (e.g. for the position indication).



Rys. 40. Versions of actuator installation

**Versions of the piston rod finishing.**



Rys. 41. Versions of the piston rod finishing.



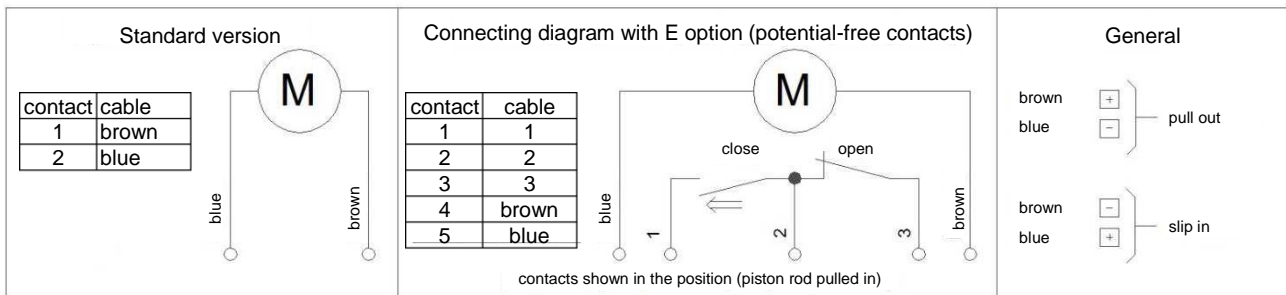
The specific data of SG actuators are shown in the table:

Parameter	Actuator type*							
	SG16..	SG20..	SG26..	SG40..	SG60..	SG80..	SG100..	SG120..
Supply voltage	24 V DC							
Current consumption when operating without load	0.8 A							
Ambient temperature range	-25 °C to +60 °C							
Maximum acceptable temperature according to EN 12101-2, Appendix G	300 °C – 30 min							
Ingress Protection Rating according to DIN EN 60529	IP 54							
Current consumption at full load [A]	1.6	2.0	2.6	4.0	6.0	8.0	10.0	12.0
Speed without load [mm/s]	6.2-20.8	6.2-20.8	6.2-20.8	6.7-36.7	21.9-36.8	30.3-36.8	17.1-25.6	17.1-25.6
Speed at full load [mm/s]	5.1-17.2	4.8-16.3	4.4-14.9	5.3-29.2	15.2-25.6	18.1-22.0	12.7-19.0	11.7-17.6
Operating mode at peak load, at 250C	S2 4	S2 2.5	S2 1.5	S2 4	S2 2	S2 1	S2 2	S2 2
Operating mode at continuous load, at 400C	S3 21%	S3 13%	S3 8%	S3 20%	S3 10%	S3 5%		
Maximum activation time of the actuator in one direction [min]	4	2.5	1.5	4	2	1		

Ingress Protection Rating of the housing: IP 54  
 Operating temperature: -250C to +600C

Other important technical data concerning actuators are available on individual request.

Wiring diagrams:



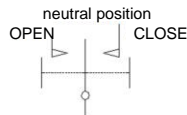
Rys. 42. Connecting diagram.

Technical conditions for SG actuators installation.

- Mechanical installation of SG actuator consists of mounting the actuator to the drive console and connecting the actuator eye bolt with a MHV hook lock. It is very important to adjust this connection. The proper adjustment ensures reliable latching of the MHV lock on a T fitting, and at the same time turning the actuator off by the limit switch, not the overload switch.

- SG actuators are suitable for connecting to the control panels delivered by Smay sp. z o.o. When connecting actuators to control panels of other companies pay attention to compatibility. Connect the actuators via the connection socket. Using traction load is compulsory. When selecting the cable length take into account installation of the connection socket and the range of the actuator turn.
- When mounting the actuators at the height exceeding 2.5 m use appropriate devices in order to avoid personal risk (possible injury or crush).
- Nominal diameter of the cable between the connection socket and the control panel shall be selected so that the voltage loss between the control panel and the actuator at full load does not exceed 1 V (see the control panel documentation). In case of control by means of other control panels choose a professional electric company to check the cable dimensioning.
- Permissible nominal voltage for actuators control is 24 V- with +30/-20% tolerance. At the same time peak voltage may not exceed 32 V, with maximum residual pulsation of 48%. Before installation in the smoke damper, the actuators must be totally pulled in (internal built-in switches); slip them in if necessary (for example powering them by means of a battery).
- Before activation, e.g. with the use of batteries (service life and installation or maintenance and repair works), install a fuse, rated the same as the nominal current, in the power line. In this case avoid simultaneous connecting all actuators to the control panel. Ignoring this instruction may result in damaging the power outlet of the control panel.
- Pay attention to obstacle-free actuator leaning during the entire feed.
- Only the ventilation push button, with a return lock and a single-speed zero position, is designed for actuators control.
- Direct switching the feed direction is forbidden. Ignoring this instruction may result in damage (required time out is about 1 s).

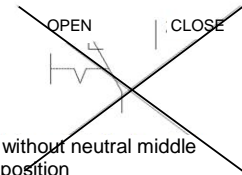
**CORRECTLY!**



control switch with neutral middle position, stable middle position | automatic return to the neutral position

**WRONG!**

damage hazard



normal switch without neutral middle position

*Rys. 43. Control switch diagram.*

After complete feed or slip in, connect the actuator for about 1 s in the opposite direction, before it will be connected once again in previous direction.

### 5.2.3. CONTROL PANEL

The main purpose of the control panel is to control electric actuators of smoke ventilation systems. The smoke extraction is a priority function. The control panel makes it possible to carry out this function by manual or automatic activation, after emergency signal from a fire detector of SAP system has been received (the alarm can be reset by means of SAP). Moreover, they can carry out the ventilation function, in manual or programmable mode. The control panel can interoperate with an external weather station, therefore automatic damper closing is possible, when the weather is bad.

The control panels are equipped with batteries, which maintain emergency power supply.

In case of blackout it is not possible to charge the batteries, but they will provide power supply needed to maintain the panel operation. Blackout will not influence emergency functions.

A sac with fuses and spare resistors is placed inside the control panel.

Possible options:

- Sending PK Alarm messages:  
one pair of potential-free contacts for sending emergency messages and one for failure messages
- PK-SA Sending signals of the position indicator
- WRM Internal weather control panel:  
If it triggers, the actuators will automatically slide in. It is necessary to connect the WM anemometer and/or RS rain detector (accessories)  
Direct connection of the module detectors in the control panel. There is no need to connect the external weather control panel  
The possibility of setting detectors sensitivity  
“Close” command remains active as long as the detector reacts, at least for 6 minutes  
W wind indicator and R rain indicator on the module
- CP External weather control panel:  
If it triggers, the actuators will automatically slide in. The ventilation functions are inactive till unlocked. Alarm signal has priority.
- WTM External warning devices control:  
Outputs for the external warning devices control in case of alarm or failure (e.g. MS multi-tone siren and BL flash lamp).

Types of Control Panels

RWZ 1b smoke extraction system control panel



*Rys. 44. RWZ 1b smoke extraction system control panel.*

Technical parameters:

- One smoke extraction group, one ventilation group
- Integrated system display
- Supply current for actuators 4 A
- Current consumption 0.7 A / 230 V~
- Gel batteries, 2 x 2 Ah / 12 V, with VdS certificate
- Charging I / U 0.2 A (28.8 V) / 27.4 V
- Dimensions in mm (width x height x depth) 330 x 330 x 110
- The requirements of EN 12101-10 and pr. EN 12101-9 are met

Actuator output:

- Nominal voltage 24 V- (+6 V / -4 V)
- Operating mode / on time S3 30%
- Maximum cross-section of the power cable 4 x 10 mm<sup>2</sup> (*rigid*)
- Maximum voltage drop 1 V (*at full load*)  
between the control panel and actuator
- Wire line monitoring open circuit, short circuit  
(unbranched trunk cable)
- Possible options PK, WRM, CP

Permissible cable length for straight, unbranched arrangement of actuators

Cross-section [mm <sup>2</sup> ]	Current [A]			
	1.0	2.0	3.0	4.0
	Permissible cable length [m]			
2x1.5	44	22	15	11
2x2.5	73	36	24	18
2x4.0	116	58	39	29
2x6.0	174	87	58	44
2x10.0	290	145	97	73

RWZ 4d smoke extraction system control panel



*Rys. 45. RWZ 4d smoke extraction system control panel.*

Technical parameters:

- One smoke extraction group, one ventilation group
- Integrated system display
- Third signal line
- Supply current for actuators 8 A Current consumption 1.1 A / 230 V~
- Gel batteries, 2 x 7 Ah / 12 V, with VdS certificate
- Charging I / U 0.7 A (28.8 V) / 27.4 V
- Dimensions in mm (width x height x depth) 400 x 400 x 125
- The requirements of EN 12101-10 and pr. EN 12101-9 are met

Actuator output:

- Nominal voltage 24 V- (+6 V / -4 V)
- Operating mode / on time S3 30%
- Maximum cross-section of the power cable 4 x 10 mm<sup>2</sup> (rigid)
- Maximum voltage drop 1 V (at full load)  
between the control panel and actuator
- Wire line monitoring open circuit, short circuit  
(unbranched trunk cable)
- Possible options: PK, WRM, WTM, CP

Permissible cable length for straight, unbranched arrangement of actuators

Cross-section [mm <sup>2</sup> ]	Current [A]							
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
	Permissible cable length [m]							
2x1.5	44	22	15	11	9	7	6	5
2x2.5	73	36	24	18	15	12	10	9
2x4.0	116	58	39	29	23	19	17	15
2x6.0	174	87	58	44	35	29	25	22
2x10.0	290	145	97	73	58	48	41	36
4x1.5	87	44	29	22	17	15	12	11
4x2.5	145	73	48	36	29	24	21	18
4x4.0	232	116	77	58	46	39	33	29
4x6.0	348	174	116	87	70	58	50	44
4x10.0	580	290	193	145	116	97	83	73

When the four-core cable is used, connect the cores in parallel, two cores each RWZ 5e smoke extraction system control panel



Rys. 46. RWZ 5e smoke extraction system control panel.

**One or two smoke extraction groups, up to four ventilation groups**

Type	RWZ 5-8e	RWZ 5-16e	RWZ 5-24e	RWZ 5-32e
Total output current [A]	8	16 (2x8)	24 (3x8)	32 (4x8)
Current consumption	1.1 A / 230 V~	2.2 A / 230 V~	3.3 A / 230 V~	4.4 A / 230 V~
Gel batteries, with VdS certificate	2 x 7 Ah / 12 V	2 x 12 Ah / 12 V	2 x 17 Ah / 12 V	
Charging I / U	0.7 A (28.8 V) / 27.4 V	0.7 A (28.8 V) / 27.4 V	0.7 A (28.8 V) / 27.4 V	
Dimensions in mm (width x height x depth)	500 x 500 x 210		600 x 600 x 210	
The requirements of EN 12101-10 and pr. EN 12101-9 are met				

**Actuator outputs:**

- Nominal voltage 24 V- (+6 V / -4 V)
- Current per each actuator output 8 A
- Note:
- For RWZ 5-16:
  - Total current of actuators 1 and 2 max. 8 A*
  - Total current of actuators 3 and 4 max. 8 A*
- For RWZ 5-24
  - Total current of actuators 3 and 4 max 8 A*
- Take into consideration the total output current of the control panel (Manual, chapter 6.1)
- Operating mode / on time S3 30%
- Maximum cross-section of the power cable 4 x 10 mm<sup>2</sup> (rigid) *per each output*
- Maximum voltage drop between the control panel and actuator 1 V (at full load)
- Wire line monitoring (unbranched trunk cable) open circuit, short circuit
- Possible options: PK, PK-SA, WRM, WTM, CP

Permissible cable length for straight, unbranched arrangement of actuators

Cross-section [mm <sup>2</sup> ]	Current [A]							
	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0
Permissible cable length [m]								
2x1.5	44	22	15	11	9	7	6	5
2x2.5	73	36	24	18	15	12	10	9
2x4.0	116	58	39	29	23	19	17	15
2x6.0	174	87	58	44	35	29	25	22
2x10.0	290	145	97	73	58	48	41	36
4x1.5	87	44	29	22	17	15	12	11
4x2.5	145	73	48	36	29	24	21	18
4x4.0	232	116	77	58	46	39	33	29
4x6.0	348	174	116	87	70	58	50	44
4x10.0	580	290	193	145	116	97	83	73

When the four-core cable is used, connect the cores in parallel, two cores each.

Installation / start-up:

Operations at the control panel may be carried out by professional personnel only.

Before starting any work, be sure to discharge any static electricity.

Disconnect power supply before any actions at the control panel!

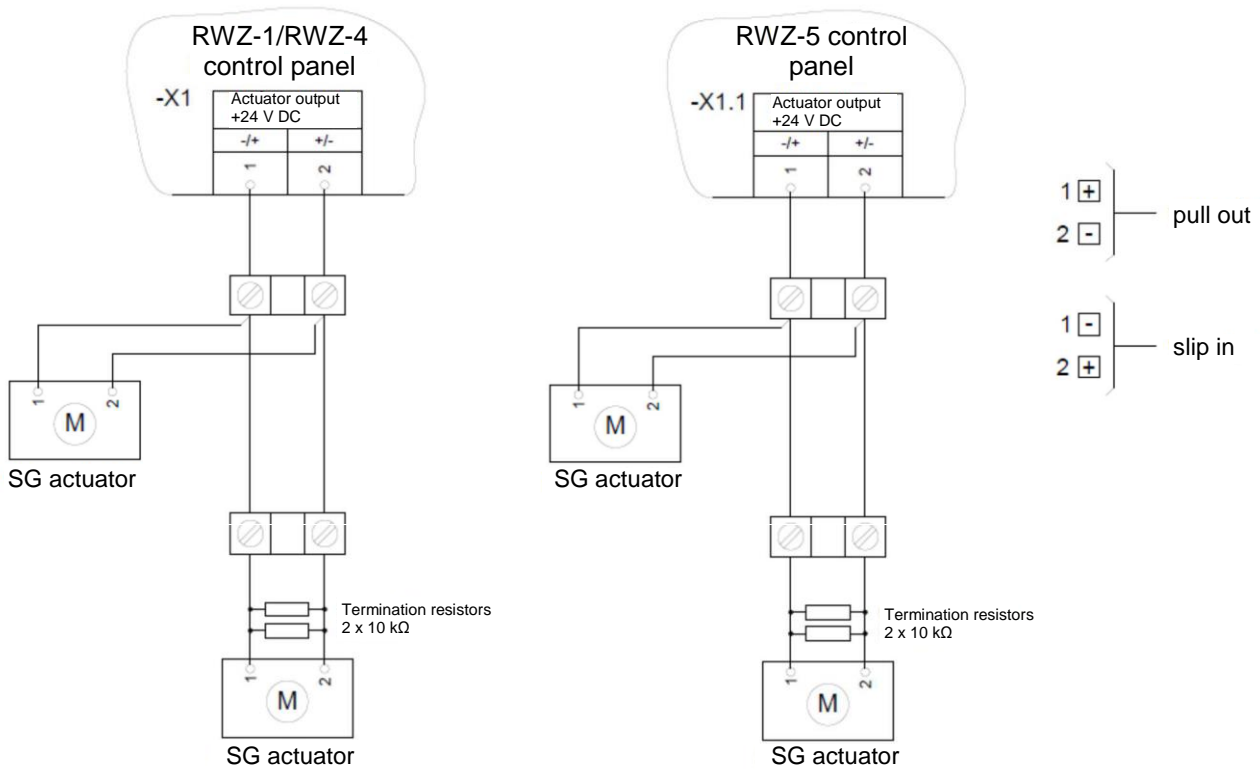
Actuators may not be advanced with the use of external electrical power supplies (e.g. external batteries), when they have already been connected to the control panel. It may result in damage of the control panel energetic output.

All works should be carried out in accordance with the full version of the “Installation and Operation Manual”, which is provided along with the control panel.

During control panel installation carry out the following actions:

- Fasten the housing with appropriate mounting elements. Lead the connection wires through appropriate holes.
- Set functions (group configuration – RWZ5e) and cable the control panel according to the schematic diagram. Turn on the mains voltage.
- Indicators and the service display will go ON for a moment. Then the indicator will be flashing for about 15 s (calibration process). If the “failure” indicator goes on continuously, it means the failure of the signal line (see Instruction Manual, item 5). The service display will be ON for about 120 s.
- Insert the batteries into the housing and connect them.
- If the OK indicator goes ON – the device is ready to work. If the “failure” indicator is still ON, take into account the guidelines given in Chapter 5 of the Instruction Manual,
- “Troubleshooting”.
- During the start-up check all functions and indicators of the control panel, as well as its components.
- Individual functions are described in Chapter 3 of the Instruction Manual (“Failure Simulation and Detection Control”; Chapter 5).
- At the end of the activation slip all actuators in completely.

After approx. 24 hours of blackout-free operation, the batteries are charged enough to ensure full maintenance time in case of any failure.



Rys. 47. Diagrams of connecting actuators to the RWZ 5 control panel

In the RWZ-5 control panel connect subsequent actuators to the following terminals: X1.2, X1.3, X1.4, depending on the configuration of smoke zones and ventilation zones.

**Maintenance**

During maintenance activities – if there are no other local regulations – control all functions and indicators of the control panel, as well as its components, at least once a year. This also applies to controlling clamping points, connection cables, indicators and fuses, as well as possible cleaning of various components.

Check fastening of mounting brackets etc. Possibly lubricate actuators and smoke extraction devices.

The control panel has a built-in signal function “maintenance needed”. If this function is activated, after approx. 11 months of operation, the control panel will inform the user about required maintenance. After approx. 14 months, the failure message will be additionally generated in order to inform about expired maintenance.

The batteries operation should be checked at least once a year.

At 20 °C ambient temperature they should be replaced once per 3 years as a standard, but not later than after 4 years. Each additional 10 °C of ambient temperature decreases the battery service time by approx. 1 year!

Charged but disconnected batteries may be stored for approx. 6 months. In case of extended storage it is necessary to charge the batteries.

As part of the weather module maintenance, the following works must be carried out at least once a year:

- Clean rain detectors with a wet cloth, possibly with a mild cleaning agent (do not scour the detector surface!)
- Check the smoothness of the anemometer movement
- Check detectors functioning
- Check smoke extraction and ventilation devices for proper closing



### Close-Down

- Disconnect the batteries from the control panel (e.g. disconnect the battery connection cable or F2 fuse). Turn off the mains voltage.
- The end user, i.e. the last owner, shall hand over worn batteries to the distributor or appropriate waste treatment plant. This obligation applies to both individual end users and company end users.

In regard to the control panels, this Operation and Maintenance Manual contains only basic technical data and information about installation, start-up, maintenance and close-down. Both the Installer and the User are required to know and apply the complete version of the “Installation and Operation Manual”, which is provided along with the control panel.

## 6. SYSTEM EQUIPMENT

### 6.1. WRS 2B WEATHER CONTROL PANEL

Required signal is sent by four separate potential-free change-over contacts (output contacts). The contacts remain active as long as the detector operates, and the contact minimum operating time is equal to 6 minutes.

WM wind detector and/or RS rain detector are connected to WRS 2b control panel. As expected, operation is achieved by regulation of the trigger threshold for the signal from the wind/smoke detector.

Functional capabilities of the control panel (to set) are as follows:

“Limited wind sensitivity” (it is possible to close only if the wind persists).

“Continuous heating” (the rain detector is heated continuously).

“Contact programming” (contacts 3 and 4 optionally switch over during the rain and/or wind).

“Output inactive” (relays are not energised for the service/maintenance time).

“Close time shortening” (minimum delay in actuators closing is decreased from 6 to 3 minutes).

“Failure” (contact 2 will switch in case of failure of the rain detector).

“Test” (a function that makes it possible to test the detectors and actuators operation).

The active status of the control panel is indicated with a LED: I readiness, W wind and R rain.



*Rys. 48. WRS 2B weather control panel*

### Options / accessories

- WM 1: wind detector (an anemometer with a pinwheel) to measure the velocity of wind
- RS 2: heated rain detector
- SK: rack bracket (a mast, 40 cm in height) for installation of WM and RS detectors on a flat roof
- MB: a fastening member for WM and RS detectors to mount them to a mast (to Ø 60 mm pipe) KE: Expansion with additional potential-free contacts
- SG: a housing with the door made of clear plastic, opening to the left side, IP54

Not suitable for outdoor use. Protect against direct sunlight, humidity and excessive dust! It is recommended to mount the product in dry and heated rooms.

### Technical parameters:

- Supply voltage 230 V~ / 50-60 Hz
- Current consumption 0.09 A
- Dimensions in mm (width x height x depth) 165 x 155 x 75, 200 x 155 x 95 (for the SG option)
- Operating temperature -50C to +400C
- Air relative humidity 20% to 80% without condensation
- Ingress Protection Rating of the housing IP 40; IP54 (for SG option)

### Installation / Start-up

Any operations at the control device may only be carried out by trained persons.

It is necessary to discharge electrostatic charges before starting work.

The wind sensor should measure undisturbed airflow (the wind flow). Therefore the sensors should be fixed, e.g. to the mast, at the height of at least 2 m over the roofing.

Observe applicable regulations in regard to the lightning protection system and OSH (PN-EN 62305, PN-EN 60728-11).

**Any work on the control device may only be carried out in de-energised state.**

During control panel installation carry out the following actions:

- Remove both parts of the housing cover. Fix the housing to the ground by means of appropriate screws. Lead the power/signal cables through appropriate holes.
- Set required functions on the DIP switches (Instruction Manual, Item 4), then lead the control wiring according to the diagram.
- Turn on the mains voltage. W and R LEDs will light for a short time, and I LED will light continuously. The control panel is ready to work.
- If any detector is active at that time, W and/or R LEDs will continue to light. If any LED flashes, follow the Instruction Manual, Item 3.
- During start-up check functions and operation of control indicators, as well as other elements of the system. Detailed description is given in Items 3 and 4 of the Instruction Manual.

## Maintenance

At least once a year carry out the following maintenance and inspection activities:

- Clean the rain detector with a damp cloth, possibly with a mild cleaning agent. (Do not scour the detector surface)
- Check the wind detector functioning for free turning of the
- fan
- Check the operation of detectors (wind and rain simulation)
- Check if all smoke extraction and ventilation systems are connected properly

In regard to the weather control panel, this Operation and Maintenance Manual contains only basic technical data and information about installation, start-up, maintenance and close-down. Both the Installer and the User are required to know and apply the complete version of the “Installation and Operation Manual”, which is provided along with the control panel.

## 6.2. ACCESSORIES OF THE WEATHER STATION



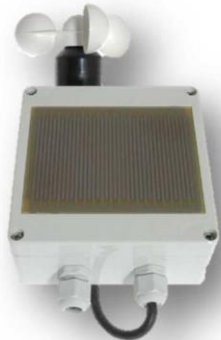
### RS 2d

A heated rain detector (the heater is activated after the detector response, and deactivated after drying),  
about 80 cm<sup>2</sup> sensor area  
With a fixing console.



### WM 1

An anemometer (cup type, rotational) for measuring the wind velocity.



### RS 2d-WM 1

A combination of RS 2d and WM 1 detectors described above, installed according to the mounting angle



**MB**  
Clamps for RS 2 and WM 1 polar elements mounting (the pipe diameter is equal to 60 mm)



**SK**  
A rack (40 cm high) for 2 and RS WM 1 elements mounting on a flat roof

### 6.3. OSD63 SMOKE AND HEAT DETECTOR



*Rys. 49. OSD63 smoke detector.*

#### Technical Data:

- CNBOP-PIB 1438-CPR-0452 certificate
- PN-EN 54-5:2000 + A1:2002, PN-EN 54-7:2000 + A1:2002 + A2:2006 standards
- A1R detector class
- Monitoring voltage from 10 V to 30 V Monitoring current 35 uA
- Standard alarm current 20 mA (adjustable) Red LED optic indicators – signalling the operation status Operating temperature range from -25C to +50C
- Storage temperature range from -30C to +70C Relative humidity 95%, at +40C
- Detector weight (with a socket) 0.12 kg
- Dimensions – 50 mm in height, 110 mm in diameter

OSD63 point detector is designed for detecting the early stage of propagation of fire. It may be used in conventional and addressable alarm systems, and smoke extraction systems.

It is characterized by multilevel security controls against false alarms. Advanced algorithms for detecting environmental conditions inform the detector about the initial stage of fire.

It has an integrated algorithm for auto-compensation to protect against dirt. The OSD63 can operate in the low current consumption mode, in the monitoring state – 35 uA, and in the wide range of supply voltages 10-30 V.

It is possible to turn off selected sensors (a detector operates as optic / temperature / multisensor one).

Information about the detector status is presented by means of two optic indicators – monitoring, alarm type, dirt status, failure status.

Functional features

- The possibility of configuring the detector with free software from the PC level (USB) – a dozen or so parameters.
- Very easy detector cleaning (disassembling and assembling without any tools). Temperature sensors are mechanically protected, also during cleaning.
- Mechanical protection against unauthorized plug-out of the detector from the socket.
- Connecting cables to the detector socket by means of spring clamps (for YnTKSY cables without any tools) – eliminated effect of poor contact of typical screw clamps.

### Maintenance

Clean optic elements in dry conditions, with a soft brush and vacuum cleaner. It is recommended to bath the detector casing (basket) and the cylindrical element inside (maze) in widely available cleaning agents (dishwashing liquids), and then rinse with clear water. In the end it is recommended to rinse those elements in any anti-static liquid and then to dry them.

Detailed information about the layout, installation, configuration, operation and maintenance is given in the Instruction Manual.

Both the Installer and the User are required to know and implement the “Instruction Manual” of the OSD63 detector, which is provided along with the device.

## 6.4. SA-K6 SOUNDER



Rys. 50. SA-K6 sounder



Rys. 51. WSD-1 acoustic signal switch.

It is designed for acoustic signalling in fire detection systems, in closed spaces. There is the possibility of selecting one out of 4 acoustic signals.

Using WSD-1 you can turn off the sound signal and leave the optical signal alone.

#### Technical Data:

Type of signalling device:	acoustic
Supply voltage	16-32.5 V DC
Quiescent current	0 mA
Current consumption at alarm state	< 65 mA
Sound intensity at the distance of	1 m >100 dB

Operating temperature range	from -25 °C to +55 °C
Ingress Protection Rating of the housing	IP 21C
Weight	~184 g
Dimensions	Ø 115 x 70 mm
Interoperating junction box	PIP-1AN

### 6.5. SO-PD11 OPTICAL INDICATOR



Rys. 52. SO-Pd11 optical indicator.

It is designed for optical signalling with a set of LEDs in fire detection systems. The indicator is designed for mounting in closed spaces. It generates 3 different flash rates. It is possible to turn on the continuous light.

#### Technical Data:

- Type of signalling device optical
- Supply voltage 24 V DC
- Quiescent current 0 mA
- Current consumption at alarm state < 60 mA
- Ingress Protection Rating of the housing IP 53D
- Weight ~150 g
- Dimensions Ø 115 x 63 mm
- Interoperating junction box PIP-3AN

### 6.6. RT 2 EMERGENCY PUSH BUTTON



Rys. 53. RT 2 Emergency Push Button

The RT 2 smoke extraction push button is used for manual alarm triggering in smoke extraction systems.

In the RT 2-K version the push button has one LED indicator – the red one, which indicates ALARM. In the RT 2-K-BS version the push button has three LED indicators: the red one – ALARM, the yellow one – DAMAGE, and the green one – OK.

The push button should be located at a place, where it would be easily accessible for users and service teams, preferably at/near escape routes. Electric connections should be made by authorized persons.

The alarm is triggered by pushing the emergency push button, after breaking the glass in the housing.

In order to cancel the alarm release the push button mechanical lock after opening the housing.

**Technical Data:**

Power supply	24 V=, 100 mA max.
Operating temperature range	-100C to +550C
Air humidity	20% to 80% (without condensation)
Ingress Protection Rating of the housing	IP 42
Dimensions (height x width x depth)	125 x 125 x 35 mm
Way of activation	manual
Range of cross-sections of the cables to connect	1.0 mm <sup>2</sup>
Housing	ABS, lockable

**6.7. VENTILATION PUSH BUTTON**



*Rys. 54. Ventilation push button.*

The LT-AP push button makes it possible to control the ventilation function in a comfortable and safe way. It is made as a surface-mounted element.

**Technical Data:**

- Maximum contact load 10 A / 250 V AC
- IP44 Ingress Protection Rating of the housing
- Light grey colour

## 7. DELIVERY/TRANSPORT

Individual elements of SCD smoke dampers are transported on pallets or in factory-made packages. Between the elements being in touch there are spacers made of cardboard or stretch foil. Individual packets are placed in wooden containers or on pallets. Small elements and made-up fixings are delivered in the foil packaging or in cardboard boxes. During transport all elements should be protected against moving and weather conditions.

After every delivery it is necessary to carry out the visual inspection of individual elements of the set. Do not expose to mechanical damage.

The elements of SDS smoke dampers should be stored in closed spaces providing protection against weather conditions, where

- Relative humidity  $\varphi < 80\%$ , at  $t = 20\text{ °C}$
- Ambient temperature  $-20\text{ °C} < t < +60\text{ °C}$
- The elements should not be in any contact with dust, gas and corrosive vapours nor other substances that could cause corrosion.

## 8. INSTALLATION CONDITIONS

### 8.1. GENERAL GUIDELINES

The dampers are designed for mounting onto flat roofs slanted by not more than  $15^\circ$ .

The dampers are delivered as sets of matched elements, which makes the trouble-free mounting possible. In exceptional cases the dampers may be delivered ready assembled. In such a case, due to the comfort and safety of transport, the deflectors are delivered separately. The thermal trip unit and, eventually, E ventilation actuator are delivered separately too. Before running the device into operation all delivered elements shall be mounted definitely, according to the Installation Manual.

When unloading it is necessary to check the compliance of delivery with element specifications. Unloading should be done manually or by means of standard warehouse equipment, observing all valid safety rules.

Before mounting in a system check the elements of SCD dampers for mechanical damage. Send any defective elements back to the Manufacturer in order to have them assessed in terms of any repair options and repaired if possible. Independent repair of damaged elements of SCD dampers is forbidden.

Every supply includes: Element specification, Operating and Maintenance Manual and Installation Manual

Dampers may only be installed by companies trained by Smay Sp. z o.o. within the range of the product technical properties, terms and conditions of installation work, and the inspection of performed works. Workers should have personal certificates issued by Smay Sp. z o.o., with the authorization for mounting SCD dampers. The certificate is valid for 3 years after training. Moreover, they should have certified expert qualifications, appropriate for the given scope of work, as well as certificates for carrying out operations under specific environmental conditions.

Works associated with installation, and then operation, maintenance and service of the dampers should be carried out in accordance with OSH regulations. In this case, work at height is particularly dangerous. Persons, who carry out this kind of work should be secured by means of professional equipment.

This Operation and Maintenance Manual presents the installation issues only in a demonstrative way.



The mounting of the damper should be carried out precisely in accordance with the Installation Manual, version 1, by means of materials specified in this manual only.

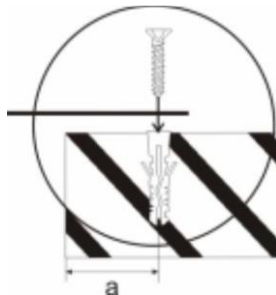
SCD smoke dampers together with the control system may constitute the configuration of several components made by various Manufacturers. Each component is delivered along with the Manufacturer’s Manual. Both assembly companies and the User are obliged to read those Manuals and apply them with regard to installation, operation and maintenance.

- SCD dampers may be mounted on steel, concrete or wooden roof structures. The damper is fixed to the roof structure with the use of a base flange, which is screwed in by means of connectors, selected accordingly to the type of structure. The fixing elements spacing should not exceed 350 mm.
- Dimensions of recommended fasteners

Ground	Fastener
Steel	5.5 x 16 self-drilling screws
Concrete	Plastic anchor with a steel screw – 8 x 60 size
Wood	6 x 60 countersunk wood screw

- Minimum distance from the hole edge

Ground	Minimum distance from the hole edge
Steel	15 mm
Concrete	50 mm
Wood	30 mm



*Rys. 55. Guidelines for the foundation of a SCD damper on a roof structure.*

- During setting and installation of the base check if the diagonal dimensions are equal. Acceptable deviation is  $\pm 2$  mm.  
The damper base insulation prevents excessive heat loss. The insulation method is specified by the Designer. Thermal insulation materials and anti-damp insulation materials adjusted to the roof specification, compatible with the project specification, are delivered by the Installer. In case of standard roof structures it is possible to include insulation materials in the Manufacturer’s completion.
- It is recommended to insulate the entire perimeter of the base with mineral wool, 50 mm thick. The insulation material should be of A1 reaction-to-fire class and be characterised by high density (150 kg/m<sup>3</sup> minimum) and thermal insulation power (thermal resistance  $R_i = 1.25$  m<sup>2</sup>·K/W minimum).
- It is recommended to introduce the anti-damp processing (PCV membrane, building paper) under the drip cap of the aluminium drainpipe.  
Fasten elements of the anti-damp insulation, in accordance with the rules of the

roofing art, to the folded tin part of the damper base.

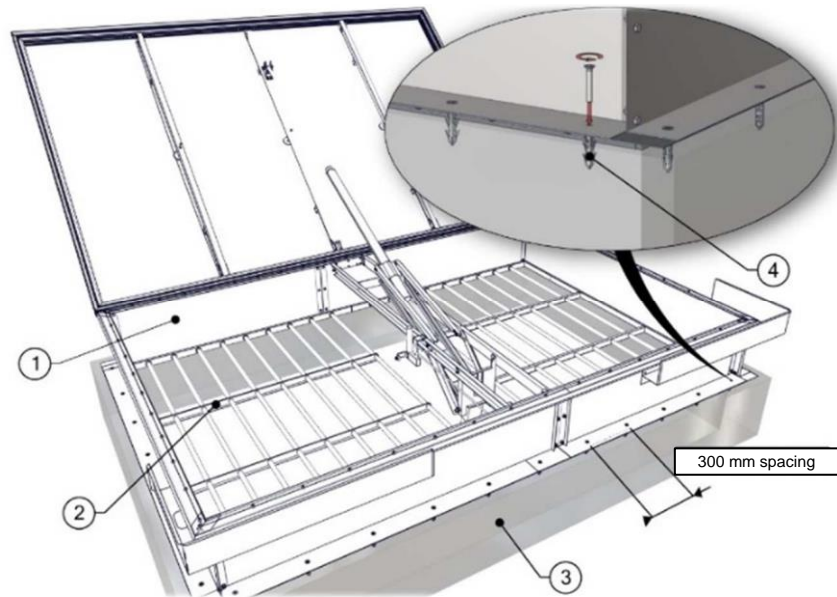
Keep utmost care when using thermal equipment for welding building paper. It is recommended to use protective shields in order to secure the polycarbonate filling of the cover against temperature impact.

- The drainpipe aluminium profiles should be screwed to the base with 4.8 x 19 roofing screws.
- During installation of damper leaves it is necessary to check, if the leaf opening movement is obstacle-free.
- Once mounted, put the leaves on and secure the hinge shield profile.
- Before installation of cover protective belts remove the protective foil from polycarbonate elements. PC surface, resistant to UV radiation (overprint on the foil), shall be placed on the outer side.
- In case of damper installation on sloped roofs, position the damper in such a way that:
  - For SCD-1 dampers, the damper hinge is placed on the lower side of the roof.
  - For SCD-2 dampers, the damper hinges are placed perpendicularly to the roof sloping.



*Rys. 56. SCD dampers installation on sloped roofs.*

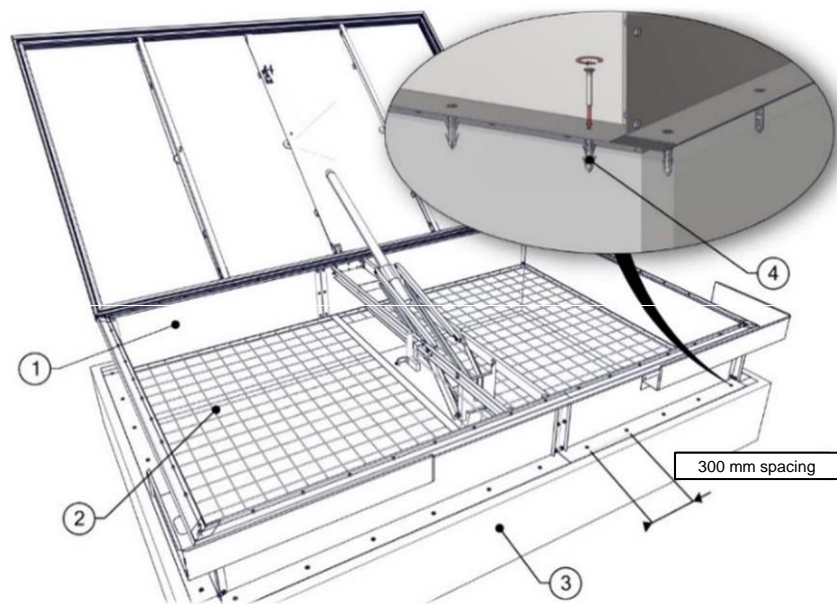
- Carry out adjustment of the damper cover bolting elements strictly according to the guidelines given in the Installation Manual.
- Installation of deflectors should be carried out according to the guidelines given in the Installation Manual, with the use of screw elements.
- Installation of the anti-burglar bars and anti-fall grates should be carried out according to the guidelines given in the Installation Manual.



1. Smoke damper
2. KA bars
3. Roof structure
4. Fastener according to the table

*Rys. 57. KA anti-burglar bars installation.*

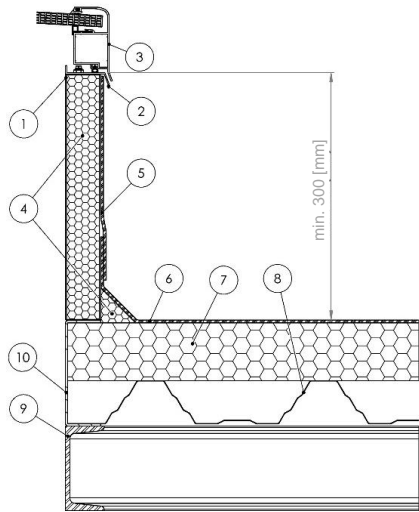
- Installation of the anti-fall grid should be carried out according to the guidelines given in the Installation Manual.



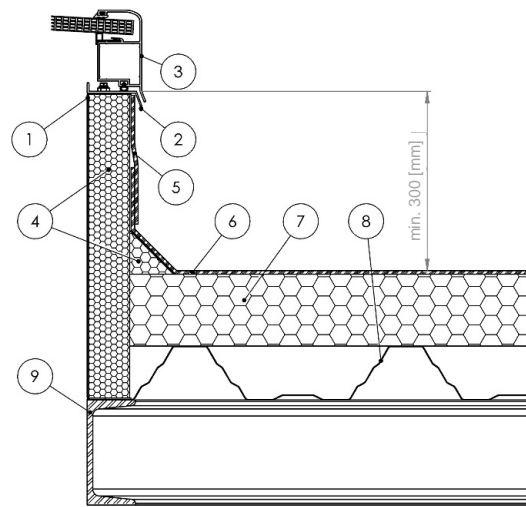
1. Smoke damper
2. KZU grate
3. Roof structure
4. Fastener according to the table

*Rys. 58. KZU anti-fall grid installation.*

## 8.2. EXAMPLES OF MOUNTING SCD SMOKE DAMPERS ON TYPICAL ROOFS



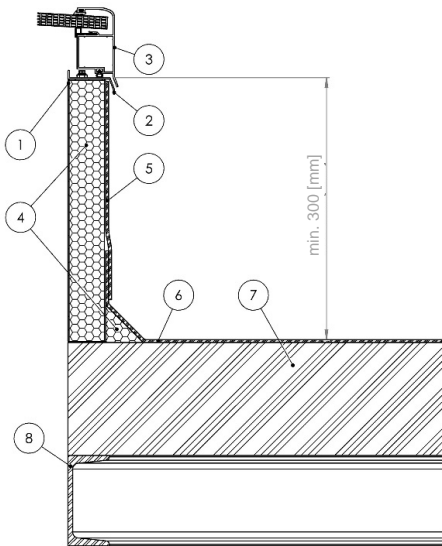
1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Thermal insulation
8. Steel decking
9. Roof girder – roof structure
10. Supporting structure



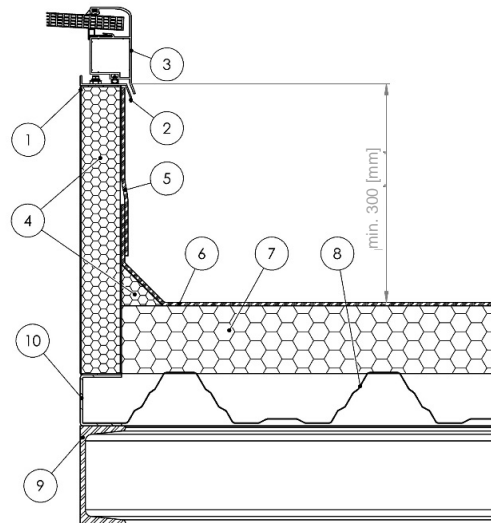
1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Thermal insulation
8. Steel decking
9. Roof girder – roof structure

Rys. 59. SCD smoke damper mounting on an insulated steel roof, without any substructure, under the profiled sheet metal.

Rys. 60. SCD damper mounting on an insulated steel plinth with a substructure, under the insulation layer



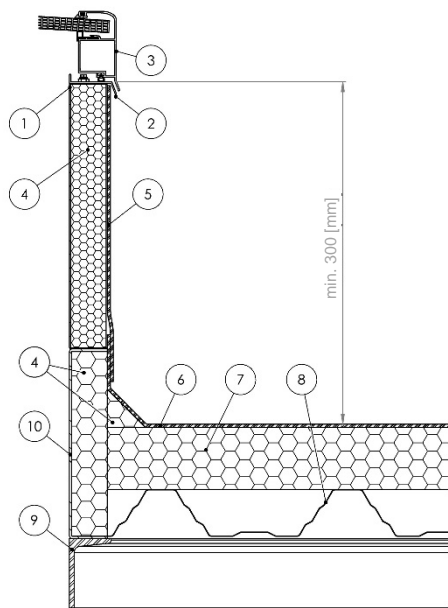
1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Steel/concrete floor
8. Roof girder – roof structure



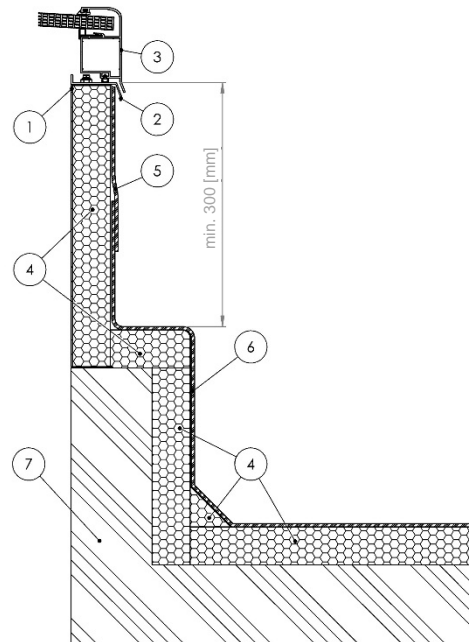
1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Thermal insulation
8. Steel decking
9. Roof girder – roof structure
10. Supporting structure

Rys. 61. SCD damper mounting on a reinforced concrete roof.

Rys. 62. SCD damper mounting on an insulated steel plinth with a substructure over the insulation layer



1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Thermal insulation
8. Steel decking
9. Roof girder – roof structure
10. Supporting structure



1. Smoke damper base made of galvanised steel sheet
2. Roof damper drainpipe
3. Smoke damper profile
4. Thermal insulation
5. Smoke damper damp insulation
6. Roof damp insulation
7. Steel/concrete floor

*Rys. 63. SCD damper mounting on an insulated steel plinth with a substructure over the insulation layer.*

*Rys. 64. SCD damper mounting on a reinforced concrete plinth.*

It is also permissible to install the damper on existing roof structures. In this case, guidelines for damper foundation and insulation should be prepared individually.

### 8.3. MARKING ON INSTALLED DAMPERS (PUT INTO OPERATION)

The information about the installed SCD smoke damper should be placed on the device or recorded in the Construction Site Log. This information must include the following data:

- damper manufacturer's name
- smoke damper name according to the Certificate – type, model and year of production
- technical properties of the external energy source
- trigger temperature of the thermal trip (if mounted)
- active area
- classes of: snow load, wind load, efficiency at low temperatures, reliability and resistance to high temperatures,
- number and year of issue of the European Standard connected with the given certificate name of the company which has mounted the damper,
- damper mounting date.

## 9. ENTRY INTO SERVICE

After the device and the control system have been mounted, before commissioning of the smoke damper, it is recommended to carry out and note the following actions:

- check the electric and pneumatic systems for mechanical
- damage,
- check the state of electric/pneumatic connections between individual elements,
- check the thermal insulation and joint seals for moisture
- permeability,
- check the movement abilities for all control variants,
- check the device, particularly the polycarbonate cover and drive mechanical members, for cleanness,
- check all labels and stickers for readability.

After the SCD smoke damper has been installed, but before it is put into operation, the following document shall be filled and signed by authorized persons: “SCD Smoke Damper Inspection and Launch Protocol”. This protocol should be signed by a person, who has valid, individual certificate issued by Smay Sp. z o.o, which entitles this person to install SCD dampers, and by the User’s representative. The copy of this document shall be sent to Smay Sp. z o.o. QCD.

Failure to comply with this formality will void the warranty of the device.

## 10. ROUTINE MAINTENANCE INSTRUCTIONS

During operation, SCD smoke dampers shall be inspected at least every 12 months, with the inspection recorded in an inspection report.

Otherwise it will be impossible to accept and authorise the damper.

During regular inspection, pay close attention to the mechanical damage of power supply devices and systems, the state of connections between individual elements, the state of the insulation, the continuity of sealing of connections with the roof plane, and metal sheet processing of the bases; notice possible points of damage.

Control and assess all available control functions by means of a test run. Check actuators by opening and closing the dampers; check the state of control panels, emergency push buttons and the weather control panel with wind and rain detectors. Check all pneumatic and electric supply systems.

Check the cleanliness of the polycarbonate cover and mechanical drive elements, check leaf bolts tightness, as well as legibility of the marking stickers.

In order to achieve the appropriate state of the wall polycarbonate, which is infill of SCD damper leafs, clean it with lukewarm water with addition of a mild cleaning agent. Do not use brushes and abrasive materials, as well as strong alkaline detergents, which can react with aluminium, polycarbonate and EPDM. Salt used for snow removal is also harmful for polycarbonate panels. Avoid any contact between panel surfaces secured against UV radiation and butyl solvent or isopropyl alcohol. Do not clean heated polycarbonate panels exposed to sunlight or high temperatures.

Remember that cleaning agents and solvents appropriate for polycarbonate cleaning may not be safe for surfaces covered with a UV absorber film. In case of any doubts, carry out a trial of the cleaning agent on a sample panel or consult the Supplier.

## 11. DAMPERS CLASSIFICATION FOR REPAIR

The service staff of the Manufacturer or the companies trained by the Manufacturer are authorised to repair defects found during periodic inspections. If malfunction or damage is found, the User is obliged to notify the Manufacturer or an authorized service company.

Each time the damper operates during a fire-fighting action, it is necessary to evaluate its state and qualify it for repair or replacement. The assessment may only be carried out by the Manufacturer's service staff or by a company authorized by Smay Sp. z o.o.

The repair works or replacement of the damper after emergency operation are not covered by the Warranty.

## 12. WARRANTY TERMS

The Manufacturer warrants the products supplied according to the provisions of the Agreement or the General Warranty Terms and Conditions of Smay Sp. z o.o.

The Warranty does not cover defects caused by improper storage, transport, installation, elements operation and, especially, mechanical damage and defects of anti-corrosion coatings.

The Warranty is void when it is found that the User has made structural modifications on his own or installed the product not in accordance with the Installation Manual and Operation and Maintenance Manual, the defects have resulted from incorrect maintenance, or the product rating plate has been removed.

## SERIAL NUMBER

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### MONITORING OF MOUNTING ACTIVITIES

- Base installation
  - Check the diagonal lengths (Sketch 1):  
SCD-1, diagonal 1 = diagonal 2 yes / no\*  
SCD-2, diagonal 1 = diagonal 2 yes / no\*  
SCD-2, diagonal 3 = diagonal 4 yes / no\*
  
- Leaf installation
  - Check the centricity of the installation (Sketch 2):  
SCD-1, deviation 1 = deviation 2 yes / no\*  
SCD-2, deviation 1 = deviation 2 yes / no\*  
SCD-2, deviation 3 = deviation 4 yes / no\*

### KINEMATIC EFFICIENCY CHECK

- Emergency opening test, damper own power supply
  1. Pneumatic drive
    - Emergency opening time below 60 [s] yes / no\*
    - Damper opening angle: SCD-1  $\geq 1400$  / SCD-2  $\geq 900$  yes / no\*  
(measurement from the plane)
  2. Electric drive
    - Emergency opening time below 60 [s] yes / no\*
    - Damper opening angle: SCD-1  $\geq 1400$  / SCD-2  $\geq 900$  yes / no\*  
(measurement from the plane)

\* delete as appropriate

Name and phone number of the installation company:	Notes:

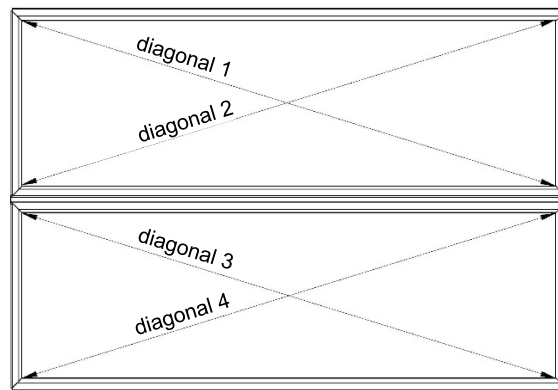
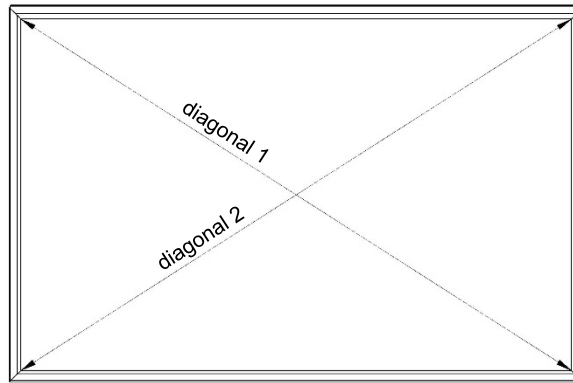
The Warranty remains valid, if the device inspection and launch protocol have been filled and signed properly.

Send a copy of the protocol to Smay Sp. z o.o. Quality Control Department, or to the e-mail address [serwis@smay.eu](mailto:serwis@smay.eu), under pain of nullity.

Ordering Party / User signature:

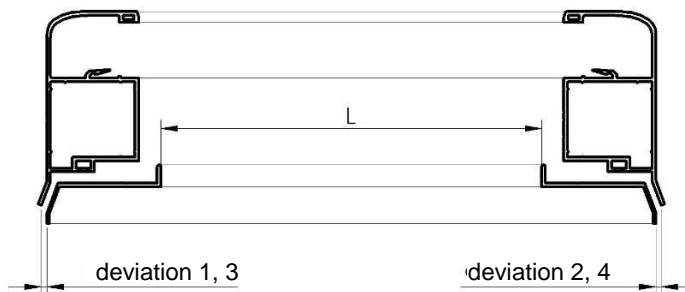


Sketch 1



Acceptable difference between diagonal 1 and diagonal 2 is 5 [mm] maximum

Sketch 2



Acceptable difference between deviation 1 and deviation 2 is 2 [mm] maximum  
Acceptable difference between deviation 3 and deviation 4 is 2 [mm] maximum