

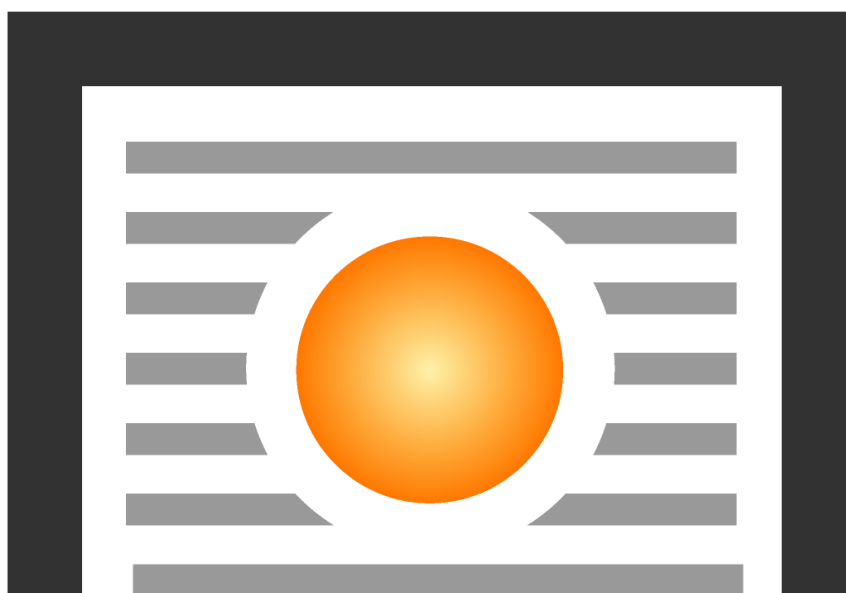
Fire damper:



Single blade fire cut-off damper for multi-zone fire ventilation systems

Model FID S/V p/P & FID S/V-M p/P

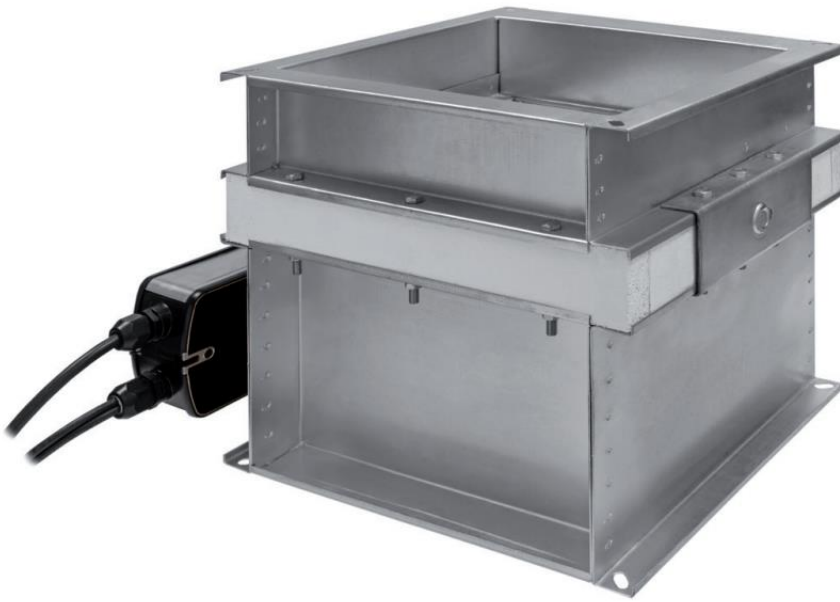
Technical Catalogue



SAFE • VENT[®]

Table of content

1. Application.....	3
2. Design.....	4
3. Versions.....	4
3.1 FID S/V p/P, FID S/V-M p/P – Smoke exhaust fire damper for multi-zone fire ventilation systems with an actuator – damper closing and opening with an actuator	4
4. Dimensions	5
5. Installation	6
5.1 Preparation of installation openings	6
5.2 Sample installation in concrete and masonry walls.....	7
5.3 Sample installation in sets	8
6. Technical parameters of FID S/V p/P, FID S/V-M p/P rectangular dampers.....	10
7. Estimated Weights of FID S/V p/P, FOD S/V-M p/P rectangular dampers [kg]	17
8. Marking.....	17
9. Power Supply Control.....	18
9.1 Cooperation with smoke exhaust/cut-off dampers – drive quick selection table.....	18
9.2 Actuators	19
9.2.1 BF electric actuators	19
9.2.2 BE, BLE electric actuators	21
9.2.3 BFL, BFN ELECTRIC ACTUATORS	22
9.2.4 EXBF actuators	23
9.3 RST trigger control mechanisms	24
9.3.1 Independent limit switches – RST version.....	24
9.3.2 Switch specifications	24
9.4 RST-KW1 mechanisms	25
9.4.1 Description of electrical connections:	25
9.5 Manufacture standards	26
9.5.1 FID S/S c/P damper	26
9.5.2 FID S/S p/P, FID S/S p/O, FID S/V p/P damper	27
9.5.3 FID PRO/S damper	27
9.5.4 WIP/S, WIP/V, WIP/V-M, WIP/T, WIP/T-G damper	27
9.5.5 WIP PRO/S, WIP PRO/V, WIP PRO/V-M damper with an actuator.....	27
9.5.6 WIP PRO/S, WIP PRO/V, VIP PRO/V-M damper with RST-KW1 mechanism.....	28



1488-CPR-0448/W



ATEST HIGIENICZNY



CERTYFIKACJA PRODUKTU

EIS120

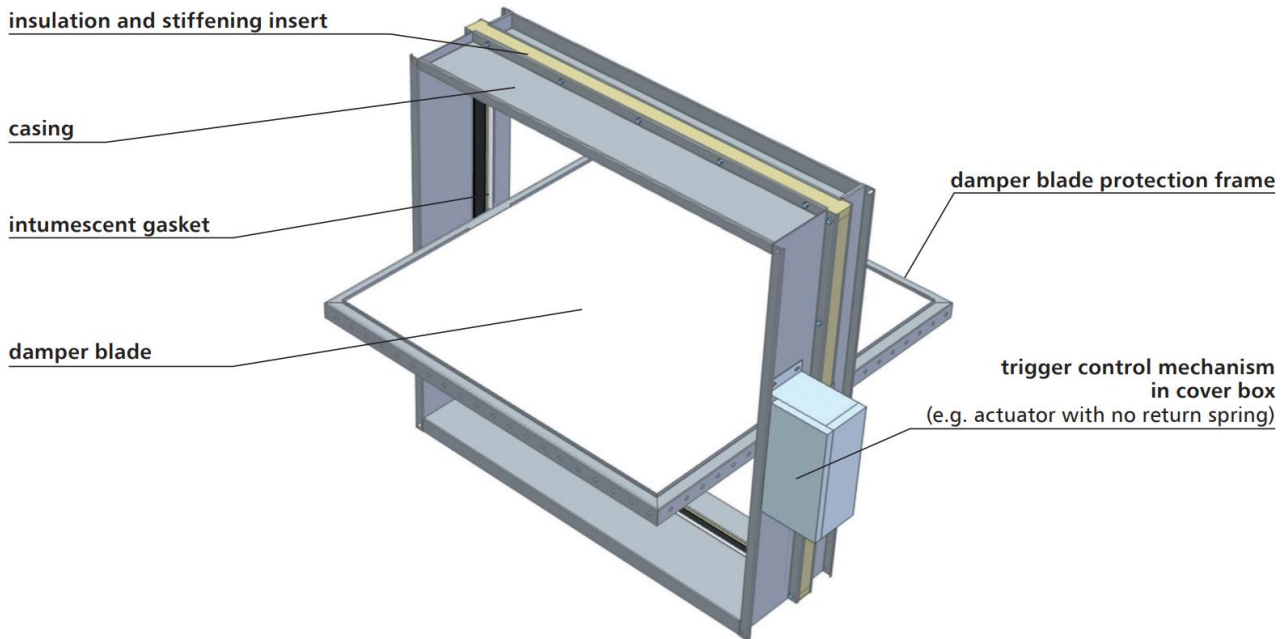
- Certificate of constancy of performance 1488-CPR-0448/W.
- Dampers certified for compliance with EN 12101-8.
- Dampers qualified under EN 13501-4 and tested under EN 1366-10.
- Smoke exhaust dampers with the fire resistance independent of airflow direction and installation side.

1. Application

The FID S/V p/P, FID S/V-M p/P smoke exhaust dampers are intended for installation in automatically operated fire ventilation systems.

Dampers FID S/V p/P are used in fire ventilation systems, while dampers marked FID S/V-M p/P are used in mixed systems - fire and comfort ventilation systems. They support both single and multiple fire zones in a building. They prevent the spreading of fire, smoke and burning fumes into the adjacent zones. During normal system operation, the blade of the damper is open or closed depending on damper function. The damper blade opens in the zone on fire and dampers close in other zones.

2. Design



The FID S/V p/P, FID S/V-M p/P smoke exhaust dampers consist of a casing with a rectangular cross-section, made of two segments separated with a fire-proof panel with the cross-section of 20 x 40 mm, a moving damper blade and a remotely activated actuator. Standard damper casing is made of galvanised steel sheet. For chemically aggressive environments, special manufacture casing is used, in which steel elements are made of 1.4404 acid-proof steel sheet, while other elements are impregnated. The casing total length is at least 296 mm.

Dampers may be made with an extension element, in which case the casing length is 400 mm. The damper blade is made of a fire-proof panel with the total thickness of 40 mm, which is covered with a reinforcement steel profile. The inner side of the fire damper casing features an intumescent gasket. There are stop profiles fastened to the inner casing surface, which limit the rotating motion of the damper blade. The stop shaped are lined with a polyethylene ventilation-grade seal.

3. Versions

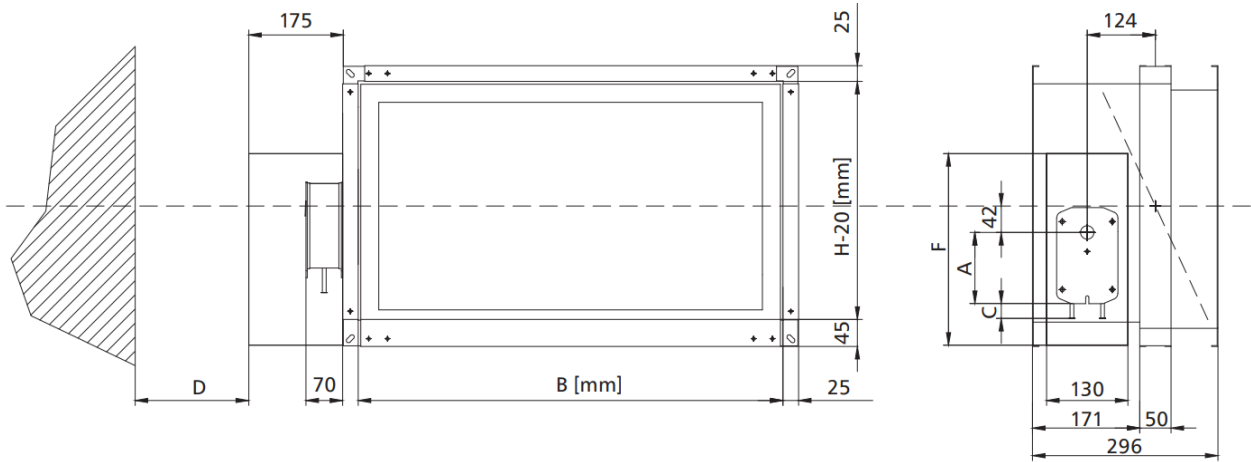
3.1 FID S/V p/P, FID S/V-M p/P – Smoke exhaust fire damper for multi-zone fire ventilation systems with an actuator – damper closing and opening with an actuator

During normal operation, the damper blade of the fire damper remains open or closed. In case of fire, the blade of the damper in the zone on fire opens, while in other zones the damper blades are closed - the dampers are remotely activated by applying the power supply.

The FID S/V p/P, FID S/V-M p/P dampers are equipped with a Belimo trigger control mechanisms BE or BLE series axial actuator, powered with 24 V AC/DC or 230 V AC. BLE-series actuators are used in FID S/V-M p/P dampers with the surface of not more than 0.75 m² and in FID S/V-M p/P with the surface of not more than 1.25 m².

BE and BLE series actuators are equipped with limit switches used to monitor the blade position. Furthermore, the mechanical position indicator is placed on the actuator.

Dampers with Belimo BE or BLE series actuators close and open when the voltage is applied to the actuator terminals.



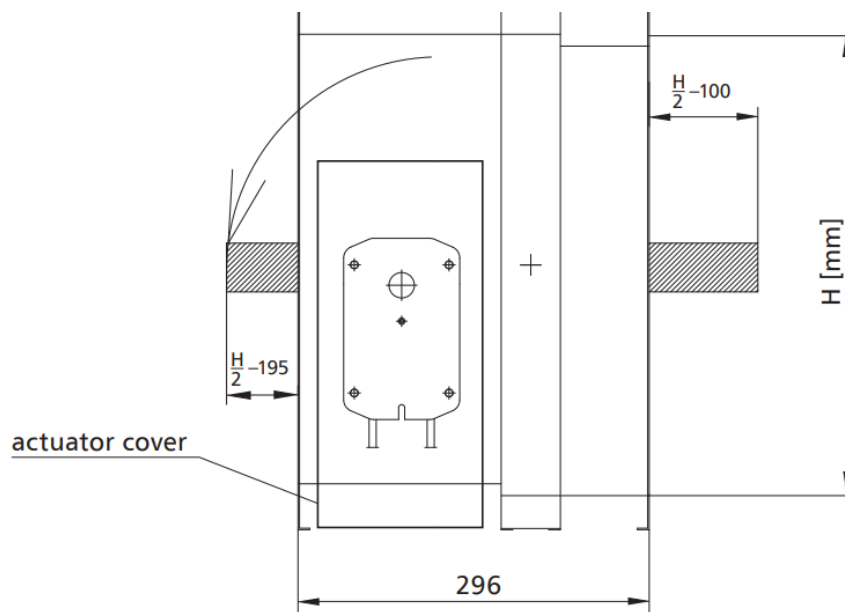
Mechanism	A	C	D	E
BE	198	10	75	345
BLE	130	30	75	70

4. Dimensions

Rectangular dampers:

- Nominal width B: from 200 mm to 1500 mm
- Nominal height H: from 200 mm to 1500 mm
- The maximum cross-section surface of one damper up to:
 - - 1.5 m² for FID S/V p/P dampers,
 - - 1.25 m² for FID S/V-M p/P dampers.

▣ Apart from the standard dimensions, fire dampers may be manufactured with intermediate dimensions (in 1 mm increments, in the given range)

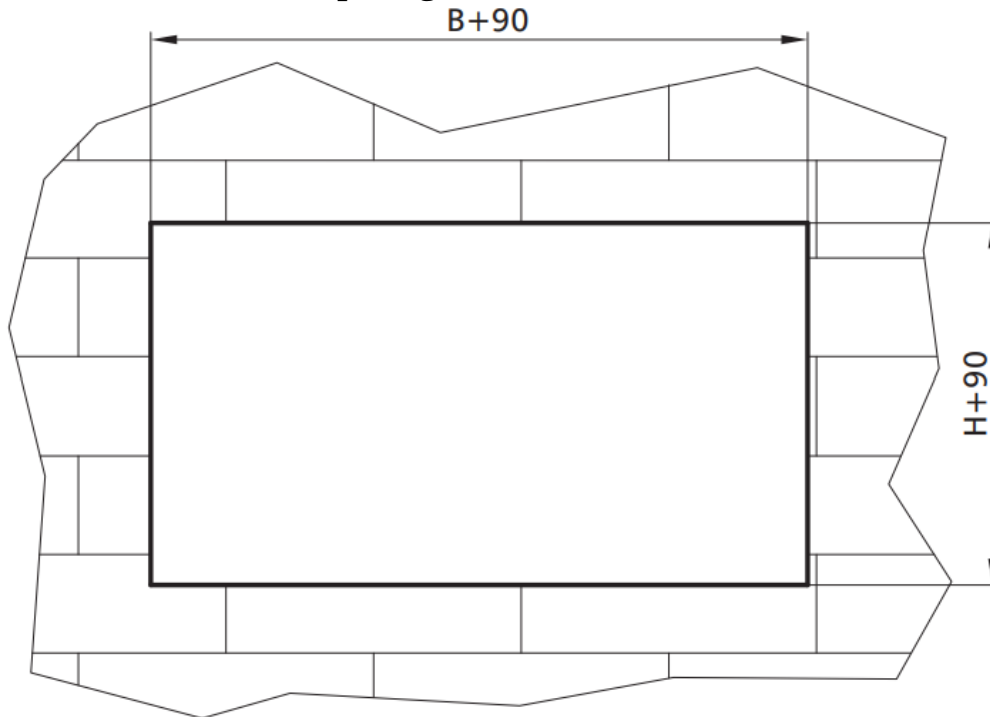


5. Installation

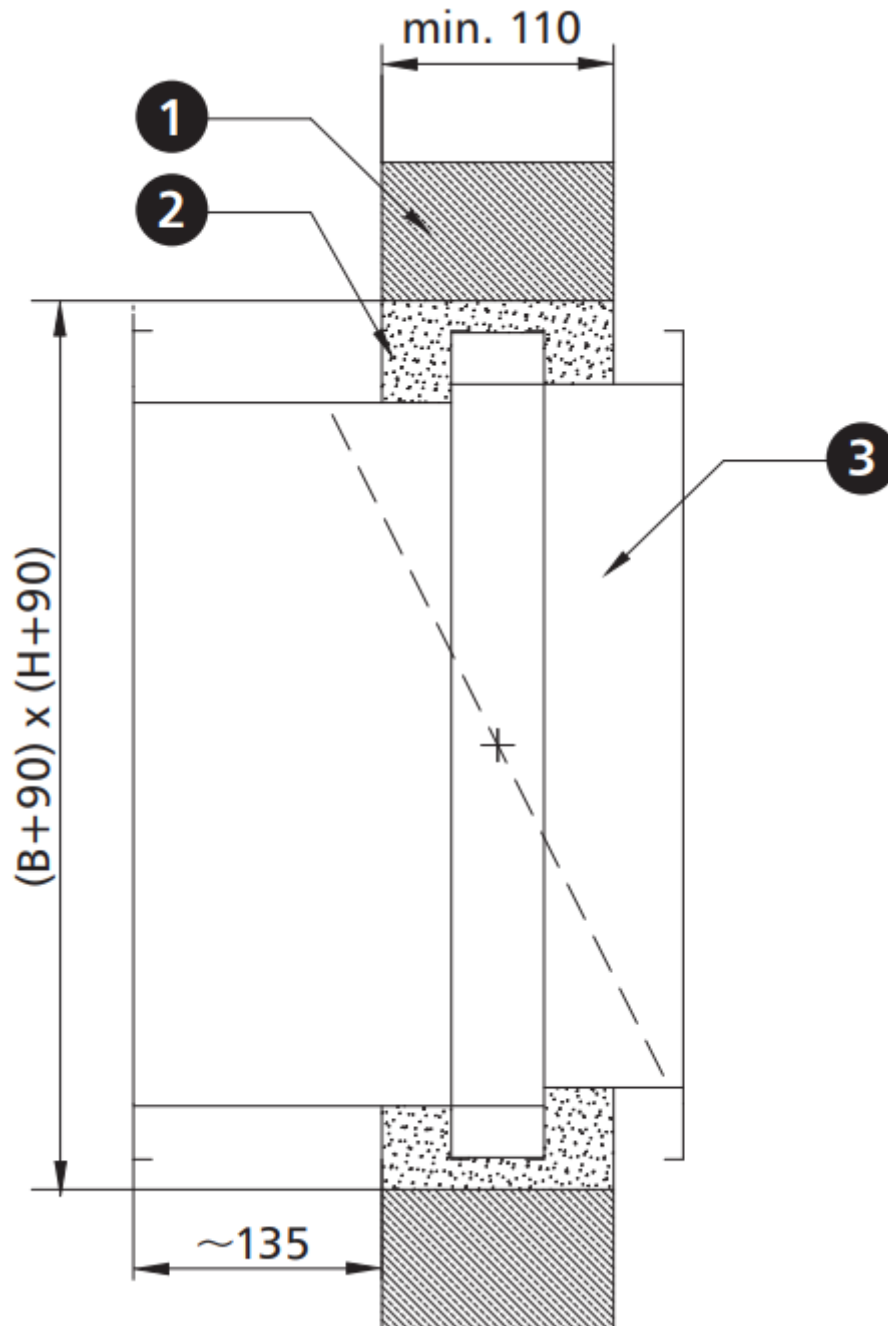
The FID S/V p/P rectangular dampers are EI120($V_{ew} i \leftrightarrow o$)S1000C₃₀₀AA multi-rated if installed in concrete partitions made of full bricks or cellular blocks with the thickness of at least 110 mm.

The FID S/V-M p/P rectangular dampers are EI120($V_{ew} i \leftrightarrow o$)S1500C₁₀₀₀AA multi-rated if installed in concrete partitions made of full bricks or cellular blocks with the thickness of at least 110 mm.

5.1 Preparation of installation openings



5.2 Sample installation in concrete and masonry walls

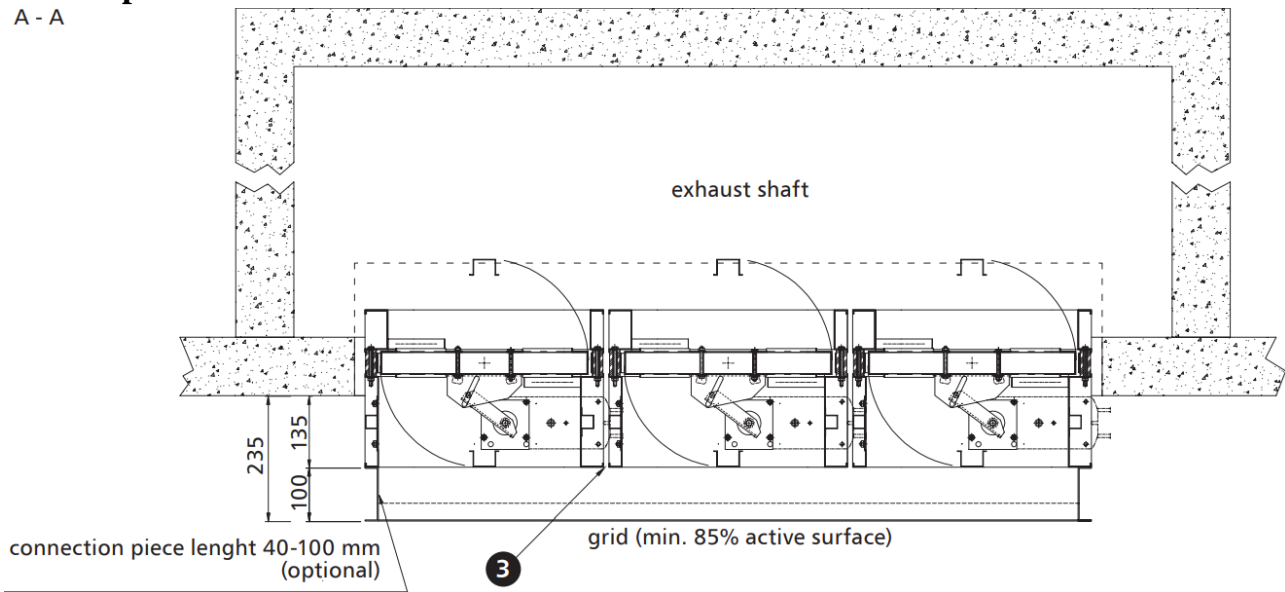


1. Rigid wall – concrete, cellular concrete or bricks
2. Sealing – concrete, cement or cement-lime masonry mortar*
3. Fire damper FID S

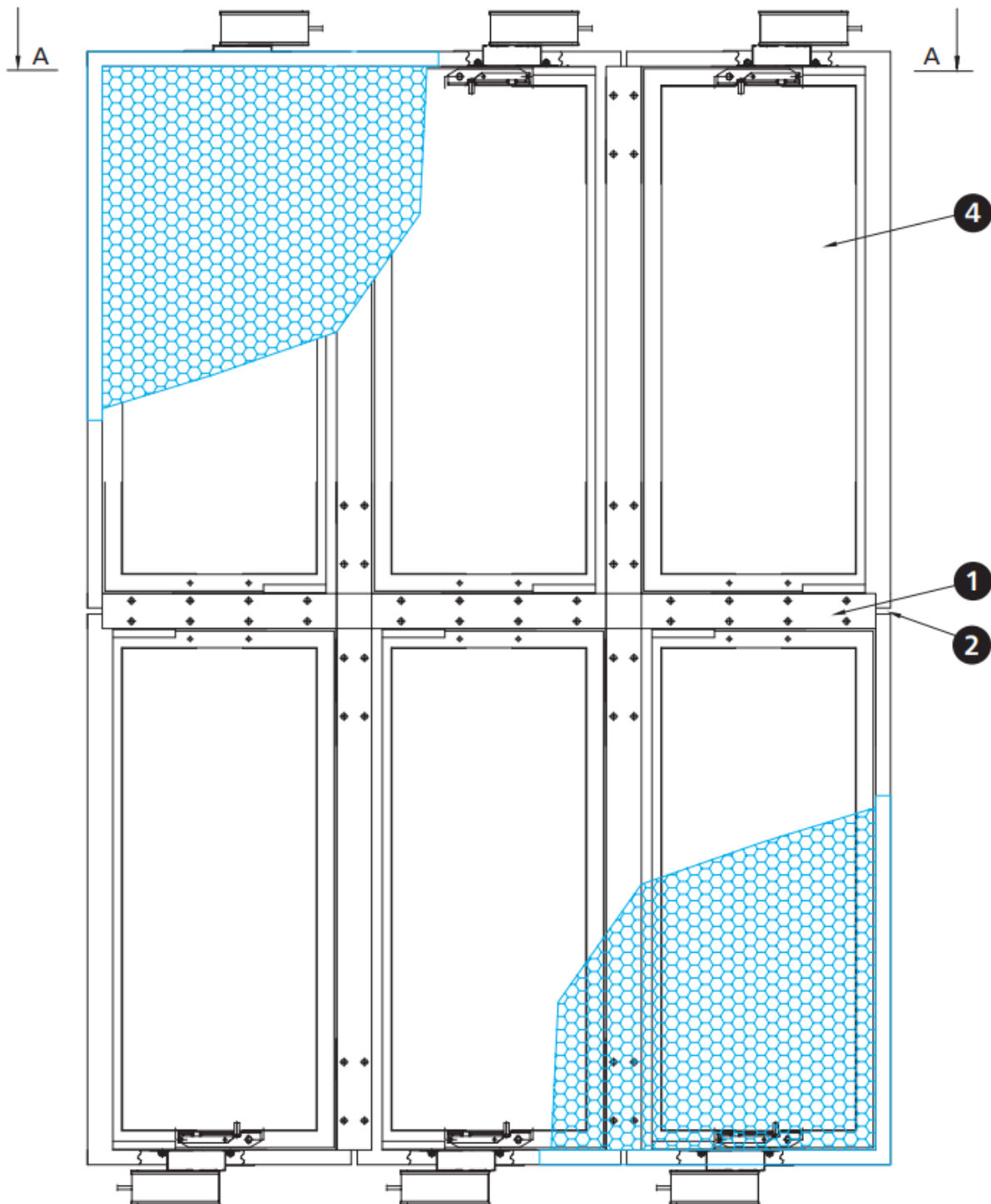
☐ It is possible to use a different sealing which ensures the required fire resistance

5.3 Sample installation in sets

A - A



The height of $H=400$ mm ensures that the partition does not protrude outside the damper casing on the actuator side. To attach a guard grid (grill), a connection piece - length: 40-100 mm is required.



1. Installation flat bar, width 60 mm
2. 10 mm gaps between damper flanges
3. Fire resistant material, e.g. mineral wool with the density of at least 80 kg/m^3 , A1 class
4. Fire damper FID S

Installation of the damper with a vertical axis of rotation

Such installation must be clearly stated in the draft documentation and mentioned in the order. The dimensions of the damper BxH should be given as to the damper with a horizontal axis of rotation.

6. Technical parameters of FID S/V p/P, FID S/V-M p/P rectangular dampers

B – nominal width [mm]

H – nominal height [mm]

v – velocity [m/s]

Sk – duct cross section [m²]

Se – damper active cross section [m²]

Q – flow [m³/h]

Δp – pressure drop [Pa]

L_{WA} – damper noise level [dB]

width B [mm]	height H [mm]																
	200					250					300						
	v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	Δp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	Δp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	Δp [Pa]	L _{WA} [dB]	
200	4	0.040	0.029	420	9	31	0.050	0.039	564	9	31	0.06	0.049	708	8	32	
	6			631	21	41			847	19	42			1 063	19	42	
	8			841	37	49			1 129	35	49			1 417	33	50	
	10			1 051	58	55			1 411	54	55			1 771	52	55	
	250	4	0.050	0.037	526	9	31	0.063	0.049	706	9	32	0.075	0.062	886	8	32
		6			788	21	42			1 058	19	43			1 328	18	42
		8			1 051	37	50			1 411	35	50			1 771	31	50
		10			1 314	57	55			1 764	54	56			2 214	49	56
	300	4	0.060	0.044	631	9	32	0.075	0.059	847	8	33	0.09	0.074	1 063	8	32
		6			946	20	43			1 270	19	43			1 594	17	43
		8			1 261	36	50			1 693	34	51			2 125	30	50
		10			1 577	56	56			2 117	53	56			2 657	47	56
350	4	0.070	0.051	736	9	33	0.088	0.069	988	8	33	0.105	0.086	1 240	7	32	
	6			1 104	20	43			1 482	19	44			1 860	16	43	
	8			1 472	36	51			1 976	33	51			2 480	29	50	
	10			1 840	56	57			2 470	52	57			3 100	45	56	
400	4	0.080	0.058	841	9	33	0.100	0.078	1 129	8	34	0.12	0.098	1 417	7	32	
	6			1 261	19	43			1 693	19	44			2 125	15	42	
	8			1 682	35	51			2 258	33	52			2 834	27	50	
	10			2 102	54	57			2 822	52	57			3 542	42	56	
450	4	0.090	0.066	946	9	33	0.113	0.088	1 270	7	32	0.135	0.111	1 594	7	32	
	6			1 419	19	44			1 905	17	43			2 391	15	43	
	8			1 892	35	51			2 540	29	51			3 188	27	50	
	10			2 365	54	57			3 175	46	56			3 985	42	56	
500	4	0.100	0.073	1 051	9	34	0.125	0.098	1 411	7	33	0.15	0.123	1 771	7	32	
	6			1 577	19	44			2 117	16	43			2 657	15	43	
	8			2 102	35	52			2 822	28	50			3 542	26	50	
	10			2 628	54	58			3 528	44	56			4 428	41	56	
550	4	0.110	0.080	1 156	8	34	0.138	0.108	1 552	7	33	0.165	0.135	1 948	6	33	
	6			1 734	19	44			2 328	16	43			2 922	14	43	
	8			2 313	34	52			3 105	28	51			3 897	26	51	
	10			2 891	53	58			3 681	44	57			4 671	40	56	
600	4	0.120	0.088	1 261	8	34	0.150	0.118	1 693	7	33	0.18	0.148	2 125	6	33	
	6			1 892	19	45			2 540	15	43			3 188	14	43	
	8			2 523	34	52			3 387	27	51			4 251	26	51	
	10			3 154	53	58			4 234	42	56			5 314	40	57	
650	4	0.130	0.095	1 367	8	35	0.163	0.127	1 835	6	32	0.195	0.160	2 303	6	33	
	6			2 050	19	45			2 752	14	43			3 454	14	44	
	8			2 733	34	53			3 669	26	50			4 605	26	51	
	10			3 416	53	59			4 586	40	56			5 756	40	57	
700	4	0.140	0.102	1 472	8	35	0.175	0.137	1 976	6	33	0.21	0.172	2 480	6	34	
	6			2 208	19	45			2 964	14	43			3 720	14	44	
	8			2 943	33	53			3 951	26	51			4 959	26	52	
	10			3 679	52	59			4 939	40	56			6 199	40	57	
800	4	0.160	0.117	1 682	8	35	0.200	0.157	2 258	6	32	0.24	0.197	2 834	6	33	
	6			2 523	18	45			3 387	14	43			4 251	14	44	
	8			3 364	32	53			4 516	24	51			5 668	24	52	
	10			4 205	50	59			5 645	38	56			7 085	38	57	
900	4	0.180	0.131	1 892	7	34	0.225	0.176	2 540	6	32	0.27	0.221	3 188	5	32	
	6			2 838	16	44			3 810	13	43			4 782	12	42	
	8			3 784	29	52			5 080	23	50			6 376	21	50	
	10			4 730	45	58			6 350	36	56			7 970	32	56	
1000	4	0.200	0.146	2 102	7	34	0.250	0.196	2 822	6	32	0.3	0.246	3 542	5	32	
	6			3 154	16	45			4 234	13	43			5 314	12	43	
	8			4 205	29	52			5 645	22	50			7 085	21	50	
	10			5 256	45	58			7 056	35	56			8 856	32	56	
1100	4	0.220	0.161	2 313	7	35	0.275	0.216	3 105	5	32	0.33	0.271	3 897	5	33	
	6			3 469	16	45			4 657	12	43			5 845	12	43	
	8			4 625	29	53			6 209	22	50			7 793	21	51	
	10			5 782	45	59			7 762	34	56			9 742	32	56	
1200	4	0.240	0.175	2 523	8	37	0.300	0.235	3 387	5	33	0.36	0.295	4 251	9	40	
	6			3 784	18	47			5 080	12	43			6 376	20	51	
	8			5 046	29	53			6 774	22	51			8 502	36	58	
	10			6 307	45	59			8 467	34	57			10 627	42	60	
1300	4	0.260	0.190	2 733	8	37	0.325	0.255	3 669	5	33	0.39	0.320	4 605	5	33	
	6			4 100	18	47			5 504	12	43			6 908	12	44	
	8			5 466	29	54			7 338	21	51			9 210	21	51	
	10			6 833	45	59			9 173	33	57			11 513	32	57	
1400	4	0.280	0.204	2 943	7	36	0.350	0.274	3 951	5	33	0.42	0.344	4 959	5	34	
	6			4 415	16	46			5 927	12	44			7 439	12	44	
	8			5 887	29	54			7 903	21	51			9 919	21	52	
	10			7 358	45	60			9 878	32	57			12 398	32	58	
1500	4	0.300	0.219	3 154	7	35	0.375	0.294	4 234	5	33	0.45	0.369	5 314	5	34	
	6			4 730	15	46			6 350	12	44			7 970	12	45	
	8			6 307	27	53			8 467	21	51			10 627	21	52	
	10			7 884	42	59			10 584	32	57			13 284	32	58	

		height H (mm)															
		350					400					450					
		v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.070	0.059	852	8	32	0.080	0.069	996	7	31	0.090	0.079	1 140	7	31
		6			1 279	18	42			1 495	17	42			1 711	15	41
		8			1 705	32	50			1 993	29	49			2 281	26	49
	10	2 131	50	56	2 491	46	55	2 851	41	54							
	250	4	0.088	0.074	1 066	7	31	0.100	0.087	1 246	6	29	0.113	0.099	1 426	6	29
		6			1 598	16	42			1 868	13	40			2 138	13	40
		8			2 131	29	50			2 491	23	47			2 851	22	47
	10	2 664	45	55	3 114	36	53	3 564	35	53							
	300	4	0.105	0.089	1 279	7	32	0.120	0.104	1 495	6	30	0.135	0.119	1 711	5	30
		6			1 918	16	43			2 242	13	41			2 566	12	40
		8			2 557	28	50			2 989	24	48			3 421	22	48
	10	3 197	44	56	3 737	37	54	4 277	34	54							
	350	4	0.123	0.104	1 492	7	32	0.140	0.121	1 744	6	30	0.158	0.139	1 996	5	30
		6			2 238	15	42			2 616	13	41			2 994	12	41
		8			2 984	26	50			3 488	22	48			3 992	21	48
	10	3 730	41	56	4 360	35	54	4 990	33	54							
	400	4	0.140	0.118	1 705	6	31	0.160	0.138	1 993	6	31	0.180	0.158	2 281	5	30
		6			2 557	13	41			2 989	13	41			3 421	12	41
		8			3 410	24	49			3 986	22	49			4 562	21	48
	10	4 262	37	55	4 982	35	55	5 702	32	54							
	450	4	0.158	0.133	1 918	5	30	0.180	0.156	2 242	5	30	0.203	0.178	2 566	4	29
		6			2 877	12	41			3 363	12	41			3 849	10	40
		8			3 836	22	48			4 484	21	48			5 132	18	47
	10	4 795	34	54	5 605	32	54	6 415	28	53							
	500	4	0.175	0.148	2 131	5	31	0.200	0.173	2 491	5	30	0.225	0.198	2 851	4	29
		6			3 197	12	41			3 737	11	40			4 277	9	39
		8			4 262	22	49			4 982	19	48			5 702	17	47
	10	5 328	34	55	6 228	30	54	7 128	26	52							
	550	4	0.193	0.163	2 557	5	30	0.220	0.190	2 740	5	30	0.248	0.218	3 136	4	29
		6			3 836	12	41			4 110	11	41			4 704	9	40
		8			5 115	21	48			5 481	19	48			6 273	17	47
	10	6 394	32	54	6 851	30	54	7 841	26	53							
	600	4	0.210	0.178	2 557	5	30	0.240	0.208	2 989	4	28	0.270	0.238	3 421	4	29
		6			3 836	10	40			4 484	8	37			5 132	9	40
		8			5 115	19	48			5 979	14	45			6 843	17	47
	10	6 394	29	53	7 474	27	53	8 554	26	53							
	650	4	0.228	0.192	2 771	5	30	0.260	0.225	3 239	4	30	0.293	0.257	3 707	4	30
		6			4 156	10	40			4 858	10	40			5 560	9	40
		8			5 541	19	48			6 477	17	48			7 413	17	48
	10	6 926	29	54	8 096	27	53	9 266	26	54							
	700	4	0.245	0.207	2 984	5	30	0.28	0.242	3 488	4	30	0.315	0.277	3 992	4	30
		6			4 476	10	41			5 232	10	40			5 988	9	40
		8			5 967	19	48			6 975	17	48			7 983	16	48
	10	7 459	29	54	8 719	27	54	9 979	25	53							
	800	4	0.280	0.237	3 410	4	30	0.32	0.277	3 986	4	30	0.360	0.317	4 562	4	29
		6			5 115	10	41			5 979	9	41			6 843	9	40
		8			6 820	18	48			7 972	17	48			9 124	16	47
	10	8 525	28	54	9 965	26	54	11 405	25	53							
	900	4	0.315	0.266	3 836	4	31	0.360	0.311	4 484	6	35	0.405	0.356	5 132	4	29
		6			5 754	10	41			6 726	12	44			7 698	9	40
		8			7 672	18	49			8 968	26	54			10 264	16	47
	10	9 590	28	55	11 210	33.4	58	12 830	25	53							
	1000	4	0.350	0.296	4 262	4	30	0.400	0.346	4 982	4	31	0.450	0.396	5 702	4	29
		6			6 394	9	41			7 474	9	42			8 554	9	40
		8			8 525	17	48			9 965	17	49			11 405	16	47
	10	10 656	26	54	12 456	26	55	14 256	25	53							
	1100	4	0.385	0.326	4 689	4	32	0.440	0.381	5 481	4	31	0.495	0.436	6 273	4	29
		6			7 033	10	42			8 221	9	42			9 409	9	39
		8			9 377	18	50			10 961	17	49			12 545	15	47
	10	11 722	28	56	13 702	26	55	15 682	24	53							
	1200	4	0.420	0.355	5 115	4	31	0.480	0.415	5 979	4	31	0.540	0.475	6 843	4	29
		6			7 672	9	41			8 968	9	42			10 264	9	39
		8			10 230	16	49			11 958	16	49			13 686	15	47
	10	12 787	25	54	14 947	25	55	17 107	24	53							
	1300	4	0.455	0.385	5 541	4	32	0.520	0.450	6 477	4	32	0.585	0.515	7 413	4	28
		6			8 312	10	43			9 716	9	42			11 120	8	39
		8			11 082	17	50			12 954	16	50			14 826	15	46
	10	13 853	27	56	16 193	25	55	18 533	23	52							
	1400	4	0.490	0.414	5 967	4	32	0.560	0.484	6 975	4	32	0.630	0.554	7 983	4	28
		6			8 951	10	43			10 463	9	43			11 975	8	39
		8			11 935	17	50			13 951	16	50			15 967	15	46
	10	14 918	27	56	17 438	25	56	19 958	23	52							
	1500	4	0.525	0.444	6 394	4	32	0.600	0.519	7 474	4	32	0.675	0.594	8 554	4	28
		6			9 590	9	43			11 210	9	43			12 830	8	38
		8			12 787	17	50			14 947	16	50			17 107	14	46
	10	15 984	26	56	18 684	25	56	21 384	22	51							

width B [mm]		height H [mm]														
		500					550					600				
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]
200	4	0.1	0.089	1 284	6	29	0.110	0.099	1 428	5	29	0.120	0.109	1 572	5	29
	6			1 927	13	40			2 143	12	39			2 359	12	39
	8			2 569	22	47			2 857	21	47			3 145	21	47
	10			3 211	35	53			3 571	33	53			3 931	32	53
250	4	0.125	0.112	1 606	6	30	0.138	0.124	1 786	5	30	0.150	0.137	1 966	5	30
	6			2 408	13	41			2 678	12	40			2 948	12	40
	8			3 211	22	48			3 571	21	48			3 931	21	48
	10			4 014	35	54			4 464	33	53			4 914	32	54
300	4	0.15	0.134	1 927	5	30	0.165	0.149	2 143	5	30	0.180	0.164	2 359	5	30
	6			2 890	12	41			3 214	12	41			3 538	11	40
	8			3 853	21	48			4 285	21	48			4 717	19	48
	10			4 817	33	54			5 357	32	54			5 897	30	53
350	4	0.175	0.156	2 248	5	30	0.193	0.174	2 500	5	31	0.210	0.191	2 752	5	30
	6			3 372	12	41			3 750	12	41			4 128	10	40
	8			4 496	21	48			5 000	21	49			5 504	19	48
	10			5 620	32	54			6 250	32	55			6 880	29	54
400	4	0.2	0.178	2 569	5	30	0.220	0.198	2 857	5	30	0.240	0.218	3 145	4	30
	6			3 853	11	41			4 285	10	41			4 717	10	41
	8			5 138	19	48			5 714	19	48			6 290	18	48
	10			6 422	30	54			7 142	29	54			7 862	28	54
450	4	0.225	0.201	2 890	4	29	0.248	0.223	3 214	4	29	0.270	0.246	3 538	4	30
	6			4 335	9	39			4 821	9	40			5 307	9	40
	8			5 780	17	47			6 428	17	47			7 076	17	48
	10			7 225	26	52			8 035	26	53			8 845	26	53
500	4	0.250	0.223	3 211	4	27	0.275	0.248	3 571	4	29	0.300	0.273	3 931	4	29
	6			4 817	8	38			5 357	9	39			5 897	9	39
	8			6 422	14	45			7 142	15	47			7 862	15	47
	10			8 028	20	50			8 928	24	52			9 828	24	53
550	4	0.275	0.245	3 853	3	27	0.303	0.273	4 285	4	28	0.330	0.300	4 717	4	28
	6			5 780	8	37			6 428	8	38			7 076	8	39
	8			7 707	13	45			8 571	14	46			9 435	14	46
	10			9 634	21	51			10 714	22	52			11 794	22	52
600	4	0.3	0.268	3 853	3	27	0.330	0.298	4 285	3	28	0.360	0.328	4 717	3	28
	6			5 780	8	38			6 428	8	38			7 076	8	39
	8			7 707	13	45			8 571	13	46			9 435	13	46
	10			9 634	21	51			10 714	21	51			11 794	21	52
650	4	0.325	0.290	4 175	4	31	0.358	0.322	4 643	3	28	0.390	0.355	5 111	3	28
	6			6 262	10	41			6 964	8	38			7 666	8	39
	8			8 349	17	49			9 285	13	46			10 221	13	46
	10			10 436	21	51			11 606	21	52			12 776	21	52
700	4	0.350	0.312	4 496	3	28	0.385	0.347	5 000	3	28	0.420	0.382	5 504	3	29
	6			6 744	8	38			7 500	8	39			8 256	8	39
	8			8 991	13	46			9 999	13	46			11 007	13	47
	10			11 239	21	52			12 499	21	52			13 759	21	52
800	4	0.4	0.357	5 138	3	28	0.440	0.397	5 714	3	29	0.480	0.437	6 290	3	29
	6			7 707	8	39			8 571	8	39			9 435	8	40
	8			10 276	13	46			11 428	13	47			12 580	13	47
	10			12 845	21	52			14 285	21	53			15 725	21	53
900	4	0.45	0.401	5 780	3	28	0.495	0.446	6 428	3	29	0.540	0.491	7 076	3	30
	6			8 670	8	39			9 642	8	40			10 614	8	38
	8			11 560	13	46			12 856	13	47			14 152	13	45
	10			14 450	21	52			16 070	21	53			17 690	21	51
1000	4	0.5	0.446	6 422	3	28	0.550	0.496	6 428	3	30	0.600	0.546	7 862	3	30
	6			9 634	8	39			9 642	8	40			11 794	8	41
	8			12 845	13	46			12 856	13	48			15 725	13	48
	10			16 056	21	52			16 070	21	54			19 656	21	54
1100	4	0.55	0.491	7 065	4	29	0.605	0.546	7 857	4	31	0.660	0.601	8 649	3	31
	6			10 597	8	39			11 785	8	41			12 973	8	41
	8			14 129	14	47			15 713	14	49			17 297	13	49
	10			17 662	22	53			19 642	22	55			21 622	21	54
1200	4	0.6	0.535	7 707	3	27	0.660	0.595	8 571	3	30	0.720	0.655	9 435	3	30
	6			11 560	7	38			12 856	7	40			14 152	7	40
	8			15 414	13	45			17 142	13	48			18 870	12	48
	10			19 267	20	51			21 427	20	54			23 587	19	54
1300	4	0.65	0.580	8 349	3	27	0.715	0.645	9 285	3	30	0.780	0.710	10 221	3	30
	6			12 524	7	38			13 928	7	41			15 332	7	41
	8			16 698	13	45			18 570	13	48			20 442	12	48
	10			20 873	20	51			23 213	20	54			25 553	19	54
1400	4	0.7	0.624	8 991	3	27	0.770	0.694	9 999	3	31	0.840	0.764	11 007	3	30
	6			13 487	7	38			14 999	7	41			16 511	7	41
	8			17 983	13	45			19 999	13	49			22 015	12	48
	10			22 478	20	51			24 998	20	54			27 518	19	54
1500	4	0.75	0.669	9 634	3	27	0.825	0.744	10 714	3	31	0.900	0.819	11 794	3	31
	6			14 450	7	38			16 070	7	41			17 690	7	41
	8			19 267	13	45			21 427	13	49			23 587	12	49
	10			24 084	20	51			26 784	20	55			29 484	19	54

		height H [mm]															
		650					700					750					
		v [m/s]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]	Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.130	0.119	1 716	5	29	0.140	0.129	1 860	5	29	0.150	0.139	2 004	5	29
		6			2 575	11	39			2 791	11	40			3 007	11	40
		8			3 433	20	47			3 721	20	47			4 009	20	47
		10			4 291	31	53			4 651	31	53			5 011	31	53
	250	4	0.163	0.149	2 146	5	30	0.175	0.162	2 326	5	30	0.188	0.174	2 506	5	30
		6			3 218	11	40			3 488	11	41			3 758	11	41
		8			4 291	20	48			4 651	20	48			5 011	20	48
		10			5 364	31	53			5 814	31	54			6 264	31	54
	300	4	0.195	0.179	2 575	5	30	0.210	0.194	2 791	4	29	0.225	0.209	3 007	4	30
		6			3 862	10	40			4 186	10	40			4 510	10	40
		8			5 149	19	48			5 581	18	47			6 013	18	48
		10			6 437	29	53			6 977	28	53			7 517	28	54
	350	4	0.228	0.209	3 004	4	30	0.245	0.226	3 256	4	30	0.263	0.244	3 508	4	30
		6			4 506	10	40			4 884	10	40			5 262	10	41
		8			6 008	18	48			6 512	17	48			7 016	17	48
		10			7 510	28	54			8 140	27	53			8 770	27	54
	400	4	0.260	0.238	3 433	4	30	0.280	0.258	3 721	4	30	0.300	0.278	4 009	4	31
		6			5 149	10	41			5 581	10	41			6 013	10	41
		8			6 866	18	48			7 442	17	48			8 018	17	49
		10			8 582	28	54			9 302	27	54			10 022	27	54
	450	4	0.293	0.268	3 862	4	30	0.315	0.291	4 186	4	29	0.338	0.313	4 510	4	30
		6			5 793	9	40			6 279	9	40			6 765	9	40
		8			7 724	17	48			8 372	15	47			9 020	15	48
		10			9 655	26	54			10 465	24	53			11 275	24	53
	500	4	0.325	0.298	4 291	4	29	0.350	0.323	4 651	4	29	0.375	0.348	5 011	4	29
		6			6 437	9	40			6 977	8	40			7 517	8	40
		8			8 582	15	47			9 302	15	47			10 022	15	47
		10			10 728	24	53			11 628	23	53			12 528	23	53
	550	4	0.358	0.328	5 149	4	29	0.385	0.355	5 116	4	29	0.413	0.383	5 512	4	29
		6			7 724	8	39			7 674	8	39			8 268	8	40
		8			10 299	14	47			10 233	14	47			11 025	14	47
		10			12 874	22	52			12 791	22	53			13 781	22	53
	600	4	0.390	0.358	5 149	3	28	0.420	0.388	5 581	3	29	0.450	0.418	6 013	3	29
		6			7 724	8	39			8 372	8	39			9 020	8	40
		8			10 299	13	46			11 163	13	47			12 027	13	47
		10			12 874	21	52			13 954	21	53			15 034	21	53
	650	4	0.423	0.387	5 579	3	28	0.455	0.420	6 047	3	28	0.488	0.452	6 515	3	28
		6			8 368	7	39			9 070	7	39			9 772	7	39
		8			11 157	13	46			12 093	13	46			13 029	12	46
		10			13 946	20	52			15 116	20	52			16 286	19	52
	700	4	0.455	0.417	6 008	3	28	0.490	0.452	6 512	3	29	0.525	0.487	7 016	3	28
		6			9 012	7	39			9 768	7	39			10 524	7	39
		8			12 015	13	46			13 023	13	47			14 031	12	46
		10			15 019	20	52			16 279	20	53			17 539	19	52
	800	4	0.520	0.477	6 866	3	27	0.560	0.517	7 442	4	29	0.600	0.557	8 018	3	28
		6			10 299	6	38			11 163	7	37			12 027	6	39
		8			13 732	12	45			14 884	11	43			16 036	12	46
		10			17 165	18	51			18 605	16	47			20 045	18	52
	900	4	0.585	0.536	7 724	3	26	0.630	0.581	8 372	3	27	0.675	0.626	9 020	3	27
		6			11 586	6	36			12 558	6	37			13 530	6	38
		8			15 448	10	44			16 744	10	45			18 040	10	45
		10			19 310	16	50			20 930	16	51			22 550	16	51
	1000	4	0.650	0.596	8 582	3	26	0.700	0.646	9 302	3	27	0.750	0.696	10 022	3	28
		6			12 874	6	36			13 954	6	38			15 034	6	38
		8			17 165	10	44			18 605	10	45			20 045	10	46
		10			21 456	16	50			23 256	16	51			25 056	16	52
	1100	4	0.715	0.656	9 441	3	29	0.770	0.711	10 233	3	31	0.825	0.766	11 025	3	28
		6			14 161	8	40			15 349	8	42			16 537	8	39
		8			18 881	13	47			20 465	13	49			22 049	13	46
		10			23 602	21	53			25 582	21	55			27 562	21	52
	1200	4	0.780	0.715	10 299	3	28	0.840	0.775	11 163	3	30	0.900	0.835	12 027	2	28
		6			15 448	7	39			16 744	7	41			18 040	5	38
		8			20 598	12	46			22 326	12	48			24 054	10	46
		10			25 747	19	52			27 907	19	54			30 067	15	52
	1300	4	0.845	0.775	11 157	3	28	0.910	0.840	12 093	3	31	0.975	0.905	13 029	2	28
		6			16 736	7	39			18 140	7	41			19 544	5	39
		8			22 314	12	46			24 186	12	49			26 058	10	46
		10			27 893	19	52			30 233	19	55			32 573	15	52
	1400	4	0.910	0.834	12 015	3	28	0.980	0.904	13 023	3	31	1.050	0.974	14 031	2	28
		6			18 023	7	39			19 535	7	42			21 047	5	39
		8			24 031	12	46			26 047	12	49			28 063	10	46
		10			30 038	19	52			32 558	19	55			35 078	15	52
	1500	4	0.975	0.894	12 874	3	28	1.050	0.969	13 954	3	31	1.125	1.044	15 034	3	30
		6			19 310	7	39			20 930	7	42			22 550	6	41
		8			25 747	12	46			27 907	12	49			30 067	11	48
		10			32 184	19	52			34 884	19	55			37 584	17	54

		height H [mm]															
		800					850					900					
		v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.160	0.149	2 148	5	29	0.170	0.159	2 292	5	29	0.180	0.169	2 436	5	30
		6			3 223	11	40			3 439	11	40			3 655	11	40
		8			4 297	19	47			4 585	19	48			4 873	19	48
		10			5 371	30	53			5 731	30	53			6 091	30	54
	250	4	0.200	0.187	2 686	5	30	0.213	0.199	2 866	5	30	0.225	0.212	3 046	5	31
		6			4 028	11	41			4 298	11	41			4 568	11	41
		8			5 371	19	48			5 731	19	49			6 091	19	49
		10			6 714	30	54			7 164	30	54			7 614	30	55
	300	4	0.240	0.224	3 223	4	30	0.255	0.239	3 439	4	30	0.270	0.254	3 655	4	30
		6			4 834	10	41			5 158	10	41			5 482	10	41
		8			6 445	18	48			6 877	18	48			7 309	17	48
		10			8 057	28	54			8 597	28	54			9 137	27	54
	350	4	0.280	0.261	3 760	4	30	0.298	0.279	4 012	4	31	0.315	0.296	4 264	4	30
		6			5 640	10	41			6 018	10	41			6 396	9	41
		8			7 520	17	48			8 024	17	49			8 528	17	48
		10			9 400	27	54			10 030	27	54			10 660	26	54
	400	4	0.320	0.298	4 297	4	31	0.340	0.318	4 585	4	31	0.360	0.338	4 873	4	30
		6			6 445	10	41			6 877	10	42			7 309	9	41
		8			8 594	17	49			9 170	17	49			9 746	16	48
		10			10 742	27	55			11 462	27	55			12 182	25	54
	450	4	0.360	0.336	4 834	4	29	0.383	0.358	5 158	4	29	0.405	0.381	5 482	3	29
		6			7 251	8	39			7 737	8	40			8 223	8	39
		8			9 668	14	47			10 316	14	47			10 964	13	47
		10			12 085	22	53			12 895	22	53			13 705	21	52
	500	4	0.400	0.373	5 371	4	29	0.425	0.398	5 731	4	29	0.450	0.423	6 091	3	29
		6			8 057	8	40			8 597	8	40			9 137	8	40
		8			10 742	14	47			11 462	14	47			12 182	13	47
		10			13 428	22	53			14 328	22	53			15 228	21	53
	550	4	0.440	0.410	5 908	3	29	0.468	0.438	6 304	3	29	0.495	0.465	6 700	3	29
		6			8 862	8	40			9 456	8	40			10 050	7	39
		8			11 817	13	47			12 609	13	47			13 401	13	47
		10			14 771	21	53			15 761	21	53			16 751	20	53
	600	4	0.480	0.448	6 445	3	29	0.510	0.478	6 877	3	29	0.540	0.508	7 309	3	29
		6			9 668	7	39			10 316	7	40			10 964	7	39
		8			12 891	13	47			13 755	13	47			14 619	12	47
		10			16 114	20	53			17 194	20	53			18 274	19	52
	650	4	0.520	0.485	6 983	3	28	0.553	0.517	7 451	3	29	0.585	0.550	7 919	3	29
		6			10 474	7	39			11 176	7	39			11 878	7	39
		8			13 965	12	46			14 901	12	47			15 837	12	47
		10			17 456	19	52			18 626	19	53			19 796	19	53
	700	4	0.560	0.522	7 520	3	28	0.595	0.557	8 024	3	28	0.630	0.592	8 528	3	27
		6			11 280	6	39			12 036	6	39			12 792	6	38
		8			15 039	12	46			16 047	12	46			17 055	10	45
		10			18 799	18	52			20 059	18	52			21 319	16	51
	800	4	0.640	0.597	8 594	3	27	0.680	0.637	9 170	3	27	0.720	0.677	9 746	3	28
		6			12 891	6	38			13 755	6	38			14 619	6	38
		8			17 188	10	45			18 340	10	45			19 492	10	46
		10			21 485	16	51			22 925	16	51			24 365	16	51
	900	4	0.720	0.671	9 668	3	28	0.765	0.716	10 316	3	28	0.810	0.761	10 964	3	28
		6			14 502	6	38			15 474	6	38			16 446	6	39
		8			19 336	10	46			20 632	10	46			21 928	10	46
		10			24 170	16	51			25 790	16	52			27 410	16	52
	1000	4	0.800	0.746	10 742	3	28	0.850	0.796	11 462	3	28	0.900	0.846	12 182	3	29
		6			16 114	6	39			17 194	6	39			18 274	6	39
		8			21 485	10	46			22 925	10	46			24 365	10	47
		10			26 856	16	52			28 656	16	52			30 456	16	52
	1100	4	0.880	0.821	11 817	3	28	0.935	0.876	12 609	3	29	0.990	0.931	13 401	3	29
		6			17 725	6	39			18 913	6	39			20 101	6	40
		8			23 633	10	46			25 217	10	47			26 801	10	47
		10			29 542	16	52			31 522	16	53			33 502	16	53
	1200	4	0.960	0.895	12 891	2	28	1.020	0.955	13 755	2	28	1.080	1.015	14 619	2	28
		6			19 336	5	39			20 632	5	39			21 928	5	38
		8			25 782	10	46			27 510	10	46			29 238	9	46
		10			32 227	15	52			34 387	15	52			36 547	14	51
	1300	4	1.040	0.970	13 965	2	28	1.105	1.035	14 901	2	29	1.170	1.100	15 837	2	29
		6			20 948	5	39			22 352	5	39			23 756	5	39
		8			27 930	10	46			29 802	10	47			31 674	10	47
		10			34 913	15	52			37 253	15	52			39 593	15	53
	1400	4	1.120	1.044	15 039	2	29	1.190	1.114	16 047	3	30	1.260	1.184	17 055	2	28
		6			22 559	5	39			24 071	6	40			25 583	5	39
		8			30 079	10	47			32 095	10	48			34 111	9	46
		10			37 598	15	52			40 118	16	54			42 638	14	52
	1500	4	1.200	1.119	16 114	3	31	1.275	1.194	17 194	3	30	1.350	1.269	18 274	2	29
		6			24 170	6	41			25 790	6	41			27 410	5	40
		8			32 227	11	49			34 387	10	48			36 547	10	48
		10			40 284	17	54			42 984	16	54			45 684	15	53

		height H [mm]															
		1000					1100					1200					
		v [m/s]	S _k [m ²]	S _e [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	S _k [m ²]	S _e [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.200	0.189	2 724	5	30	0.220	0.209	3 012	5	30	0.240	0.229	3 300	4	30
		6			4 087	10	40			4 519	10	41			4 951	10	41
		8			5 449	19	48			6 025	19	48			6 601	18	48
	250	4	0.250	0.237	6 811	29	54	0.275	0.262	7 531	29	54	0.300	0.287	8 251	28	54
		6			3 406	5	31			3 766	4	31			4 126	4	31
		8			5 108	10	41			5 648	10	41			6 188	10	41
	300	4	0.300	0.284	6 811	19	49	0.330	0.314	7 531	18	49	0.360	0.344	8 251	17	49
		6			8 514	29	55			9 414	28	55			10 314	27	55
		8			4 087	4	31			4 519	4	31			4 951	4	31
	350	4	0.350	0.331	6 130	10	41	0.385	0.366	6 778	10	42	0.420	0.401	7 426	9	42
		6			8 173	17	49			9 037	17	49			9 901	17	49
		8			10 217	27	54			11 297	27	55			12 377	26	55
	400	4	0.400	0.378	4 768	4	31	0.440	0.418	5 272	4	31	0.480	0.458	5 776	4	31
		6			7 152	9	41			7 908	9	42			8 664	9	41
		8			9 536	17	49			10 544	17	49			11 552	15	49
	450	4	0.450	0.426	11 920	26	55	0.495	0.471	13 180	26	55	0.540	0.516	14 440	24	54
		6			5 449	3	28			6 025	3	28			6 601	3	29
		8			8 173	7	39			9 037	7	39			9 901	7	39
	500	4	0.500	0.473	10 898	13	46	0.550	0.523	12 050	13	46	0.600	0.573	13 202	13	47
		6			13 622	20	52			15 062	20	52			16 502	20	53
		8			6 130	3	28			6 778	3	29			7 426	3	29
	550	4	0.550	0.520	9 195	7	39	0.605	0.575	10 167	7	39	0.660	0.630	11 139	7	40
		6			12 260	13	47			13 556	13	47			14 852	13	47
		8			15 325	20	52			16 945	20	53			18 565	20	53
	600	4	0.600	0.568	6 811	3	29	0.660	0.628	7 531	3	29	0.720	0.688	8 251	3	30
		6			10 217	7	39			11 297	7	40			12 377	7	40
		8			13 622	13	47			15 062	13	47			16 502	13	48
	650	4	0.650	0.615	17 028	20	53	0.715	0.680	18 828	20	53	0.780	0.745	20 628	20	54
		6			7 492	3	29			8 284	3	30			9 076	3	30
		8			11 238	7	40			12 426	7	40			13 614	7	41
	700	4	0.700	0.662	14 985	13	47	0.770	0.732	16 569	13	48	0.840	0.802	18 153	13	48
		6			18 731	20	53			20 711	20	54			22 691	20	54
		8			8 173	3	29			9 037	3	29			9 901	3	29
	750	4	0.750	0.715	12 260	7	40	0.880	0.837	13 556	6	39	0.960	0.917	14 852	6	40
		6			16 347	12	47			18 075	12	47			19 803	12	47
		8			20 434	19	53			22 594	18	53			24 754	18	53
	800	4	0.800	0.757	8 855	3	29	0.990	0.941	9 791	3	29	1.080	1.031	10 727	3	30
		6			13 282	7	40			14 686	6	40			16 090	6	40
		8			17 709	12	47			19 581	12	47			21 453	12	48
	850	4	0.850	0.815	22 136	19	53	1.100	1.046	24 476	18	53	1.200	1.146	26 816	18	53
		6			9 536	3	27			10 544	2	27			11 552	2	27
		8			14 304	6	38			15 816	5	38			17 328	5	38
	900	4	0.900	0.851	19 071	10	46	1.210	1.151	21 087	10	45	1.320	1.261	23 103	10	46
		6			23 839	16	51			26 359	15	51			28 879	15	51
		8			10 898	3	28			12 050	2	28			13 202	2	28
	950	4	0.950	0.891	16 347	6	39	1.320	1.255	18 075	5	38	1.440	1.375	19 803	5	39
		6			21 796	10	46			24 100	10	46			26 404	10	46
		8			27 245	16	52			30 125	15	52			33 005	15	52
	1000	4	1.000	0.946	12 260	3	29	1.430	1.360	13 556	3	29	1.540	1.466	14 852	2	29
		6			18 390	6	39			20 334	6	40			22 278	5	39
		8			24 520	10	47			27 112	10	47			29 704	10	47
	1050	4	1.050	0.991	30 650	16	52	1.540	1.466	33 890	16	53	1.660	1.596	37 130	15	52
		6			13 622	3	29			15 062	2	29			16 502	2	28
		8			20 434	6	40			22 594	5	39			24 754	5	39
	1100	4	1.100	1.041	27 245	10	47	1.660	1.596	30 125	10	47	1.800	1.746	33 005	9	46
		6			34 056	16	53			37 656	15	52			41 256	14	52
		8			14 985	3	29			16 569	2	29			18 153	2	29
	1150	4	1.150	1.086	22 477	6	40	1.770	1.711	24 853	5	40	1.920	1.871	27 229	5	39
		6			29 969	10	48			33 137	10	47			36 305	9	47
		8			37 462	16	53			41 422	15	53			45 382	14	52
	1200	4	1.200	1.135	16 347	2	28	1.880	1.821	18 075	10	47	2.040	1.981	19 803	2	28
		6			24 520	5	39			27 112	22	58			29 704	5	39
		8			32 694	9	46			36 150	38	66			39 606	8	46
	1250	4	1.250	1.180	40 867	14	52	1.990	1.931	45 187	14	52	2.160	2.101	49 507	13	52
		6			17 709	2	28			19 581	2	28					
		8			26 564	5	39			29 372	5	38					
	1300	4	1.300	1.230	35 418	9	46	2.100	2.041	39 162	8	46	2.280	2.221			
		6			44 273	14	52			48 953	13	52					
		8			19 071	2	29										
	1350	4	1.350	1.275	28 607	5	39	2.210	2.151	31 337	10	47	2.400	2.341			
		6			38 143	9	47										
		8			47 678	14	53										
	1400	4	1.400	1.324	20 434	2	28	2.320	2.261	22 594	10	47	2.520	2.461			
		6			30 650	5	39										
		8			40 867	8	46										
	1450	4	1.450	1.373	51 084	13	52	2.430	2.371				2.640	2.581			
		6															
		8															

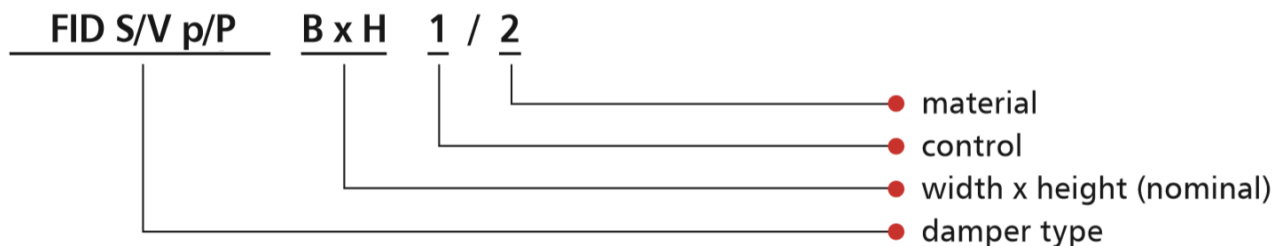
		height H [mm]															
		1300					1400					1500					
		v [m/s]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]	Sk [m ²]	Se [m ²]	Q [m ³ /h]	dp [Pa]	L _{WA} [dB]
width B [mm]	200	4	0.260	0.249	3 588	4	30	0.280	0.269	3 876	4	29	0.300	0.289	4 164	4	29
		6			5 383	9	40			5 815	9	40			6 247	9	40
		8			7 177	17	48			7 753	16	47			8 329	15	47
		10			8 971	26	53			9 691	25	53			10 411	24	53
	250	4	0.325	0.312	4 486	4	31	0.350	0.337	4 846	4	30	0.375	0.362	4 164	4	30
		6			6 728	9	41			7 268	9	40			6 247	8	40
		8			8 971	17	49			9 691	15	48			8 329	15	48
		10			11 214	26	54			12 114	24	54			10 411	23	53
	300	4	0.390	0.374	5 383	4	31	0.420	0.404	5 815	4	31	0.450	0.434	6 247	4	30
		6			8 074	9	41			8 722	9	41			9 370	8	40
		8			10 765	16	49			11 629	15	49			12 493	14	48
		10			13 457	25	55			14 537	24	54			15 617	22	54
	350	4	0.455	0.436	6 280	4	30	0.490	0.471	6 784	3	30	0.525	0.506	7 288	3	30
		6			9 420	8	41			10 176	8	40			10 932	8	40
		8			12 560	15	48			13 568	13	48			14 576	13	48
		10			15 700	23	54			16 960	21	53			18 220	21	54
	400	4	0.520	0.498	7 177	3	29	0.560	0.538	7 753	3	29	0.600	0.578	8 329	3	30
		6			10 765	7	40			11 629	7	40			12 493	7	40
		8			14 354	13	47			15 506	13	48			16 658	13	48
		10			17 942	20	53			19 382	20	53			20 822	20	54
	450	4	0.585	0.561	8 074	3	29	0.630	0.606	8 722	3	29	0.675	0.651	9 370	3	30
		6			12 111	7	40			13 083	7	40			14 055	7	40
		8			16 148	12	47			17 444	12	47			18 740	12	48
		10			20 185	19	53			21 805	19	53			23 425	19	53
	500	4	0.650	0.623	8 971	3	29	0.700	0.673	9 691	3	30	0.750	0.723	10 411	3	30
		6			13 457	7	40			14 537	7	40			15 617	7	41
		8			17 942	12	48			19 382	12	48			20 822	12	48
		10			22 428	19	53			24 228	19	54			26 028	19	54
	550	4	0.715	0.685	9 868	3	30	0.770	0.740	10 660	3	30	0.825	0.795	11 452	3	31
		6			14 802	7	40			15 990	7	41			17 178	7	41
		8			19 737	12	48			21 321	12	48			22 905	12	49
		10			24 671	19	54			26 651	19	54			28 631	19	54
	600	4	0.780	0.748	10 765	3	29	0.840	0.808	11 629	3	29	0.900	0.868	12 493	3	29
		6			16 148	6	39			17 444	6	40			18 740	6	40
		8			21 531	11	47			23 259	11	47			24 987	11	48
		10			26 914	17	53			29 074	17	53			31 234	17	53
	650	4	0.845	0.810	11 663	3	29	0.910	0.875	12 599	3	29	0.975	0.940	13 535	3	30
		6			17 494	6	40			18 898	6	40			20 302	6	40
		8			23 325	11	47			25 197	11	48			27 069	11	48
		10			29 156	17	53			31 496	17	53			33 836	17	54
	700	4	0.910	0.872	12 560	2	28	0.980	0.942	13 568	2	28	1.050	1.012	14 576	2	28
		6			18 840	5	38			20 352	5	39			21 864	5	39
		8			25 119	10	46			27 135	10	46			29 151	10	47
		10			31 399	15	52			33 919	15	52			36 439	15	52
	800	4	1.040	0.997	14 354	2	28	1.120	1.077	15 506	2	29	1.200	1.157	16 658	2	29
		6			21 531	5	39			23 259	5	39			24 987	5	40
		8			28 708	10	46			31 012	10	47			33 316	10	47
		10			35 885	15	52			38 765	15	53			41 645	15	53
	900	4	1.170	1.121	16 148	2	29	1.260	1.211	17 444	2	29	1.350	1.301	18 740	2	30
		6			24 222	5	39			26 166	5	40			28 110	5	40
		8			32 296	10	47			34 888	10	47			37 480	10	48
		10			40 370	15	53			43 610	15	53			46 850	15	53
	1000	4	1.300	1.246	17 942	2	28	1.400	1.346	19 382	2	28	1.500	1.446	20 822	2	28
		6			26 914	5	39			29 074	5	38			31 234	5	39
		8			35 885	9	47			38 765	8	46			41 645	8	46
		10			44 856	14	52			48 456	13	52			52 056	13	52
	1100	4	1.430	1.371	19 737	2	29			21 321	2	29			22 905	2	29
		6			29 605	5	39			31 012	5	39			33 316	5	39
		8			39 473	9	47			39 473	9	47			41 645	9	47
		10			49 342	14	53			49 342	14	53			52 056	14	53

7. Estimated Weights of FID S/V p/P, FOD S/V-M p/P rectangular dampers [kg]

		width B [mm]														
		200	250	300	400	500	600	700	800	900	1000	1100	1200	1300	1400	1500
height H [mm]	200	9.5	9.7	10	10	15	17	17.5	19	22	25	28	30	33	39	45
	250	9.5	10	11	11	16	17.5	18	21	24	27	29	32	34	45	48
	300	10	11	11	12	17	20	21	23	26	28	31	34	38	50	51
	350	11	11	11	16	18	20.5	23	26	28	29	33	35	36	52	53
	400	10	11	12	18	19	21	25	29	30	33	35	36	39	54	55
	500	15	16	17	19	20	23	27	32	33	35	38	40	44	55	56
	600	17	17.5	20	21	30	26	30	35	37	39	43	48	52	56	58
	700	17.5	18	21	23	30	35	35	40	42	44	47	52	54	57	65
	800	20	21	22	24	29	35	37	41	43	49	52	57	60	62	78
	900	22	25	25	28	33	35	39	43	47	53	56	60	62	64	82
	1000	23	29	28	33	36	42	43	49	53	56	59	65	67	69	98
	1100	26	30	31	35	38	42	47	56	59	62	63	69	71		
	1200	32	33	35	36	40	49	53	56	61	71	72	73			
	1300	39	40	38	39	44	52	57	59	78	79	80				
	1400	42	45	48	39	48	56	63	65	80	82					
1500	45	48	50	50	52	58	68	71	82	98						

☒ For dampers with no actuator, subtract ~1 kg.

8. Marking



1 – Control:

- Belimo trigger control mechanism
 - BE24** – actuator with no return spring, U = 24 V AC/DC
 - BLE24** – actuator with no return spring, U = 24 V AC/DC
 - BE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a plug for the SBS Control system
 - BLE24-ST** (with the BKNE230-24 option) – actuator with no return spring, U = 24 V AC/DC, with a plug for the SBS Control system
 - BE230** – actuator with no return spring, U = 230 V AC
 - BLE230** – actuator with no return spring, U = 230 V ACBFN24-T – actuator with a return spring, U = 24 V AC/DC

2 – Material:

- [No symbol] – galvanized steel, Zn 275 g/m² coating
- KN – 1.4404 acid-proof stainless steel

Example marking:

FID S/V p/P 400 x 400 BLE24

Smoke exhaust damper for fire ventilation systems with a 24 V compact Belimo actuator with limit switches.

9. Power Supply Control

9.1 Cooperation with smoke exhaust/cut-off dampers – drive quick selection table

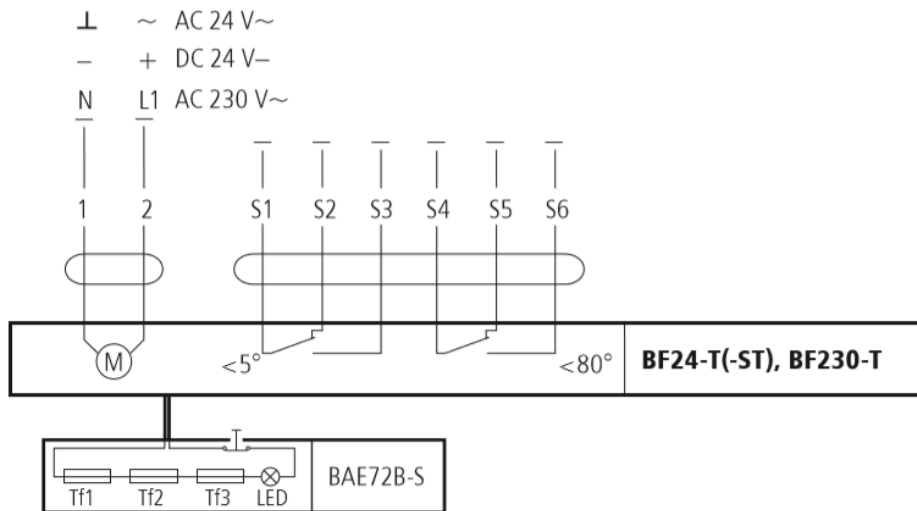
	FID S/S c/P	FID S/S p/P FID S/S p/O	FID S/V p/P FID S/V-M p/P	FID PRO	WIP/ S	WIP/T	WIP/T- G	WIP/V WIP/V-M	WIP PRO/S	WIP PRO/V WIP PRO/V- M
BF24-T (ST)		X			X	X			X	
BF230-T		X			X	X			X	
BFL24-T (-ST)	X	X		X	X	X			X	
BFL230-T	X	X		X	X	X			X	
BFN24-T (-ST)	X	X			X	X			X	
BFN230-T	X	X			X	X			X	
BE24			X			X		X		X
BE230			X			X		X		X
BLE24			X			X		X		X
BLE230			X			X		X		X
EXBF24-T	X	X		X	X	X			X	
EXBF230-T	X	X		X	X	X			X	
BF24TL-T (-ST)	X	X		X	X	X			X	
RST	X	X		X						
RST/WK1	X	X		X						
RST/WK2	X	X		X						
RST-KW1/S	X	X		X						
RST-KW1/S/WK2	X	X		X	X	X	X		X	
RST-KW1/24I	X	X		X						
RST-KW1/24P	X	X		X					X	
RST-KW1/230I	X	X		X						
RST-KW1/230P	X	X		X					X	
BF24 (-ST)							X			
BF230							X			
BFL24 (-ST)							X			
BFL230							X			
BFN24 (-ST)							X			
BFN230							X			

9.2 Actuators

9.2.1 BF electric actuators

SPECIFICATIONS	BF24 (BF24-T)	BF230 (BF230-T)
Power supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
Power demand:		
- For spring tensioning	7 W	8 W
- For holding	2 W	3 W
Sizing (apparent power)	10 VA	11 VA
Protection class	III	II
Ingress protection rating	IP 54	IP 54
Auxiliary circuit breaker:	2 x EPU 3 (0.5) A 250 V	2 x EPU 3 (0.5) A 250 V~
- Activation position	5°, 80°	5°, 80°
Torque		
- Motor	18 Nm	18 Nm
- Return spring	12 Nm	12 Nm
Cable connection:		
- Motor (length: 0.9 m)	2 x 0.75 mm ²	2 x 0.75 mm ²
- Auxiliary circuit breaker	6 x 0.75 mm ²	2 x 0.75 mm ²
Movement time (0-90°)		
- Motor	120 s	120 s
- Return spring	~16 s	~16 s
Operating temperature range	-30...+50°C	-30...+50°C
Sound intensity level:		
- Motor	max 45 dB (A)	max 45 dB (A)
- Return spring	~63 dB (A)	~63 dB (A)

9.2.1.1 Electrical diagram of the BF...-T series actuator:



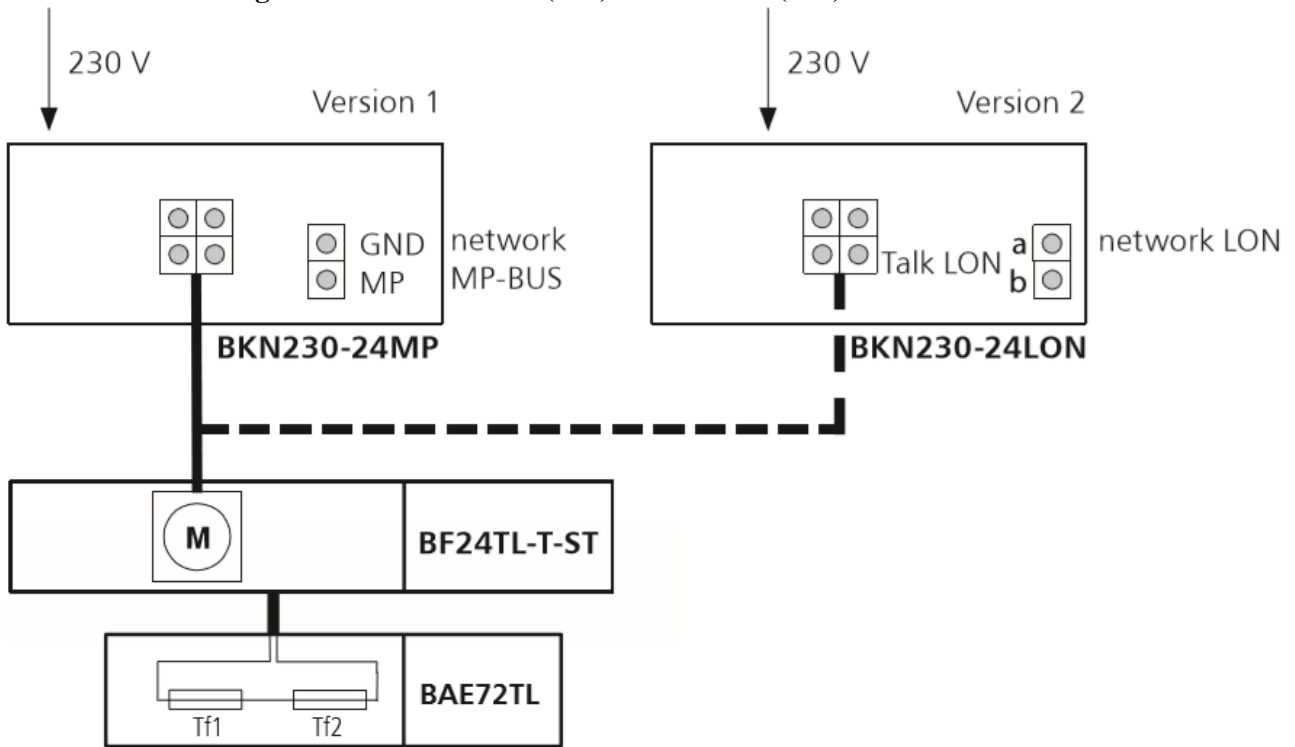
note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

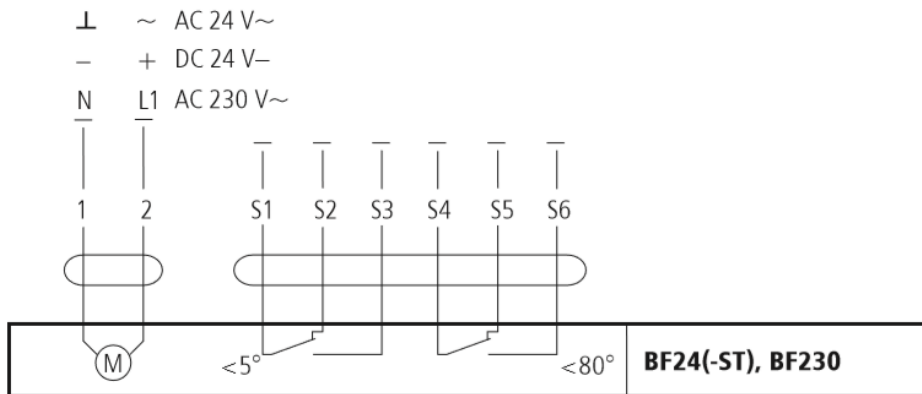
note:

The location of the actuator limit switches is shown for the no voltage position.

9.2.1.2 Electrical diagram of the BF24TL-T(-ST) and BF24TL(-ST) actuator:



9.2.1.3 Electrical Diagram of the BF series actuator:



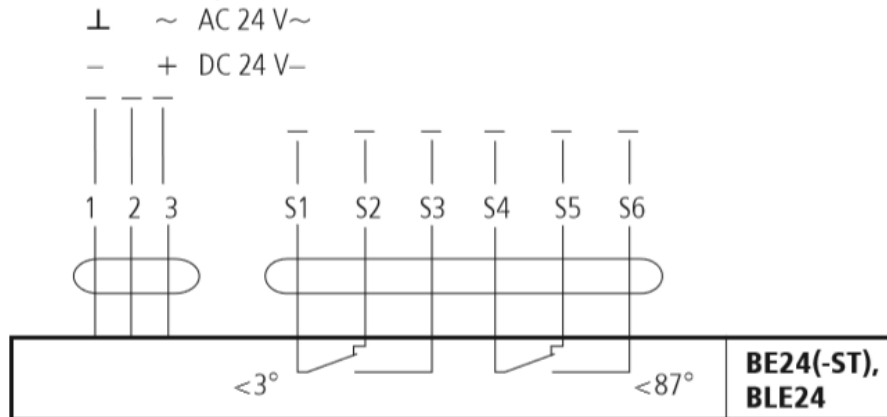
note: 24 V connection through a safety transformer. To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

note: The location of the actuator limit switches is shown for the no voltage position.

9.2.2 BE, BLE electric actuators

Specifications	BE24, BE24-ST	BE230	BLE24	BLE230
Power Supply	AC 24 V 50/60 Hz	AC 230 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 230 V 50/60 Hz
Power demand: - In movement - For holding	12 W 0.5 W	8 W 0.5 W	7.5 W 0.5 W	5 W 0.5
Sizing (apparent power)	18 VA	15 VA	9 VA	12 VA
Protection class	III	II	III	II
Ingress protection rating	IP 54	IP 54	IP 54	IP 54
Auxiliary circuit breaker: - Activation position	2 x SPDT 6 (1.5) A AC 250 V 5°, 80°	2 x SPDT 6 (1.5) A AC 250 V 5°, 80°	2 x EPU 3 (1.5) A 250 V 5°, 80°	2 x EPU 3 (1.5) A 250 V~ 5°, 80°
Torque - motor	40 Nm	40 Nm	15 Nm	15 Nm
Movement time (0-90°) – motor	< 60 s for 90°	< 60 s for 90°	< 30 s for 90°	< 30 s for 90°
Operating temperature	-30...+50°C	-30...+50°C	-30...+50°C	-30...+50°C
Sound intensity level	~62 dB (A)	~62 dB (A)	~62 dB (A)	~62 dB (A)

9.2.2.1 Electric diagram of the BE, BLE series actuator

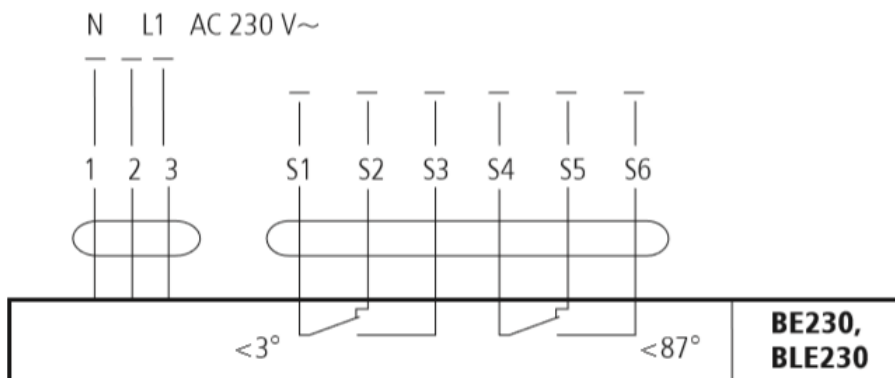


note:

The actuator operation control requires routing three wire system to it. The actuator rotation sense is changed by the application of the power supply voltage to the terminal 2 or 3, depending on the desired direction.

note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further drives in parallel. Check the power consumption.



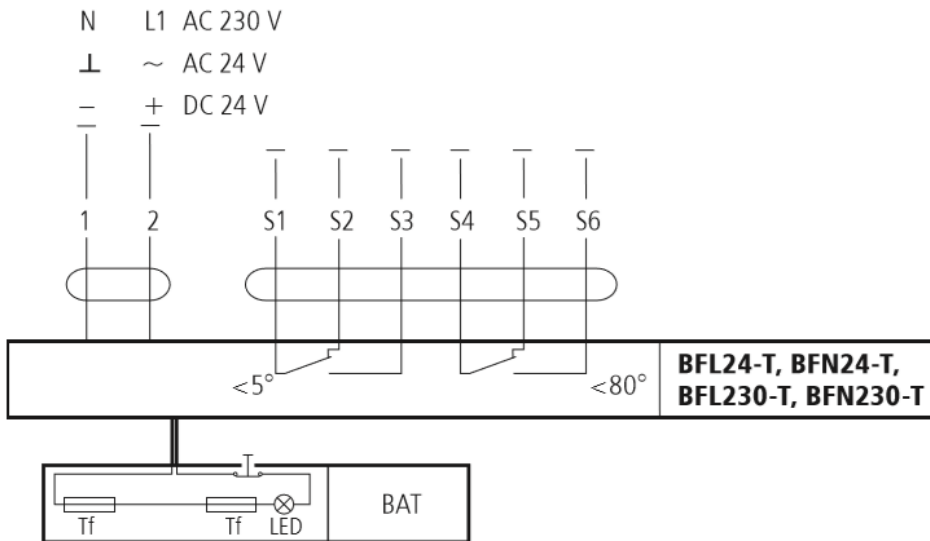
note:

The location of the actuator limit switches is shown for the no voltage position.

9.2.3 BFL, BFN ELECTRIC ACTUATORS

Specifications	BFL24 (BFL24-T)	BFL230 (BFL230-T)	BFN24 (BFN24-T)	BFN230 (BFN230-T)
Power Supply	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz	AC 24 V 50/60 Hz DC 24 V	AC 220-240 V 50/60 Hz
Power demand:				
- Spring tensioning	2.5 W	3.5 W	4 W	5 W
- For holding	0.7 W	1.1 W	1.4 W	2.1
Sizing (apparent power)	4 VA	6.5 VA	6 VA	10 VA
Protection class	III	II	III	II
Ingress protection rating	IP 54	IP 54	IP 54	IP 54
Auxiliary circuit breaker:	2 x SPDT 3 (0.5) A AC 250 V	2 x SPDT 3 (0.5) A AC 250 V	2 x EPU 3 (0.5) A 250 V	2 x EPU 3 (0.5) A 250 V
- Activation position	5°, 80°	5°, 80°	5°, 80°	5°, 80°
Torque				
- motor	4 Nm	4 Nm	9 Nm	9 Nm
- return spring	3 Nm	3 Nm	7 Nm	7 Nm
Movement time (0-90°):				
- motor	< 60 s	< 60 s	< 60 s	< 60 s
- return spring	~20 s	~20 s	~20 s	~20 s
Operating temperature	-30...+55°C	-30...+55°C	-30...+55°C	-30...+55°C
Sound intensity level				
- motor	max 43 dB (A)	max 43 dB (A)	max 55 dB (A)	max 55 dB (A)
- return spring	~62 dB (A)	~62 dB (A)	~67 dB (A)	~67 dB (A)

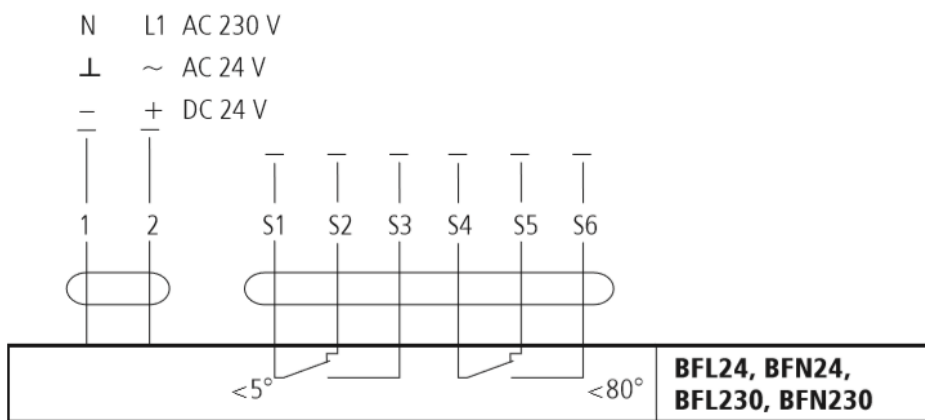
9.2.3.1 Electrical diagram of the BFL...-T, BFN...-T series actuator:



note: 24 V connection through a safety transformer. To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

note: The location of the actuator limit switches is shown for the no voltage position.

9.2.3.2 Electrical diagram of the BFL, BFN series actuator:



note: 24 V connection through a safety transformer.

To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

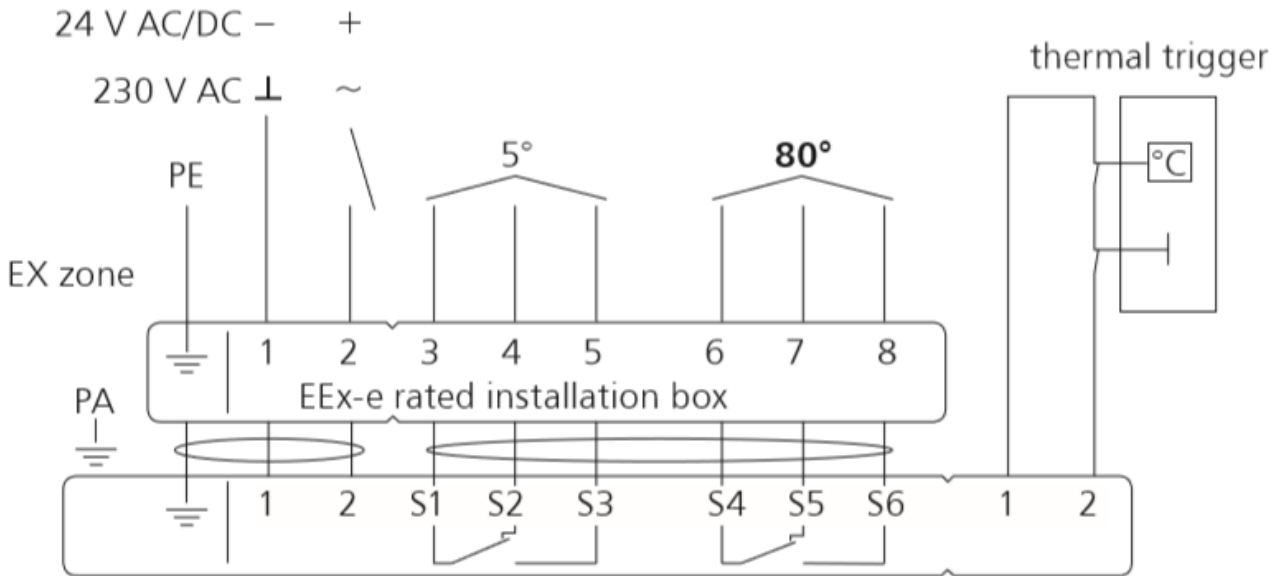
note:

The location of the actuator limit switches is shown for the no voltage position.

9.2.4 EXBF actuators

SPECIFIKATIONS	EXBF B 001 2...0 N 000	EXBF A 001 2 ...0 N 000
Zone	1, 2, 21, 22	
ATEX-rating	II 2 GD EEx d IIC T6	
Power supply	24 V AC ±20% 50/60 Hz / 24 V DC - 10/+20%	230 V AC ±14% 50/60 Hz
Power demand: - For spring tensioning - For holding	7 W 2 W	8 W 3 W
Sizing (apparent power)	10 VA	11 VA
Ingress protection rating	IP 66	IP 66
Auxiliary circuit breaker: - Activation position	2 x SPDT 6 A (3) max 250 v AC 5°, 80°	2 x SPDT 6 A (3) max 250 V AC 5°, 80°
Torque: - Motor - Return spring	18 Nm 12 Nm	18 Nm 12 Nm
Movement time (0-90°) - Motor - Return spring	150 s ~20 s	150 s ~20 s
Ambient temperature	-30...+50°C	-30...+50°C

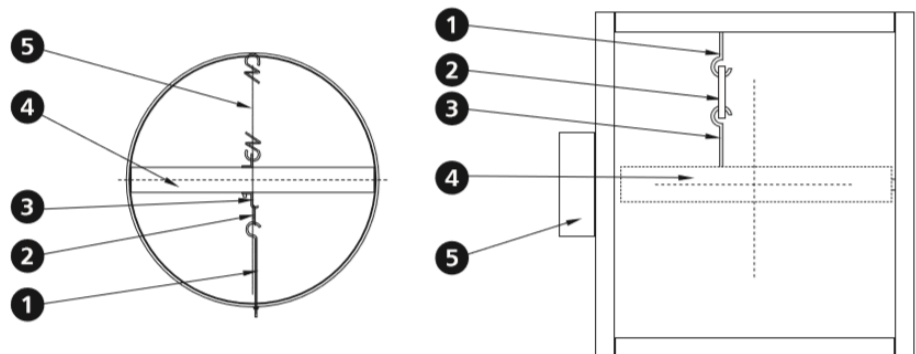
9.2.4.1 Connection diagram for EXBF and EXBF...-T actuators:



9.3 RST trigger control mechanisms

In the RST version the WK1 limit switches are independent units installed inside the fire damper casing. The thermal trigger is on the damper blade. The driving spring is installed on the damper blade or in a guard box on its casing.

1. Moving hook with nut
2. Fusible link
3. Fixed hook on the damper blade
4. Damper blade
5. Drive spring



9.3.1 Independent limit switches – RST version

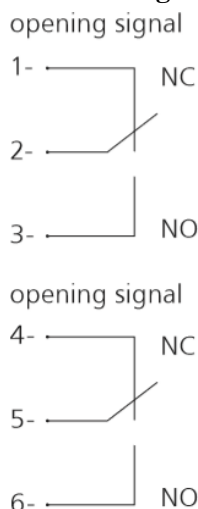
WK1 – limit switch (closed damper blade signal)

WK2 – limit switch (closed/open damper blade signal)

9.3.2 Switch specifications

WK1 and WK2 limit switch	1xNO/1xNC SPDT 5 A, 230 V AC
Limit switch operating temperature	-25 ... +85°C
Casing	plastic

9.3.2.1 Electric connection diagram of WK1 and WK2 limit switches



note:

When the damper blade closes, the closed indication limit switch is switched over (contacts 2-3 are closed).

9.4 RST-KW1 mechanisms

	RST-KW1/S	RST-KW1/S/WK2	RST-KW1/24I	RST-KW1/24P	RST-KW1/230I	RST-KW1/230P
Rated voltage	-	-	24 V – 48 V DC	24 V – 48 V DC	230 AC	230 AC
Power consumption	-	-	3.5 W	1.6 W	2 W	2 W
Thermal trigger	74°C (optionally 95°C)					
Connections – trigger	-	-	Wire 0.6m, 2 x 0.5 mm ²			
Connections – limit switches	-	-	Wire 0.6m, 6 x 0.5 mm ²			
Limit switch	-	-	2 x BI/NC 5A. 230 V AC			
Movement time	max. 2 s					
Mechanism operation control (closing)	-	-	Voltage application „pulse”	Voltage removal „break”	Voltage application „pulse”	Voltage removal „break”
Mechanism operation control (opening)	Manual	Manual	Manual	Manual	Manual	Manual
Pulse width	max. 1 s					

9.4.1 Description of electrical connections:

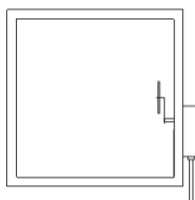
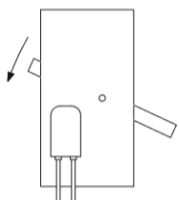
RST-KW1 mechanism power supply	Closing limit switch	Opening limit switch
Wire number: 1-2	Wire number: 3-4 – NO (normally open)	Wire number 6-7 – NO (normally open)
	Wire number 4-5 – NC (normally closed)	Wire number 7-8 – NC (normally closed)

9.5 Manufacture standards

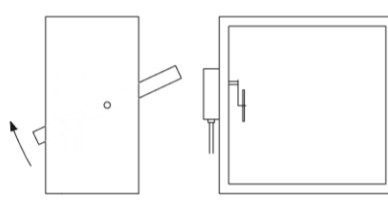
Damper type	Description	Standard	Option
FID S/S c/P	Right damper	X	
	Inverse damper		X
	Left damper		X
	Actuator normal to the axis flow	X	
	Actuator along the axis flow		
FID S/S p/P FID S/V p/P	Right damper	X	
	Inverse damper		X
	Left damper		X
	Actuator normal to the axis flow	X	
	Actuator along the axis flow		X
FID S/S p/O	Right damper	X	
	Inverse damper		
	Left damper		
	Actuator normal to the axis flow	X	
	BF actuator along the v (exception)	X	
	Actuator along the axis flow		X
FID PRO	Right damper	X	
	Inverse damper		
	Left damper		
	Actuator normal to the axis flow	X	
	Actuator along the axis flow		X
WIP	Right damper		
	Inverse damper		X
	Left damper		X
	Actuator normal to the axis flow	X	
	Actuator along the axis flow	X	
WIP PRO	Right damper		X
	Inverse damper		X
	Left damper	X	
	Actuator normal to the axis flow	X	
	Actuator along the axis flow		

9.5.1 FID S/S c/P damper

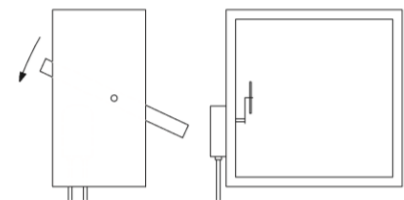
right damper standard



inverse damper
(wires downward)



left damper

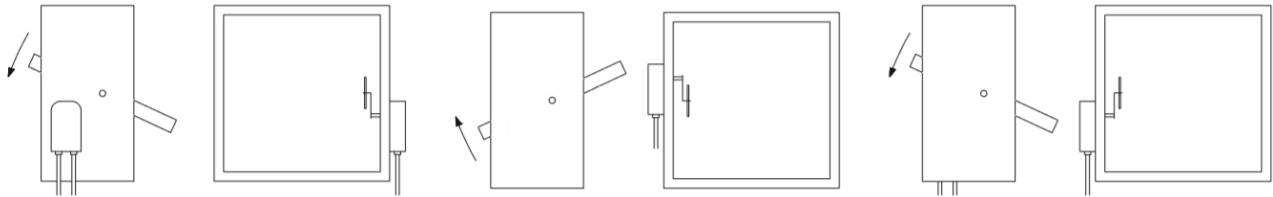


9.5.2 FID S/S p/P, FID S/S p/O, FID S/V p/P damper

right damper standard

inverse damper
(wires downward)

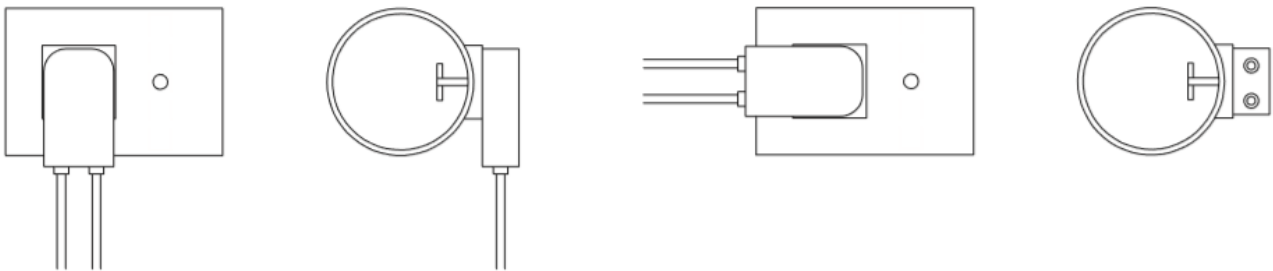
left damper



9.5.3 FID PRO/S damper

right damper
standard

actuator along the axis flow



9.5.4 WIP/S, WIP/V, WIP/V-M, WIP/T, WIP/T-G damper

left damper
standard

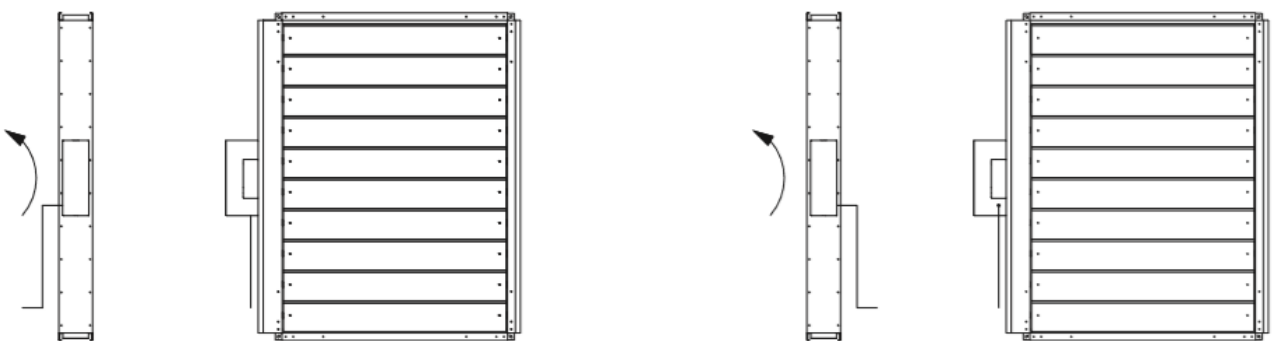
inverse damper
(wires downward)



9.5.5 WIP PRO/S, WIP PRO/V, WIP PRO/V-M damper with an actuator

left damper
standard

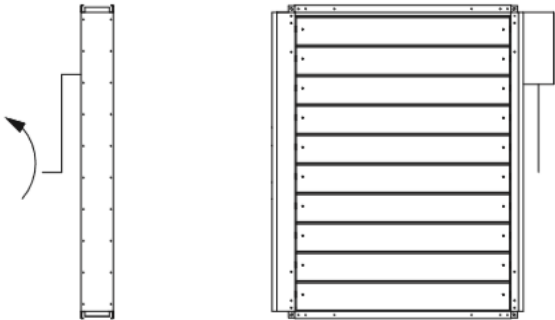
inverse damper
reversed cable outlet



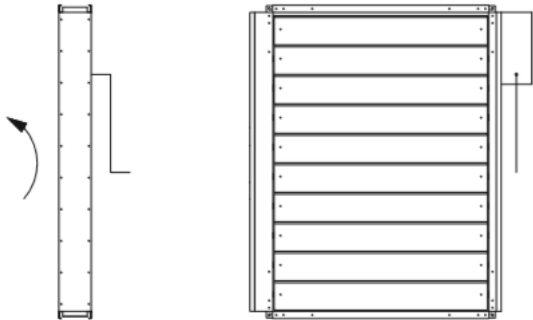
☑ Installation in reversed horizontal and vertical position available

9.5.6 WIP PRO/S, WIP PRO/V, VIP PRO/V-M damper with RST-KW1 mechanism

left damper
standard



inverse damper
reversed cable outlet



☒ Installation in reversed horizontal and vertical position available