Fire damper:

Multi-blade smoke exhaust fire dampers for multi-zone fire ventilations systems

Model WIP PRO/V & WIP PRO/V-M

Technical Catalogue

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1396-CPR-0115

FIRES
The Experts On Fire Safety

ATEST HIGIENICZNY

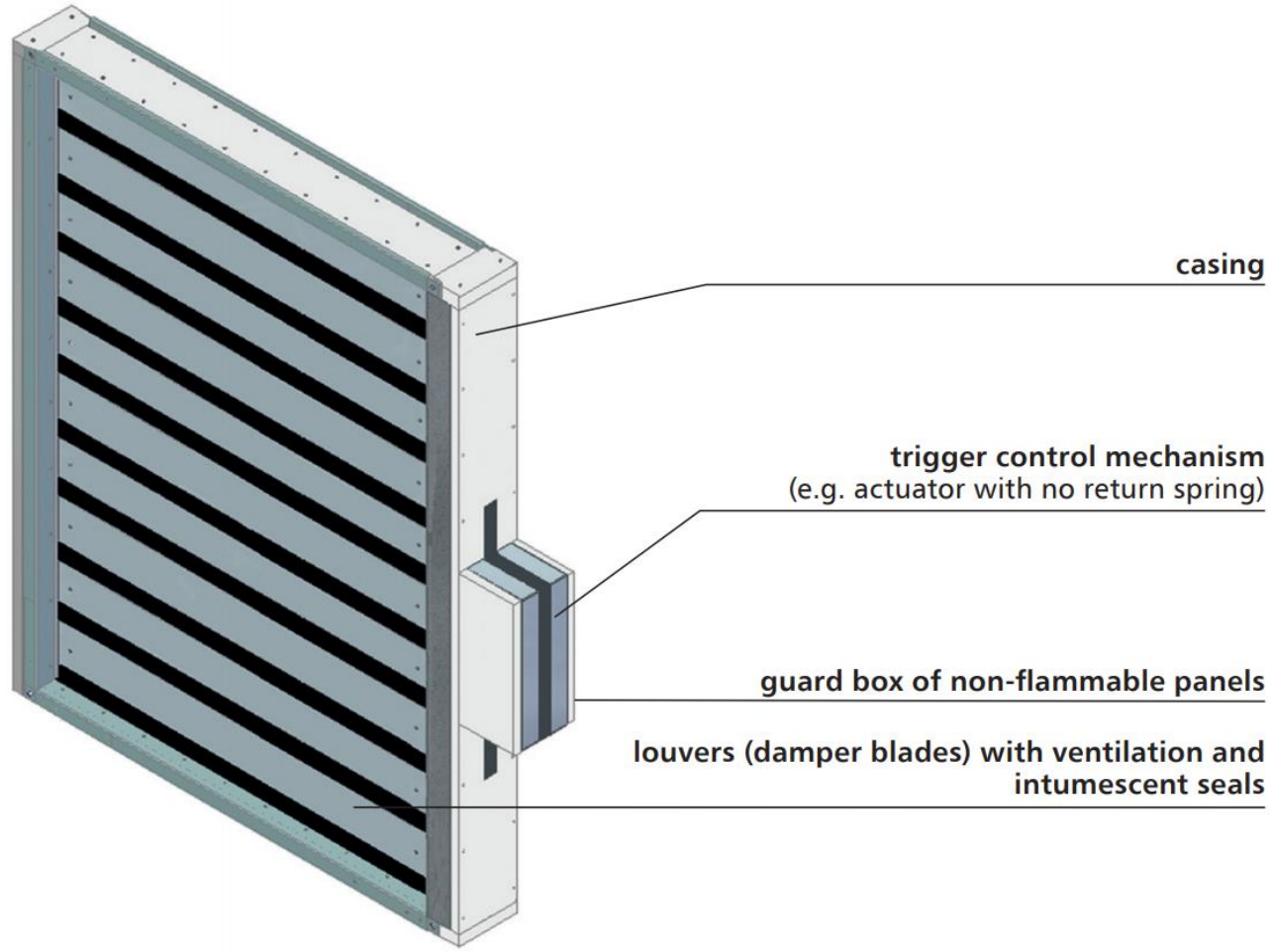
EIS120, EIS90, ES120

- Certificate of constancy of performance 1396-CPR-0115.
- Dampers certified for compliance with EN 12101-8.
- Dampers qualified under EN 13501-4 and tested under EN 1366-10.
- Narrow louvered fire dampers for fire ventilation systems.

1. Application

Multi-blade WIP PRO/V, WIP PRO/V-M fire dampers for use in automatic fire ventilation systems. WIP PRO/V fire dampers are used in fire ventilation systems, WIP PRO/V-M fire dampers are used in mixed systems, combining both fire and comfort ventilation systems. The devices prevent fire, smoke and fire gases propagation to the adjacent areas. During normal operation, the fire damper is in open or closed position depending on its function. In the fire-covered area, the fire damper is open, whereas it remains closed in the other areas. WIP PRO/V, WIP PRO/V-M fire dampers due to their design are intended for use in systems, where the components such as a silencer, bend or supply/return grille are installed downstream of the fire damper.

2. Design



Multi-blade WIP PRO/V, WIP PRO/V-M dampers consist of a rectangular casing made of two steel sections joined with a noncombustible plate using rivets and galvanized steel fasteners, a set of movable blades rotating around their axis and a trigger control mechanism. The fire damper casing is made of fire resistant panels and galvanized steel „C" shape profiles. The device is reinforced on both sides with steel corners. Intumescent and ventilation seals are installed on the inside. Each fire damper blade is made of two 20 mm thick fire resistant plates. Intumescent seal and ventilation seals fixed with staples are installed at the entire blade length. The blades rotate around the axis made by two steel pins. Each pin is mounted in a brass sleeve mounted on a vertical side H of the fire damper casing.

3. Versions

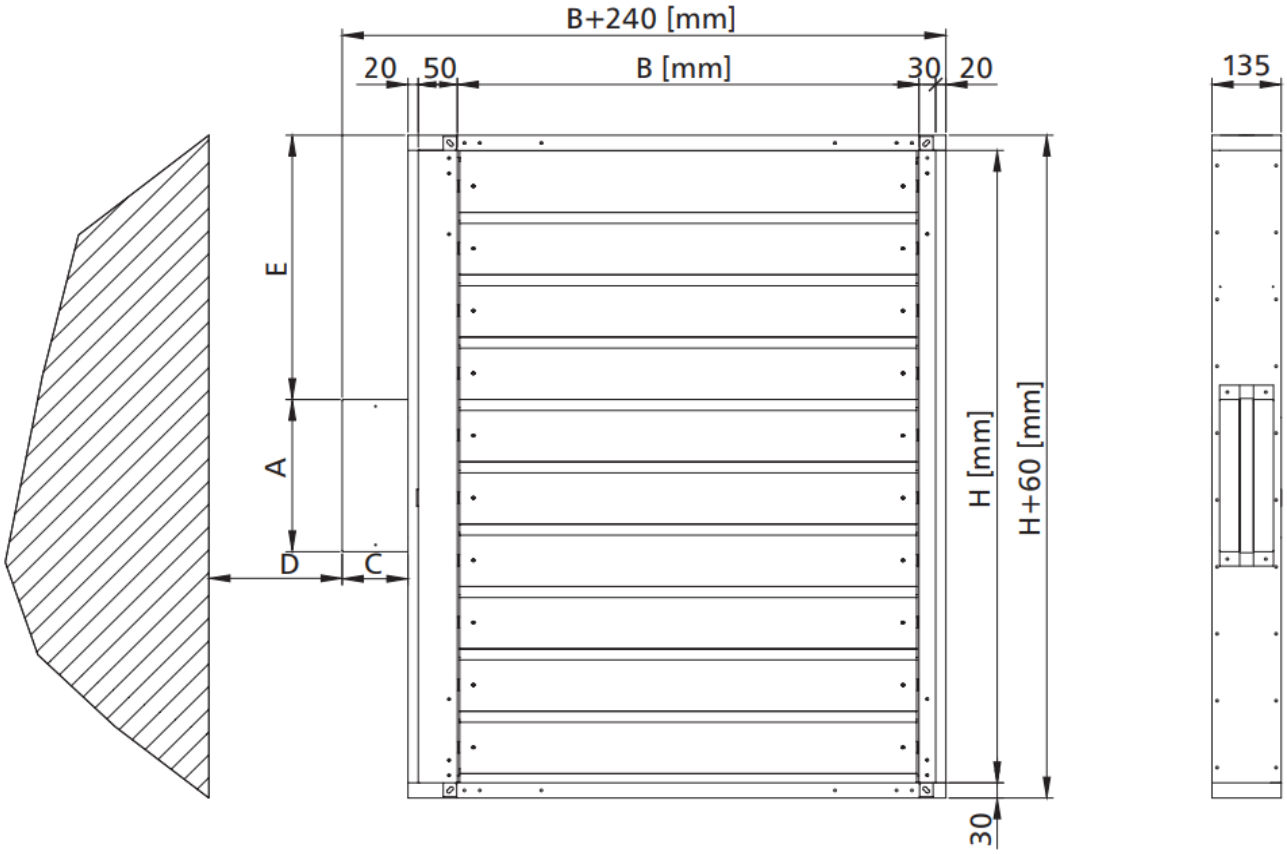
3.1 WIP PRO/V, WIP PRO/V-M fire damper for multi-zone fire ventilation systems with actuator – damper opened/closed with an actuator

During normal operation, the louvers are open or closed. In case of fire, the fire damper louvers are opened in the fire-covered area and closed in the other areas - the fire damper is released remotely by feeding the supply voltage to the trigger control mechanism.

WIP PRO/V, WIP PRO/V-M fire dampers feature a Belimo trigger control mechanisms **BLE**, **BE** axial actuator without the return spring (24 V AC/DC or 230 V AC). BLE, BE series actuators are equipped with

limit switches used to monitor the blade position. Furthermore, the mechanical blade position indicator is placed on the actuator.

WIP PRO/V, WIP PRO/V-M fire dampers with Belimo BLE, BE actuators are opened or closed by supplying voltage to the actuator terminals. Furthermore, dampers with those actuators may be opened/closed manually using a key.



Mechanism	A	C	D	E
BF, BFL, BFN	298	120	75	Formula*

* show in below table

For the even number of blades	For the odd number of blades
E [mm] = (H/2 - 123) + 30	E [mm] = (H/2 – 61.5) + 30

Number for blades = H/123

4. Dimensions

Rectangular dampers:

- Nominal width B: from 110 mm to 900 mm
- Nominal height H: from 263 mm to 1250 mm
- The maximum cross-section surface of one damper up to 1.125 m^2

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

Square fire dampers may also be fitted with round connectors for the spigot connection to the round ducts.

5. Installation

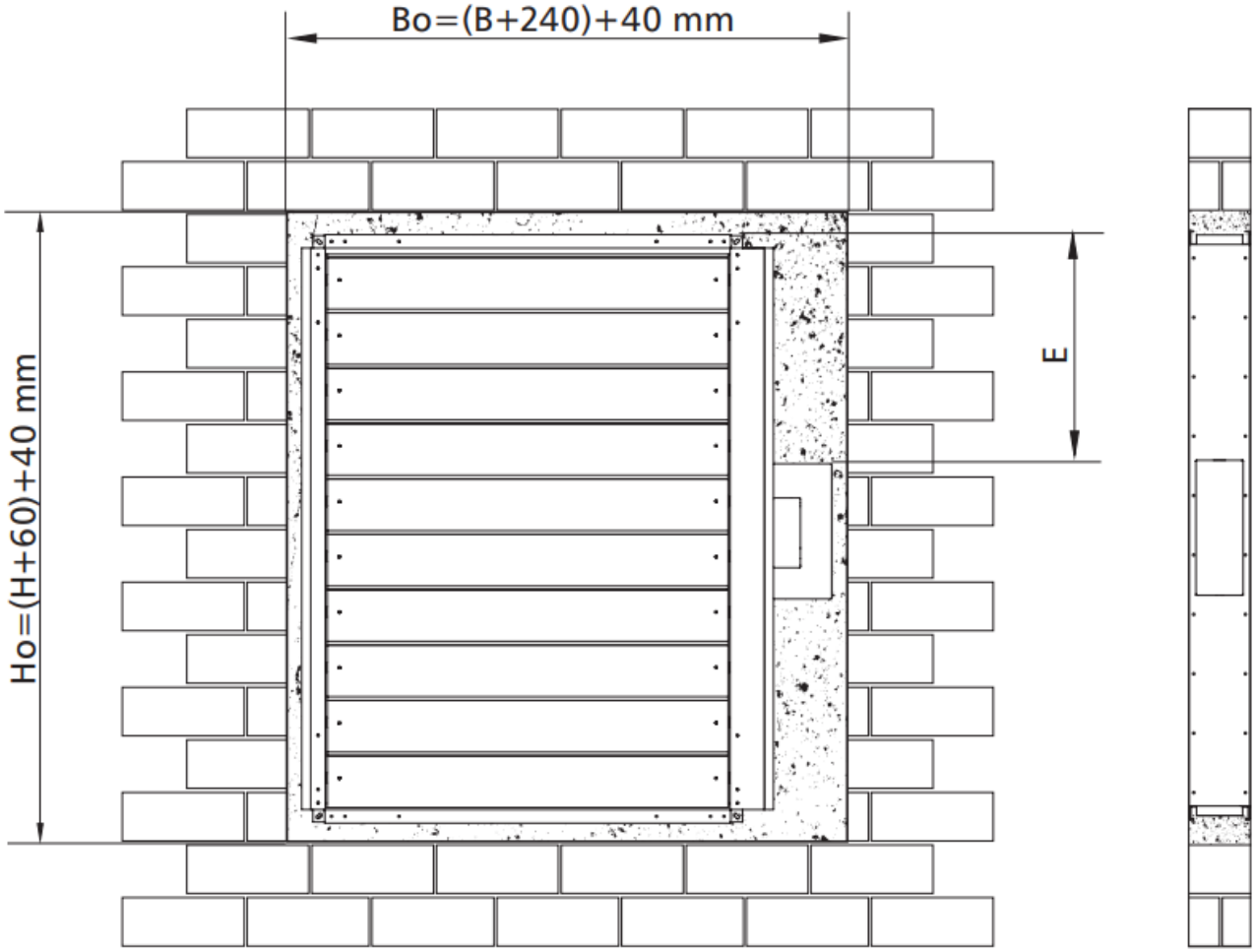
Rectangular WIP PRO/V, WIP PRO/V-M fire dampers are class EI120(v_e i i↔ o)S-rated devices, if installed in concrete partitions, min. 110 mm thick, made of common bricks or aerated concrete blocks, min. thickness 115 mm or stud partitions with min. EI120 fire rating.

5.1 Preparation of installation openings

The minimum dimensions of the installation opening that permits correct installation of the WIP PRO/V, WIP PRO/V-M damper is:

Bo = (B + 240) + 40 mm

Ho = (H + 60) + 40 mm

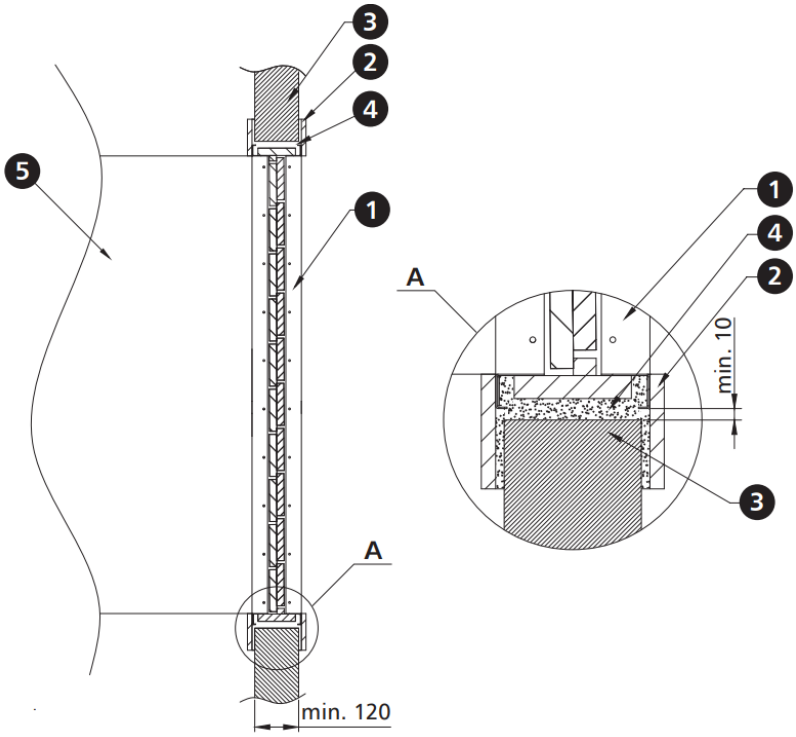


Dimension E (distance from the top fire damper edge to the edge of the trigger control mechanism box) - depending on the dimension H and the trigger control mechanism used:

Mechanism	For the even number of blades	For the odd number of blades
BE, BLE	E [mm] = (H/2 -123) + 30	E [mm] = (H/2 – 61.5) + 30

5.2 Sample installation in concrete block or full brick walls

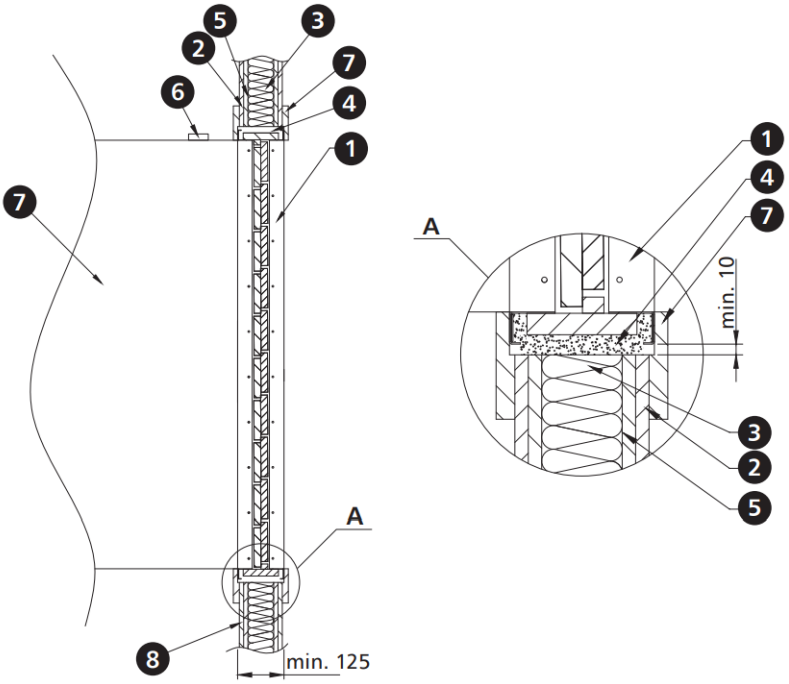
1. Fire damper WIP PRO
2. Gypsum board trim 100x12.5 mm
3. Brick masonry wall
4. Cement mortar (e.g. gypsum)*
5. Smoke ventilation duct



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

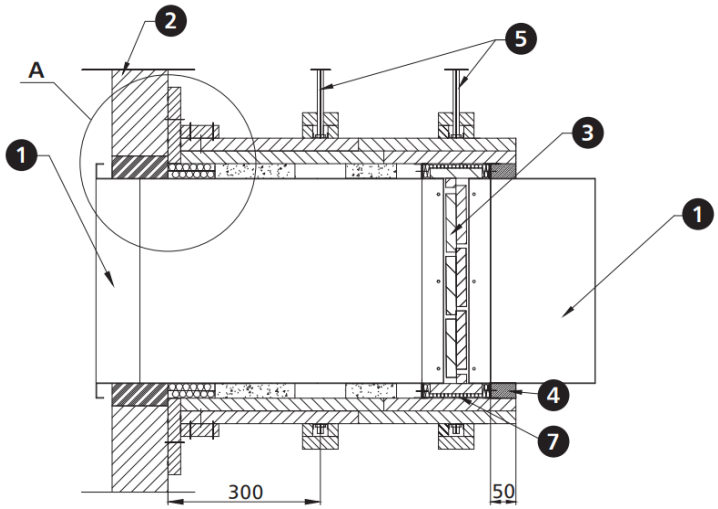
5.3 Sample installation in in lightweight walls

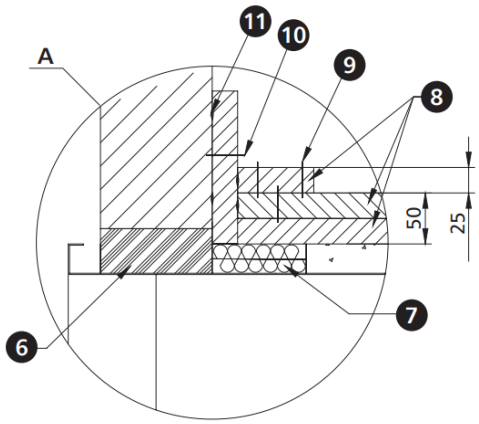
1. Fire damper WIP PRO
2. Gypsum board 12.5 mm
3. Mineral wool with the density of at least 80 kg/m^3, A1 class
4. Mortar (e.g. gypsum)*
5. Structural profile
6. Gypsum board trim 100x12.5 mm
7. Smoke ventilation duct
8. Partition wall



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

5.4 Sample installation outside the fire partition

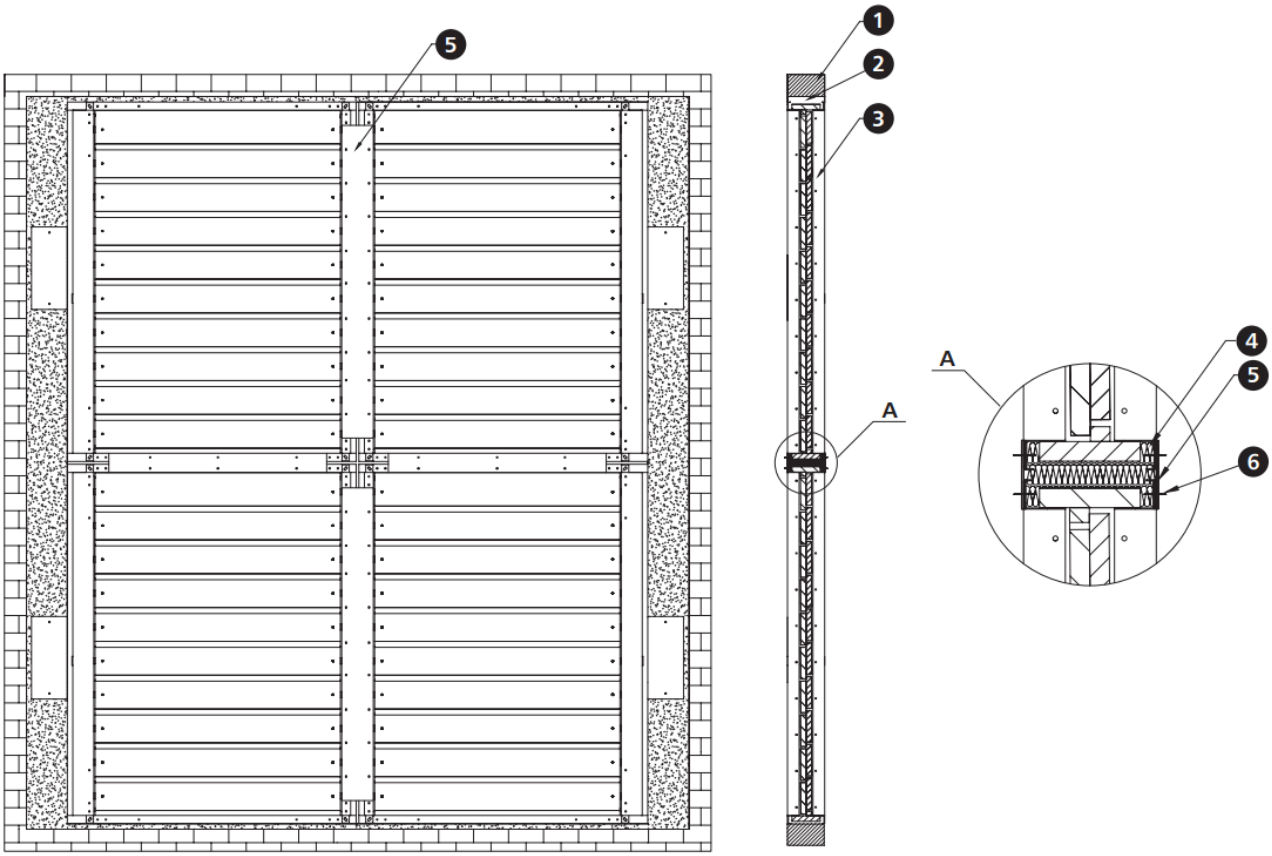




1. Smoke ventilation duct
2. partition wall
3. Fire damper WIP PRO
4. Gypsum infill
5. Duct suspension
6. Sealing (cement or cement-lime masonry mortar)*
7. Mineral wool with the density of at least 80 kg/m^3, A1 class
8. Ridurit fire retardant board
9. Screws 3.5 x 50 at ~150 mm centres
10. Steel expansion anchor Ø8 x 80 mm
11. Board joints sealed with Conlit Glue

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

5.5 Sample installation in a multiple set (a battery of four dampers)

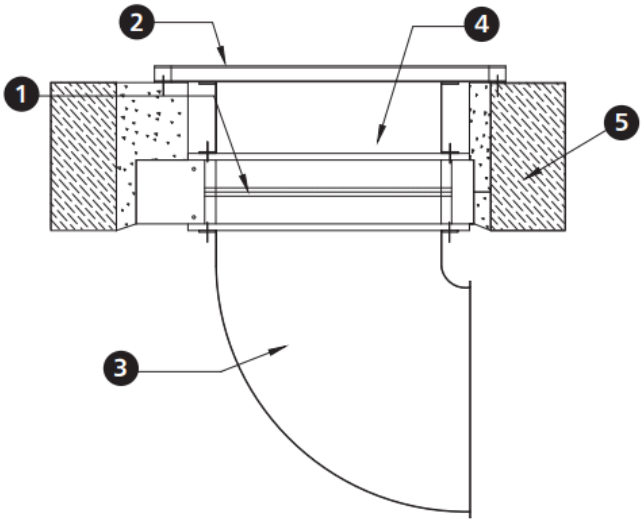


1. e.g. masonry wall
2. e.g. cement mortar*
3. fire damper WIP PRO
4. mineral wool with the density of at least 80kg/m^3, A1 class
5. Steel flat bar, dimensions:
   - Vertical H: Width 110 mm, thickness 2 mm
   - Horizontal B: width 70 mm, thickness 2 mm
6. ST8x16 screw

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

5.6 Example applications – installation with end cap

1. Fire damper WIP
2. Duct cover
3. Ventilation duct
4. Duct - ventilation straight connection pipe
5. Wall, ceiling



If a WIP/V, WIP/V-M damper is used, thanks to the shutters (no single-plane partition) it is possible to use the space in front of and behind the damper for such system elements as a duct cover or a rectangular silencer or to route a duct along the wall using a duct bend or reduction.

6. Technical parameters of WIP PRO/V, WIP PRO/V-M rectangular dampers

B – nominal width [mm]
H – nominal height [mm]
v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]
Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 263 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	300 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	350 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.029	0.019	269	13	6	0.033	0.019	269	14	10	0.039	0.019	269	16	15
	6			404	28	16			404	30	21			404	36	25
	8			539	50	24			539	54	28			539	63	33
	10			673	78	29			673	85	34			673	99	39
150	4	0.040	0.026	367	13	7	0.045	0.026	367	14	12	0.053	0.026	367	16	16
	6			551	28	17			551	30	22			551	36	27
	8			734	50	25			734	54	30			734	63	34
	10			918	78	31			918	85	36			918	99	40
200	4	0.053	0.034	490	13	8	0.060	0.034	490	14	13	0.070	0.034	490	16	17
	6			734	28	19			734	30	23			734	36	28
	8			979	50	26			979	54	31			979	63	35
	10			1 224	78	32			1 224	84	37			1 224	99	41
250	4	0.067	0.043	612	13	9	0.075	0.043	612	14	14	0.088	0.043	612	16	18
	6			918	28	20			918	30	24			918	36	29
	8			1 224	50	27			1 224	54	32			1 224	63	36
	10			1 530	78	33			1 530	85	38			1 530	99	42
300	4	0.080	0.051	734	13	10	0.090	0.051	734	14	15	0.105	0.051	734	16	19
	6			1 102	28	20			1 102	30	25			1 102	36	30
	8			1 469	50	28			1 469	54	33			1 469	63	37
	10			1 836	78	34			1 836	85	39			1 836	99	43
350	4	0.093	0.060	857	13	11	0.105	0.060	857	14	15	0.123	0.060	857	16	20
	6			1 285	28	21			1 285	30	26			1 285	36	30
	8			1 714	50	29			1 714	54	33			1 714	63	38
	10			2 142	78	34			2 142	85	39			2 142	99	44
400	4	0.106	0.068	979	13	11	0.120	0.068	979	14	16	0.140	0.068	979	16	20
	6			1 469	28	22			1 469	30	26			1 469	36	31
	8			1 958	50	29			1 958	54	34			1 958	63	38
	10			2 448	78	35			2 448	84	40			2 448	99	44
450	4	0.120	0.077	1 102	13	12	0.135	0.077	1 102	14	16	0.158	0.077	1 102	16	21
	6			1 652	28	22			1 652	30	27			1 652	36	31
	8			2 203	50	30			2 203	54	34			2 203	63	39
	10			2 754	78	36			2 754	84	40			2 754	99	45
500	4	0.133	0.085	1 224	13	12	0.150	0.085	1 224	14	17	0.175	0.085	1 224	16	21
	6			1 836	28	23			1 836	30	27			1 836	36	32
	8			2 448	50	30			2 448	54	35			2 448	63	39
	10			3 060	78	36			3 060	85	41			3 060	99	45
550	4	0.146	0.094	1 346	2	12	0.165	0.094	1 346	14	17	0.193	0.094	1 346	16	22
	6			2 020	4	23			2 020	30	28			2 020	36	32
	8			2 693	6	31			2 693	54	35			2 693	63	40
	10			3 366	10	36			3 366	84	41			3 366	99	46
600	4	0.160	0.102	1 469	13	13	0.180	0.102	1 469	14	18	0.210	0.102	1 469	16	22
	6			2 203	28	23			2 203	30	28			2 203	36	33
	8			2 938	50	31			2 938	54	36			2 938	63	40
	10			3 672	78	37			3 672	85	42			3 672	99	46
650	4	0.173	0.111	1 591	13	13	0.195	0.111	1 591	14	18	0.228	0.111	1 591	16	22
	6			2 387	28	24			2 387	30	29			2 387	36	33
	8			3 182	50	31			3 182	54	36			3 182	63	41
	10			3 978	78	37			3 978	85	42			3 978	99	46
700	4	0.186	0.119	1 714	13	14	0.210	0.119	1 714	14	18	0.245	0.119	1 714	16	23
	6			2 570	28	24			2 570	30	29			2 570	36	33
	8			3 427	50	32			3 427	54	36			3 427	63	41
	10			4 284	78	37			4 284	85	42			4 284	99	47
750	4	0.200	0.128	1 836	13	14	0.225	0.128	1 836	14	19	0.263	0.128	1 836	16	23
	6			2 754	28	24			2 754	30	29			2 754	36	34
	8			3 672	50	32			3 672	54	37			3 672	63	41
	10			4 590	78	38			4 590	85	43			4 590	99	47
800	4	0.213	0.136	1 958	13	14	0.240	0.136	1 958	14	19	0.280	0.136	1 958	16	23
	6			2 938	28	25			2 938	30	29			2 938	36	34
	8			3 917	50	32			3 917	54	37			3 917	63	41
	10			4 896	78	38			4 896	84	43			4 896	99	47
850	4	0.226	0.145	2 081	13	14	0.255	0.145	2 081	14	19	0.298	0.145	2 081	16	24
	6			3 121	28	25			3 121	30	30			3 121	36	34
	8			4 162	50	32			4 162	54	37			4 162	63	42
	10			5 202	78	38			5 202	84	43			5 202	99	48
900	4	0.239	0.153	2 203	13	15	0.270	0.153	2 203	14	19	0.315	0.153	2 203	16	24
	6			3 305	28	25			3 305	30	30			3 305	36	34
	8			4 406	50	33			4 406	54	37			4 406	63	42
	10			5 508	78	39			5 508	84	43			5 508	99	48

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 400 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	450 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	500 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.044	0.028	401	13	8	0.050	0.028	401	14	12	0.056	0.037	532	11	15
	6			601	29	18			601	31	23			798	26	26
	8			802	52	26			802	55	30			1 064	45	34
	10			1 002	81	32			1 002	86	36			1 331	71	39
150	4	0.060	0.038	546	13	9	0.068	0.038	546	14	14	0.077	0.050	726	11	17
	6			820	29	20			820	31	24			1 089	26	27
	8			1 093	52	27			1 093	55	32			1 452	45	35
	10			1 366	81	33			1 366	86	38			1 814	71	41
200	4	0.080	0.051	729	13	10	0.090	0.051	729	14	15	0.102	0.067	968	11	18
	6			1 093	29	21			1 093	31	25			1 452	26	29
	8			1 457	52	28			1 457	55	33			1 935	45	36
	10			1 822	81	34			1 822	86	39			2 419	71	42
250	4	0.100	0.063	911	13	11	0.113	0.063	911	14	16	0.128	0.084	1 210	11	19
	6			1 366	29	22			1 366	31	26			1 814	26	30
	8			1 822	52	29			1 822	55	34			2 419	45	37
	10			2 277	81	35			2 277	86	40			3 024	71	43
300	4	0.120	0.076	1 093	13	12	0.135	0.076	1 093	14	17	0.154	0.101	1 452	11	20
	6			1 639	29	23			1 639	31	27			2 177	26	30
	8			2 186	52	30			2 186	55	35			2 903	45	38
	10			2 732	81	36			2 732	86	41			3 629	71	44
350	4	0.140	0.089	1 275	13	13	0.158	0.089	1 275	14	17	0.179	0.118	1 693	11	20
	6			1 913	29	23			1 913	31	28			2 540	26	31
	8			2 550	52	31			2 550	55	35			3 387	45	39
	10			3 188	81	37			3 188	86	41			4 234	71	44
400	4	0.160	0.101	1 457	13	13	0.180	0.101	1 457	14	18	0.205	0.134	1 935	11	21
	6			2 186	29	24			2 186	31	28			2 903	26	32
	8			2 915	52	31			2 915	55	36			3 871	45	39
	10			3 643	81	37			3 643	86	42			4 838	71	45
450	4	0.180	0.114	1 639	13	14	0.203	0.114	1 639	14	18	0.230	0.151	2 177	11	22
	6			2 459	29	24			2 459	31	29			3 266	26	32
	8			3 279	52	32			3 279	55	36			4 355	45	40
	10			4 099	81	38			4 099	86	42			5 443	71	45
500	4	0.200	0.127	1 822	13	14	0.225	0.127	1 822	14	19	0.256	0.168	2 419	11	22
	6			2 732	29	25			2 732	31	29			3 629	26	33
	8			3 643	52	32			3 643	55	37			4 838	45	40
	10			4 554	81	38			4 554	86	43			6 048	71	46
550	4	0.220	0.139	2 004	13	15	0.248	0.139	2 004	14	19	0.282	0.185	2 661	11	22
	6			3 006	29	25			3 006	31	30			3 992	26	33
	8			4 008	52	33			4 008	55	37			5 322	45	40
	10			5 009	81	39			5 009	86	43			6 653	71	46
600	4	0.240	0.152	2 186	13	15	0.270	0.152	2 186	14	20	0.307	0.202	2 903	11	23
	6			3 279	29	26			3 279	31	30			4 355	26	33
	8			4 372	52	33			4 372	55	38			5 806	45	41
	10			5 465	81	39			5 465	86	44			7 258	71	47
650	4	0.260	0.164	2 368	13	15	0.293	0.164	2 368	14	20	0.333	0.218	3 145	11	23
	6			3 552	29	26			3 552	31	31			4 717	26	34
	8			4 736	52	34			4 736	55	38			6 290	45	41
	10			5 920	81	39			5 920	86	44			7 862	71	47
700	4	0.280	0.177	2 550	13	16	0.315	0.177	2 550	14	20	0.358	0.235	3 387	11	23
	6			3 825	29	26			3 825	31	31			5 080	26	34
	8			5 100	52	34			5 100	55	38			6 774	45	42
	10			6 376	81	40			6 376	86	44			8 467	71	47
750	4	0.300	0.190	2 732	13	16	0.338	0.190	2 732	14	21	0.384	0.252	3 629	11	24
	6			4 099	29	27			4 099	31	31			5 443	26	34
	8			5 465	52	34			5 465	55	39			7 258	45	42
	10			6 831	81	40			6 831	86	45			9 072	71	48
800	4	0.320	0.202	2 915	13	16	0.360	0.202	2 915	14	20	0.410	0.269	3 871	11	24
	6			4 372	29	27			4 372	31	31			5 806	26	34
	8			5 829	52	34			5 829	55	38			7 741	45	42
	10			7 286	81	40			7 286	86	44			9 677	71	48
850	4	0.340	0.215	3 097	13	17	0.383	0.215	3 097	14	20	0.435	0.286	4 113	11	24
	6			4 645	29	27			4 645	31	31			6 169	26	34
	8			6 193	52	35			6 193	55	38			8 225	45	42
	10			7 742	81	40			7 742	86	44			10 282	71	48
900	4	0.360	0.228	3 279	13	17	0.405	0.228	3 279	14	20	0.461	0.302	4 355	11	24
	6			4 918	29	27			4 918	31	31			6 532	26	34
	8			6 558	52	35			6 558	55	38			8 709	45	42
	10			8 197	81	41			8 197	86	44			10 886	71	48

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 550 Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L_{WA} [dB]	630 Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L_{WA} [dB]	650 Sk [m²]	Se [m²]	Q [m³/h]	dp [Pa]	L_{WA} [dB]
110	4	0.061	0.037	532	13	10	0.070	0.046	664	11	14	0.072	0.046	664	12	9
	6			798	29	21			996	25	24			996	27	20
	8			1 064	51	29			1 327	44	32			1 327	48	27
	10			1 331	79	34			1 659	69	38			1 659	76	33
150	4	0.083	0.050	726	13	12	0.095	0.063	905	11	15	0.098	0.063	905	12	10
	6			1 089	29	22			1 358	25	26			1 358	27	21
	8			1 452	51	30			1 810	44	33			1 810	48	28
	10			1 814	79	36			2 263	69	39			2 263	76	34
200	4	0.110	0.067	968	13	13	0.127	0.084	1 207	11	16	0.130	0.084	1 207	12	12
	6			1 452	29	24			1 810	25	27			1 810	27	22
	8			1 935	51	31			2 413	44	34			2 413	48	30
	10			2 419	79	37			3 017	69	40			3 017	76	36
250	4	0.138	0.084	1 210	13	14	0.159	0.105	1 508	11	17	0.163	0.105	1 508	12	13
	6			1 814	29	25			2 263	25	28			2 263	27	23
	8			2 419	51	32			3 017	44	35			3 017	48	31
	10			3 024	79	38			3 771	69	41			3 771	76	36
300	4	0.165	0.101	1 452	13	15	0.191	0.126	1 810	11	18	0.195	0.126	1 810	12	13
	6			2 177	29	25			2 715	25	29			2 715	27	24
	8			2 903	51	33			3 620	44	36			3 620	48	31
	10			3 629	79	39			4 525	69	42			4 525	76	37
350	4	0.193	0.118	1 693	13	15	0.222	0.147	2 112	11	19	0.228	0.147	2 112	12	14
	6			2 540	29	26			3 168	25	29			3 168	27	25
	8			3 387	51	34			4 224	44	37			4 224	48	32
	10			4 234	79	39			5 279	69	43			5 279	76	38
400	4	0.220	0.134	1 935	13	16	0.254	0.168	2 413	11	19	0.260	0.168	2 413	12	15
	6			2 903	29	27			3 620	25	30			3 620	27	25
	8			3 871	51	34			4 827	44	37			4 827	48	33
	10			4 838	79	40			6 034	69	43			6 034	76	39
450	4	0.248	0.151	2 177	13	17	0.286	0.189	2 715	11	20	0.293	0.189	2 715	12	15
	6			3 266	29	27			4 073	25	30			4 073	27	26
	8			4 355	51	35			5 430	44	38			5 430	48	33
	10			5 443	79	40			6 788	69	44			6 788	76	39
500	4	0.275	0.168	2 419	13	17	0.318	0.210	3 017	11	20	0.325	0.210	3 017	12	16
	6			3 629	29	28			4 525	25	31			4 525	27	26
	8			4 838	51	35			6 034	44	38			6 034	48	34
	10			6 048	79	41			7 542	69	44			7 542	76	40
550	4	0.303	0.185	2 661	13	17	0.349	0.230	3 318	11	21	0.358	0.230	3 318	12	16
	6			3 992	29	28			4 978	25	31			4 978	27	27
	8			5 322	51	36			6 637	44	39			6 637	48	34
	10			6 653	79	41			8 296	69	45			8 296	76	40
600	4	0.330	0.202	2 903	13	18	0.381	0.251	3 620	11	21	0.390	0.251	3 620	12	16
	6			4 355	29	28			5 430	25	32			5 430	27	27
	8			5 806	51	36			7 240	44	39			7 240	48	34
	10			7 258	79	42			9 050	69	45			9 050	76	40
650	4	0.358	0.218	3 145	13	18	0.413	0.272	3 922	11	21	0.423	0.272	3 922	12	17
	6			4 717	29	29			5 883	25	32			5 883	27	27
	8			6 290	51	36			7 844	44	39			7 844	48	35
	10			7 862	79	42			9 805	69	45			9 805	76	41
700	4	0.385	0.235	3 387	13	18	0.445	0.293	4 224	11	22	0.455	0.293	4 224	12	17
	6			5 080	29	29			6 335	25	32			6 335	27	28
	8			6 774	51	37			8 447	44	40			8 447	48	35
	10			8 467	79	42			10 559	69	46			10 559	76	41
750	4	0.413	0.252	3 629	13	19	0.476	0.314	4 525	11	22	0.488	0.314	4 525	12	17
	6			5 443	29	29			6 788	25	33			6 788	27	28
	8			7 258	51	37			9 050	44	40			9 050	48	35
	10			9 072	79	43			11 313	69	46			11 313	76	41
800	4	0.440	0.269	3 871	13	19	0.508	0.335	4 827	11	22	0.520	0.335	4 827	12	17
	6			5 806	29	30			7 240	25	33			7 240	27	28
	8			7 741	51	37			9 654	44	40			9 654	48	35
	10			9 677	79	43			12 067	69	46			12 067	76	41
850	4	0.468	0.286	4 113	13	19	0.540	0.356	5 129	11	23	0.553	0.356	5 129	12	17
	6			6 169	29	30			7 693	25	33			7 693	27	28
	8			8 225	51	37			10 257	44	41			10 257	48	35
	10			10 282	79	43			12 821	69	46			12 821	76	41
900	4	0.495	0.302	4 355	13	20	0.572	0.377	5 430	11	23	0.585	0.377	5 430	12	17
	6			6 532	29	30			8 145	25	32			8 145	27	28
	8			8 709	51	38			10 860	44	39			10 860	48	35
	10			10 886	79	43			13 576	69	44			13 576	76	41

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 700 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	750 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	800 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.077	0.046	664	14	12	0.083	0.060	859	9	15	0.088	0.055	795	10	11
	6			996	30	23			1 288	20	25			1 193	22	22
	8			1 327	54	30			1 717	35	33			1 590	40	29
	10			1 659	85	36			2 146	55	39			1 988	62	35
150	4	0.105	0.063	905	14	14	0.114	0.081	1 171	9	16	0.120	0.075	1 084	10	12
	6			1 358	30	24			1 756	20	27			1 626	22	23
	8			1 810	54	32			2 341	35	34			2 169	40	30
	10			2 263	85	37			2 927	55	40			2 711	62	36
200	4	0.140	0.084	1 207	14	15	0.152	0.108	1 561	9	17	0.160	0.100	1 446	10	14
	6			1 810	30	25			2 341	20	28			2 169	22	24
	8			2 413	54	33			3 122	35	35			2 892	40	32
	10			3 017	85	39			3 902	55	41			3 614	62	38
250	4	0.175	0.105	1 508	14	16	0.190	0.136	1 951	9	18	0.200	0.126	1 807	10	15
	6			2 263	30	26			2 927	20	29			2 711	22	25
	8			3 017	54	34			3 902	35	36			3 614	40	33
	10			3 771	85	40			4 878	55	42			4 518	62	39
300	4	0.210	0.126	1 810	14	17	0.227	0.163	2 341	9	19	0.240	0.151	2 169	10	15
	6			2 715	30	27			3 512	20	30			3 253	22	26
	8			3 620	54	35			4 683	35	37			4 337	40	33
	10			4 525	85	40			5 854	55	43			5 422	62	39
350	4	0.245	0.147	2 112	14	17	0.265	0.190	2 732	9	20	0.280	0.176	2 530	10	16
	6			3 168	30	28			4 098	20	30			3 795	22	27
	8			4 224	54	35			5 463	35	38			5 060	40	34
	10			5 279	85	41			6 829	55	44			6 325	62	40
400	4	0.280	0.168	2 413	14	18	0.303	0.217	3 122	9	20	0.320	0.201	2 892	10	17
	6			3 620	30	28			4 683	20	31			4 337	22	27
	8			4 827	54	36			6 244	35	38			5 783	40	35
	10			6 034	85	42			7 805	55	44			7 229	62	41
450	4	0.315	0.189	2 715	14	18	0.341	0.244	3 512	9	21	0.360	0.226	3 253	10	17
	6			4 073	30	29			5 268	20	31			4 879	22	28
	8			5 430	54	36			7 024	35	39			6 506	40	35
	10			6 788	85	42			8 780	55	45			8 132	62	41
500	4	0.350	0.210	3 017	14	19	0.379	0.271	3 902	9	21	0.400	0.251	3 614	10	18
	6			4 525	30	29			5 854	20	32			5 422	22	28
	8			6 034	54	37			7 805	35	39			7 229	40	36
	10			7 542	85	43			9 756	55	45			9 036	62	42
550	4	0.385	0.230	3 318	14	19	0.417	0.298	4 293	9	22	0.440	0.276	3 976	10	18
	6			4 978	30	30			6 439	20	32			5 964	22	29
	8			6 637	54	37			8 585	35	40			7 952	40	36
	10			8 296	85	43			10 732	55	46			9 940	62	42
600	4	0.420	0.251	3 620	14	20	0.455	0.325	4 683	9	22	0.480	0.301	4 337	10	18
	6			5 430	30	30			7 024	20	33			6 506	22	29
	8			7 240	54	38			9 366	35	40			8 675	40	36
	10			9 050	85	43			11 707	55	46			10 843	62	42
650	4	0.455	0.272	3 922	14	20	0.493	0.352	5 073	9	22	0.520	0.326	4 699	10	19
	6			5 883	30	31			7 610	20	33			7 048	22	29
	8			7 844	54	38			10 146	35	40			9 397	40	37
	10			9 805	85	44			12 683	55	46			11 747	62	43
700	4	0.490	0.293	4 224	14	20	0.531	0.379	5 463	9	23	0.560	0.351	5 060	10	19
	6			6 335	30	31			8 195	20	33			7 590	22	30
	8			8 447	54	38			10 927	35	41			10 120	40	37
	10			10 559	85	44			13 658	55	47			12 650	62	43
750	4	0.525	0.314	4 525	14	21	0.569	0.407	5 854	9	23	0.600	0.377	5 422	10	19
	6			6 788	30	31			8 780	20	34			8 132	22	30
	8			9 050	54	39			11 707	35	41			10 843	40	37
	10			11 313	85	44			14 634	55	47			13 554	62	43
800	4	0.560	0.335	4 827	14	19	0.606	0.434	6 244	9	23	0.640	0.402	5 783	10	20
	6			7 240	30	29			9 366	20	34			8 675	22	30
	8			9 654	54	37			12 488	35	41			11 566	40	38
	10			12 067	85	42			15 610	55	47			14 458	62	44
850	4	0.595	0.356	5 129	14	21	0.644	0.461	6 634	9	24	0.680	0.427	6 144	10	20
	6			7 693	30	32			9 951	20	34			9 217	22	31
	8			10 257	54	39			13 268	35	42			12 289	40	38
	10			12 821	85	45			16 585	55	47			15 361	62	44
900	4	0.630	0.377	5 430	14	21	0.682	0.488	7 024	9	24	0.720	0.452	6 506	10	20
	6			8 145	30	32			10 536	20	34			9 759	22	31
	8			10 860	54	39			14 049	35	42			13 012	40	38
	10			13 576	85	45			17 561	55	48			16 265	62	44

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 850 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	900 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	950 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.097	0.064	927	12	14	0.099	0.064	927	13	10	0.105	0.064	927	14	13
	6			1 390	27	24			1 390	30	21			1 390	32	23
	8			1 853	49	32			1 853	53	28			1 853	57	31
	10			2 317	76	37			2 317	83	34			2 317	89	36
150	4	0.132	0.088	1 264	12	15	0.135	0.088	1 264	13	11	0.143	0.088	1 264	14	14
	6			1 895	27	25			1 895	30	22			1 895	32	24
	8			2 527	49	33			2 527	53	30			2 527	57	32
	10			3 159	76	39			3 159	83	35			3 159	89	38
200	4	0.176	0.117	1 685	12	16	0.180	0.117	1 685	13	13	0.190	0.117	1 685	14	15
	6			2 527	27	27			2 527	30	23			2 527	32	26
	8			3 370	49	34			3 370	53	31			3 370	57	33
	10			4 212	76	40			4 212	83	37			4 212	89	39
250	4	0.220	0.146	2 106	12	17	0.225	0.146	2 106	13	14	0.238	0.146	2 106	14	16
	6			3 159	27	28			3 159	30	24			3 159	32	27
	8			4 212	49	35			4 212	53	32			4 212	57	34
	10			5 265	76	41			5 265	83	38			5 265	89	40
300	4	0.264	0.176	2 527	12	18	0.270	0.176	2 527	13	14	0.285	0.176	2 527	14	17
	6			3 791	27	28			3 791	30	25			3 791	32	27
	8			5 054	49	36			5 054	53	33			5 054	57	35
	10			6 318	76	42			6 318	83	38			6 318	89	41
350	4	0.308	0.205	2 948	12	19	0.315	0.205	2 948	13	15	0.333	0.205	2 948	14	18
	6			4 423	27	29			4 423	30	26			4 423	32	28
	8			5 897	49	37			5 897	53	33			5 897	57	36
	10			7 371	76	42			7 371	83	39			7 371	89	41
400	4	0.352	0.234	3 370	12	19	0.360	0.234	3 370	13	16	0.380	0.234	3 370	14	18
	6			5 054	27	30			5 054	30	26			5 054	32	29
	8			6 739	49	37			6 739	53	34			6 739	57	36
	10			8 424	76	43			8 424	83	40			8 424	89	42
450	4	0.396	0.263	3 791	12	20	0.405	0.263	3 791	13	16	0.428	0.263	3 791	14	19
	6			5 686	27	30			5 686	30	27			5 686	32	29
	8			7 582	49	38			7 582	53	34			7 582	57	37
	10			9 477	76	44			9 477	83	40			9 477	89	43
500	4	0.441	0.293	4 212	12	20	0.450	0.293	4 212	13	17	0.475	0.293	4 212	14	19
	6			6 318	27	31			6 318	30	27			6 318	32	30
	8			8 424	49	38			8 424	53	35			8 424	57	37
	10			10 530	76	44			10 530	83	41			10 530	89	43
550	4	0.485	0.322	4 633	12	21	0.495	0.322	4 633	13	17	0.523	0.322	4 633	14	20
	6			6 950	27	31			6 950	30	28			6 950	32	30
	8			9 266	49	39			9 266	53	35			9 266	57	38
	10			11 583	76	44			11 583	83	41			11 583	89	43
600	4	0.529	0.351	5 054	12	21	0.540	0.351	5 054	13	17	0.570	0.351	5 054	14	20
	6			7 582	27	31			7 582	30	28			7 582	32	30
	8			10 109	49	39			10 109	53	36			10 109	57	38
	10			12 636	76	45			12 636	83	41			12 636	89	44
650	4	0.573	0.380	5 476	12	21	0.585	0.380	5 476	13	18	0.618	0.380	5 476	14	20
	6			8 213	27	32			8 213	30	28			8 213	32	31
	8			10 951	49	39			10 951	53	36			10 951	57	38
	10			13 689	76	45			13 689	83	42			13 689	89	44
700	4	0.617	0.410	5 897	12	22	0.630	0.410	5 897	13	18	0.665	0.410	5 897	14	21
	6			8 845	27	32			8 845	30	29			8 845	32	31
	8			11 794	49	40			11 794	53	36			11 794	57	39
	10			14 742	76	45			14 742	83	42			14 742	89	44
750	4	0.661	0.439	6 318	12	22	0.675	0.439	6 318	13	18	0.713	0.439	6 318	14	21
	6			9 477	27	32			9 477	30	29			9 477	32	31
	8			12 636	49	40			12 636	53	37			12 636	57	39
	10			15 795	76	46			15 795	83	42			15 795	89	45
800	4	0.705	0.468	6 739	12	22	0.720	0.468	6 739	13	19	0.760	0.468	6 739	14	21
	6			10 109	27	33			10 109	30	29			10 109	32	32
	8			13 478	49	40			13 478	53	37			13 478	57	39
	10			16 848	76	46			16 848	83	43			16 848	89	45
850	4	0.749	0.497	7 160	12	22	0.765	0.497	7 160	13	19	0.808	0.497	7 160	14	21
	6			10 741	27	33			10 741	30	30			10 741	32	32
	8			14 321	49	40			14 321	53	37			14 321	57	39
	10			17 901	76	46			17 901	83	43			17 901	89	45
900	4	0.793	0.527	7 582	12	23	0.810	0.527	7 582	13	19	0.855	0.527	7 582	14	22
	6			11 372	27	33			11 372	30	30			11 372	32	32
	8			15 163	49	41			15 163	53	37			15 163	57	40
	10			18 954	76	47			18 954	83	43			18 954	89	46

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

width B [mm]	v [m/s]	height H [mm] 1000 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1050 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1100 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.110	0.073	1 058	12	15	0.116	0.073	1 058	13	12	0.124	0.083	1 190	11	14
	6			1 587	27	25			1 587	29	22			1 784	24	24
	8			2 116	48	33			2 116	51	30			2 379	43	32
	10			2 645	76	38			2 645	79	36			2 974	67	38
150	4	0.151	0.100	1 443	12	16	0.158	0.100	1 443	13	13	0.169	0.113	1 622	11	15
	6			2 164	27	26			2 164	29	24			2 433	24	26
	8			2 886	48	34			2 886	51	31			3 244	43	33
	10			3 607	76	40			3 607	79	37			4 055	67	39
200	4	0.201	0.134	1 924	12	17	0.210	0.134	1 924	13	14	0.225	0.150	2 163	11	16
	6			2 886	27	28			2 886	29	24			3 244	24	26
	8			3 848	48	35			3 848	51	32			4 326	43	34
	10			4 810	76	41			4 810	79	38			5 407	67	40
250	4	0.251	0.167	2 405	12	18	0.263	0.167	2 405	13	15	0.282	0.188	2 704	11	17
	6			3 607	27	29			3 607	29	25			4 055	24	27
	8			4 810	48	36			4 810	51	33			5 407	43	35
	10			6 012	76	42			6 012	79	39			6 759	67	41
300	4	0.301	0.200	2 886	12	19	0.315	0.200	2 886	13	15	0.338	0.225	3 244	11	17
	6			4 329	27	29			4 329	29	26			4 866	24	28
	8			5 772	48	37			5 772	51	34			6 489	43	36
	10			7 214	76	43			7 214	79	39			8 111	67	41
350	4	0.351	0.234	3 367	12	20	0.368	0.234	3 367	13	16	0.394	0.263	3 785	11	18
	6			5 050	27	30			5 050	29	27			5 678	24	29
	8			6 733	48	38			6 733	51	34			7 570	43	36
	10			8 417	76	43			8 417	79	40			9 463	67	42
400	4	0.402	0.267	3 848	12	20	0.420	0.267	3 848	13	17	0.451	0.300	4 326	11	19
	6			5 772	27	31			5 772	29	27			6 489	24	29
	8			7 695	48	38			7 695	51	35			8 652	43	37
	10			9 619	76	44			9 619	79	41			10 814	67	43
450	4	0.452	0.301	4 329	12	21	0.473	0.301	4 329	13	17	0.507	0.338	4 866	11	19
	6			6 493	27	31			6 493	29	28			7 300	24	30
	8			8 657	48	39			8 657	51	35			9 733	43	37
	10			10 822	76	45			10 822	79	41			12 166	67	43
500	4	0.502	0.334	4 810	12	21	0.525	0.334	4 810	13	18	0.564	0.376	5 407	11	20
	6			7 214	27	32			7 214	29	28			8 111	24	30
	8			9 619	48	39			9 619	51	36			10 814	43	38
	10			12 024	76	45			12 024	79	42			13 518	67	44
550	4	0.552	0.367	5 291	12	22	0.578	0.367	5 291	13	18	0.620	0.413	5 948	11	20
	6			7 936	27	32			7 936	29	29			8 922	24	31
	8			10 581	48	40			10 581	51	36			11 896	43	38
	10			13 226	76	45			13 226	79	42			14 870	67	44
600	4	0.602	0.401	5 772	12	22	0.630	0.401	5 772	13	18	0.676	0.451	6 489	11	20
	6			8 657	27	32			8 657	29	29			9 733	24	31
	8			11 543	48	40			11 543	51	37			12 977	43	39
	10			14 429	76	46			14 429	79	42			16 222	67	44
650	4	0.653	0.434	6 252	12	22	0.683	0.434	6 252	13	19	0.733	0.488	7 029	11	21
	6			9 379	27	33			9 379	29	29			10 544	24	31
	8			12 505	48	40			12 505	51	37			14 059	43	39
	10			15 631	76	46			15 631	79	43			17 573	67	45
700	4	0.703	0.468	6 733	12	23	0.735	0.468	6 733	13	19	0.789	0.526	7 570	11	21
	6			10 100	27	33			10 100	29	30			11 355	24	32
	8			13 467	48	41			13 467	51	37			15 140	43	39
	10			16 834	76	46			16 834	79	43			18 925	67	45
750	4	0.753	0.501	7 214	12	23	0.788	0.501	7 214	13	19	0.845	0.563	8 111	11	21
	6			10 822	27	33			10 822	29	30			12 166	24	32
	8			14 429	48	41			14 429	51	38			16 222	43	40
	10			18 036	76	47			18 036	79	43			20 277	67	45
800	4	0.803	0.534	7 695	12	23	0.840	0.534	7 695	13	20	0.902	0.601	8 652	11	22
	6			11 543	27	34			11 543	29	30			12 977	24	32
	8			15 391	48	41			15 391	51	38			17 303	43	40
	10			19 238	76	47			19 238	79	44			21 629	67	46
850	4	0.853	0.568	8 176	12	23	0.893	0.568	8 176	13	20	0.958	0.638	9 192	11	22
	6			12 264	27	34			12 264	29	31			13 788	24	33
	8			16 353	48	41			16 353	51	38			18 384	43	40
	10			20 441	76	47			20 441	79	44			22 981	67	46
900	4	0.904	0.601	8 657	12	24	0.945	0.601	8 657	13	20	1.014	0.676	9 733	11	22
	6			12 986	27	34			12 986	29	31			14 599	24	33
	8			17 315	48	42			17 315	51	38			19 466	43	40
	10			21 643	76	48			21 643	79	44			24 332	67	46

B – nominal width [mm]
H – nominal height [mm]

v – velocity [m/s]
Sk – duct cross section [m^2]
Se – damper active cross section [m^2]

Q – flow [m^3/h]
Dp – pressure drop [Pa]
L_{WA} – damper noise level [dB]

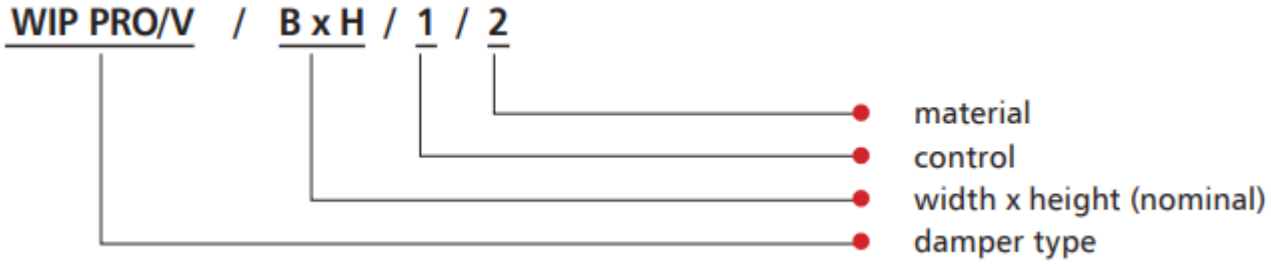
width B [mm]	v [m/s]	height H [mm] 1150 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1200 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]	1250 Sk [m^2]	Se [m^2]	Q [m^3/h]	dp [Pa]	L_{WA} [dB]
110	4	0.127	0.083	1 190	13	11	0.132	0.083	1 190	2	13	0.138	0.092	1 321	11	10
	6			1 784	29	22			1 784	4	23			1 982	24	21
	8			2 379	52	29			2 379	7	31			2 642	43	28
	10			2 974	81	35			2 974	11	37			3 303	66	34
150	4	0.173	0.113	1 622	13	12	0.180	0.113	1 622	2	14	0.188	0.125	1 801	11	12
	6			2 433	29	23			2 433	4	25			2 702	24	22
	8			3 244	52	30			3 244	7	32			3 603	43	30
	10			4 055	81	36			4 055	11	38			4 504	66	36
200	4	0.230	0.150	2 163	13	12	0.240	0.150	2 163	2	14	0.250	0.167	2 402	11	11
	6			3 244	29	23			3 244	4	25			3 603	24	22
	8			4 326	52	31			4 326	7	33			4 804	43	29
	10			5 407	81	36			5 407	11	38			6 005	66	35
250	4	0.288	0.188	2 704	13	13	0.300	0.188	2 704	2	15	0.313	0.209	3 002	11	12
	6			4 055	29	24			4 055	4	26			4 504	24	23
	8			5 407	52	32			5 407	7	33			6 005	43	30
	10			6 759	81	37			6 759	11	39			7 506	66	36
300	4	0.345	0.225	3 244	13	14	0.360	0.225	3 244	2	16	0.375	0.250	3 603	11	13
	6			4 866	29	25			4 866	4	27			5 404	24	24
	8			6 489	52	32			6 489	7	34			7 206	43	31
	10			8 111	81	38			8 111	11	40			9 007	66	37
350	4	0.403	0.263	3 785	13	15	0.420	0.263	3 785	2	17	0.438	0.292	4 203	11	14
	6			5 678	29	25			5 678	4	27			6 305	24	24
	8			7 570	52	33			7 570	7	35			8 407	43	32
	10			9 463	81	39			9 463	11	41			10 508	66	38
400	4	0.460	0.300	4 326	13	15	0.480	0.300	4 326	2	17	0.500	0.334	4 804	11	14
	6			6 489	29	26			6 489	4	28			7 206	24	25
	8			8 652	52	34			8 652	7	36			9 608	43	32
	10			10 814	81	39			10 814	11	41			12 010	66	38
450	4	0.518	0.338	4 866	13	16	0.540	0.338	4 866	2	18	0.563	0.375	5 404	11	15
	6			7 300	29	27			7 300	4	29			8 106	24	25
	8			9 733	52	34			9 733	7	36			10 809	43	33
	10			12 166	81	40			12 166	11	42			13 511	66	39
500	4	0.575	0.376	5 407	13	16	0.600	0.376	5 407	2	18	0.625	0.417	6 005	11	15
	6			8 111	29	27			8 111	4	29			9 007	24	26
	8			10 814	52	35			10 814	7	36			12 010	43	33
	10			13 518	81	40			13 518	11	42			15 012	66	39
550	4	0.633	0.413	5 948	13	17	0.660	0.413	5 948	2	19	0.688	0.459	6 605	11	16
	6			8 922	29	27			8 922	4	29			9 908	24	26
	8			11 896	52	35			11 896	7	37			13 211	43	34
	10			14 870	81	41			14 870	11	43			16 513	66	40
600	4	0.690	0.451	6 489	13	17	0.720	0.451	6 489	2	19	0.750	0.500	7 206	11	16
	6			9 733	29	28			9 733	4	30			10 809	24	27
	8			12 977	52	35			12 977	7	37			14 412	43	34
	10			16 222	81	41			16 222	11	43			18 014	66	40
650	4	0.748	0.488	7 029	13	18	0.780	0.488	7 029	2	20	0.813	0.542	7 806	11	17
	6			10 544	29	28			10 544	4	30			11 709	24	27
	8			14 059	52	36			14 059	7	38			15 612	43	35
	10			17 573	81	41			17 573	11	43			19 516	66	40
700	4	0.805	0.526	7 570	13	18	0.840	0.526	7 570	2	20	0.875	0.584	8 407	11	17
	6			11 355	29	28			11 355	4	30			12 610	24	27
	8			15 140	52	36			15 140	7	38			16 813	43	35
	10			18 925	81	42			18 925	11	44			21 017	66	41
750	4	0.863	0.563	8 111	13	18	0.900	0.563	8 111	2	20	0.938	0.626	9 007	11	17
	6			12 166	29	29			12 166	4	31			13 511	24	28
	8			16 222	52	36			16 222	7	38			18 014	43	35
	10			20 277	81	42			20 277	11	44			22 518	66	41
800	4	0.920	0.601	8 652	13	18	0.960	0.601	8 652	2	20	1.000	0.667	9 608	11	17
	6			12 977	29	29			12 977	4	31			14 412	24	28
	8			17 303	52	37			17 303	7	39			19 215	43	35
	10			21 629	81	42			21 629	11	44			24 019	66	41
850	4	0.978	0.638	9 192	13	19	1.020	0.638	9 192	2	21	1.063	0.709	10 208	11	18
	6			13 788	29	29			13 788	4	31			15 312	24	28
	8			18 384	52	37			18 384	7	39			20 416	43	36
	10			22 981	81	43			22 981	11	45			25 520	66	42
900	4	1.035	0.676	9 733	13	19	1.080	0.676	9 733	2	21	1.125	0.751	10 809	11	18
	6			14 599	29	30			14 599	4	32			16 213	24	28
	8			19 466	52	37			19 466	7	39			21 617	43	36
	10			24 332	81	43			24 332	11	45			27 022	66	42

7. Estimated Weights of WIP PRO/V, WIP PRO/V-M dampers [kg]

width B [mm]	height H [mm]										
	263	300	400	500	600	700	800	900	1000	1100	1250
110	3	3	4	5	7	8	9	10	11	13	14
150	4	4	6	8	9	11	12	14	16	17	20
200	5	6	8	10	12	15	17	19	21	23	27
250	7	8	12	13	16	18	21	24	27	29	33
300	8	9	12	16	19	22	25	29	32	35	40
350	9	11	15	18	22	26	30	34	37	41	47
400	11	12	17	21	25	30	34	38	43	47	54
500	14	16	21	27	32	37	43	48	54	59	67
600	16	19	25	32	38	45	51	58	64	71	81
700	19	22	30	37	45	52	60	68	75	83	94
800	22	25	34	43	51	60	69	77	86	95	108
900	25	29	38	48	58	68	77	87	97	106	128

ℹ The table shows the weight of dampers with RST-KW1 type trigger control mechanism or actuators

8. Marking



1 – Control:

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

2 – Material:

[No symbol] – galvanized steel, Zn 275 g/m^2 coating
KN – 1.4404 acid-proof stainless steel

Example marking:

WIP PRO/V 400 x 400 BLE24
Louvered fire damper EIS120 with a compact 24 V Belimo actuator with limit switches.

9. Power Supply Control

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

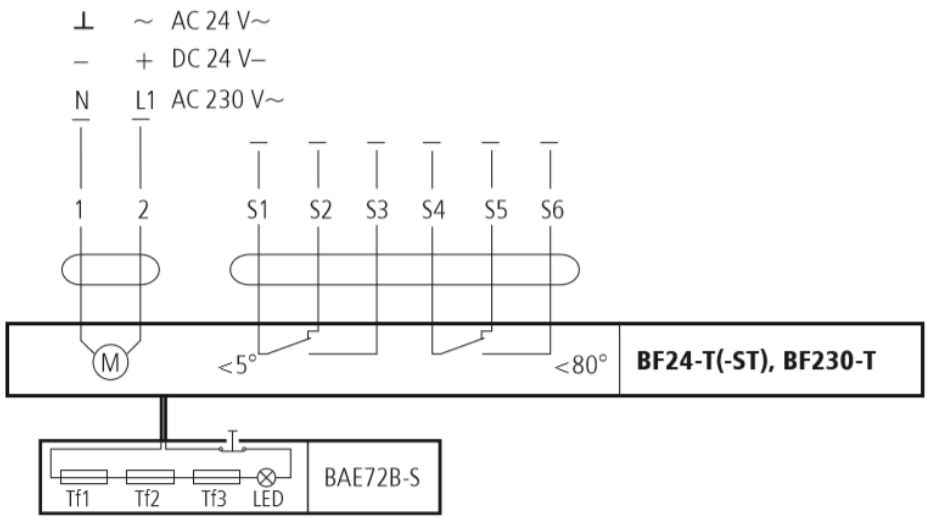
	FID S/S c/P	FID S/S p/P FID S/S p/O	FID S/V p/P FID S/V-M p/P	FID PRO	WIP/ S	WIP/T	WIP/T-G	WIP/V WIP/V-M	WIP PRO/S	WIP PRO/V WIP PRO/V-M
BF24-T (ST)		X			X	X			X	
BF230-T		X			X	X			X	
BFL24-T (-ST)	X	X		X	X	X			X	
BFL230-T	X	X		X	X	X			X	
BFN24-T (-ST)	X	X			X	X			X	
BFN230-T	X	X			X	X			X	
BE24			X			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

SPECIFIKATIONS	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** - **For holding**	 7 W 2 W	 8 W 3 W
Sizing (apparent power)	10 VA	11 VA
Protection class	III	II
Ingress protection rating	IP 54	IP 54
Auxiliary circuit breaker: - **Activation position**	2 x EPU 3 (0.5) A 250 V 5°, 80°	2 x EPU 3 (0.5) A 250 V~ 5°, 80°
Torque - **Motor** - **Return spring**	 18 Nm 12 Nm	 18 Nm 12 Nm
Cable connection: - **Motor (length: 0.9 m)** - **Auxiliary circuit breaker**	 2 x 0.75 mm^2 6 x 0.75 mm^2	 2 x 0.75 mm^2 2 x 0.75 mm^2
Movement time (0-90°) - **Motor** - **Return spring**	 120 s ~16 s	 120 s ~16 s
Operating temperature range	-30…+50°C	-30…+50°C
Sound intensity level: - **Motor** - **Return spring**	 max 45 dB (A) ~63 dB (A)	 max 45 dB (A) ~63 dB (A)

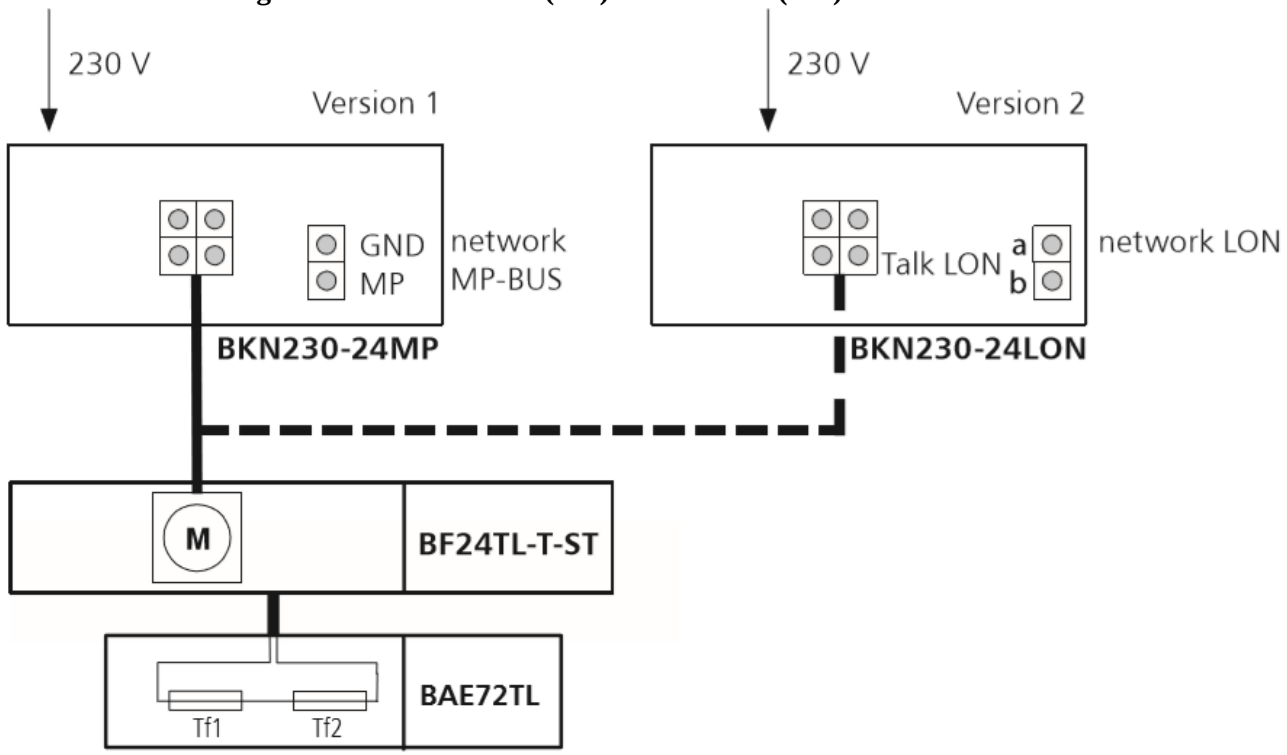
9.2.1.1 Electrical diagram of the BF…-T series actuator:



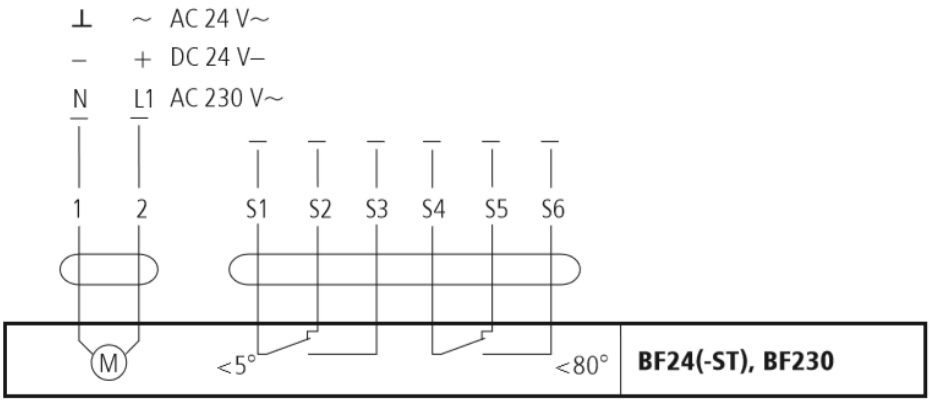
note: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

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:



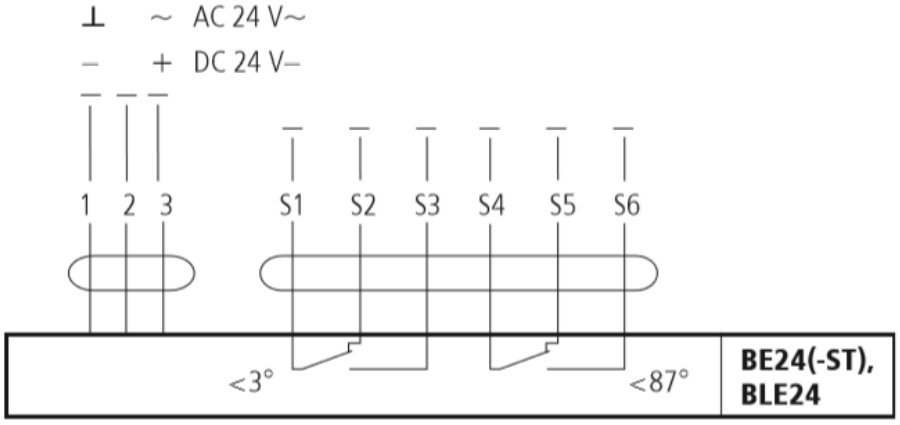
note: 24 V connection through a safety transformer. To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

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

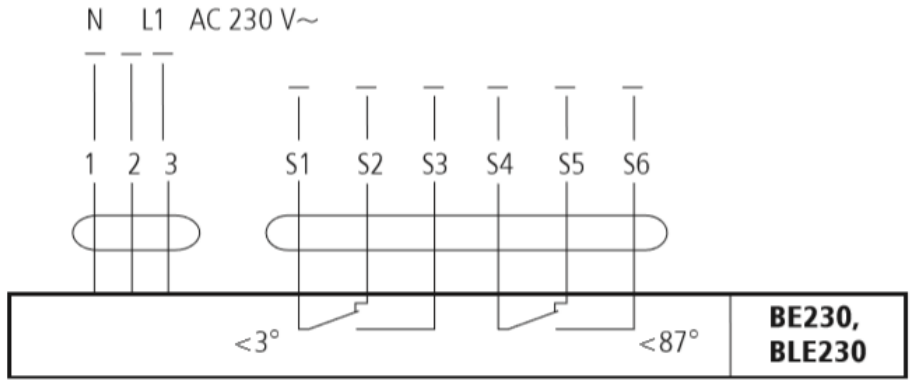
9.2.2 BE, BLE electric actuators

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:	2 x SPDT 6 (1.5) A AC 250 V	2 x SPDT 6 (1.5) A AC 250 V	2 x EPU 3 (1.5) A 250 V	2 x EPU 3 (1.5) A 250 V~
- Activation position	5°, 80°	5°, 80°	5°, 80°	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)

9.2.2.1Electric 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.



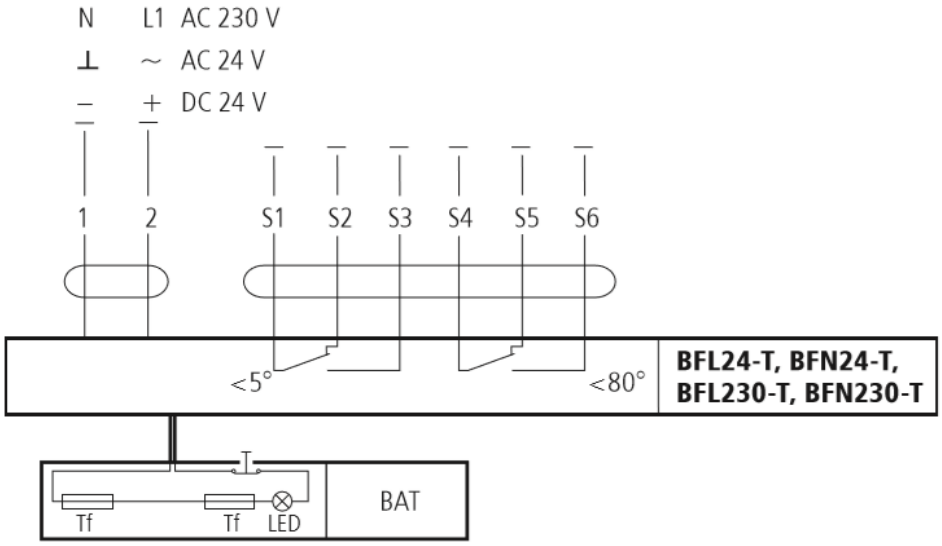
note: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further drives in parallel. Check the power consumption.

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** **- For holding**	 2.5 W 0.7 W	 3.5 W 1.1 W	 4 W 1.4 W	 5 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: **- Activation position**	2 x SPDT 3 (0.5) A AC 250 V 5°, 80°	2 x SPDT 3 (0.5) A AC 250 V 5°, 80°	2 x EPU 3 (0.5) A 250 V 5°, 80°	2 x EPU 3 (0.5) A 250 V 5°, 80°
Torque **- motor** **- return spring**	 4 Nm 3 Nm	 4 Nm 3 Nm	 9 Nm 7 Nm	 9 Nm 7 Nm
Movement time (0-90°): **- motor** **- return spring**	 < 60 s ~20 s	 < 60 s ~20 s	 < 60 s ~20 s	 < 60 s ~20 s
Operating temperature	-30…+55°C	-30…+55°C	-30…+55°C	-30…+55°C
Sound intensity level **- motor** **- return spring**	 max 43 dB (A) ~62 dB (A)	 max 43 dB (A) ~62 dB (A)	 max 55 dB (A) ~67 dB (A)	 max 55 dB (A) ~67 dB (A)

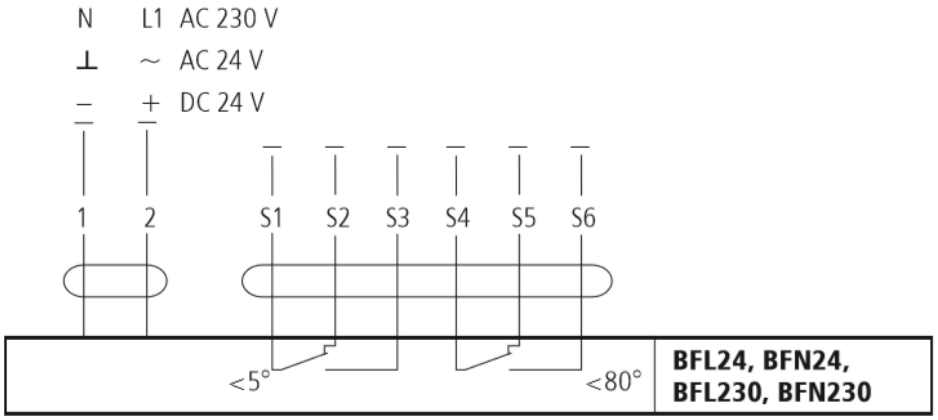
9.2.3.1 Electrical diagram of the BFL…-T, BFN…-T series actuator:



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:



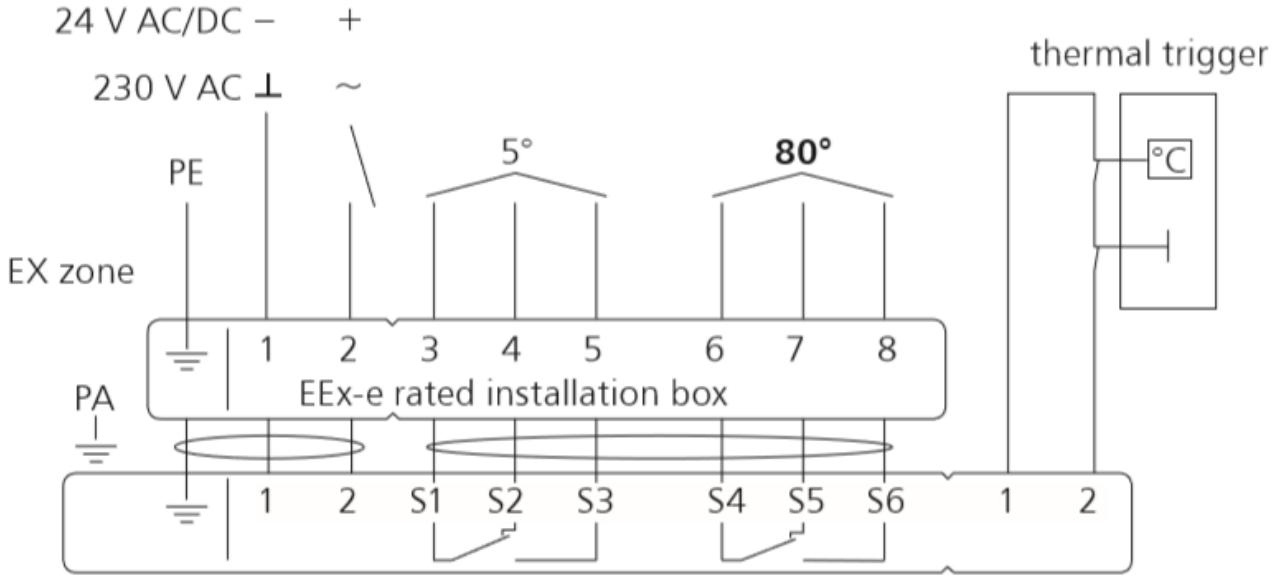
note: 24 V connection through a safety transformer.
To disconnect the 230 V actuator from the mains, the gap of at least 3 mm between the contacts (when off) is required in the switch. It is possible to connect further actuators in parallel. Check the power consumption.

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:	2 x SPDT 6 A (3) max 250 v AC	2 x SPDT 6 A (3) max 250 V AC
- Activation position	5°, 80°	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

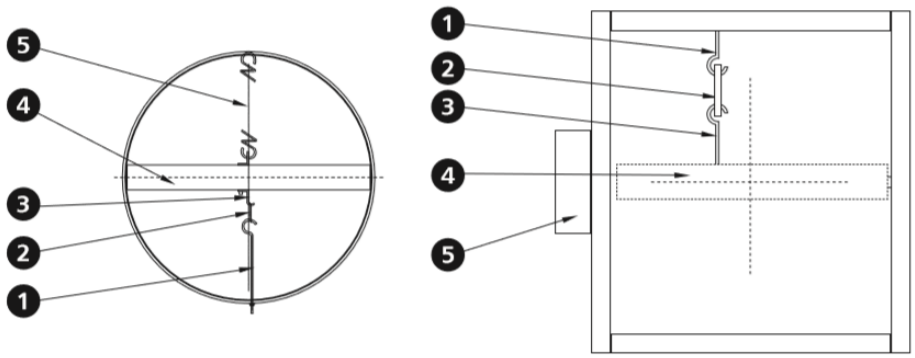
9.2.4.1 Connection diagram for EXBF and EXBF…-T actuators:



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



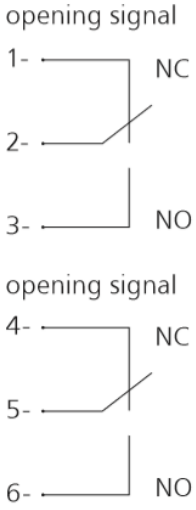
9.3.1 Independent limit switches – RST version

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					

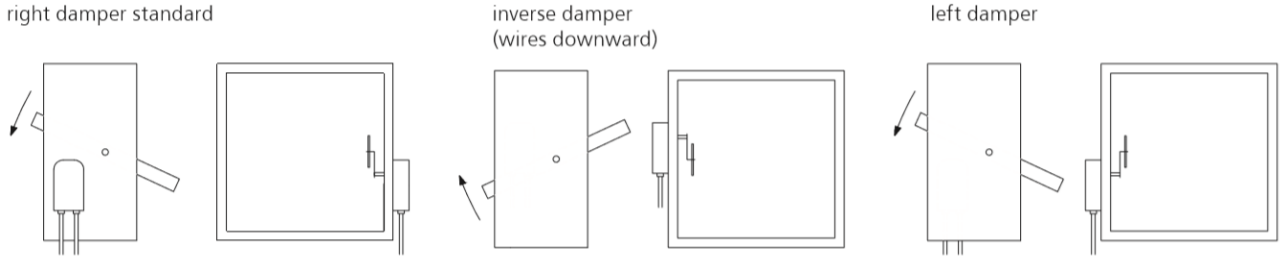
9.4.1 Description of electrical connections:

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)

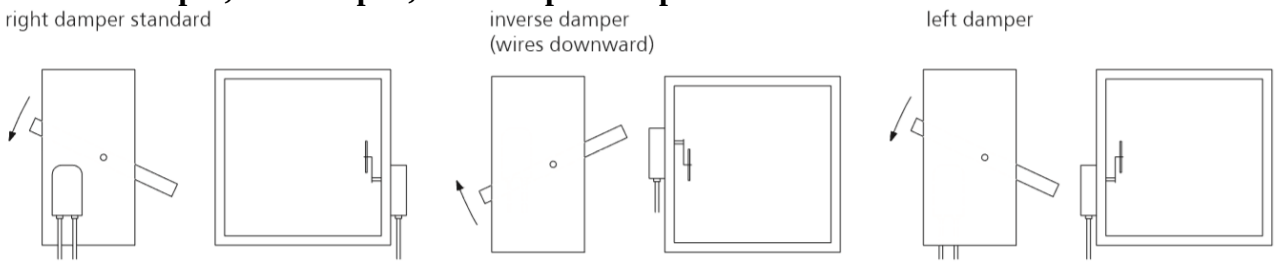
9.5 Manufacture standards

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		

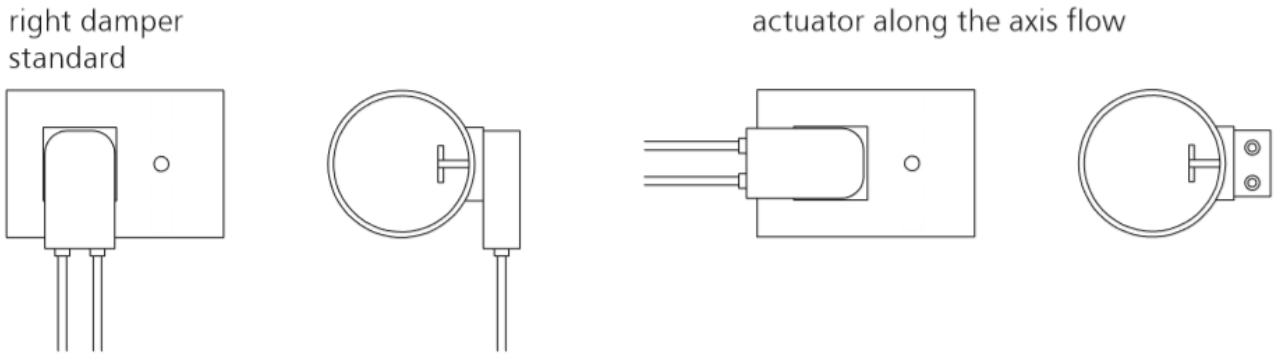
9.5.1 FID S/S c/P damper



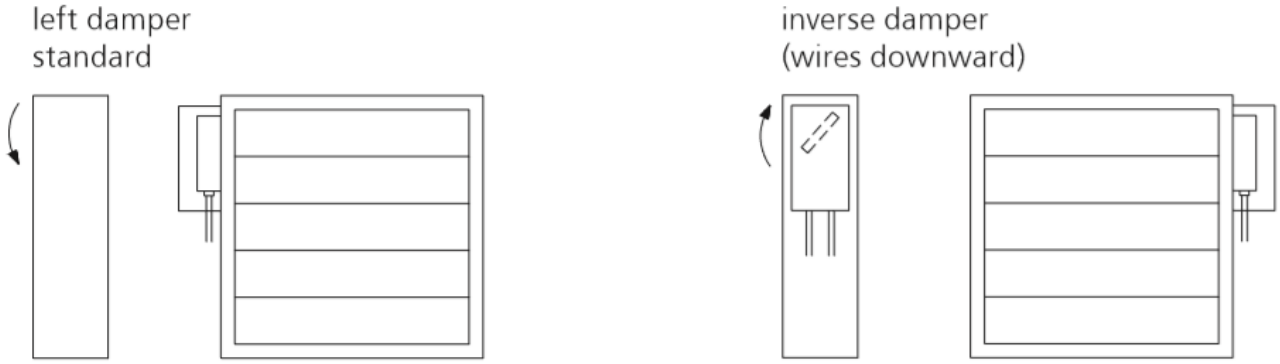
9.5.2 FID S/S p/P, FID S/S p/O, FID S/V p/P damper



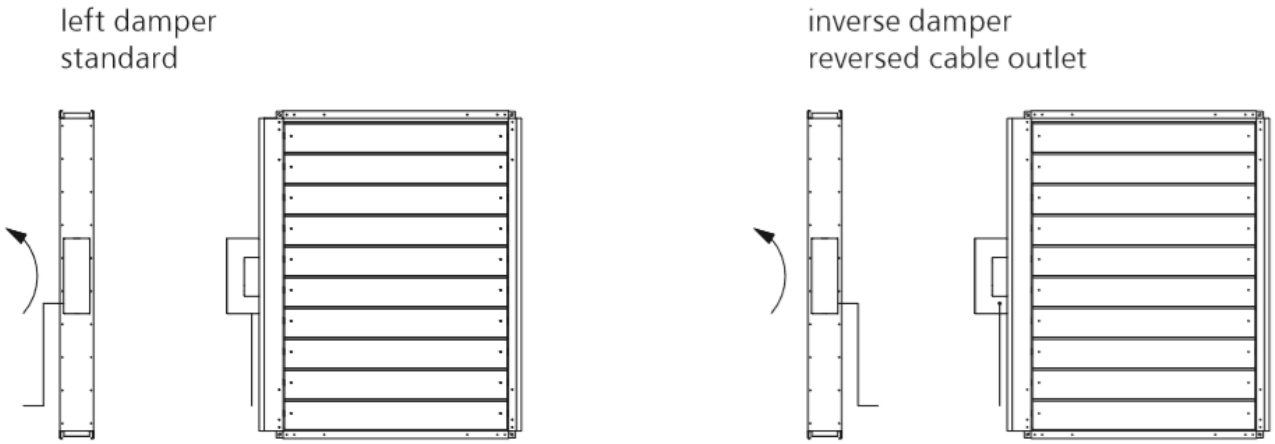
9.5.3 FID PRO/S damper



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



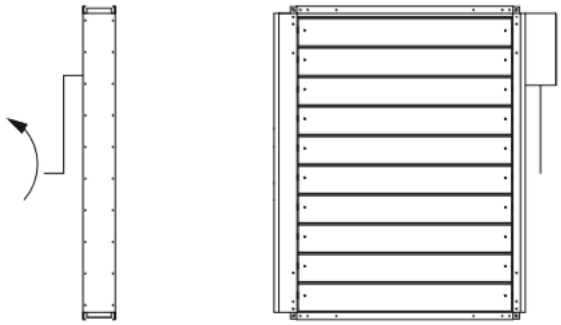
9.5.5 WIP PRO/S, WIP PRO/V, WIP PRO/V-M damper with an actuator



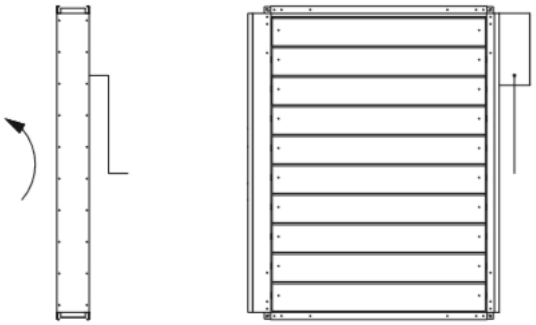
Installation in reversed horizontal and vertical position available

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